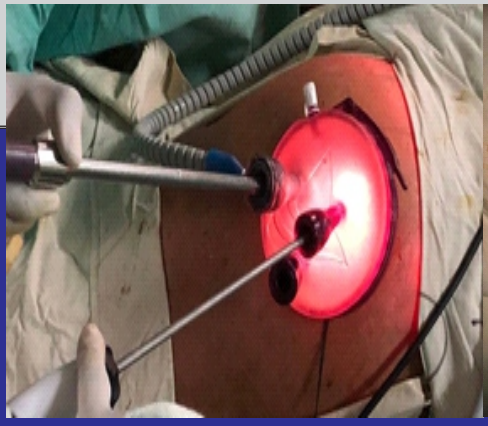
THE SRI LANKA JOURNAL OF SURGERY

December 2020 Volume 38, No.3 ISSN 1391-491X



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The Sri Lanka Journal of Surgery

Journal of
The College of Surgeons
of Sri Lanka.

December 2020 Volume 38, No.3 - Quarterly. ISSN 1391-491X e - journal ISSN 2279 2201

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Printed by
Ananda Press
82/5, Sri Ratnajothi Saravanamuttu Mawatha
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QUARTERLY ISSN 1391-49X

A centre dedicated for men's health and wellbeing for the first time in Sri Lanka - End your suffering with an effective treatment for Erectile Dysfunction

Lanka Hospitals PLC, a premier health care provider in Sri Lanka, announces its latest addition to the Centres of Excellence- the Male Wellness Centre (MWC) – in a bid to offer services to improve health and wellbeing of men. It's also significant that a fully-fledged wellness centre dedicated solely for men has been established for the first time in Sri Lanka.

The MWC caters to a host of services including Personnel fitness scheduling and programming, Sport health and injury management, Dietary & Nutritional advices, Pre-marital counseling and health screening, Management of premature ejaculation, Management of Erectile dysfunction, Cosmetic surgeries (Bariatric / Ocular / Dental). In addition to the General health screening, patients can obtain screening for Liver, Kidney, Respiratory, Cardiac, Diabetic, Endocrine-Hormonal, Cancer and Sexually Transmitted Diseases in addition to Substances and Alcohol abuses. Furthermore, apart from leading physicians MWC offers the service of competent consultant specialists such as Cardiologist, Endocrinologist, Diabetologist, Venerologist, Urologist, Nephrologist, Oncologist, Surgeon, Vascular Surgeon, Psychiatrist as well as Counsellor.

Erectile Dysfunction (Impotence) is a common health issue suffered by men, defined by the difficulty in achieving and maintaining a penile erection during sexual intercourse. In the Sri Lankan context, the issue is hardly brought into light especially by those who suffer and often show reluctance to seeking proper medical attention. Often, incorrect and misleading advice not only aggravates the issue, but also lead them to face unwanted complications. A special Shock Wave Therapy unit was established within the Male Wellness Centre by the Lanka Hospitals to specifically treat impotence.

The Centre conducts in-depth studies and comprehensive medical analysis to precisely identify the causes for impotence such as Vascular, Psychogenic, Neurological, Hormonal, Structural and others. Being a newer and less invasive way to treat this common sexual challenge shock wave therapy has proven to be effective even when oral medication has failed. Also known as penile extracorporeal low-intensity shockwave therapy, this method involves the use of low intensity acoustic pulse waves that lead to release of factors which promote growth of new blood vessels in the penis Therapy compromises of a handheld device being angled towards the shaft of the penis. One of the main advantages of this treatment method is that it has no clinically relevant side effects. Each treatment session can last approximately 20 minutes.

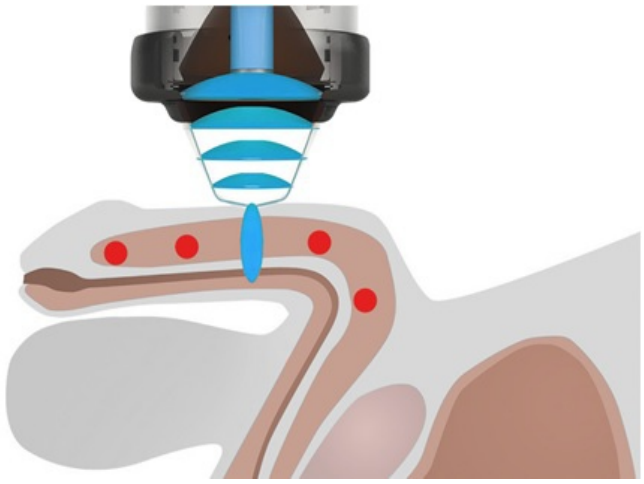

Figure 1. Shock wave therapy

Shock wave treatment is a completely painless way to treat what can be a life altering condition and a regular course of treatment usually comprises of six sessions. The frequency of these session can be tailor made as below and would be decided by the consultant:

1) Every day for 6 days
2) Every second day over an 11 day period
3) Twice a week for 3 weeks

The outcomes include gaining of more frequent erections, more rigid erections, ability to maintain an erection and perform entire act of sexual intercourse and freedom to reduce or omit medication. Therefore the use of a treatment which researchers claim is “really a breakthrough” could be good news for men who have erectile dysfunction.

As a hospital staying abreast with latest medical technology, Lanka Hospitals established Male Wellness Centre in a bid to provide world class health care services to Sri Lankan as well as International patients. Moreover, when catering to health issues and conditions that are highly sensitive and personal, Lanka Hospitals delivers complete confidentiality to its patients with the assistance of its specially trained staff.

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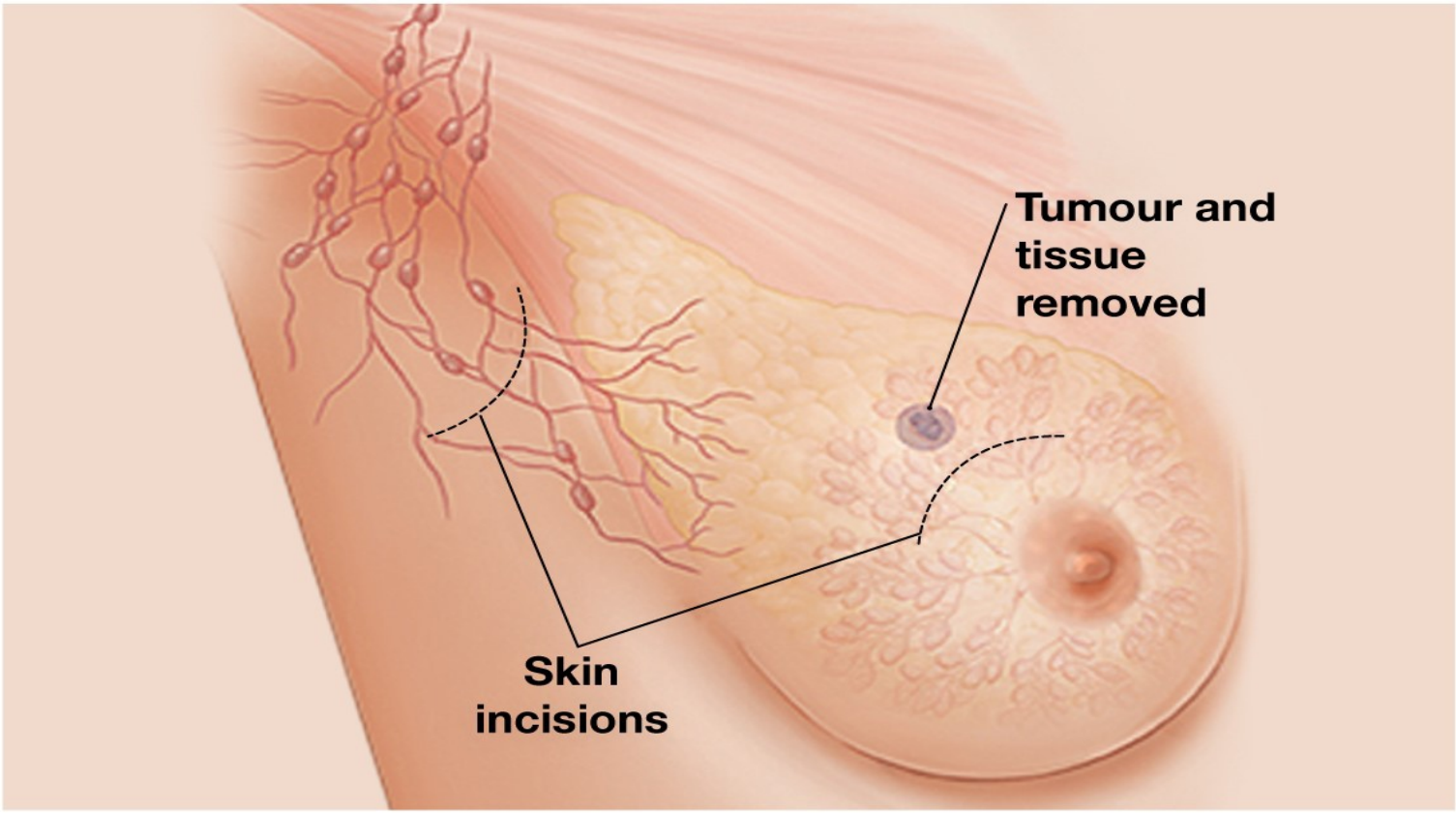

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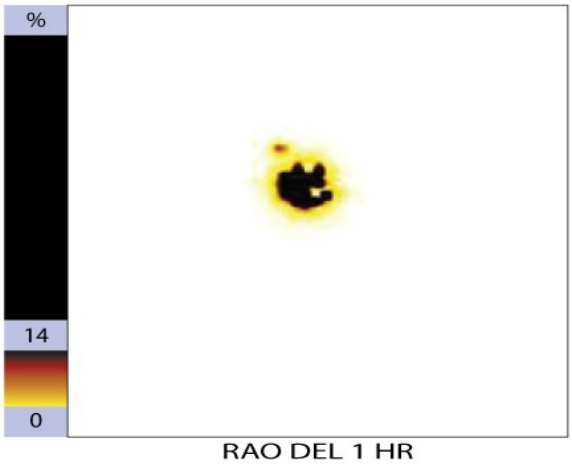

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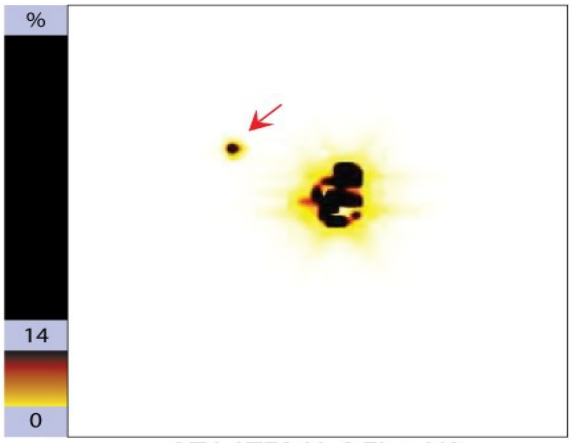

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The Sri Lanka Journal of Surgery

December 2020 Volume 38, No. 3

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The Sri Lanka Journal of Surgery

December 2020 Volume 38, No. 3

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SCIENTIFIC ARTICLE

Cancer in Sri Lanka; trends, care and outcomes

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Department of Surgery, Faculty of Medicine, University of Colombo, Sri Lanka

Keywords: Breast cancer; colorectal cancer; thyroid cancer; cancer registration; quality of care

Abstract

Introduction

The burden of cancer is increasing rapidly in Sri Lanka. However, limited data are available on incidence trends, diagnosis, treatment or outcomes of cancer in Sri Lanka. This oration encompasses a series of studies undertaken,

- To describe the trends in incidence
- To analyse stage at diagnosis, treatment and outcomes
- To describe the long-term quality of life [QOL] after completion of treatment of cancer in Sri Lanka

Methods

Three different strategies were undertaken.

- Incidence and trends - based on data published by the Sri Lanka National Cancer Registry [SLCR] during 2001-2010 for breast, thyroid and colorectal cancers. Joinpoint regression analysis was used to calculate changes over time.
- Diagnosis, treatment and outcomes – patients with breast and colorectal cancer registered between 01/01/2016 and 31/12/2019 for treatment at the Apeksha hospital, Maharagama were included.
- QOL – analysed using validated EORTC QLQ-C30 and QLQ-BR23 questionnaires in a cohort of women who have completed treatment for breast cancer.

Results

Significant increases in incidence were observed for all cancers which ranged between 2.5% to 8.5% per annum.

Apeksha hospital data included 4,185 breast and 1,985 colorectal cancers. While most of the cancer therapies appeared to have followed accepted guidelines, lower use of some of the adjuvant therapies is concerning.

The QOL mean scores for sexual functioning, sexual enjoyment, systemic therapy, breast symptoms, arm symptoms, and hair loss assessed by the QLQ-BR23 were found to be poor with scores of 18.3, 33.3, 30.5, 16.2, 23.4 and 32.7 out of 100, respectively.

Conclusions

Analysis of SLCR data confirmed the rise in the incidence of breast, colorectal and thyroid cancers. These findings may help predict future trends in incidence and implement strategies to control the incidence of these cancers. Disease and treatment patterns identified will be useful to plan future strategies to deal with these cancers more effectively.

Introduction

Cancer is the second most common cause of death in Sri Lanka [1]. Together with its rapidly aging population, cancer will have an increasingly major role in Sri Lanka's health system [2].

Researching into cancer incidence, trends, management, outcomes and disparities are important to identify areas where changes could be implemented to reduce the burden of cancer through measures to reduce incidence, early detection and better treatment strategies. However, a major limitation remains the lack of comprehensive information on incidence, trends, diagnostic and treatment pathways and its association with cancer outcomes which avert the identification of areas which are amenable to such interventions.

The National Cancer Control Program [NCCP] maintains the Sri Lanka Cancer Registry [SLCR]. NCCP data include all cancers treated at national cancer treatment centres and data from other major private and government hospitals, and pathology laboratories. This registry mainly contains socio-demographic and histologic data while staging data for some cancers are also included. In recent years, the SLCR has commenced collecting mortality statistics from death registries of hospitals in some provinces, but still remains largely incomplete [3]. Currently there is no systematic process to gather outcome data of any cancer in Sri Lanka.

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Received: 29-11-2020 Accepted: 25-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8772

A series of studies were undertaken;

- To describe the incidence trends of selected common cancers in Sri Lanka,
- To analyse patterns of cancer stage at diagnosis, treatment and outcomes
- To describe the long-term quality of life [QOL] after completion of treatment for cancer in Sri Lanka

Methods

Three different strategies were undertaken.

- Incidence and trends - Based on data published by the NCCP for the period between 2001 and 2010.
- Diagnosis, treatment and outcomes – Patients with breast and colorectal cancer registered between 01/01/2016 and 31/2/2019 at the Apeksha Hospital, Maharagama
- QOL – was analysed using validated EORTC QLQ-C30 and QLQ-BR23 questionnaires in a cohort of women who have completed treatment for breast cancer [4].

Incidence and trends

Study Population

Details of all patients with breast, colorectal and thyroid cancers diagnosed between 01/01/2001 and 31/12/2010 were extracted from the publications of cancer incidence data of Sri Lanka by the NCCP [5].

Analysis

Age standardized rates of all cancers per 100,000 population were calculated using WHO age standardized populations including for age categories and by gender [6]. Joinpoint regression analysis was used to identify points where a statistically significant change over time in linear slope of the trend occurred [7].

Diagnosis, treatment and cancer outcomes

Study population

A cohort of patients seeking care for breast and colorectal cancer was established at the Apeksha Hospital. Collected data included detailed patient demographics, information on cancer diagnosis, treatments [surgery, chemotherapy and radiation therapy] and outcomes [disease free survival, overall survival and recurrence].

Developing the Electronic database, Data gathering and validation

An online data repository was developed based on District Health Information System [DHIS2] software platform for data storage and analysis [http://cancersrilanka.space]. Data were gathered from January 1st, 2016 onwards, on new referrals to the Apeksha Hospital, Maharagama. All patients underwent a follow-up every six months.

Analysis

Categorical variables were described with numbers and percentages and continuous variables with mean/median with standard deviations. Survival analysis was done with Kaplan-Meier survival curves with disease recurrence as the censoring point. All analyses were performed using SPSS version 24.

Quality of life after treatment of cancer

Study population

All women with non-metastatic breast cancer who underwent surgery for breast cancer at the Professorial Surgical Unit, Colombo during 2015-2018 and completed a minimum of one year follow up were invited to participate in the study. Fifty-four women who responded were analysed using the validated EORTC QLQ-C30 and QLQ-BR23 questionnaires [8].

Analysis

The data were coded and analysed according to the scoring protocol described in the EORTC QLQ-30 manual using SPSS version 24 [8, 9]. Non-parametric tests including Chi square test and Mann-Whitney U test were used for univariate statistical analyses.

Results

Incidence and trends

Breast cancer

This study included 19,755 patients with newly diagnosed primary invasive breast cancer over the study period [10]. The overall mean age of the patients was 53.1 years [median 52 years].

The WHO age standardized incidence of breast cancer has increased from 9.2 in 2001 [95% CI 8.17-9.62] to 12.9 per 100,000 in 2010 [95% CI 12.4-13.5]; a 1.4-fold increase, [$p<0.05$ for trend] [Figure 1]. This is an EAPC in incidence of 4.4 [95% CI 3.3-5.4] over this period.

Results of the Joinpoint analysis of incidence time trends by age, gender and histology type are shown in Table 1.

Only a modest increase in the incidence of breast cancer was observed among women younger than 50 years [from 32.0 to 39.6 per 100,000; EAPC=2.3, 95% CI 1.1-3.5, $p<0.05$], while the increase was substantially greater among women older than 50 years [from 50.4 to 76.9 per 100,000; EAPC=5.5, 95% CI 4.1-7.0, $p<0.05$] [Figure 2].

Colorectal cancer

A total of 7,694 colorectal cancers were diagnosed over the study period . There were 3,849 [50.5%] males and 3,767 [49.4%] females diagnosed of colorectal carcinoma with a male to female ratio of 1.02:1. The overall mean age of study patients was 58.7 years [median 59 years], the mean age in males was 59.1 [median 60 years] and in females was 58.0 [median 58 years]. The commonest site of colorectal cancer was seen in the rectum [51.1%] followed by sigmoid colon [12.1%] and recto sigmoid junction [4.8%].

The WHO age standardized incidence of colorectal cancer in Sri Lanka has increased significantly from 2.9 per 100,000 in 2001 [95% CI: 2.64– 3.16] to 6.08 per 100,000 in 2010 [95% CI: 5.71– 6.44] ; a 2.1-fold increase [p <0.05 for trend]. This increase translates into an estimated annual percentage change [EAPC] of 8.9 [95% CI 7.5–10.4] [Table 2]. The proportional increase in incidence was slightly greater for females [from 2.8 to 5.6; a 2.0-fold increase, EAPC: 9.4 [95% CI: 7.7– 11.2], [p <0.05 for trend] compared with males [from 3.02 to 6.62; a 2.2-fold increase, EAPC: 8.5 [95% CI: 6.9–10.2], p <0.05 for trend].

Thyroid cancer

This study included a total of 7,681 thyroid malignancies diagnosed over the 10-year study period [12]. The commonest histological type was papillary [n=5,302, 69%] followed by follicular [n=1,411, 18.4%], medullary [n=138, 1.8%] and anaplastic [n=285, 3.71%]. The majority of the cancers were in females [n=6,166, 80.3%] with a male to female ratio of 1: 4.07. Mean age of study patients was 43.8 years [median 44 years].

Results of thyroid cancer incidence in Sri Lanka with Joinpoint analysis of trends by gender, age group and histology subtype are shown in Table 3.

The WHO age standardized incidence of thyroid cancer in Sri Lanka was observed to have increased significantly from 2.44 per 100,000 in 2001 [95% CI: 2.21-2.67] to 5.16 per 100,000 in 2010 [95% CI: 4.85-5.47]; a 2.1-fold increase [p<0.05 for trend] [Figure 3]. This is an EAPC of 8.2 [95% CI 5.9-10.5]. The proportional increase in incidence was greater for females [from 3.61 to 8.06; a 2.23-fold increase, p<0.05 for trend] compared with males [from 1.24 to 2.15; a 1.73-fold increase, p<0.05 for trend] [Figure 3].A greater part of the increase in thyroid cancer incidence is attributable to an increase in incidence of papillary thyroid cancer, which has increased from 1.64 to 3.61 per 100,000; a 2.2-fold increase [p<0.05 for trend].

Diagnosis, treatment and outcomes

This study included all breast [n=4,185] and colorectal [n=1,195] cancer patients who registered for adjuvant treatment at the National Cancer Institute, Maharagama during the period between 01st January 2016 and 31st December 2019.

Breast cancer

Distribution of patient and tumour characteristics of the study population is shown in Table 4. The mean age of the women was 55.7 years [standard deviation [SD] 11.6, median 56 years, range 20-93 years].

Just over two thirds [67.8%] of the cancers were of early stage [stage I & II] at diagnosis [Table 4]. Of the patients with data available on all biological and receptor characteristics [n=3291, 78.6%] tumour subtype analysis was done. Of those 58% were luminal A type cancers while the rate of triple negative cancers was 19.6%.

Treatment characteristics of the women included in the analysis is shown in Table 5.

Of the total population of women, 14.2% had received neoadjuvant chemotherapy [NACT]. Adjuvant therapy characteristics were analysed in women who have completed adjuvant chemotherapy and radiotherapy [n=3,573]. Approximately two thirds [67.7%] have received adjuvant chemotherapy. Radiotherapy to the breast, chest wall or nodal basins was received by nearly 60% [n=2,131]. Receipt of radiotherapy by different types of surgery to the breast was analysed for women who were diagnosed during 2016-2018 as some patients diagnosed in 2019 are still undergoing chemotherapy and were yet to receive radiotherapy. Of the 3,197 eligible patients, 2,281 [71.3%] and 733 [22.9%] had undergone mastectomy and wide local excision, respectively. Of the mastectomy patients, 1,425 [62.5%] had received radiotherapy while 540 [73.7%] from the wide local excision group had received radiotherapy [data not shown].

We analyzed the concordance between guideline recommendations for use of adjuvant therapy for non-metastatic breast cancer and actual rates of delivery [Table 6] [13, 14]. Rate of chemotherapy delivery [neoadjuvant or adjuvant] was 89.3% for women with node positive breast cancer. Approximately 75% eligible women [i.e., following breast conserving therapy or with 3+ positive lymph nodes] have received adjuvant radiotherapy. Endocrine therapy has been initiated in 85% of women with hormone receptor positive breast cancer while rate of trastuzumab use was 49% among women with HER2 positive breast cancer.

Recurrence free survival rates were analyzed for non-metastatic breast cancers which were 96%, 90% and 74% for stage I, II and III cancers, respectively at 3-years.

Colorectal cancer

Of the 1,195 patients included the mean age was 53.3 years [range 18 to 90 years, median 62.3, SD 11.8]. There was a slightly higher number of males [n=605, 51%] than females [n=590, 49%]. Colorectal cancer stage at diagnosis is shown in Table 7.

Overall, the use of adjuvant chemotherapy has been used in 87.5% patients out of which 28% have received it prior to surgery [neoadjuvant]. Almost all patients [99%] for whom chemotherapy was absolutely indicated according to guidelines have received chemotherapy.

Quality of life

Fifty-four female patients were included in the study with a mean age of 59.0 years [median 60 years, range 36-81] with 61.1% [n=33] being less than 60 years. Majority of the women were postmenopausal [85.2%%, n=46]. A majority [61.1%, n=33] underwent mastectomy as the primary surgery and the rest [45%, n=19] underwent BCS. Axillary node dissection was performed in 59.2% [n=32] and the rest only a sentinel lymph node biopsy.

The mean EORTC QLQ-C30 and QLQ-BR23 scores are shown in Table 9.

Discussion

National Cancer Registry Data

The studies based on the Sri Lanka National Cancer Registry [SLCR] have shown a steady increase in the incidence of nearly all of the included common cancers over the 10-year study period. Overall, the rates of increase in incidence ranged between 2.5% to 8.5% per year.

There are many possible reasons for the observed increases in cancer incidence. One is the gradual increase in screen detected cancer [15]. Although Sri Lanka does not have national cancer screening programmes except for cervical cancer, many government and private institutions have started providing opportunistic cancer screening especially over the last decade [16]. Another likely contributor is better reporting and greater coverage of cancer data by the cancer registry [5].

Despite all these possible reasons for an 'artificial' increase in the incidence, it is likely that there has been a genuine increase in the incidence similar to many other developing countries [1]. Several factors have been proposed to be possible contributors towards this increase. These include westernization of lifestyle including increased consumption of processed and fatty food, sedentary lifestyle leading to increased obesity and increasing rates of alcohol and smoking [17].

In general, the highest incidence of cancers was seen in 60-70 age group. Further, the rate of rise in incidence was also observed to be higher in this age group. Sri Lanka has one of the fastest ageing populations in the world [18]. Older patients are more likely to have more comorbidities and a poorer survival from cancer [19]. Healthcare policy makers in the country need to consider all these factors in planning strategies, if they are to effectively deal with the increasing burden of cancer.

We propose several changes to improve the utility of data collected by the SLCR. First the coverage of cancer data collection needs to be improved. Introducing legislation, for example to make informing a cancer diagnosis compulsory to all pathologists or pathology laboratories are simple yet very effective ways to increase the completion. Further this could be used to improve the coverage additional data including the cancer stage. Thirdly, combining cancer data with cause of death data would provide accurate figures of cancer specific survival. Although this is more difficult as it requires a change in the system of death registration, such a change would be useful to identify the mortality not only of cancer, but of many other important diseases as well.

Cancer data from the National Cancer Institute, Maharagama

Although still in very early stages, this data collection project has shown useful results and has also shown the feasibility of collecting cancer data efficiently and cost effectively.

Breast cancer

To our knowledge, this is the largest published cohort of breast cancer patients in Sri Lanka and the most comprehensive especially in relation to treatment characteristics.

The proportion of early stage breast cancer in our study is comparable to the two previous studies Balawardana et al and Mudduwa et al who have observed 68% and 67% early breast cancers, respectively. This probably is a reflection of failure of the health system of the country to implement effective strategies aimed at early diagnosis of breast cancer.

Present study has shown a substantial increase in the rate of breast conservation surgery [22.7%] as compared with the study by Balawardena et al where the proportion of breast conservative surgery was only 3% despite including a similar proportions of stage I and II cancers compared with the

present study [20]. This probably reflects better access to mammography, surgeon expertise as well as greater awareness among women with breast cancer.

We identified considerable lapses in the concordance between guideline recommendations and the delivery of cancer care [13, 14]. For instance, only 75% women with absolute indications for radiotherapy have received adjuvant radiotherapy. Difficulties and limitations in access, patient co-morbidities, socioeconomic factors and poor health literacy are some of the known factors that may have limited the use of optimum adjuvant therapy.

Government of Sri Lanka has initiated several strategies with the aim of improving access to treatments and the quality of care for patients with cancer in the country. For instance, a program has been implemented to procure linear accelerators and to station radiation oncology centres in each of the nine provinces of the country to improve the access to radiotherapy [20]. Further action is needed to improve the availability resources including chemotherapy, endocrine and targeted therapy to ensure easier access with minimal delays. In addition, multidisciplinary team [MDT] to discuss and provision of care may improve quality of care and ensure all patients receive standard guideline concordant care. Advances in information technology will allow smaller base hospitals to obtain specialist cancer advise by joining MDT meetings held at tertiary hospitals online.

There are several limitations in our study. Incomplete and missing data were identified mainly in relation to adjuvant therapy and treatment modalities. Nevertheless, this is thus far the largest and most comprehensive cohort of patients with breast cancer reported from Sri Lanka.

Colorectal cancer

In this study, we have described disease characteristics and treatment patterns in a cohort of patients with newly diagnosed colorectal cancer in Sri Lanka.

Advanced stage at diagnosis was one of the most prominent features with nearly 57% had locally advanced or metastatic disease at presentation. Use of adjuvant therapy appeared to have been well in concordance with the standard guidelines. For instance, over 99% of stage III colorectal cancers have received either neoadjuvant or adjuvant chemotherapy. However, the overall chemotherapy rate of 87.5% may point towards overuse of chemotherapy especially among patients with low risk stage I and II disease.

There are several limitations in this study too similar to breast cancer study. Incomplete and missing data were identified mainly in relation to adjuvant therapy and treatment modalities is a major limitation.

Future

Future plans for the data repository include coverage of cancers beyond breast and colorectal and expansion to include data from other national cancer treatment centres. Many of the Sri Lankan public sector hospitals are in the process of converting from paper based to electronic data recording systems. Hence, linkage of these databases in the future is realistic which would potentially allow access to many patient and cancer related information as well as follow-up data from these hospital databases.

Many potential challenges are anticipated which include trained manpower for data collection, and long-term project funding. While the challenges remain real, with wider participation of stakeholders including the relevant government organizations we believe it will be possible to overcome these challenges successfully.

Quality of life

This prospective cohort study evaluated the post-treatment long-term QOL in Sri Lankan female patients diagnosed with breast cancer has shown substantially poor QOL in sexual functioning and enjoyment, breast and arm symptoms and hair loss domains while the impact on global health status including physical, social and emotional functions were minimal.

According to our findings, the low sores in breast related symptoms measured by BR-23 seems to be a major contributing factor for the lower QOL in breast cancer patients. Taking this into consideration, it is necessary to take measures to address the burden of breast related symptoms of these patients following surgery as these are easily preventable with adequate care. The HRQL of these patients may be improved by simple measures such as addressing sexual issues by referring them for counselling and prescribing topical applications, offering physiotherapy to alleviate arm symptoms, provision of wigs to combat hair loss following treatment. Provision of regular contact with the patients through trained cancer care nurses to recognize these issues and provide advice may help improve QOL in these domains which ultimately will help improve overall QOL.

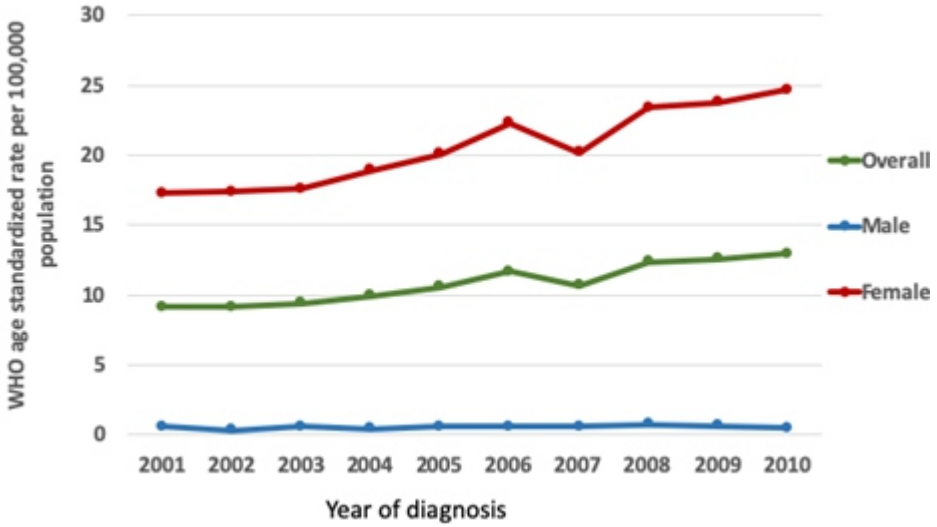

Figure 1. Trends in the incidence of breast cancer in Sri Lanka 2001-2010

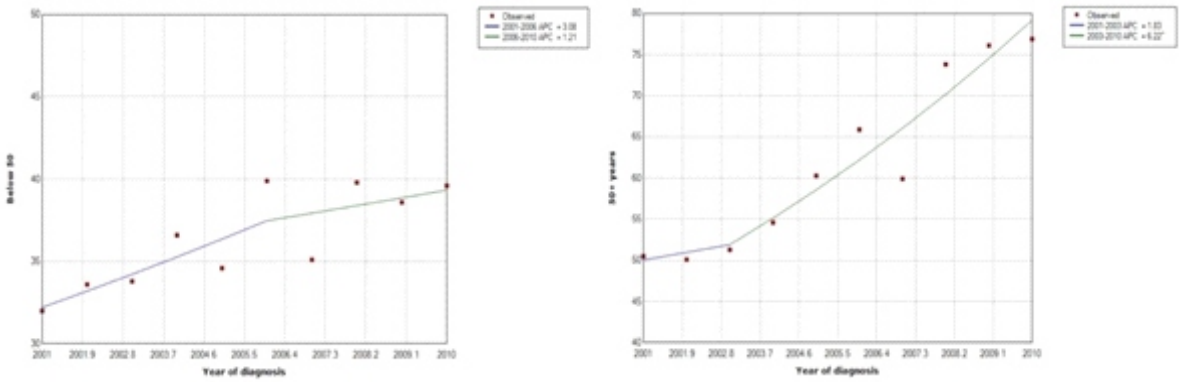

Figure 2. Joinpoint analysis of incidence of breast cancer by age category, <50 years versus 50+ years

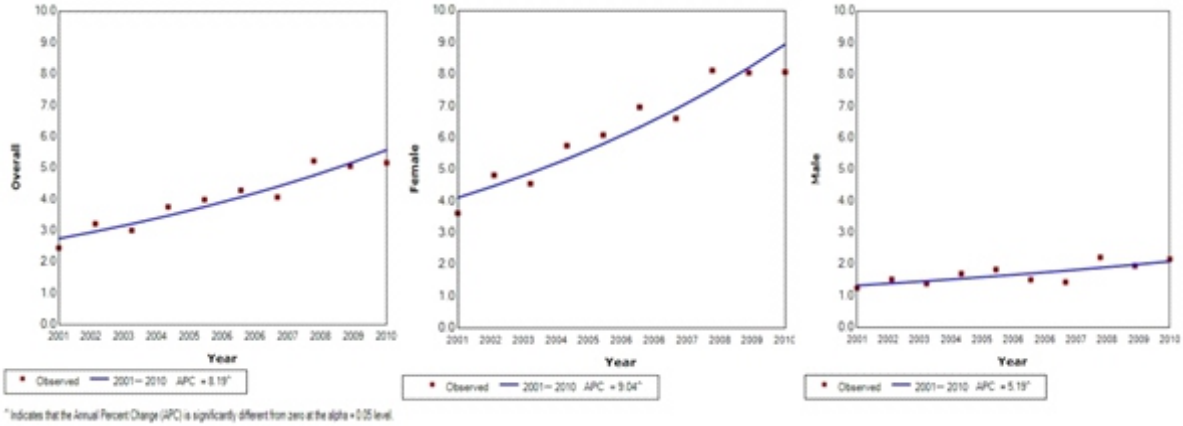

Figure 3. Joinpoint analysis of incidence of thyroid cancer by gender in Sri Lanka 2001-2010

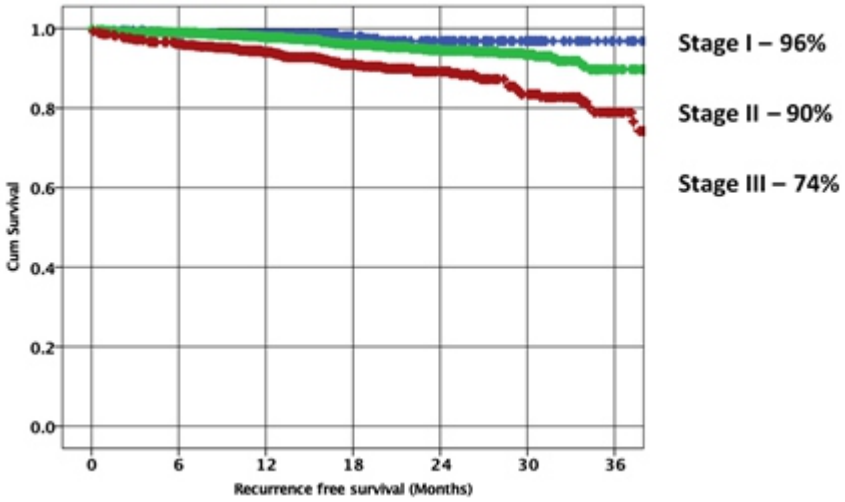

Figure 4. Recurrence free survival of non-metastatic breast cancer received treatment at Apeksha Hospital, 2016-2019

Table 1. Breast cancer incidence in Sri Lanka by gender and age group with Joinpoint analysis of Estimated Annual Percentage Change [EAPC] from 2001-2010

	2001		2010		EAPC 2001-2010 [95% CI]
	n	Rate [95% CI]	n	Rate [95% CI]	
Age group [years]					
Female					
<20	2	0.06	2	0.06	0
20-39	197	6.42	263	7.78	2.12*
40-59	952	44.6	1374	58.4	3.09*
60+	396	48.1	755	74.8	5.55*
Age standardized	1547	17.3 [16.5-18.2]	2401	24.7 [23.7-25.7]	4.4 [3.3-5.5] *
Overall age standardised rate	1591	9.17 [8.17-9.62]	2440	13.0 [12.5-13.5]	4.4 [3.3-5.4]
Histology type Female					
Ductal CA	1221	13.6 [12.9-14.4]	2085	21.4 [20.5-22.4]	5.2 [2.8-7.8]*
Lobular CA	74	0.8 [0.6-1.0]	55	0.6 [0.4-0.7]	-3.3 [-10.4-19.2]
Others	94	1.0 [0.8-1.3]	119	1.2 [1.0-1.5]	2.4 [-2.4-7.5]

***The EAPC is significant [p <0.05]**

Table 2. Colorectal cancer incidence in Sri Lanka by gender and age group with joinpoint analysis 2001-2010

	n	Rate [95% CI]	n	Rate [95% CI]	[95% CI]
Age group [years]					
Male					
15-29	10	0.35	12	0.43	-
30-44	31	1.78	57	2.54	-
45-59	92	8.76	179	11.48	-
60-74	87	16.29	246	35.34	-
75+	21	15.11	67	32.68	-
Age standardized	241	3.02 [2.64-3.4]	562	6.62 [6.07-7.16]	8.5 [6.9– 10.2]*
Age group [years] Female					
15-29	4	0.14	6	0.22	-
30-44	46	2.73	53	2.30	-
45-59	95	9.79	177	10.83	-
60-74	81	17.53	203	26.36	-
75+	20	15.50	75	31.38	-
Age standardized	246	2.8 [2.5-3.2]	514	5.6 [5.1-6.1]	9.4 [7.7– 11.2]*
Overall age standardized rate	487	2.9 [2.64-3.16]	1076	6.08 [5.71-6.44]	8.9 [7.5–10.4]*

***The EAPC is significant [p <0.05]**

Table 3. Thyroid cancer incidence in Sri Lanka by gender, age group and histology subtype with Joinpoint analysis 2001-2010

Age group [years]					
Male					
20-39	39	1.29	61	1.84	4.2 [0.0-8.6]
40-59	40	1.93	83	3.66	5.9 [0.2-11.9]
60+	26	3.16	52	5.77	5.3 [0.6-10.2]
Age standardized	106	1.24 [1.00-1.47]	203	2.15 [1.85-2.44]	5.3 [1.9-8.8]
Age group [years]					
Female					
20-39	143	4.66	363	10.7	9.8 [7.2-12.6]
40-59	127	5.95	348	14.8	9.2 [6.3-12.2]
60+	54	5.90	99	9.81	4.1 [0.8-8.5]
Age standardized	337	3.61 [3.23-4.00]	831	8.06 [7.52-8.65]	9.0 [6.6-11.5]
Overall age standardized rate	443	2.44 [2.21-2.67]	1034	5.16 [4.85-5.47]	8.2 [5.9-10.5]
Histology type [Overall]					
Papillary	304	1.64 [1.46-1.83]	735	3.61 [3.35-3.87]	8.8 [6.6-11.1]
Follicular	100	0.56 [0.45-0.67]	188	0.95 [0.82-1.09]	6.5 [5.2-7.9]
Other	39	0.24 [0.16-0.31]	111	0.61 [0.49-0.71]	7.6 [1.0-14.6]

***EAPC – Estimated Annual Percentage Change**

Table 4. Demographic and tumour characteristics of women with breast cancer diagnosed during 2016-2019 at the National Cancer Institute, Sri Lanka

Characteristic	Number of patients [%]
Age category	
<40	344 [8.2]
40-49	1030 [24.6]
50-59	1182 [28.2]
60-69	1096 [26.2]
70+	533 [12.7]
Year of diagnosis	
2016	968 [23.1]
2017	1103 [26.4]
2018	1133 [27.1]
2019	981 [23.4]
Stage category	
I	575 [13.7]
II	2266 [54.1]
III	1249 [29.8]
IV	95 [2.3]
Histology type	
Ductal CA	3479 [88.4]
Lobular CA	189 [4.8]
Mucinous CA	85 [2.2]
Papillary CA	51 [1.3]
Metaplastic CA	25 [0.6]
Other	108 [2.7]
Missing	[248]
Grade	
I	580 [15.5]
II	1880 [50.3]
III	1278 [34.2]
Missing	[447]
Subtype	
Luminal A	1910 [58.0]
Luminal B	428 [13.0]
HER-2 enriched	308 [9.4]
Triple negative	645 [19.6]
Missing	[894]
Total	**4185 [100]**

Table 5. Treatment characteristics of women with breast cancer diagnosed during 2016-2019 at the National Cancer Institute, Sri Lanka

Type of treatment	n [%]
Surgery – Breast	
Mastectomy only	2825 [67.6]
Mastectomy + reconstruction	36 [0.9]
Wide local excision	948 [22.7]
No surgery	365 [8.7]
Missing	[11]
Surgery – Axilla	
Sentinel LN biopsy	833 [20.0]
Axillary clearance	2914 [69.8]
No surgery	426 [10.2]
Missing	[12]
Neoadjuvant chemotherapy	
Yes	509 [12.2]
No	3676 [87.8]
Adjuvant chemotherapy	
Yes	2422 [67.7]
No	1151 [32.2]
Not-started / not-completed	[612]
Adjuvant radiotherapy	
Yes	2131 [59.6]
No	1442 [40.3]
Not-started / not-completed	[612]
Adjuvant endocrine therapy	
Yes	2136 [59.8]
No	1437 [40.2]
Not started	[612]

Table 6. Concordance between adjuvant treatments delivered to women with non-metastatic breast cancer diagnosed during 2016-2019 at the National Cancer Institute, Sri Lanka versus guideline* recommendations

*National Institute of Health and Care Excellence [NICE] and National Comprehensive Cancer Network [NCCN]

Indicator	Groups	n [%]
Use of chemotherapy [CT]	CT indicated	2119 [100]
• *CT should be delivered to patients with node-positive disease*	CT delivered	1892 [89.3]
Use of adjuvant radiotherapy [RT]	RT indicated	1280 [100]
• *RT should be delivered to patients after breast conserving surgery and those with 3+ positive LNs*	RT delivered	961 [75.1]
Use of adjuvant endocrine therapy [ET]	ET indicated	2116 [100]
• *Adjuvant ET should be given to all patients with ER+/-PR positive breast cancer*	ET started	1803 [85.2]
Use of adjuvant trastuzumab	Trastuzumab indicated	720 [100]
• *Adjuvant trastuzumab should be given to all patients with HER2 positive breast cancer*	Trastuzumab delivered	353 [49.0]

Table 7. Stage distribution of breast cancer patients treated at National Cancer Institute, Maharagama 2016-2019

Indicator	Groups	n [%]
Use of chemotherapy [CT]	CT indicated	588 [100]
• *CT should be delivered to patients with stage III disease*	CT delivered	583 [99.1]

Table 8. Concordance between adjuvant treatments delivered to patients with colo-rectal cancer diagnosed during 2016-2019 at the National Cancer Institute, Sri Lanka versus guideline* recommendations

Stage		n [%]
Stage category	0	2 [0.2]
	I	165 [13.8]
	II	338 [28.3]
	III	588 [49.2]
	IV	100 [8.4]
	Unknown	[2]
Year	2016	245 [20.5]
	2017	228 [19.1]
	2018	361 [30.2]
	2019	361 [30.2]
Histology	Adenocarcinoma	995 [94.5]
	Mucinous carcinoma	46 [4.3]
	Signet ring cell carcinoma	7 [0.6]
	Other	5 [0.5]
	Unknown	[142]
Differentiation	Well	55 [5.4]
	Moderate	916 [91.3]
	Poor	32 [3.1]
	Unknown	[192]
Total		**1195 [100]**

*National Institute of Health and Care Excellence [NICE] and National Comprehensive Cancer Network [NCCN]

Table 9. EORTC QLQ-C30 and QLQ-BR23 mean scores of women after a minimum of 1-year after completion of treatment for breast cancer in Sri Lanka [N=54]

	Scales/Items	Mean	Range	SD
Global health status/ HRQL		68.8	8.3-100	27.1
QLQ-C30	Physical function	71.4	33.3-100	19.78
	Role function	81.5	0-100	20.13
	Emotional function	77.0	0-100	26.59
	Cognitive function	80.2	33.3-100	18.33
	Social Function	86.4	0-100	24.24
QLQ-BR23	Body image	76.4	16.7-100	25.99
	Sexual functioning	18.3	0-100	23.509
	Sexual enjoyment	33.3	0-100	32.33
	Future perspective	73.6	0-100	34.81
	Systemic therapy side effects	30.5	0-90.5	22.765
	Breast symptoms	16.2	0-66.7	14.058
	Arm symptoms	23.4	0-77.7	20.32
	Hair loss	32.7	0-100	39.87

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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SCIENTIFIC ARTICLE

Percutaneous transluminal lower limb angioplasty [PTA] for chronic limb threatening ischaemia [CLTI] in a low resource setting 4 year experience

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Keywords: Balloon angioplasty; chronic limb threatening ischaemia (CLTI); amputation free survival; peripheral vascular disease (PVD)

Introduction

With the emergence of diabetes mellitus, there is a significant burden of peripheral occlusive arterial disease [POAD] in Sri Lanka [1]. The age-sex standardized prevalence of diabetes mellitus for Sri Lankans aged 20 years and above was 10.3% [2]. The worldwide prevalence of POAD was evaluated from several studies and range from 3% to 10%, increasing to 15% to 20% in persons over 70 years [3]. A study done in elderly urban Chinese population reveals a 20% prevalence of POAD [4]. In another study done in South Indian population, the overall prevalence of POAD was 3.2% with higher prevalence [7.8%] in known diabetic patients compared to newly diagnosed diabetic patients [3.5%] [4]. Age and sex adjusted prevalence of POAD in Sri Lankan population was found to be 3.6% in a study done in 2013 [6].

A meta-analysis of 13 studies and 1527 patients with a median follow up of one year revealed that untreated chronic limb threatening ischaemia [CLTI] has a major amputation free survival rate of 56%. [7]. The definitive treatment for chronic limb threatening ischaemia is either lower limb bypass procedures or angioplasty with or without stenting [3, 8]. Revascularization is indicated for patients with either severe debilitating intermittent claudication, rest pain or tissue loss due to ischaemic ulcer or gangrene [8]. According to Inter-society consensus for the management of POAD, lower limb bypass surgery is preferred over angioplasty for TASC type C and type D lesions [3]. However, lower limb bypass surgery is unsuitable for patients with significant co-morbidities and poor cardiac function. It is also associated with significant postoperative complications when compared to angioplasty. Bypass surgery is also not suitable in some patients with poor runoff arteries i.e poor target arteries to bypass onto. If the stenotic segments are focal it may be easily treated with angioplasty as well. 30-day mortality following lower limb bypass surgery is reported to be 2% to 8% and five-year graft failure rates vary from 50% to 90% [9].

In recent years, with continuing advances in imaging techniques, angioplasty equipment, endovascular expertise and unsuitability of patients for bypass procedures, the use of PTA as a primary treatment for ischaemic foot ulcers has been increasing [10, 11, 12].

In order to improve the primary patency rate and durability of the intervention, placement of a metallic stent following PTA became another fascinating step forward in the evolution of endovascular interventions. During 1978-1985, Julio Palmaz developed the first ever balloon expandable stent and it was approved by the FDA for peripheral arterial use in 1991 [13] Self-expanding stents, with the ability of regaining their original configuration after compression were invented to be placed in arteries which are repeatedly subject to external forces, such as superficial femoral arteries.[14] Drug Eluting Stent was introduced to prevent the stent failure from restenosis. DESs slowly release the drugs which inhibit cell proliferation, fibrosis and thereby prevent thrombi formation and restenosis.

Drug coated balloons were also introduced recently with hope of improving the primary patency rates by suppressing the neo-intimal hyperplasia and restenosis of diseased arteries. This method is a combination of balloon angioplasty and drug delivery to the local site. The balloon consists of drugs [commonly paclitaxel] which suppresses cell proliferation. The drug should also have the pharmacokinetic properties to be rapidly absorbed by the intima of arteries and to exert a sustained action to prevent restenosis [11,14,15].

Another alternative to balloon angioplasty is atherectomy, a procedure done to remove the atherosclerotic plaques from peripheral arteries. The atherectomy device consist of cutting blades which shave off the atherosclerotic plaques, which is aspirated through tip of catheter connecting to negative pressure system. There are four different types of atherectomy available to treat the peripheral arteries. They are directional atherectomy, rotational atherectomy, laser atheroablation and orbital atherectomy [14,16].

The amputations free survival for this patient population in a

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Received: 13-11-2020 Accepted: 28-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8789

low resource setting is not known. In this setting drug eluting balloons, plain stents, drug eluting stents and atherectomy devices are limited due to cost. All the cases were done using only non-drug coated balloons and it's the first series of angioplasties done in Sri Lanka by vascular surgeons. The purpose of this study is to evaluate the effectiveness of PTA alone in limb salvage in patients with chronic limb threatening ischaemia.

Methods

Patients who had ischaemic tissue loss or gangrene [Rutherford category 5 and 6] that were deemed non-healing with high risk of major amputation [below knee or above knee amputation] and had underwent PTA between January 2013 to April 2018 who consented were recruited into this prospective study. Patients who are in heart failure or left ventricular ejection fraction of less than 20% or known hypersensitivity to contrast were excluded. Ischaemia was diagnosed clinically and all of them had an arterial duplex scan to confirm it. All patients had an arterial duplex scan of the lower limb done before undergoing PTA. Some patients also had CT Angiography. The patients were on their routine medications for diabetes, hypertension, dyslipidemia and ischemic heart diseases. The patients who were on metformin had it withheld for 48 hours prior to the procedure and an alternative medication was used until it is restarted 48 hours after the procedure. The patients were admitted on the day of procedure. All of them had underwent PTA alone. No one was offered stenting. Almost all of them got discharged the following day with a period of hospitalization for less than 24 hours. A loading dose of Clopidogrel 300mg is given to patients who had a successful angioplasty if they were not on it already. It is then continued with 75mg of Clopidogrel daily for at least six months. Patients were hydrated with normal saline prior to the procedure and after the procedure. If renal impairment was present N-acetylcysteine was given with the pre-hydration for renal protection. Hydration was continued post procedure for at least six hours. In patients with a low cardiac ejection fraction the volume of hydration was reduced as necessary.

The procedure starts with cannulating the access site [common femoral artery] with a large bore needle and using an introducer wire to place an access sheath. Unfractionated Heparin is given through the sheath. Then an angiogram is done to identify the occlusive or stenotic lesions. Then a 0.014 or 0.035 wire is used to cross the occlusive or stenotic lesions and angioplasty is done with a percutaneous angioplasty balloon. Post procedure angiogram is performed to check the radiological success.

Following the angioplasty, the patients got their ulcers treated in ulcer clinics of their choice. The ulcer care was not standardized. This was due to cost constrains of travelling for regular dressings.

Data was collected prospectively using a standard questionnaire and entered a computerized database. Patients were followed up using telephone interviews regarding limb salvage and survival. Follow up using telephone was necessary as patients go to local clinical settings for ulcer care once the angioplasty is done. Whether the ulcer has healed or not were asked on the same interview. The statistical analysis of determining long term results were done using Kaplan-Meier method and it was used to estimate the Survival rate, Amputation Free Survival and Death censored Limb Salvage.

Results

The total number of 226 patients who were included in the study were followed up. 27[12%] of the patients were lost to follow up. All of them underwent plain balloon angioplasty alone. None of the patients were treated with stents, drug coated balloons and atherctomy devices. No procedure was abandoned.

199 patients who were followed up [median age 67 years, range 29-95: 119 men]. The percentage of patients with Diabetes, Hypertension, IHD and CKD are 91.5%, 56.7%, 39.7% and 12.5% respectively [Table 1].

Distribution of lesions treated were Iliac arteries 4%, superficial femoral arteries 39.7%, popliteal arteries 15.6% and tibial arteries 40% and the respective radiological success rates were 62.5%, 93.6%, 96.7% and 90.1% [Table 2].

The initial radiological success rate is 88.4%. Acute complications [<30 days] developed in 5% [10/199] of patients and that includes two deaths [Table 3].

A total of 66 patients died. Patient Survival rates, Amputation Free Survival and Death Censored Limb Salvage rates were calculated in the group of radiological success up to 5 years. The survival rate at 1, 2 and 4years were 78.6%,70.9%,60% respectively.

Of the 176 patients who had radiologically successful PTAs 49 [28%] were found to have healed wounds and the median duration of wound healing is 6 months. Of the radiologically unsuccessful group [23] only one [5%] patient healed the ulcer. In the radiologically unsuccessful group 5 [22%] required bypass to salvage and another 5 [22%] underwent major amputations.

In amputees 45% stated that they had impaired activities of daily living [ADL]. In the limb salvaged group ADL was impaired only in 17%.

Of the limb salvaged group 28% were not wearing footwear

despite advice. Even though the limb was salvaged only 63% were mobile without assistance while 5% were bed bound and 14% requiring wheelchairs for ambulation [Table 4].

Of the 22 amputees followed up 50% did not wear footwear. The percentage bed bound, limited to wheelchair and using crutches are 4.5%, 59% and 13% respectively. Only 22.7% were ambulant using a prosthesis [Table 5].

Discussion

In our study the amputation free survival at 4 years was 52%. In a meta-analysis of angioplasty follow up it was reported that the 4 year amputation free survival was 48% [17]. Our results of AFS is comparable to the world reported rates even though non drug coated balloons were used. In our study the overall 3-year survival is 67%. The overall 3-year survival of the angioplasty done in the BASIL trial was 52% % [18]. The increased survival in this group may be due to the lower median age [67 years] compared to BASIL group [greater than 70]. This is because the higher median age and higher incidence of age-related co-morbidities among the participants of BASIL trial have a negative impact on their overall survival. A significant limitation in this study is not tabulating the outcomes according to the Rutherford or WIFI classification. In Rutherford 6 category where multi-level occlusive disease is present the outcomes may be worse. A significant proportion of the population were in Rutherford 5 category. Hence treating single segments with plain old balloon angioplasty may bring better results.

Angioplasty with Drug coated Balloon [DCB] is becoming more preferred over conventional Plain Old Balloon Angioplasty [POBA] in developed countries. A recent meta-analysis of randomized controlled trials done to compare the use of DCB and POBA revealed that the use of DCBs is associated with improved vessel patency and a lower risk of target vessel restenosis when compared to POBA in patients with femorapopliteal disease [19].

Endovascular stent insertion for CLTI is becoming a more favorable option when compared to PTA alone [20,21,]. A meta-analysis of randomized control trials comparing PTA alone and angioplasty with balloon expandable stents revealed higher primary patency rates at 6 months with stenting compared to PTA alone in the treatment of femoropopliteal artery occlusive disease. However, there were no difference in long-term primary results and secondary patency rates [22].

In intrahospital arterial occlusive disease, although stenting is expected to have a higher primary patency rates, there is not enough evidence to support its superiority over PTA alone [23]. Insertion of Drug Eluting Stents [DES] for infrapopiteal arterial occlusive disease is superior to PTA alone or Angioplasty with Bare Metal Stents [BMS] because DESs significantly inhibit vascular restenosis and thereby improve primary patency rates, reduce risk of reintervention and amputation, improve wound healing and event free survival rate [24,25].

Since the resources available to us in Sri Lanka are limited due to cost factors, only plain angioplasty balloons were used in all the cases and drug coated balloons or stents were not used. Setting up the peripheral intervention program in Sri Lanka was a bit difficult at the beginning. Sri Lanka has an ongoing cardiac intervention program. The modification required the use of longer balloons that can be used in the lower limbs and longer wires that it requires to place them. Initially as the team was not experienced the procedure used to take about 2 to 3 hours and at the latter stages it took about 45 minutes to 90 minutes.

In our study the death censored limb salvage rate was 79.4%. This is in keeping with the world reported rates which is around 80% [26]. The drawback in our study is that radiological patency follows up was not done.

Conclusion

The low incidence of serious complications makes PTA an attractive alternative in the treatment of patients with ischeamic foot ulcers. Even in a low-resource setting, PTA is an attractive option for revascularization and wound healing for patients presenting ischemic ulcers consistent with Rutherford category five [5] tissue loss. The amputation free survival in this group at 4 years [47,8%]. Poor ulcer healing rates may be due to noncompliance with offloading footwear. In the limb salvaged group only 63% were mobilizing without any walking aid while in the amputee group the only 22.7% mobilizing independently with a prosthesis. This reflects the need for higher intensity post procedure rehabilitation.

Table 1. Comorbidity

DM	91.5% [182/199]
Hypertension	56.7% [113/199]
IHD	39.7% [79/199]
CKD	12.5% [25/199]

Table 2. Lesion distribution

Lesion Treated	%		% Success	
Iliac	8/199	4%	5/8	62.5%
SFA	79/199	39.7%	74/79	93.6%
Popliteal	31/199	15.6%	30/31	96.7%
Tibials	81/199	40.7%	73/81	90.1%

Table 3. Complications

Death – Acute Heart Failure	2/199	1%
Dissection	6/199	3%
False Aneurysm	3/199	1%
AV Fistula	2/199	1%
Pulmonary oedema	1/199	0.5%
Haematoma	7/199	3.5%

Table 4. Overall Survival

Duration	% prediction of Survival
1 year	78.6%
2 year	70.9%
3 year	67.%
4year	60%

The amputation free survival at 1,2 and 4 years were 65%,57.5%,47.8%respectively.

Table 5. Amputation Free Survival

Duration	AFS %
1 vear	65%
2 years	57.5%
3 years	52%
4 years	47.8%

Table 6. Death censored limb salvage

Duration	% Death Censored Limb Salvage
6 months	87.5
1 year	84%
2 year	81%
3 year	79.4%
4 year	79.4%

Table7. Patients with salvaged limbs – 92/114

Activities of daily living	
Impaired	16/92 17.3%
Not impaired	76/92 82.6%
Footwear	
Uses footwear	66/92 71.7%
Doesn't use footwear	26/92 28.2% [includes 5 healed wounds]
Drug compliance	100%
Bed bound	5/92 5.4%
No mobilizing aids	58/92 63%
Wheelchair	13/92 14.1%
Crutches	1/92 1%
Walkers	10/92 10.8%
Walking stick	7/92 7.6%

Table 8. Patients with Amputated Limbs.

Activities of daily living	
Impaired	10/22 45.4%
Not impaired	12/22 54.5%
Footwear and care to other foot	
Uses footwear	11/22 50%
Doesn't use footwear	11/22 50%
Drug compliance	100%
Bed bound	1/22 4.5%
Limb prosthesis	5/22 22.7%
Wheelchair	13/22 59%
Crutches	3/22 13.6%

Data available in 22 patients

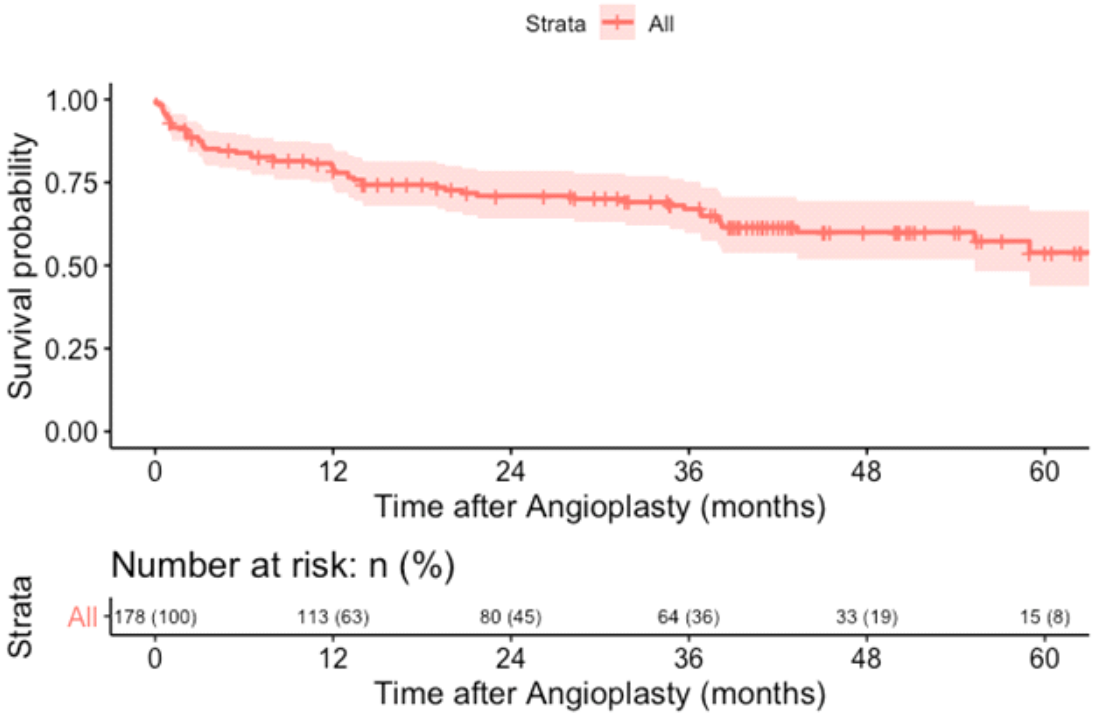

Figure 1. Overall Survival

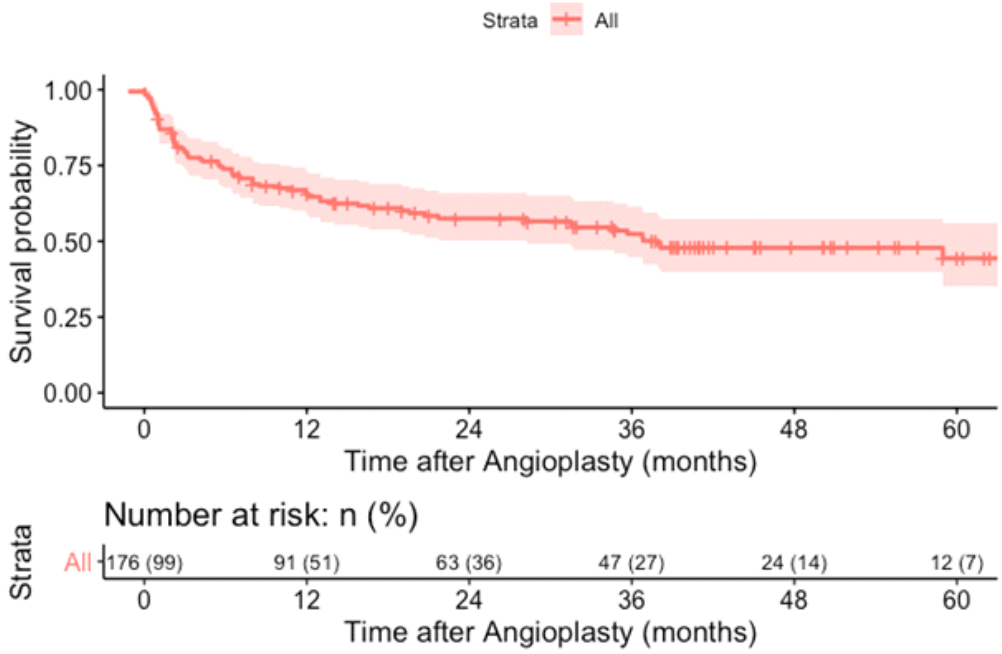

Figure 2. Amputation free survival

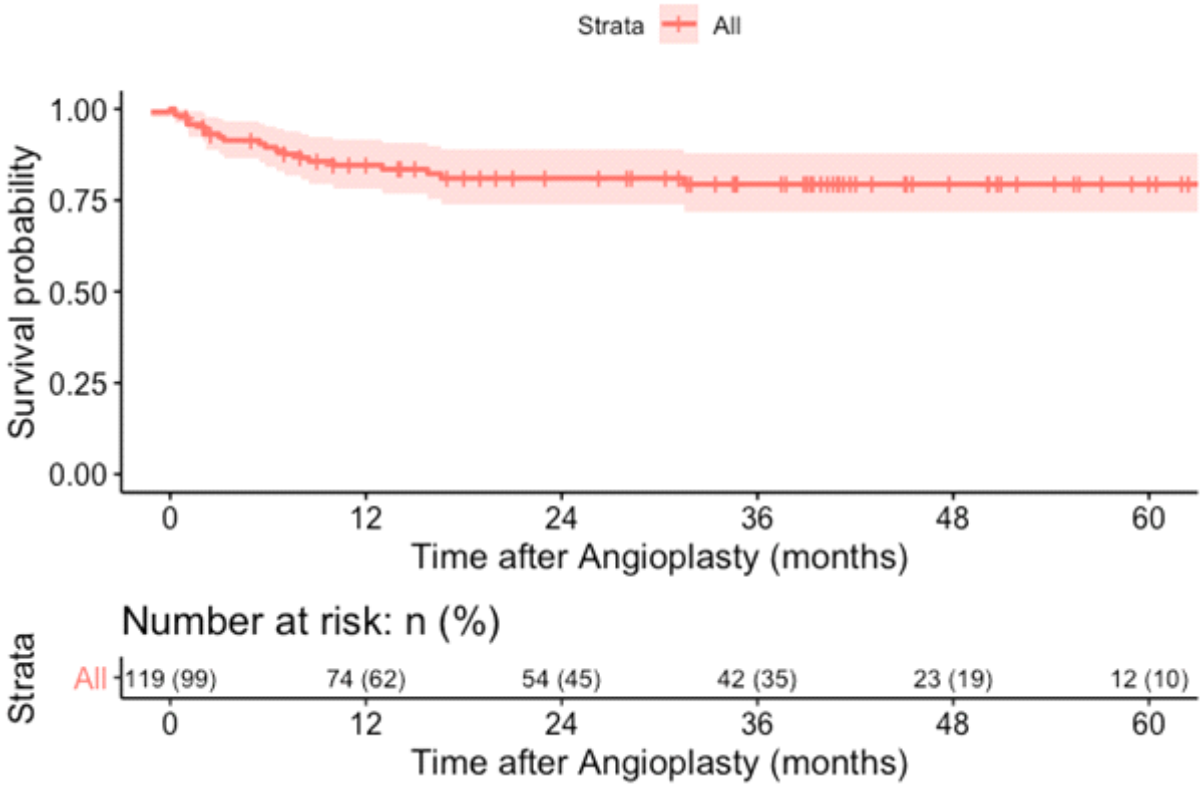

Figure 3. Death censored limb salvage

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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SCIENTIFIC ARTICLE

Efficacy of surgical treatment in the management of idiopathic granulomatous mastitis: an institutional experience in Sri Lanka

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Keywords: Idiopathic granulomatous mastitis (IGM); benign breast disease; breast lumpectomy; chronic inflammation

Abstract

Introduction

Idiopathic Granulomatous Mastitis (IGM) is a rare, benign, chronic inflammatory breast disease which can mimic a carcinoma both clinically and radiologically. This study aims to establish the efficacy of surgical treatment in the management of IGM.

Methods

We have retrospectively analysed 25 patients diagnosed with IGM between 2012-2019 who were managed surgically with wide local excision (WLE). Ultrasound scans (USS) and fine-needle aspiration cytology (FNAC) were performed in all patients to confirm mastitis and to exclude malignancy. IGM was diagnosed by excisional biopsy. WLE was performed on all patients and were followed up to an average of 37 months. (range 3- 83 months, median 41.5 months)

Results

None of the patients showed recurrence of the disease during the period of follow-up. Post-operative complications observed included oozing from the surgical site (8%), wound site infection (4%), and minor skin necrosis (4%).

Conclusion

In the past, IGM has been managed in different ways ranging from observation, steroids, incision and drainage, with variable recurrence rates. As there is no accepted guideline up to date regarding the most effective treatment for IGM, we'd like to propose a surgical treatment with WLE as the treatment of choice due to the high rate of success and low rate of recurrence shown by our institutional experience.

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Received: 07-11-2020 Accepted: 16-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8760

Introduction

Granulomatous mastitis is a rare benign breast disease that is characterized by non-caseating granulomatous inflammation of the perilobular region. It can be divided into two entities based on the presence or absence of a specific aetiology [1]. The common causes for granulomatous inflammation of the breast are infections (a known pathogen being Coryne-bacterium), trauma, and disease conditions like TB, sarcoidosis or autoimmune diseases [2 – 5].

Idiopathic granulomatous mastitis (IGM) as defined by Kessler and Wolloch in 1972 is a disease of unknown aetiology [6]. Various studies have sought to confirm the association of this condition with factors such as hyperprolactinaemia, breastfeeding, smoking, use of the oral contraceptive pill (OCP) and disease conditions like DM and autoimmune diseases [1, 3, 5 – 7]. It is the more common type of granulomatous mastitis, seen commonly in parous women of the reproductive age group, the mean age of presentation ranging from 28.4 to 37.75 years according to our literature review [7 -13].

It presents mainly as a painful lump, with the presence of inflammation, abscesses, sinuses or fistulae formation at times and often leads to a diagnostic dilemma [8, 12, 14]. IGM is commonly mistaken as breast carcinoma leading to unnecessary mastectomies or treated with incision and drainage following a wrongful diagnosis of breast abscess [10, 12, 13, 15].

Biopsy of IGM has revealed the presence of non-caseating granulomas, consisting of epithelioid cells, Langerhan type giant cells, lymphocytes and plasma cells [10, 11]. Biopsy and histopathological review can help exclude other mimics namely TB, breast carcinoma and abscess [4, 10, 13]. The presence of granulomatous reactions on biopsy has led to the improper use of antituberculous therapy following suspicion of tuberculous mastitis [10, 16]. Exclusion of other diagnoses using laboratory, radiological and histopathological investigations is of vital importance in the accurate diagnosis of the condition.

Through time, it has been managed in numerous ways ranging from observation to steroids to mastectomy [12, 17, 18]. This

study was done to assess the effectiveness of surgical management for IGM.

Method

Twenty-five consecutive patients with IGM diagnosed by ultrasound and FNAC, who visited the breast clinic at a private institution in Sri Lanka, were studied over 7 years from 2012 and retrospective analysis of data was done. The patients were assessed with regards to parity, breastfeeding, post lactation secretions, lactational mastitis and also for the association with potential risk factors; oral contraceptive pill (OCP) use, history of smoking, history of breast disease or surgery and prior diagnoses of other diseases such as tuberculosis (TB), sarcoidosis, diabetes mellitus and autoimmune diseases. An ultrasound scan (USS) was done preoperatively confirming mastitis with suppuration in all patients. Fine needle aspiration cytology (FNAC) confirmed the presence of acute/chronic inflammatory cells in all patients without any atypical or malignant cells. Following surgical excision of the mass, all cases were diagnosed as IGM histopathologically. Depending on the size of the defect, a rotational flap was used to fill the cavity. The fluid found within cavities; sinuses were taken for aerobic culture during surgery. All participants were followed up annually at the clinic for a period ranging from 3 months to 83 months with a median of 41.5 months.

Results

The study population had a mean age of 33.96 years, with the youngest aged 25 and the oldest aged 45. All participants were parous women with a minimum parity of one and a maximum of three. All women had breastfed after each pregnancy.

All participants presented with a painful unilateral mass. The skin was visibly inflamed in 64% (n=16) of the study population while 60% (n=15) had sinuses with 50% of them having a serous discharge. 40% (n=10) had nipple involvement and only 1 participant had involvement of the axilla. Only 2 participants complained of fever (8%).

Out of all patients studied, 2 had a history of OCP use (8%) but none were smokers. One patient was a non-insulin-dependent diabetic (4%) but none had a history of TB, sarcoidosis or autoimmune diseases. One participant (4%) had a history of contralateral breast IGM and had undergone incision and drainage followed by wide local excision.

56% (n=14) of participants has breastfed once before disease onset, while 36% (n=9) has breastfed twice and 8% (n=2) thrice. Majority of the participants has breastfed for 1-3 years with 4 patients (16%) feeding for less than 6 months. Only 5 of those in the study population (20%) has fed for more than 3 years.

In the pregnancy preceding presentation, 2 participants (8%) developed mastitis on affected side progressing to lactational mastitis. 3 participants (12%) developed nipple infection during the breastfeeding period preceding presentation.

Majority of the participants claimed not to have had any issues with milk production and 76% did not complain of secretion post lactation. Out of the 6 participants who complained of secretion post lactation, only 1 had up to 1 year, the rest resolving by 3 months.

Eight participants (32%) had undergone incision and drainage prior to presentation to study centre (4 participants once, 2 participants twice, and 2 thrice).

During our study, the biopsy was performed for all participants following surgery. 96% (n=24) had epithelioid histiocytes, 88% (n=22) had giant cells, 60% (n=15) had abscess formation, 32% (n=8) had duct ectasia and none had tumour cells or caseating necrosis. In all participants, the histological diagnosis was granulomatous mastitis without associated with other pathologies.

This diagnosis further collaborated with the culture reports. The aerobic culture was performed for all, out of which 100% (n=25) had negative cultures. Ziehl-Neelsen staining was done in all samples to exclude tuberculous mastitis.

All patients were managed surgically with WLE, and with flap closure in 60% (n= 15). Majority of them had local rotational or advancement flaps using the glandular breast tissue (n=12). Larger defects (greater than 5cm) were closed with either a mini latissimus dorsi flap (n=1), a latissimus dorsi muscle flap (n=1) or a latissimus dorsi myocutaneous flap (n=1). The skin was included in the WLE of patients who displayed skin involvement with sinuses or inflammation.

None showed recurrence of the disease following surgery during the follow-up period. The complications observed were oozing from the surgical site, wound site infection and minor wound edge skin necrosis in 2 (8%), 1(4%) and 1(4%) participants respectively.

Discussion

IGM is a rare disease presenting a diagnostic dilemma, but with proper clinical and laboratory assessment, an accurate diagnosis can be arrived at, with the exclusion of other disease mimics.

Diagnosis, however, is not the only area that raises a concern. This benign breast disease has and is being managed using different therapeutic approaches and is yet to have a standardized protocol [18]. Amongst the management options available are steroid use with or without methotrexate and other immunosuppressants, and the surgical treatment

consisting of incision and drainage, wide local excision or mastectomy [5, 9, 14, 17].

Various studies conducted on IGM support surgery as a better therapeutic option. One study concluded that out of the 8 participants treated using wide local excision, only 2 had recurrences (25% recurrence rate) in comparison to 50% recurrence rate when treated with incision and drainage and 50% recurrence rate for those treated with steroids [8]. Wilson JP et al analysed 116 cases of IGM and drew the following conclusions. 56% success rate with observation alone, 42% success rate with steroid therapy, 79% with partial mastectomy and a 100% success rate with mastectomy supporting surgery as a better modality of treatment [18].

A study done by Ozturk E et al showed zero recurrence rate for those managed with wide local excision (11 patients) and only one recurrence out of the subjects treated with incisional biopsy and medical management, who was then subsequently treated with abscess drainage and wide local excision [9].

The conclusions of these studies are following the results of our study.

All patients in our study were managed surgically with wide local excision.

Prior to the WLE that was done in our study, 8 had undergone incision and drainage, 2 of them twice, and 2 of them having undergone drainage thrice. The condition did not resolve in any of them following the procedure and resolved only after excision was performed through this study. It is a clear indication that IGM should not be managed as an abscess alone with incision and drainage, but with proper wide local excision to completely excise the inflammatory tissue that results in this condition, including the affected skin.

It is the authors' recommendation to use wide local excision with flap closure if a patient presents with a lump size greater than 5 cm in diameter or if there is the involvement of the skin. In our study population, all participants with a lump size greater than 5 cm underwent surgical excision with flap closure and had zero recurrence rates and zero complications during the subsequent follow-up period. Minor complications were noted only when WLE was done without utilizing a flap to close the defect, though they were self-limited. With a 100% success rate with wide excision, mastectomy becomes redundant and unnecessary in the management.

It is our observation that IGM requires complete excision of the inflammatory tissue. Failure to do so can result in a recurrence or poor resolution of the symptoms. Whether the inflammation occurs due to an immunological reaction to inspissated milk within the duct system has also been queried in the past [15]. The hypothesis of an immunological reaction to inspissated milk supports our surgical principle of wider excision of the affected breast tissues in IGM than in the performance of an incision and drainage. Moreover, it was noted that all participants in our study showed an abrupt cessation of lactation, and further immunological studies are warranted to confirm such a postulation.

Conclusion

IGM is a chronic inflammatory disease of the perilobular region of the breast tissue, which often leads to uncertainty during diagnosis and treatment. It requires the complete excision of inflammatory tissue for resolution. Our study concludes that wide local excision is an appropriate therapeutic option for successful management. Closure with flaps is preferred for masses greater than 5 cm and those involving the skin for complete resolution.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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SCIENTIFIC ARTICLE

Double single-port pan-proctocolectomy with transanal total mesorectal excision [TaTME] and ileal pouch-anal anastomosis [IPAA]: improvisation under limited resources

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Keywords: TaTME; double single port; innovation; pouch surgery

Abstract

Introduction

Novel surgical techniques fail to reach all parts of the world equally due to financial constraints. Non-availability of high-cost equipment in the developing world hinders progress. Transanal total mesorectal incision [TaTME] is a novel technique becoming popular world over due to many perceived benefits. Some of the equipment requirements prevent surgeons in resource-limited environments from taking up this technique. We describe the performance of a double single port panproctocolectomy with TaTME and ileal pouch-anal anastomosis for a patient with colitis-associated rectal cancer under improvised conditions at a tertiary care centre in Sri Lanka. Standard practice requires two laparoscopic stacks and an integrated air insufflator both of which are not available in the local setting. A flexible endoscope was used to replace the need for a second laparoscopic stack and a simple drainage bag connection to the standard insufflator to provide a stable pneumo-peritoneum. The patient had a rapid uneventful recovery.

Introduction

Transanal mesorectal excision [TaTME] is a technique that has been well accepted by colorectal surgeons due to the improved access it provides to the deep pelvis [1]. Apart from better access, this technique is associated with other perceived benefits such as a well-controlled rectotomy and a double purse-string stapled anastomosis, which theoretically lowers the risk of leakage in low rectal anastomoses [2]. The double single port technique uses a single port device at the proposed ileostomy site in the right iliac fossa [RIF] for the abdominal dissection and a transanal port device for the 'bottom-up' dissection in the mesorectal plane. The reduced access trauma in this procedure is associated with better outcome [3].

The double single port technique requires the use of two separate laparoscopic stacks for either side for two surgeons to operate in tandem and to carry out the procedure. Additionally, an integrated CO2 insufflation device with special tubing is required to provide a stable pneumopelvis without bellowing of the rectum [3]. These requirements limit the use of this technique in resource-scarce environments. Here we describe a double single-port restorative proctocolectomy with TaTME performed using a flexible endoscope and an improvised insufflation system to counter the resource limitation.

Methodology

A 70-year-old female was referred by the gastroenterologist with colitis-associated cancer of the upper rectum. She had pancolitis and the cancer was localised to the rectum. Following a multi-disciplinary team discussion, it was decided to proceed with a restorative panproctocolectomy. The patient was placed in Lloyd-Davies position and a GelPoint port [Applied Medical, Rancho Santo Margarita, California] was placed at the proposed ileostomy site in the RIF [Figure 1], and a GelPoint Path [Applied Medical, Rancho Santo Margarita, California] transanally.

A flexible endoscope [Fuji EC-760ZP, Fujifilm, Japan] was used in place of a second laparoscopic stack and a 30-degree

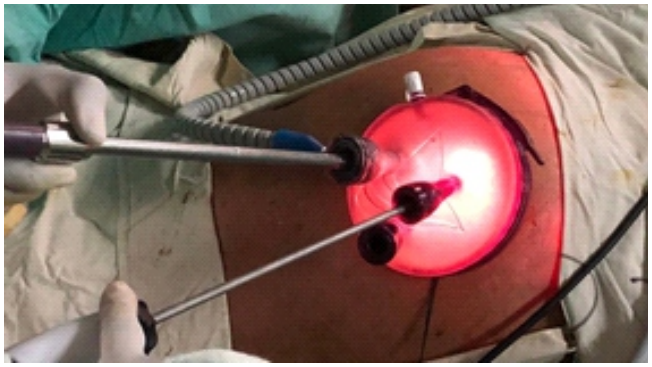

Figure 1. GelPoint single port at the proposed ileostomy site for trans abdominal dissection.

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DOI: http://doi.org/10.4038/sljs.v38i3.8761

telescope for the 'bottom-up' dissection. The endoscope was inserted directly through the gelport to increase the maneuverability while two 10mm plastic working ports were used for the laparoscopic instruments [Figure 2]. An improvisation was made to the standard CO2 insufflator by connecting a drainage bag between the device and the port [Figure 3]. This acted as a reservoir and maintained a stable air supply into the pneumopelvis maintained at 15 mmHg. This simple 'hack' eliminated the need for an integrated insufflator.

A purse-string was inserted just proximal to the proposed rectotomy site. Using a hook diathermy and a laparoscopic grasper the dissection along the TME plane was carried out up to the peritoneal reflection. The abdominal dissection was carried out using the single port at the RIF and one 5mm additional port in the left iliac fossa to complete the total colectomy using a 30° laparoscopic telescope. The two dissection planes of the rectum were met at the peritoneal reflection to complete the rendezvous procedure. The specimen was delivered through the port in the right iliac fossa and divided at the terminal ileum. An ileal pouch was fashioned extra-corporeally and a double purse-string stapled pouch-anal anastomosis was carried out. The port site at the RIF was used for the diverting loop ileostomy. The total operating time was 320 minutes with a blood loss of less than 100 ml. Both surgeons have been formally trained in TaTME at several centres in Europe through mentoring and cadaveric dissection courses.

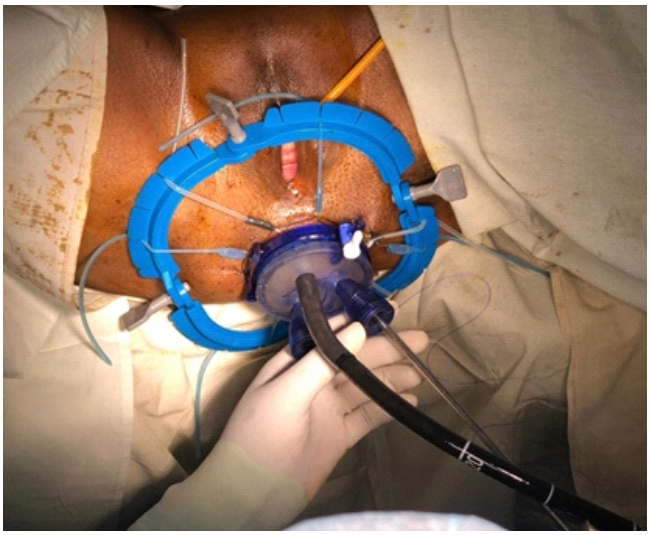

Figure 2. Setup for the transanal dissection with the flexible endoscope inserted through the GelPoint path.

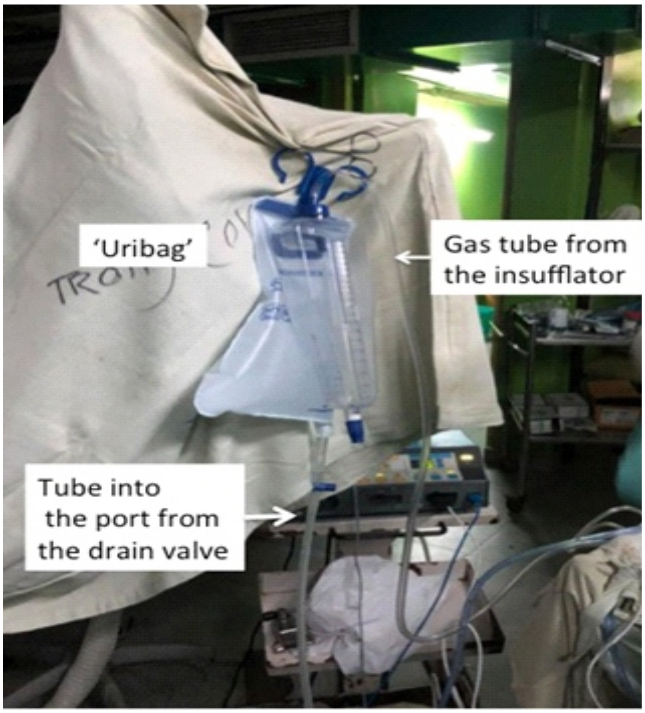

Figure 3. The 'uribag hack' - a sterile urine drainage bag connected between the insufflator and the port.

Postoperative pain control was excellent as the patient only had the ileostomy site and a 5mm drain site [Figure 4]. The patient had an uneventful recovery and was discharged on postoperative day five.

Discussion

Scarcity of resources hindering progress in surgical innovation has been a long-discussed topic [4]. The general non-availability of high-cost surgical instruments has limited surgical innovation to certain parts of the world. This could be countered through innovation and improvisations that allow safe surgery at a low cost. TaTME has proven the comparable outcome in both benign and malignant proctectomies. Use of this technique for restorative surgery in UC has been well

Figure 4. At the end of the procedure, the patient had the ileostomy site and the drain that was inserted through the 5mm working port site at the left iliac fossa.

documented with safety, short-term and long-term outcome [5, 6]. Performing the division of the rectum transversely at the correct height is a difficult task in pan proctocolectomy, especially in a narrow pelvis. Rectotomy done under direct vision alleviates this difficulty in TaTME reducing the future risk of 'cuffitis' [inflammation of the rectal cuff] in a residual long rectal stump in a patient with ulcerative colitis.

Dedicating two laparoscopic stacks with 30-degree telescopes for a single procedure is not feasible in a resource-limited setting. The use of a flexible endoscope instead of a laparoscopic telescope has not been described previously. While we were compelled to improvise with the endoscope due to scarcity, we identified several advantages over the 30-degree telescope. The flexibility of the scope allowed easy access in the limited space within the deep pelvis. The rigid telescope with laparoscopic instruments tends to cause clashing during the dissection.

Also, the operating surgeon and the camera operator both having to be seated close in-between the legs of the patient reduces the freedom of movements. The endoscope with controls located distally allows the camera operator to stand away from the surgeon allowing greater mobility for the surgeon. Having a suction channel at the tip of the endoscope allows the suction of smoke and fluid created within the operating space without interruption to the procedure.

In standard practice, the integrated insufflation system [eg: Airseal devise] evacuates the smoke or a suction apparatus has to be introduced through a working port disrupting the workflow. Besides, the water channel of the endoscope allows the cleaning of the camera lens of mist without withdrawing it. The picture quality of the endoscope with high definition camera allowed excellent visualization not secondary to the laparoscopic view [Figure 5].

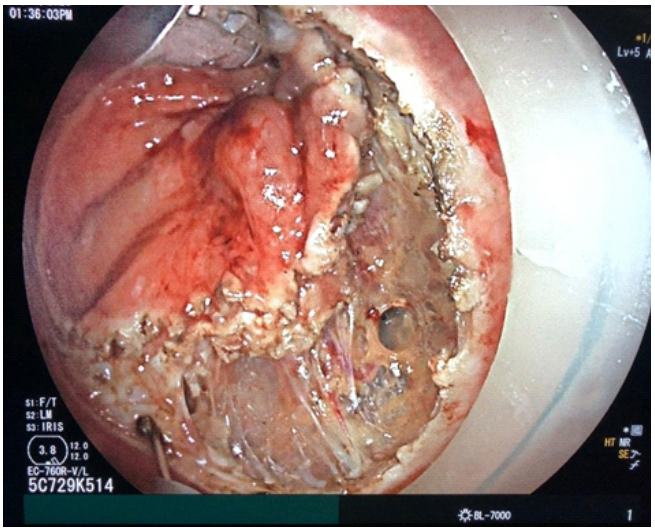

Figure 5. The view of the transanal dissection plane through the flexible endoscope. The thin 'white hair like' connective tissue of the TME plane is clearly visible.

The insertion of the scope directly through the gelport instead of a working port gave us high maneuverability and was inspired by similar use during the TASER procedure [7]. Using a single port for abdominal dissection and utilizing the same for specimen extraction helped to prevent an abdominal incision.

The pulsatile movements of the rectum, known as 'bellowing' when using the standard insufflator, is due to the intermittent flow of gas. Countering this effect by connecting a commercially designed reservoir bag to a standard system has been described previously [8]. Connecting an easily accessible sterile drainage bag ['uribag'] between the insufflator and the port provides the same effect and is being used by many colorectal units as an alternative. The integrated insufflation system and the single-use tubing system is beyond affordability in an already challenged-free healthcare system as Sri Lanka. This simple improvisation provided a cost-effective alternative. The suction mechanism on the endoscope replaced the requirement for a smoke evacuation system. A disadvantage of using the endoscope is the loss of orientation in the lumen of the rectum. We found that making mucosal markings with the diathermy at 12 'o clock position helped in orientation during the luminal phase of the dissection.

We believe this is the first reported case in the literature of a double single- port TaTME with panproctocolectomy and IPAA in Sri Lanka. We believe these improvisations will help popularize TaTME procedures amongst surgeons in the resource-limited setting. The innovative practice of surgery encourages safe practice delivered to patients at a lesser cost.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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SCIENTIFIC ARTICLE

Pancreatoduodenectomy with a novel pancreato-jejunal anastomosis by the single layer long parenchymal traverse technique: a technical note with perioperative outcome

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Keywords: Pancreatoduodenectomy; pancreato-jejunal anastomosis

Abstract

Introduction

Pancreatoduodenectomy (PD) is the standard of care for localized tumours of the head of the pancreas. The anastomosis between the remnant pancreas and the intestine is a high-risk anastomosis.

This study reports on the outcome of a new technique for an end to side, duct to mucosa pancreaticojejunostomy.

Patients and methods

Conventional pancreaticoduodenectomy was performed by an individual surgeon between the period of 2013-2014 and 2017- 2019 on 26 patients were included for the study. The postoperative pancreatic fistula (POPF) rate was observed with pancreatic leakage grouped according to 2016 ISGPS guidelines.

Results

There were 26 patients, 9 women and 17 men who underwent pancreatoduodenectomy with pancreato-enteric anastomosis by this new method. The mean age of the patients ranged from 56.7 to 56.8 years. Adenocarcinoma of the ampulla was the most frequent indication (n=10). Post-operatively, 9 (35%) had POPF and one (4%) required a re-exploration. POPF Type A was common (n=8) and did not require any interventions, where Type C was observed in 1 (4%). The consistency of the gland or the duct size did not show any significant difference with the fistula rate.

Conclusion

The new single layer interrupted pancreatojejunal anastomosis with a long parenchymal traverse technique is safe with acceptable outcomes.

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Received: 13-08-2020 Accepted: 16-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8726

Introduction

Pancreatoduodenectomy [PD] is the standard of care for patients with localized tumours of the head of the pancreas, distal bile duct or ampulla [1]. The first reported case of a one-stage pancreaticoduodenectomy for carcinoma of the head of the pancreas was done in 1945 by Dr Allen Whipple (2). The last two decades have seen this procedure be reported safely with low operative mortality rates in many high volume centres [3,4]. However, postoperative morbidity after PD remains high with the pancreato-enteric anastomosis being a major source of complications accounts for about 5% to 30% of the cases (5,6,7). Various modifications of the pancreatico jejuna anastomosis like binding pancreaticojejunostomy, inverted mattress pancreaticojejunostomy, papillary- like pancreaticojejunostomy have shown a benefit, yet none has become the standard and foolproof method in reducing the incidence of POPF (8,9,10). Therefore this short paper describes the transcription of a new technique used in Manchester, the UK which is an end to side, duct to mucosa pancreaticojejunostomy with an insertion of a transanastomotic silicone stent.

Methods and Material

This is a case series of pancreaticoduodenectomies (PD) performed by an individual surgeon (AD) at Teaching Hospital Peradeniya, a tertiary care hospital in the district of Kandy, Sri Lanka, during the period 2013-2014 and 2017-2019. These were conventional pancreaticoduodenectomies (Whipple's Procedure) with a novel anastomotic technique used for pancretico- jejunal anastomosis (P-J). 26 surgeries were carried during this period. The postoperative pancreatic fistula was assessed according to the system proposed by the International Study Group for Pancreas Surgery [11].

A new technique of P-J anastomosis

Resection was done with the standard technique. At reconstruction, pancreatojejunostomy was undertaken with a single layer interrupted anastomosis technique using 4-0 or 5-0 absorbable sutures over a 10cm segment of infant feeding tube used as a trans-anastomotic stent. The sutures were placed individually with each one taking a large “bite” of pancreatic parenchyma. This is the long parenchymal traverse technique which allows the suture material a long

Figure 1. Suture placement of the anterior layer

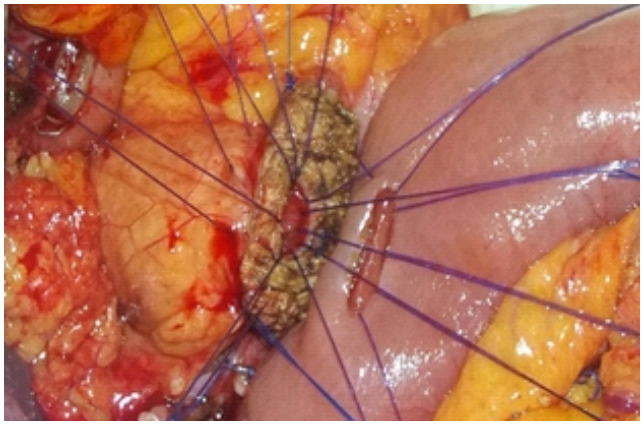

Figure 2 . Suture placement of the anterior and the posterior layers

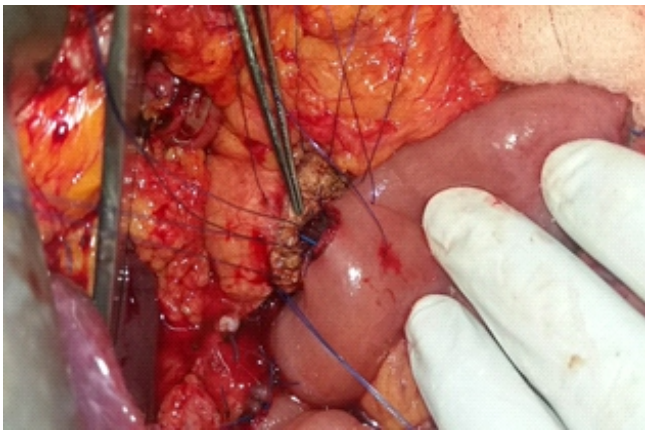

Figure 3. Silastic stent placement after completion of the posterior layer

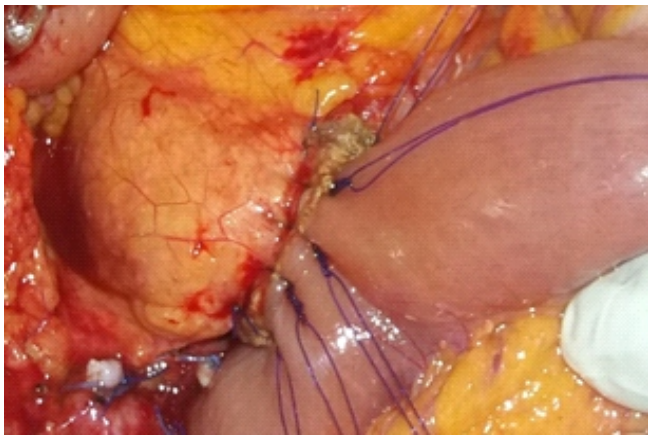

Figure 4 . Completion of the anastomosis

traverse through the pancreatic parenchyma (see figure 1 and 2). Initially, the pancreatic duct and the parenchyma were arbitrarily divided into anterior and posterior layers. Anterior layer sutures go through the full parenchyma of the pancreas about 1-2 cm from the parenchymal cut end and out through the inner aspect of the duct traversing through the parenchyma catching a thick chunk of pancreatic tissue and coming out about 2-3mm through the cut end of the pancreatic duct. If the duct is very small it is dilated by using the tip of a mosquito for proper visualisation and the anterior layer sutures are placed with double-ended suture material with traversing the duct first and coming out from the parenchyma in a reverse pattern, thereby making sure the duct is properly incorporated to the stitch. Usually, the 16mm round body half circle needle is used for the smaller ducts. The needles are left as it is for the continuation of the anastomosis later on a suture guide. Four to five stitches were put across the anterior layer of the pancreatic parenchyma (Figure 1). The number of sutures for the anterior layer depended on the size of the pancreatic duct and the size of the pancreatic stump.

Note that the defect in the jejunum is made to match the pancreatic duct. Using the diathermy, a puncture hole was made on the anti-mesenteric border of the jejunal loop, and the protruding excessive mucosa was trimmed out (Figure 1).

In the posterior layer, the suture would go through pancreatic duct initially and traversing through the parenchyma similarly explained formerly. The stitch starts from the ductal side and comes out from the posterior aspect of the pancreas. Once it has traversed the pancreas the needle would go through the jejunal wall with a thick bite of the seromuscular layer and coming out catching the mucosa just at the jejunostomy opening. The stitch on the jejuna loop should catch more of the seromuscular layer (1-2cm) and a little (2-3 mm) of the mucosa. The posterior layer will again have another 4-5 sutures to incorporate the posterior aspect of the anastomosis (Figure 2). Once it was done the two ends of the jejunum and pancreas was brought together pulling on the sutures of the posterior layer as a parachuting technique (Figure 3). This was done gently and the sutures are kept without getting entangled or cutting into the pancreatic parenchyma. Once its parachuted and the ends are approximated closely the sutures will be tied and the knots will be placed inside the anastomosis (Figure 3). Once all the knots are done in the posterior layer the excessive thread is trimmed out with a very short stub.

Then a small 10 cm feeding tube with appropriate size was put across the PJ as an anastomotic stent. Next, the suture layer which is placed in the anterior layer of the pancreas was taken across one by one through the jejunal side. The suture will pass through the jejunal mucosa catching 2-3mm, and through the jejunal wall catching about a 1-2cm of the seromuscular layer.

Once all the anterior layer sutures were put the knots are applied with having the knot on the serosal side, buttressing on to the serosa of the jejunum (Figure 4).

Results

There were 26 patients, 9 women and 17 men. The median age of the patients 58.5 and ranged from 18 to 77 years.

Out of them, 9 had POPF giving a 36% POPF rate, and only one required a re-exploration. This was due to a blocked drain and resulting in a collection which needed drainage, categorized to a type C POPF (4%). Eight of the POPF were just biochemical leaks or type A (32%), not requiring any interventions and all of them were haemodynamically stable. There was one death in the peri-operative period due to pneumonia giving a mortality of 3.8%.

We categorized the consistency of the gland into soft and firm, where there were 12 soft and14 firm pancreases. There was no statistically significant difference in the POPF rate between the soft and firm pancreas ($p= 0.2177$).

The duct size was divided to a small size if it is less than 4 mm and the larger diameter anything more than 4mm. The different size of the pancreatic duct did not show any statistically significant difference with the fistula rate ($p=1.0000$).

The correlations between the duct size and the rate of POPF and the consistency of the gland and the rate of POPF were checked. While the size of the duct had a small negative correlation with the rate of POPF (-0.081), the parenchymal consistency had a positive correlation (0.299) with POPF rate. There was no bile leak or leaks from gastrojejunostomy.

There were 9 patients where preoperative biliary drainage was done, most of them with external biliary drainage. Drainage was done if the bilirubin levels were above 250 or due to sepsis. There was one perioperative death due to aciternobacter pneumonia during the perioperative period.

Discussion

This is a case series of 26 patients who have undergone pancreaticoduodenectomy for neoplastic lesions and analysis of postoperative pancreatic fistula (POPF) rate with a new technique. It is our understanding that this technique has not been described in the literature. This also has a resemblance to Blumgart's technique of pancreaticojejunostomy [12] thus likely to be practised by many surgeons worldwide.

This case series is single surgeon experience in a tertiary care referral centre for HPB in Sri Lanka. In this series, we observe a slightly higher number of patients with POPF (36%) in comparison with other P-J techniques (13,14,15). They were all type A or biochemical leaks. These didn't alter the clinical outcome or the course of management of these patients. There was one required intervention due to a blocked drain, which required drainage of a collection. We have not analysed the number of days in the hospital, there was no difference between the two groups with POPF and another group. The hospital stays varied mainly due to patient's social circumstances.

A commonly observed problem in P-J is that sutures cut through the pancreatic tissue thus leading to dehiscence in the anastomosis, especially in soft pancreatic parenchyma. Therefore an adequate part of the pancreatic duct which is much stronger must get incorporated into the anastomosis. This practice is one of the main essences of this technique. The interrupted sutures are well placed before any of the stitches are tied enabling a good visualization of each stitch making sure that an adequate amount of ductal tissue is incorporated into the anastomosis. The long parenchyma traversing stitch with the duct will snug the stitches well to the jejunum, thus making the anastomosis watertight.

One of the advantages of this technique is that it uses a lesser number of stitches in an interrupted single layer fashion. The usage of a higher number of stitches causes more trauma to the parenchyma thus inducing more inflammation and oedema. Therefore, the lesser number of stitches, usually about 6-8, should minimize the inflammation (16). Besides, the extra number of stitches makes it more ischaemic and will affect healing. With this technique, we were able to overcome or minimize that issue.

The major component of the effluent or output from P-J anastomotic leak usually results from the jejunal side. Especially in a pancreatic dunk, if there is dehiscence in the anastomosis the output from the fistula will be quite high. Combination of high output and digestive pancreatic enzymes will adversely affect the POPF healing. In this new technique, the jejunal side will only have a puncture wound which is around 3 -5 mm which has the advantage of early closure even if there is a leak. The silastin trans-anastomotic stent will also aid the healing by maintaining the continuity of the pancreatic duct and the jejunum and also acting as a bridge across the anastomosis.

In conclusion, the advantage of this new technique is that it can be safely used in varying consistencies of the gland and varying sizes of the pancreatic duct. Therefore we recommend this technique as a safe and relatively easy procedure with minimal POPF rate.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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SCIENTIFIC ARTICLE

Do we provide enough information to histopathologist to receive a quality report back? Preliminary analysis of an audit to enhance the clinical details provision to pathology department in a peripheral hospital

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Keywords: Adequacy; clinical details; new histo-patholgy request form

Abstract

Introduction

Adequate clinical details should be provided to histopathologist to obtain a quality report. We experienced shortcomings in histopathology reporting due to deficiencies in patient detail provision.

Method

Retrospective analysis of 100 histopathology specimen forms sent from a surgical unit of Base Hospital Panadura was done. After identifying deficiencies new request form including patient demographic details, contact number, clinical details, relevant blood and biochemical investigation results, clinical diagnosis, space for a line diagram of the specimen with orientating stitches if possible and contact details of the person filled the form, was developed(Image 01). 100 new format forms were prospectively analysed to identify a change.

Results

Conventional forms designed for biochemical studies(Health 350) had been used as histopathology specimen forms as well. Percentages of properly written details were as follows; Patient demographic data -87%, clinical history- 42%, relevant biochemical results-8%,radiological findings-2%,clinical diagnosis -2%. Orientation or a line diagram of the specimen was not mentioned in any forms. After introduction of new format details received were as follows; demographic data -100%, clinical history- 100%, relevant biochemical results-88%, radiological findings-90%, clinical diagnosis -96%. The differences were statistically significant. Line diagram with orientation was included in all relevant specimens.

Conclusion

Considerable deficiency in clinical detail provision with conventional forms was noted in our cohort. The simple intervention of introduction of a spaced, well-formatted request form helped to overcome that deficit. This could be implemented in other hospitals as well.

Introduction

Histopathology helps in establishing a diagnosis, staging disease and deciding on postoperative adjuvant therapy. Therefore the accuracy of the histopathology reporting is crucial.

A study done by Cross at al has shown that the informational content with regards to breast and colon cancer pathological reports have been increased significantly throughout 1940 to 1990 [273% rise in the number of items of information]. They have attributed this increase either to clinicians demand for more specific information or to the introduction of more detailed systems of staging and prognostication of breast and colonic tumours[1].

The histopathologist does not encounter patients directly. The histopathology request form is their first contact with the patient. Thus they solely depend on clinical details provided by clinicians when they handle specimens. Therefore providing adequate and relevant clinical details to the histopathologist is a must.

Burton at al has conducted a study in the UK to evaluate over two thousand request forms sent for histopathology. They have found that clinical details were inadequate in 6.1 % of cases and frequently the contact details of the sender were lacking [2].

A similar observational study has been carried out in Pakistan to evaluate the adequacy of information provided by clinicians when requesting a histopathology investigation. Out of 500 request forms, clinical history was missing in over one-third of the forms and requesting clinician or any contact information was not mentioned in 77 % of the forms [3].

One local study has been carried out to evaluate the quality of histopathology reports in colorectal cancer. They have found that introducing a proforma for reporting, improved the

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Received: 24-11-2020 Accepted: 18-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8770

quality of the final histology report [4,5]. But local studies on the quality of the clinical details provided to histopathologists is scarce.

No common histopathology form is available for all hospitals. Institution-based formats ara available in some of the teaching hospitals but most of the peripheral hospitals lack such a facility.

Methodology

Retrospective analysis of the clinical details of 100 traditional request forms provided to the histopathology department of the base hospital Panadura by a surgical unit was carried out. There was no designated histopathology request form. The health 350 form which is for routine blood investigations had been using as a request form to send histology specimens as well [Figure 1]. Therefore a new request form was designed after identifying the key deficiencies in the clinical information provision [Figure 2]. After drafting the new format, it was introduced to the surgical team and the nursing staff of the theatre and endoscopy units. Analysis of the information of the second form was started after two weeks of piloting this format.

The clinical details of 100 new formats were prospectively analysed and compared with the previous results. Two sample t-test was used to identify a significant difference.

This evaluation will be done again in 6 months to assess the long term effectiveness of the new format

Results

Out of 100 forms analysed 62 % of the specimens had been sent for histology and the rest for cytology. Percentages of properly written details were as follows; patient demographic data -87%,clinical history - 42%,relevant biochemical results - 8%,radiological findings - 2%,clinical diagnosis - 2%.

No significant difference was found between histology and cytology specimen forms. A line diagram of the specimen with an orientation guide was not found in any of those 100 forms. Of these forms, 67% were labelled as "need further clarifications" by the pathology department. They had to contact the surgical team again to clarify the missing details, causing a further delay of the final reports.

After the introduction of the new format, the above parameters were analysed again and compared.

Parameter	Percentage with old format	Percentage with new format	*p* value
Complete patient demographic data	87.0	100.0	0.0002
Clinical history	42.0	99.0	< 0.0001
Relevant biochemical investigations findings when indicated	8.0	88.0	< 0.0001
Relevant radiological investigations findings when indicated	2.0	92.0	< 0.0001
Probable clinical diagnosis	2.0	96.0	< 0.0001

Table 1 . A line diagram with orientation stitches marked was found in all relevant specimens. The need for contacting the surgical team for further clarifications has been significantly reduced to 5 %[$p < 0.0001$].

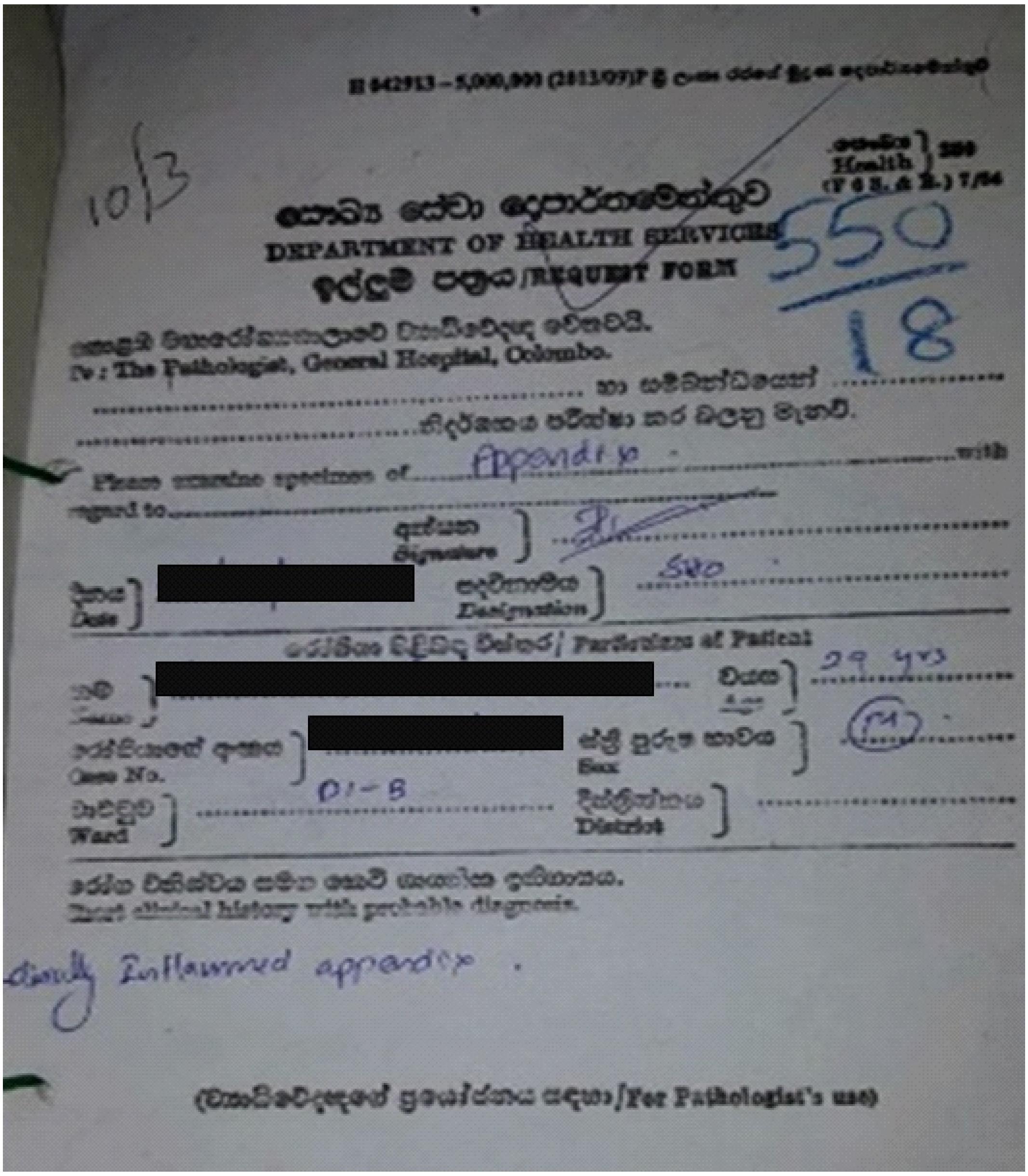
Discussion

Significant lapses were found in providing clinical history and investigation results which are relevant to pathologists. The probable clinical diagnosis was not mentioned in the majority of the traditional forms. Histopathology department had to contact the clinicians frequently for further clarifications as the information were inadequate.

The designing of the new format was based on the findings of the initial survey. After identifying the gaps in the clinical information, relevant questions were added to the new form. Size of the health 350 form is less than a quarter of an A4 sheet and there is hardly any space to write the clinical details. The new form was designed to the size of an A4 sheet. Adequate spaces were kept to include patient demographic details, contact number, clinical details, relevant blood and biochemical investigation results and clinical diagnosis

A separate space for the line diagram of the specimen with the orientation stitches is a novel element included. We referred few histopathology request forms from UK hospitals and local teaching hospitals but this element was not included in any of them [6]. Histopathologist found that it is very convenient for them to have this piece of information. After introducing the new format, provision of important clinical details has significantly improved.

Limitations of the study include that this is a preliminary analysis of the new format which has shown some promising results. However longterm effectiveness of this format has to be assessed and will be carried out after 6 months. Improvement of the quality of histopathology reports after introducing the new format has not been evaluated in the current study. That will be another good indicator of the value of the new histopathology request form and will be assessed as a separate study.



10/3

Health 350

DEPARTMENT OF HEALTH SERVICES

REQUEST FORM

550/18

To: The Pathologist, General Hospital, Colombo.

Please examine specimen of Appendix with regard to

Signature

Date [redacted]

Designation SHO

Particulars of Patient

Name [redacted] Age 29 yrs

Case No. [redacted] Sex (M)

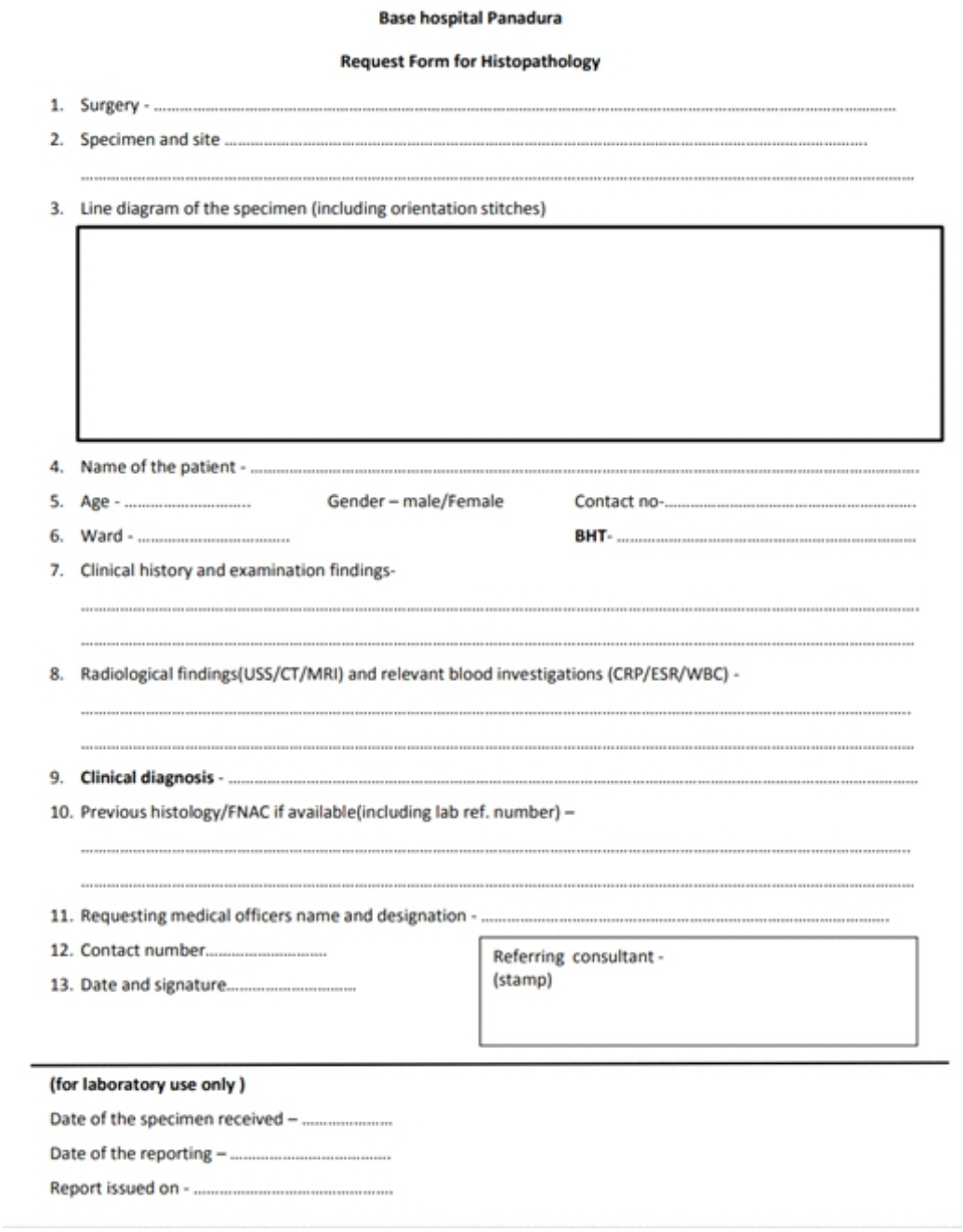
Ward 01-B District

Brief clinical history with probable diagnosis.

clinically Inflammed appendix.

(For Pathologist's use)

Figure 1. Health 350 request form



Base hospital Panadura

Request Form for Histopathology

1. Surgery - .....
2. Specimen and site .....

   .....
3. Line diagram of the specimen (including orientation stitches)

4. Name of the patient - .....
5. Age - ..... Gender – male/Female Contact no-.....
6. Ward - ..... **BHT**- .....
7. Clinical history and examination findings-

   .....

   .....
8. Radiological findings(USS/CT/MRI) and relevant blood investigations (CRP/ESR/WBC) -

   .....

   .....
9. **Clinical diagnosis** - .....
10. Previous histology/FNAC if available(including lab ref. number) –

    .....

    .....
11. Requesting medical officers name and designation - .....
12. Contact number.....
13. Date and signature.....

Referring consultant -
(stamp)

(for laboratory use only)

Date of the specimen received – .....

Date of the reporting – .....

Report issued on - .....

Figure 2. New histopathology request form

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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REVIEW ARTICLE

Critical care management in burns: a review of current evidence and guidelines - Part 2

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Keywords: Burns; severe burns; critical care; burns resuscitation; fluid resuscitation

Abstract

Recent literature on the management of critically ill patients has altered the beliefs and clinical behaviours, questioning many dogmas that were practised without much evidence. The critical care in a severely burn-injured patient requires special attention in resuscitation, haemodynamic monitoring, management of complications, organ support and determinants of outcome. The goal of resuscitation is to maintain intravascular volume and tone while correcting the reversible changes in altered physiology, aided by early debridement of burned tissue and elimination of the source of physiological derangement. Practitioners should target resuscitation based on goal-directed therapy using non-invasive markers of cardiac output. The management requires the input of a multi-disciplinary team to achieve critical care and early surgical intervention and management of complications and organ support.

Introduction

Recent literature on the management of critically ill patients has altered the beliefs and clinical behaviours, questioning many dogmas that were practised without much evidence [1]. Furthermore, the fundamental understanding of critical care in terms of fluid management, haemodynamic monitoring, management of acute respiratory distress syndrome (ARDS), organ support and nutrition support are changing [1, 2]. The goal of resuscitation is to maintain intravascular volume and tone while correcting the reversible changes in altered physiology, aided by early debridement of burned tissue and elimination of the source of physiological derangement. The definition of severe burns is based on the surface area (20% excluding superficial burns), presence of inhalational or electrical injury, patients' age and comorbidities [3]. The critical period in burns is usually transient, lasting for a few days. However, may include intermittent episodes of deterioration based on burning related complications. This review focuses on the contemporary literature on the critical care of severe burns once the patient has been stabilised after the initial injury. The review consists of two parts and the first part focusses on fluid resuscitation, goal-directed fluid therapy, haemodynamic monitoring and coagulopathy in severe burns [4]. The second part describes aspects such as thromboprophylaxis, the role of suppressing hypermetabolism, glycaemic control, nutritional support, sepsis and infection control, management of inhalational injuries, surgical debridement, pain management and palliative care in severe burns.

Methods

We performed a literature search on PubMed and Google Scholar and looked for published original articles, review articles and guidelines on critical care management in burns, up to November 2019. Our search was limited to articles in English. Correspondence, dissertations and unpublished materials were not considered. The information was summarised and presented qualitatively (narratively) under subheadings.

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Received: 11-01-2020 Accepted: 05-11-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8788

Thromboprophylaxis in burns

Deep vein thrombosis (DVT) and associated embolic events play a major role in burn patients' morbidity and mortality. A nationwide study including 36,638 burn patients showed a DVT rate of 0.8% with identifiable risk factors such as more than 20% burn surface area, old age, use of blood and blood products, mechanical ventilation and previous similar events [5]. Prophylactic use of heparin has shown benefit in thromboprophylaxis in burn patients [6]. Although prophylactic treatment is indicated, the need for surgical interventions such as burn wound excision and grafting may limit the use of pharmacological agents. There are controversies regarding the dosage of these agents because of burn associated hypermetabolism and fluid shifts which may alter the volume distribution. Apart from pharmacological agents, measures such as compression devices, early mobilization and physiotherapy are helpful in the prevention of DVT [5].

The role of suppressing hypermetabolism in severe burns

Hypermetabolic response or metabolic response to trauma is a recognized entity in all types of trauma. The magnitude and the duration of the hypermetabolic response in burn patients differ from other types of trauma [7]. Various stimuli such as burn wounds, pain, thermal changes, and hypovolemia act as triggers for a hypermetabolic response. These result in the activation of the sympathoadrenal and hypothalamic-pituitary-adrenal axes triggering a cascade of catabolic processes [7]. The response is evident by increased blood pressure, heart rate, temperature, and protein and lipid catabolism. The hypermetabolic response is categorised as the ebb phase and flow phase. Initial decreased cardiac output, temperature and metabolic rate are seen in the ebb phase. A gradual increase in the metabolic activity is characterized in the flow phase which is observed after 48hrs of burn injury. The duration of this phase is variable and may last even years after the initial insult [8]. The intensity of the response correlates with the burn surface area above 15 percent and is almost always associated when the area exceeds 40 percent [7]. Early recognition and treatment are important in the improvement of the overall outcome of the burn patients [9]. In the treatment process, attenuation of the metabolic response can be achieved by minimizing the stimuli and modulating the response. Initial adequate fluid resuscitation for tissue perfusion, pain management, prevention of hypothermia and proper timely nutritional support has shown to minimize the stimuli for a metabolic response. A meta-analysis has shown that early excision of burn and grafting is an important strategy to minimize the stimuli for metabolic response [10]. It also prevents the risk of associated infectious complications of burn wounds. For the modulation of the hypermetabolic response, several pharmacological agents have been studied. A systematic review of 15 randomised trials had shown that anabolic steroids like oxandrolone were beneficial in the modulation of protein catabolism and improving wound healing in burns over 20 percent burn surface area [11].

Significant lowering of insulin-like growth factor-1 (IGF-1) is associated with severe burn injury and its replacement is proven to be associated with better outcomes [12]. Replacement of IGF-1 reduces gut atrophy and bacterial translocation after severe burns. Furthermore, the hypermetabolic response is modulated and protein catabolism is reduced while augmenting anabolic response [12]. Moreover, it improves immune function while decreasing the inflammatory response due to severe burns. Therefore, considerable emphasis is being given to the utility of IGF-1 in the management of severe burns [12]. Beta-blockers such as propranolol cause blunting of effects of increased catecholamines have also used in burn patients [13].

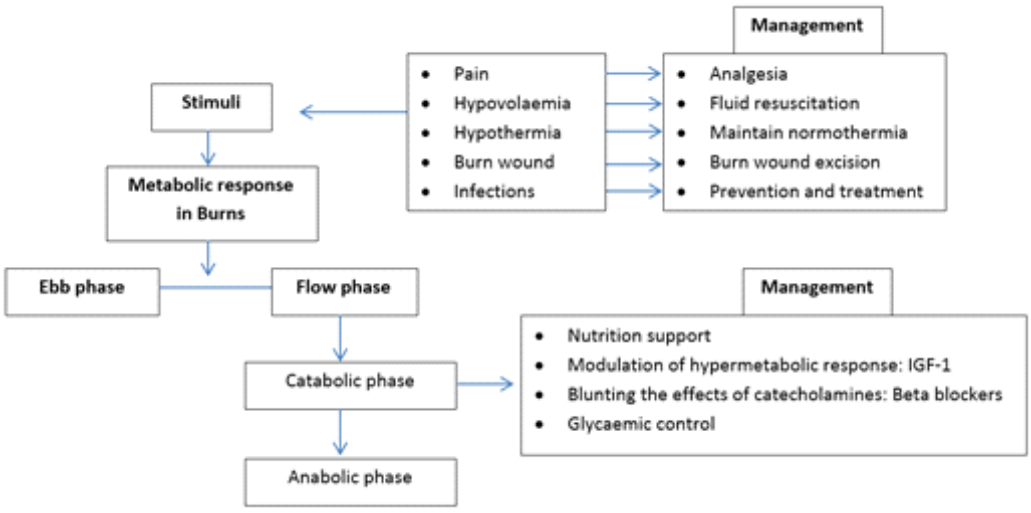

Figure 1. Modulating hypermetabolism in severe burns

Management of hypermetabolic response is multimodal and early recognition and treatment improve the outcome (Figure 1).

Glycaemic control in severe burns

Glycaemic control plays a crucial role in burns to minimize the hypermetabolism and provide adequate nutrition for recovery process following burns. Because of the burn associated stress response, there is increased catabolism as well as peripheral insulin resistance causing an increase in the blood glucose level. Blood glucose potentiates the inflammatory response of the hypermetabolic state by oxidative stress and insulin provides counter inflammatory effect by minimizing macronutrients induced inflammation [14]. Insulin also increases muscle protein synthesis and thereby improves the wound healing at the donor site and lean body mass in burn patients [15]. A reduction in post-burn infection and related mortality was also noted [16].

Similar to another critically ill patient, maintenance of glycaemic control in the desired range is important in burn patients. Although the exact range is uncertain, a systematic review on the effectiveness and safety of intensive insulin treatment and secretagogues showed that a moderate control of glucose level (130-150mg/dL) in adults was beneficial [17]. The above-mentioned control was achieved by the continuous insulin infusions but such management inward setting may be difficult because of the need for intermittent fasting for multiple surgical procedures and the workload [9]. Therefore, the desired range of less than 180mg/dl with avoidance of hypoglycaemic episodes is recommended in the ward setting [18].

Nutritional support in severe burns

Nutritional support is essential for the burn patients because of the hypermetabolic state and increased demand for nutrients. Individual factors such as moderate to severe burns more than 10-20 percent depending on the age, patients with inhalational injury and obesity are recognized as indications for nutritional support [19, 20]. Therefore, most patients with severe burns would require nutrition support. Although there are no specific guidelines on burns nutrition, the expert consensus of American Society for Parenteral and Enteral Nutrition (ASPEN) guidelines advise for early initiation of enteral feeding in burn patients [21]. It was observed that enteral nutrition was associated with fewer infections and lesser metabolic derangements in burn patients compared with parenteral [22]. However, haemodynamic status should also be considered because of mesenteric ischemia associated ileus may hinder the tolerance of enteral feeding.

Concerning enteral nutrition in critically ill patients, there is an on-going debate about gastric versus postpyloric feeding. Factors for gastric feeding are the easy placement of the tube, the achievement of gastric decompression and reduced diarrhoeal episodes but gastric stasis and risk of aspiration are associated complications. However, a meta-analysis in critically ill patients (not specific to burns) showed similar outcomes between gastric and post-gastric feeling in terms of mortality but with increased risk of aspiration pneumonia associated with gastric feeding [23]. Such evidence on the type of enteral feeding is limited among severe burns patients.

Although there are many different methods to calculate the nutrition requirement, Curreri formula is one accepted worldwide which considers weight, burned surface area and age. In addition to the calorie requirement, micronutrients and electrolytes should also be considered. Modification of this enteral nutrition with immune nutrition is also considered. Glutamine has a proven beneficial in burn patients for the lower rates of gram-negative bacteraemia and reduction in-hospital mortality rates [24].

The exact timing of discontinuation is variable because of the flow phase of hypermetabolic response may last years after the insult. Therefore, individual decisions should be made considering the anthropometric measurements such as weight, clinical and biochemical evidence of nutritional deficiency which may suggest the need for prolonging supplementation [25].

Sepsis and infection control in burns

Burn injury-related damage and secondary consequences of physiological derangement with altered immunity cause increased susceptibility for infections [26]. Infection-related morbidity and mortality remain a major problem in managing burn patients. Causes for infection may be broadly categorized in to burn wound infection and other infections. Non-burn wound-related infections are common due to the hypermetabolic response and the altered immune mechanisms. Inhalational injury, chest burns and inadequate ventilation increase susceptibility for pneumonia [26]. Invasive monitoring devices such as urinary, arterial and venous catheters act as portals of entry for infections. Loss of barrier function of the skin after burns facilitate the entry of the organisms and loss of commensal flora causes an overgrowth of invasive pathogens[26]. Avascular necrotic protein-rich material also acts as a good culture medium for bacterial growth. Type of organism depends on the timing of infection, location and patterns of microbial infections in the local setting. Due to the pathophysiological alterations in burns, conventional clinical features of infection and sepsis such as hyperthermia, tachycardia and hypotension are unreliable [26]. A high index of suspicion to identify features of infection and identification of source is the key step in management. Newly developing feeding intolerance can be

taken as a surrogate marker of probable infection [26]. Changes in the wound integrity, degree of involvement, loss of skin grafts and local features of inflammation may suggest burn wound infection. Depending on the degree of microbial invasion, colonization, non-invasive or invasive infections may result. This eventually leads to burns sepsis and organ dysfunction when it is coupled with the systemic inflammatory response in burns.

Infections may be confirmed by the histopathological evaluation and microbial cultures with a bacterial count >105 bacteria per gram of tissue[26]. Other markers such as leucocytosis, leukopenia, thrombocytopenia, and elevated acute phase reactant like C-reactive proteins may be also observed. However, the specificity is very limited due to the concomitant systemic inflammatory response in burns. Procalcitonin as a maker of infection was also studied in a meta-analysis of burn patients and cut off value of 0.53-3 ng/ml was determined with widely variable sensitivity and specificity [27]. Lactate level is essential in the diagnosis and monitoring in burns sepsis and is an important early predictor of morbidity and mortality [28]. Early burn wound excision and coverage is a proven strategy for prevention of burn wound infection and management. Empirical antibiotic treatment after obtaining appropriate cultures from the clinically suspected source of infection and later de-escalation of treatment depending on the culture and sensitivity pattern is compulsory in the treatment of infections. A systematic review which analysed evidence between 1996 to 2016 revealed no benefit in prophylactic antibiotics for prevention of burn wound infection prevention other than burn wound excision and burn reconstruction procedures [29]. Preventive strategies include hand hygiene, prevention of faecal and urinary soiling [26].

Management of inhalational injuries and acute respiratory distress syndrome (ARDS)

Compromised breathing and ventilation are associated with burn injury. Inhalational injury-related changes in the airways and lungs, acute respiratory distress syndrome (ARDS), systemic chemical effects such as carbon monoxide poisoning are recognized causes of hypoxemia (Figure 2). Reduced level of consciousness and full thickness circumferential chest burns may also cause impaired ventilation. Furthermore, full thickness abdominal burns may result in abdominal compartment syndrome and restrict the diaphragmatic movement resulting in impaired ventilation. Elective early intubation and securing the airway is important in patients with inhalational injury to prevent delayed complications and before transfer [30].

The place for bronchoscopy and broncho-alveolar lavage in the diagnosis and treatment of inhalational injury was also studied [31, 32]. Bronchoscopy allows visualization of the upper airway and proximal parts of lower airways and may be useful in suctioning of debris. Studies have shown the correlation between bronchoscopy classification of severity of the inhalational injury and in-hospital mortality and duration of the mechanical ventilation[31]. In severe subglottic inhalational injuries, bronchoscopy and pulmonary

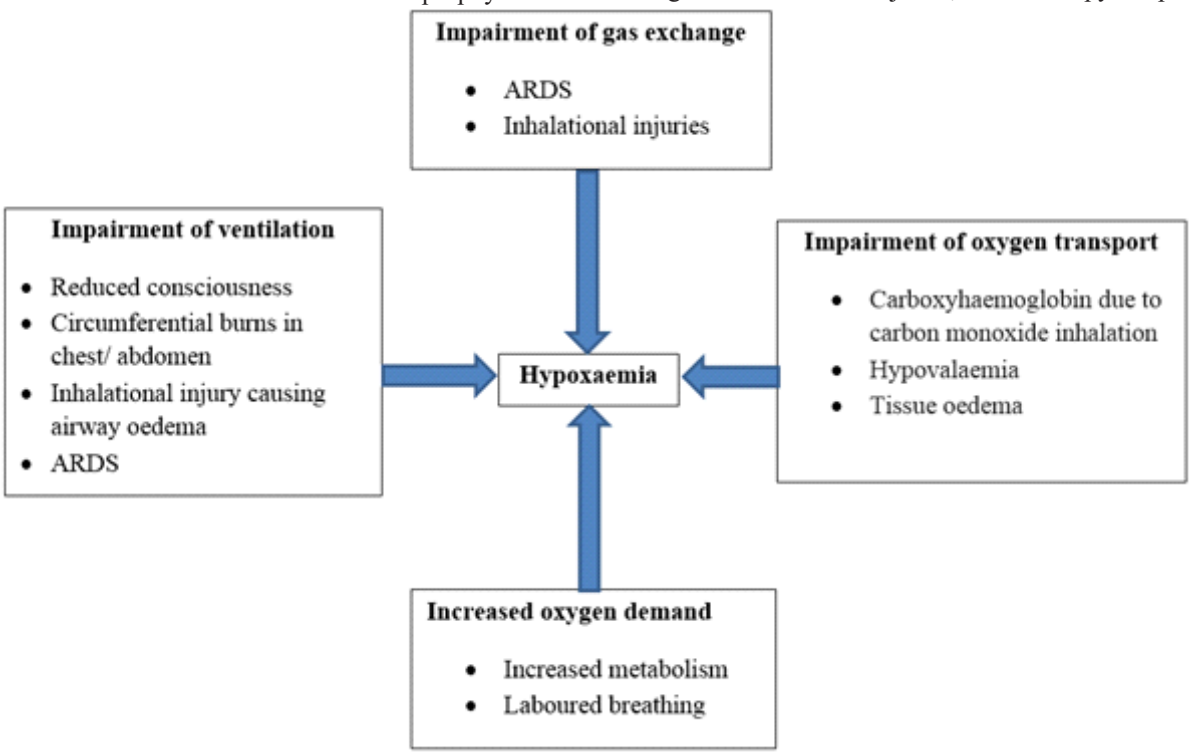

Figure 2. Mechanisms causing hypoxaemia following burns

toileting and nebulization using fibrinolytic and mucolytics were shown to be beneficial [32].

ARDS is a recognized complication with high mortality in burns. It is either due to the direct insult from inhalational injury or secondary to systemic hypermetabolic or inflammatory response. Burn patients with ARDS are managed with intubation and ventilation. According to the ARDS network study, lung protective ventilator strategies such as low tidal volumes, limited plateau pressures to prevent barotrauma have significantly improved outcomes [33]. However, patient with inhalational injury was excluded from this study. Some studies showed higher tidal volumes in ARDS treatment in paediatric burns patient showing better outcome but exact tidal volumes in burns are yet to determine [33]. The patient specific decision on the lowest tolerated tidal volumes and plateau pressures is advisable in burn patients. Other supportive treatment modalities like bronchodilators, mucolytic and chest physiotherapy can be administered [34].

Furthermore, a review of 56 studies showed benefits in bronchoscopy and pulmonary toileting, permissive hypercapnia and heparin nebulization as treatment modalities[32].

Early surgical treatment and soft tissue cover

Early surgical burn wound excision or debridement is an essential component in the initial burns resuscitation [35]. This is because the deep burn wounds are key in the pathogenesis of systemic inflammatory response syndrome and require early removal to aid in recovery [36]. The advances in burn injury pathophysiology, critical care, pharmacological interventions and organ support has improved survival and an increasing number of severe burns patients survive the initial injury. Therefore, the aspects in surgical care have shifted from achieving mere survival to rapid wound closure, scar quality, functional outcome and cosmesis [35].

The severely burned patients usually have burns of varying depth, each requiring different management approaches. Superficial burn wounds which include superficial epidermal and superficial partial thickness wounds do not require excision. Surgical scrub and covering the wound with a suitable dressing would suffice [36]. Deep burn wounds which include deep partial thickness and full thickness burns require early burn wound excision [36]. Burn wound debridement and coverage are done in the operating room once the patient has been haemodynamically stabilised generally within 24 to 72 hours following the injury [36]. The period required for full excision and burn coverage may depend on the extent of injury [36]. For burns with larger burn surface area techniques to achieve wound, the cover may include skin graft with wide meshing, temporary coverage using xenografts or allografts, donor site re-harvesting and the use of skin substitutes [36, 37].

Due to the limitations in skin grafting in severe burn patient such as poor healing and scarring of donor sites due to repeated harvesting, alternative strategies were developed to replace autograft [38]. The xenograft and allograft using cadaveric skin graft may be useful in the initial period as the immunity is low in the critically ill burns patient. However, with recovery, patients regain the immunity resulting in rejection, requiring repeated autografts. This lead to further research and development of biodegradable materials as temporary skin cover and composite cultured skin [38]. These have shown promising results in a selected group of burns patients. Further large scale studies are needed before incorporating into routine practice. However, the high cost limits its use in developing countries with limited resources.

Pain management in severe burns

Good pain control is essential for the comprehensive burn care from initial insult to long term recovery. However, the control of pain may be challenging for the treating physician. The pain related to burns is classified as background pain and procedural pain [39]. The treatments for burn wounds may cause considerable procedural pain than the initial insult itself [37]. The pathophysiological mechanisms can be classified as nociceptive pain, neuropathic pain and pain due to psychosocial distress (Figure 3). Therefore, a multimodal approach is needed to approach burn pain. Objective pain assessment, understanding of pathophysiology, multi-modal pharmacological interventions with opioids as the mainstay and compassionate attention to psychosocial contributors to pain such as anxiety are required for pain management [39]. Better outcomes in healing and rehabilitation are associated with good pain control in burns [37].

Mild analgesics that show a ceiling effect in the dose-response relationship such as acetaminophen and NSAIDs are usually not suitable for severe burns [40]. Ketamine is useful in severe burns due to its potential advantages in anaesthesia such as haemodynamic stability, preserving airway patency and hypercapnic and hypoxic physiological responses [40]. Management of anxiety with the use of anxiolytic agents in addition to opioids is useful in severe burns. Benzodiazepines in conjunction with opioids are associated with better control of background as well as procedural pain [40]. There is increasing evidence of the effectiveness in novel non-pharmacological techniques such as cognitive behavioural therapy, hypnosis and distraction techniques in burns, with specific emphasis on the reduction of procedural pain and anxiety [41].

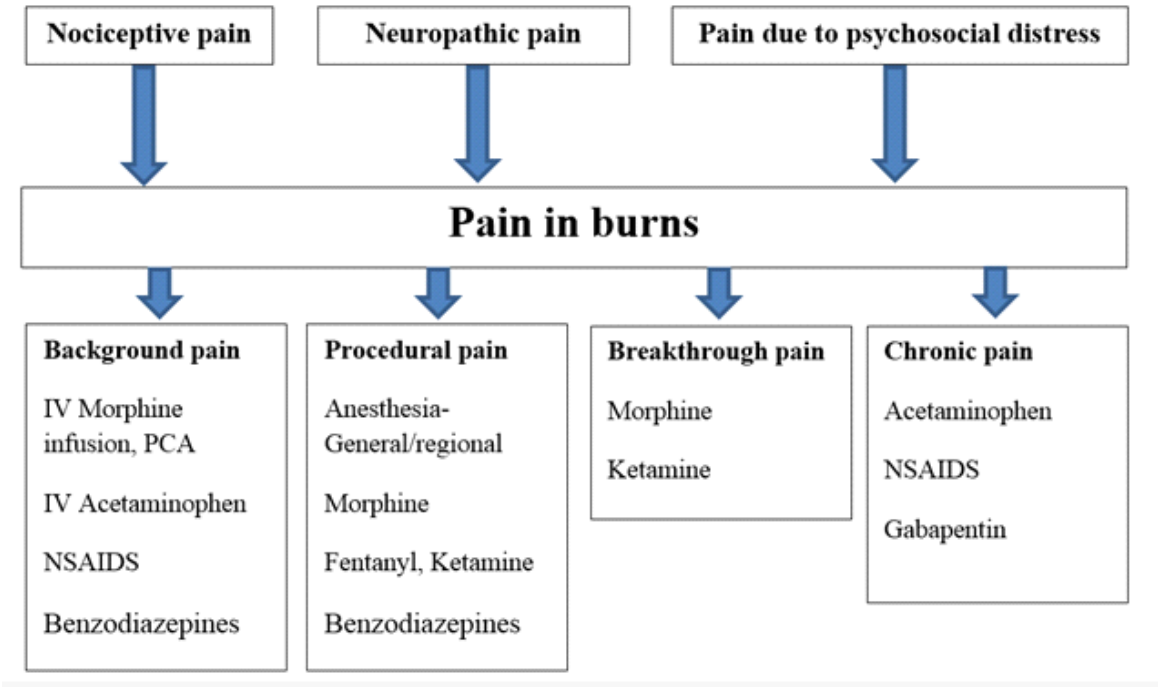

Figure 3. Mechanisms and types of pain in burns

Palliative care in severe burns

Despite the advancements in the approach to burns management, severe burns carry increased mortality. In some cases, the futility of treatment may have to be considered and discussed early by a multi-disciplinary team. Involvement of the palliative care specialists should be included if feasible to provide patient comfort and end-of-life support [37]. The protocols for the selection of patients for palliative care should be institution-specific based on the sound clinical judgement if salvage is possible depending on burn related factors and patients' comorbidities.

Conclusion

Inappropriate resuscitation may be common among burns patients. Practitioners should target resuscitation based on goal-directed therapy using non-invasive markers of cardiac output. The pathophysiological mechanisms and the definition of systemic inflammatory response syndrome (SIRS) and sepsis are different in the burns patient.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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REVIEW ARTICLE

The utility of colonoscopy after acute appendicitis in those over 40 years

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Keywords: Acute appendicitis; colonoscopy; colorectal cancer; a systematic review

Abstract

Introduction

Acute appendicitis in older patients is less frequent and may be secondary to an underlying right colonic malignancy. This dictates the practice of performing colonoscopy in these patients after the resolution of appendicitis or appendicectomy, however, the evidence for this is limited. The objective of this study was to assess the utility of early colonoscopy (i.e.<3 months) to diagnose colonic cancer in older patients (>40 years) following acute appendicitis.

Methods

PubMed, Embase, Cochrane Library and Google Scholar were searched using the search terms 'colonoscopy' OR 'malignancy' OR 'tumour' AND 'acute appendicitis'. Data regarding the proportion of older patients (>40 years) after acute appendicitis who were detected to have a right colonic malignancy at follow-up colonoscopy within 3 months were analysed.

Results

The studies included patients from age 40-96 years (male:female=1.2:1). Colonoscopies were performed over a variable period of up to 3 years after appendicitis. None of the included studies addressed the main outcome measure sought. Instead, patients were followed up for periods ranging from 12–53 months. During this period, the incidence of colonic cancer ranged from 0.7-2.9% (mean=1.7%) which was considerably higher than that of the general population.

Conclusions

The risk of colorectal cancer development in this population over subsequent years appears to be higher than the general population. The utility of early colonoscopy in older patients after acute appendicitis is unclear from the available data and recommendations can only be made after appropriate prospective studies are done.

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https://orcid.org/0000-0002-6874-6904
Received: 03-08-2020 Accepted: 22-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8723

Introduction

Acute appendicitis is one of the commonest causes of an acute abdomen [1] with an estimated lifetime risk of 7.6% to 8.6% [2]. Though the majority of appendicectomies are performed in those below 40 years, about 30% are done in patients aged over 40 years [3]. Luminal obstruction by faecoliths, lymphoid hyperplasia, parasites or neoplasms at the appendicular base are believed to be mechanisms in the causation of acute appendicitis [4].

Conventional doctrine is that acute appendicitis in the elderly may be a harbinger of a caecal [5] or right colonic tumour [6]. The pathogenesis for this is thought to be luminal occlusion of the appendix by tumour infiltration, peri-tumoural inflammatory changes or raised intraluminal pressure in the caecum caused by a distal colonic neoplasm [7]. Moreover, the incidence of colon cancer is increasing in both developing and developed countries [8]. This logic leads to the practice of performing an early colonoscopy in those over 40 years following appendicectomy [9]. However, evidence and recommendations to support this practice are scarce, leading to a lack of consensus and variability in care pathways [10, 11]. Current guidelines anyway recommend population based endoscopic screening for colorectal cancer in those above the age of 50 [12, 13]. This is pragmatic since in a normal population the detection rate of advanced adenomas in 40 - 49-year-olds is significantly less compared to the over 50-year-olds [12]. However, in patients after acute appendicitis in the corresponding age groups detection rates may be higher warranting early colonoscopy.

The objective of this systematic review was to validate the above practice by exploring the incidence of caecal or right colonic tumours detected by early colonoscopy (i.e. within 3 months) in older patients after acute appendicitis.

Materials and methods

PubMed, Embase, Cochrane Library and Google Scholar were searched using the search terms 'colonoscopy OR 'malignancy' OR 'tumour' AND 'acute appendicitis' in the title or abstract fields without any restriction on date limits. A non-English language database, APAMED Central, was searched

but did not reveal any studies relevant to the study question. The reference lists provided in full papers were also used to identify additional papers for review. The last date of the search was 31st March 2019. Both experimental and observational studies that considered the association of colonic neoplasms and acute appendicitis and the use of early colonoscopy (i.e. within 3 months) in older (more than 40 years) patients were included. Case reports were excluded from this review.

The title and abstracts were independently screened by two authors. Full texts of selected articles were reviewed, and eligible studies were identified. Data from individual studies were tabulated including the location of the study, basic demographic data of the patients, the use of colonoscopy and the percentage of malignancies detected during the follow up period. The primary outcome measure was the proportion of older patients detected to have a colonic malignancy on colonoscopy within 3 months of acute appendicitis. The secondary outcome was the overall incidence of colonic tumours in older patients following acute appendicitis.

Only a few studies observed the proportion of malignancies associated with acute appendicitis in the older population. There were no large scale prospective or case-control studies among them. They were mainly comprised of retrospective analyses and one prospective study.

Qualitative analysis was performed using the extracted data from the included studies and data were expressed as frequencies and percentages. A quantitative analysis (meta-analysis) could not be performed due to the study heterogeneity. Risk of bias analysis was performed according to the Downs and Black checklist and the findings are shown in table S1 [14].

Results

Forty-nine (49) studies found using the search strategy were screened for eligibility. The process of assessment and exclusion is summarised in the PRISMA flow chart (Figure 1). Only 11 studies were found to be suitable, analysing the proportion of colonic malignancies associated with acute appendicitis. Of these, 9 studies assessed the proportion of colonic malignancies detected immediately or subsequently after appendicectomy in patients over 40 years (Table 1) [5, 7, 10, 11, 15-19]. Two large population based studies from Taiwan analysed the risk of developing a subsequent malignancy in patients of all ages in the 12 months follow up period after appendicectomy [3, 20].

Excluding the two large population based studies, there were 4555 appendicectomies reported in patients over 40 years (age range: 40-96 years). The mean patient age in individual studies ranged from 56 - 72 years with a male to female ratio of 1.2:1.

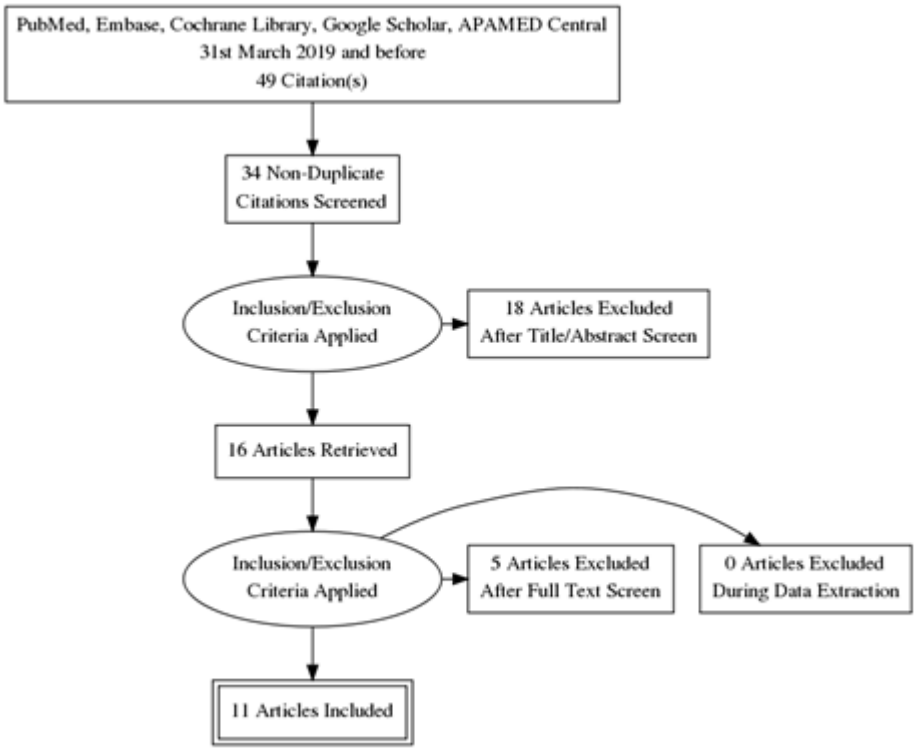

Figure 1. Prisma flow chart

The proportion of patients over 40 years who had a colonoscopy after appendicitis was highly variable (1.1-100%, within 2-3 years). Importantly, there were no studies that specifically addressed our primary outcome i.e. the detection of a caecal or colonic tumour at early colonoscopy (i.e. within 3 months) following acute appendicitis. However, a study by Lai et al detected colonic malignancies at or shortly after appendicitis using histology from intraoperatively detected tumours or subsequent computed tomography in others. Of the 16/1873 (1.76%) patients who were found to have a colonic malignancy, 8 were detected in the first 4 months. Thus a proportion of 0.88% of older patients was found to have colonic cancer within the first 4 months following acute appendicitis. Studies from Sweden, Australia and Taiwan showed that those after appendicitis had a 6.3 - 38.5 fold increased risk of developing colorectal cancer compared to the general population (Table 1) [10, 11, 16]. The overall incidence of colonic tumours in elderly patients after appendicitis was 1.7% (range: 0.7 - 2.9%) over a follow up period of 12 to 53 months. The 5 studies that compared the post-appendicectomy group to age and gender matched controls in the general population showed a considerably higher incidence of colorectal cancer in the former.

A large population study from Taiwan compared the incidence of colorectal cancer in the group following appendicectomy to that of the general population [20]. The overall incidence of colorectal cancer was 14% higher in the post-appendicectomy cohort compared to the general population of 1.5-3.5 years after appendicectomy with a hazard ratio of 2.13. Men were at higher risk than women [20]. A subsequent study by the same investigators compared 130,374 patients who underwent appendicectomy, with no previous diagnosis of cancer with a control group of 260,746 persons from the same database and assessed the incidence of malignancies within the subsequent year [3]. Interestingly, the study found a more than 4-fold increase in all cancers in the appendicectomy group over the control group (9.06 vs. 1.96 per 1000 person-months) with gastrointestinal and female genital tract malignancies accounting for 80% of the cancers. Furthermore, the hazard ratio was highest for female genital cancers followed by colorectal cancers, small intestinal cancers, pancreatic cancer and lymphomas.

A preponderance of right colonic malignancies was reported by most studies (Table 1). In contrast, the population based study from Taiwan showed that the incidence was highest for rectal cancers and lowest for caecal and ascending colon tumours in both the post-appendicectomy and general population [20].

Only one study performed a subgroup analysis between two age groups, i.e. 40-54 years and 55 years and above. The study detected a caecal cancer rate of 1.6% in the 55 years and above age category while no malignancies were detected in the 40-54 years.

Discussion

The objective of this systematic review was to evaluate the utility of performing a colonoscopy within 3 months of acute appendicitis in patients above 40 years to detect a causative or associated caecal or colon cancer. However, there was no evidence in the literature available and reviewed to support this 'common sense' practice.

Whilst none of the studies describe the findings of early colonoscopy after appendicitis, several details the incidence of colorectal cancer in this cohort of patients in the subsequent 2 to 3 years. Though not the primary outcome measure of this study, it was interesting to note that the incidence of a subsequent colorectal malignancy was approximately 1.7% compared to 0.03 - 0.4% in the age matched normal population [10, 11]. While this requires further prospective study, it raises the question of surveillance for colorectal cancer in this cohort of patients and the possible role of the appendix in colonic mucosal protection.

The pathophysiological basis for the correlation between a history of acute appendicitis or appendicectomy and subsequent colorectal cancer development requires clarification. Post-appendicectomy colonoscopy in the elderly is performed on the premise that either direct obstruction or peritumoral inflammation somehow initiates appendicitis.

However, this does not explain the increased incidence of cancer distributed along with the entire large bowel including the rectum noted in this study. More significant, though only described in the large population based Taiwanese study, is the observation of an increased incidence of extra-colonic tumours, especially female genital tract malignancies, in the post appendicectomy group. This raises interesting questions on the potential role of the appendix in tumour immunity. The appendiceal biofilm is believed to be beneficial to gut health [21] and the loss of the immunological functions of the appendix could be a plausible explanation for subsequent tumourigenesis. Furthermore, the previous appendicectomy was associated with a higher incidence of local fixity, abdominal wall invasion, poor differentiation and metastatic spread of colonic cancers [22]. It also was an independent risk factor for low survival rates and poor prognosis for patients who subsequently developed carcinoma of the caecum [22].

Most studies in this review showed the distribution of malignancies the following appendicectomy to predominate in the right colon. However, the population-based study from

Table 1. Summary of findings of studies included in the systematic review

Author	Year	Location	Study period	Study type	Design	N	Colonoscopy	Colorectal cancer N (%)	Site of tumour	Comparison with normal population
Pedersen[5]	2018	Norway	2010-2015	Retrospective study	Colonoscopy within 3 years after acute appendicitis in patients >40 years of age	731	316 (43.2%)	9 (1.20%)	4-caecum, 3-ascending, 2-rectum	NA
Mustaev[13]	2015	Australia	2002-2014	Retrospective study	Colonoscopy within 2 years after acute appendicitis in patients > 50 years of age	318	63 (19.8%)	8(2.50%)	7-right sided	NA
Lai[9]	2006	Taiwan	1998-2003	Retrospective study	Patients > 40 years found to have colon cancers immediately or subsequently (0-53 months, median 5.8 months) after appendectomy	909	NA	16(1.76%), 8(0.88%) within first 4 months	7-caecum, 3-ascending colon, 2- transverse, 2-sigmoid, 2-rectum	The odds ratio of colon cancer incidence had a 38.5-fold increase among patients older than 40 years. (Incidence is normal population: 0.03%)
Khan[7]	2013	Ireland	2005-2011	Prospective study	Patients >40 years were evaluated with CT scan and 2 underwent colonoscopy	179	2 (1.1%)	2(1.10%)	1-caecum, 1-apendix	NA
Shine[10]	2017	Australia	2003-2015	Retrospective study	Patients ≥45 years with appendicitis were analysed to find the rate of colorectal carcinoma diagnosed during the 36-month follow-up period	541	74 (11%)	15(2.70%)	4-appendix, 6-caecum, ascending/transvers-2, rectum/sigmoid-2	6.3-fold risk than the normal population. (Incidence in the age-matched normal popular-tion:0.4%)
Arnbjörnsson[14]	1982	Sweden	1980	Retrospective study	Patients ≥40 years with appendicitis were analysed to find the rate of colorectal carcinoma diagnosed during the 36-month follow-up period	561	NA	16(2.90%)	NA	29-fold risk than normal age matched population. (Incidence in the age-matched normal popul-ation:0.1%)
Dhadlie[15]	2018	Australia	2017-2018	Retrospective study	Colonoscopy within 2 years after acute appendicitis in patients >50 years of age	43	43 (100%)	1(2.30%)	1-hepatic flexure	NA
Bizer[16]	2013	USA	1973-1992	Retrospective study	Patients ≥65 years with appendicitis were analysed to find the rate of concomitant caecal or appendiceal carcinoma	218	NA	4(1.80%)	all-caecal cancer	NA
Mohamed [17]	2019	UK	2004-2014	Retrospective	Patients > 40 years with appendicitis were analysed to find the rate of caecal pathology	1055	NA	7 (0.7%)	All-caecal cancer	NA
Wu[3] (all cancers)	2015	Taiwan	2000-2009	Retrospective population-based study	130,374 patients (all ages) newly received appendectomy from 2000–2009, without cancer were compared with a control sample of	130374	NA	446(0.34%)	NA	HR of 14.7 (8.66-25.0). Incidence in the control group:0.038%)

					260,746 persons and the risk of development of cancer in the next 12 months was calculated					
Wu[18] (colorectal cancers)	2015	Taiwan	1997-1999	Retrospective population-based study	75979 patients who underwent appendectomy between 1997 and 1999 were compared with age, sex and comorbidity matched 303640 persons without appendectomy and subsequent colorectal cancer incidence was studied	75979	NA	375(0.49%)	7-Caecum-ascending colon, 24-hepatic flexure-transverse colon, 11-splenic flexure-descending colon, 48-sigmoid, 159-rectum, 63-others, 63-mixed	The incidence of colorectal cancer was higher in 1.5-3.5 years post appendectomy follow-up than for the comparisons (HR of 2.13)

Table 2. Availability of information in the studies included in relation to the objective of the systematic review

Author	Colonoscopy within 3 months mentioned	Subgroup analysis of age given	Proportion of patients who underwent colonoscopy given	Distinction between caecal, and other tumours given	Comparison with general population given
Pedersen[5]	No	No	Yes	Yes	No
Mustaev[13]	No	No	Yes	No	No
Lai[9]	No	No	No	Yes	Yes
Khan[7]	No	No	Yes	Yes	No
Shine[10]	No	No	Yes	Yes	Yes
Arnbjörnsson[14]	No	No	No	No	Yes
Dhadlie[15]	No	No	Yes	Yes	No
Bizer[16]	No	No	No	Yes	No
Mohamed[17]	No	Yes	No	Yes	No
Wu[3] (all cancers)	No	No	No	No	Yes
Wu[18] (colorectal cancer)	No	No	No	No	Yes

Taiwan [20], showed a higher incidence of rectal cancer compared to right colonic tumours. This may reflect the inherently higher incidence of rectal tumours compared to right colonic malignancies in the general population [23, 24]. However, the reason for the discrepancies is not clear and requires further study.

Limitations

Most studies were retrospective and included small numbers. Only 5 studies mentioned the proportion of patients undergoing subsequent colonoscopies (Table 2). In the limited number of patients who underwent colonoscopy in the follow-up period the indication or selection criteria was not documented. Only 7 studies made the distinction between caecal and other tumours. Studies included patients detected to have cancer over a variable subsequent period of 12-53 months and therefore it may be possible to have included patients who developed cancer at a later stage. Subgroup analysis of different age categories was not possible with the available information as only one study had looked at it [19]. Some studies did not clarify the mode of colonic tumour detection, i.e. whether it was following investigation of symptoms or during screening. A meta-analysis was not done due to the heterogeneity of the selected studies.

Conclusions

The utility of early colonoscopy in older patients after acute appendicitis is uncertain from available data in this study and recommendations can only be made after prospective studies are done. Despite the absence of clear evidence, we believe it would be sensible to proceed with an early check colonoscopy in this cohort, considering that their numbers are anyway likely to be small.

Interestingly, the subsequent risk of developing colorectal cancer and possibly some extra-colonic cancers in this older group of post-appendicectomy patients appears to be considerably higher (approximately 1.7%) than the general population. Through this systematic review ultimately could not address the primary question about the importance of early colonoscopy in older patients after acute appendicitis, it revealed a possible association between acute appendicitis and subsequent increased risk of colorectal and extracolonic malignancies. This warrants further investigation so that recommendations on long-term colonoscopic surveillance and in cases of extra-colonic neoplasms other modes of surveillance may be considered. Besides, it warrants further study of the role of the appendix in tumour immunity.

This study was published as an abstract at Asia Pacific Digestive Week 2019 [25].

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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PERSPECTIVE

Impact of COVID-19 on postgraduate surgical training: the trainees' perspective

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Keywords: COVID-19; SARS-CoV-2; postgraduate surgical training; trainees' perspective

Introduction

COVID-19 was declared a global pandemic by the World Health Organization on 11th March 2020 [1]. As of 8th of December 2020, more than 60 million cases and 1.4 million deaths have been reported globally. In Sri Lanka, more than 28,000 cases and 140 deaths have been registered so far [2]. Moreover, Sri Lanka is currently facing a second major outbreak. COVID-19 pandemic has caused profound effects on almost all the aspects of modern human life, inducing the global economy and the livelihood of the general public [3, 4]. A significant impact on all aspects of health care including the surgical specialities has been observed [5]. With the ongoing global pandemic and lack of data on long term effects of vaccines, the future direction of the pandemic remains uncertain [6]. We aim to provide the trainees' perspective on the impact on postgraduate surgical training during the pandemic at local and overseas settings.

Impact on local surgical training

The impact on medical training has been observed in both undergraduate and postgraduate training programs. The initial outbreak of COVID-19 in Sri Lanka negatively affected postgraduate surgical training for over two months before the resumption of near-normal routine surgical services. The impact due to the current second outbreak may be more severe due to the wider spread within the community, possibly exceeding the chances of containment.

In surgical specialities, hands-on experience to develop technical skills is a crucial component among other aspects of training. Changes in the healthcare system were made to minimize potential exposure and spread among patients and staff members and to utilize the limited resources productively. This approach also avoided major disruptions of emergency surgical services. Limiting care to urgent cases resulted in a smaller number of surgical patients being assessed and operated by trainees. Patients awaiting elective surgeries wished to postpone the operation. An analysis of a number of routine cases performed during the first 11 months in 2019 and 2020 at both surgical units in District General Hospital Kegalle showed a reduction from 1574 to 1165 cases [a 25% reduction]. Some patients tend to default follow up due to the fear of exposure to the virus. Higher risk of exposure and transmission among surgeons and trainees when performing various types of surgeries and endoscopic procedures also led to limitations in laparoscopy and endoscopy procedures. In an international survey among trainees across 63 countries, approximately 94% experienced lesser case volume during the pandemic. The greatest reduction was seen for colonoscopy procedures [7]. Therefore, trainees faced limited exposure and hands-on training in these aspects. Lectures, conferences, other educational activities were also limited to minimize transmission. Trainees were also facing difficulty in conducting clinical research due to the reduced patient load and risk of exposure to the virus. Depending on the prevalence of the disease, there were regional variations of the above mentioned factors. For example, an analysis of a number of admissions during the first 10 months in 2019 and 2020 in a surgical ward in District General Hospital Chilaw showed a reduction from 6081 to 3868 cases [a 36% reduction], whereas, in Base Hospital Horana, a reduction from 3969 to 3511 [an 11.5% reduction] was seen.

The impact on training also depends on the stage of surgical training and the subspecialty. The first year of the pre-MD training program mainly focuses on acquiring basic surgical skills and knowledge of fundamental surgical concepts. Clinical rotation with shorter durations has been affected more than those with relatively longer durations where there is time for some degree of compensation. For example, trainees doing short appointment of one or two months during the lockdown with theatre restrictions were exposed to a fewer number of cases. In a tertiary care urology unit at Colombo South Teaching Hospital, the average number of cases per month reduced from 64 to 30 [greater than 50% reduction] during theatre restrictions. The trainees awaiting foreign training after completion of local training are also affected. The risk of travelling to disease prevalent countries,

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DOI: http://doi.org/10.4038/sljs.v38i3.8769

delay in processing the requirements and completion of training are some of the negative consequences. The MD Surgery examinations have been standardized and well recognized by the international surgical community. Due to the current travel restrictions, difficulties have been encountered in inviting foreign examiners to maintain the standardization procedures.

Challenges faced by the overseas trainees in the UK

Overseas training is often challenging for many surgical trainees due to the differences in the patients, trainers, setting and completely different living environment. In addition, the effects of the ongoing pandemic caused unexpected greater challenges for the trainees.

National Health Service [NHS] in the UK is a highly organized functional unit which spends billions of pounds annually to cater the public health needs. Despite the existing strategies and resources, most departments struggled to continue their routine activities when hospitals were flooded with COVID patients during the pandemic. Except in highly specialized surgical units in a limited number of hospitals, all others units were forced to make a difficult decision to cancel or postpone their elective surgical activities including theatres, clinics and multidisciplinary team meetings. Although emergencies could carry on, most patients were managed conservatively with minimal operative input. In a global online survey on the treatment of acute appendicitis, conservative measures for uncomplicated and complicated appendicitis were utilised by 2.4 and 6.6 % of surgeons respectively before, but 5.3 and 23.7 %, during the pandemic [8]. The main goal of overseas training is to broaden the horizons of existing knowledge with new experiences and techniques in the field of interest. However, this was severely affected during the COVID pandemic. Most trainees were re-deployed as ward doctors or to a speciality of need, hampering the surgical training and acquisition of surgical skills. Some were deployed to the front-line of managing non-surgical COVID patients without proper training, and initially, without adequate personal protective equipment.

The safety of the family was a major concern. Most trainees living with their family in the UK lived in fear of exposing their family to the virus when returning home after working in a high-risk environment. This included the more vulnerable elderly parents and relatives who were forced to stay in the UK until the travel restrictions were sorted. Due to the travel restrictions, reaching the family in Sri Lanka was not possible in case of an emergency. Living in an unfamiliar environment with restricted travelling and leisure activities during lockdown resulted in increased levels of psychological stress, especially among the children.

It is likely that COVID-19 will affect the future overseas trainees as well. Most of the trusts may extend the contracts of existing local employees, which often closes doorways to overseas trainees. As most hospitals are facing financial difficulties, the recruitment of new overseas trainees may become limited.

Positive aspects amidst the COVID-19 pandemic

Every dark cloud has a silver lining, and similarly, COVID 19 has taught some important lessons that cannot be ignored. Irrespective of the initial struggle, we witnessed the adaptive capability of the health sector in general, both in Sri Lanka and overseas.

The trainees received experience working in a resource-limited setting with reduced staff. With the above limitations, prioritization of theatre lists and other surgical care was another aspect of learning and experience. With the limited number of the caseload, trainees received more supervision during surgery while operating with the consultants than engaging in clearing out heavy theatre lists. Operating with personal protective equipment was also a challenging new experience with the limitation in ergonomics and visual perception. Due to a reduction in clinical work and responsibilities, trainees had more time for writing, research, self-study, leisure time activities and family commitments.

The efforts to mitigate the negative effects in surgical training were carried out by the College of Surgeons, Postgraduate Institute of Medicine and various other clinical societies locally and internationally. Web-based video conferencing to facilitate educational activities were carried out in different forms like case-based discussions and topic discussion. The annual academic sessions were held virtually which gave a different experience to the surgical community. Many academic societies granted free access to their resources and learning materials to improve medical education worldwide. Improved availability and free access to operative video libraries and the development of comprehensive online learning programs by leading surgical colleges and institutions were welcome changes. Advantages of web-based activities also include cost-effectiveness of conducting activities for the organizers and also for the participants.

Although the usual clinical researches have been affected by the pandemic, web-based global platforms have given opportunities for the surgeons and surgical trainees to engage in collaborative researches [9, 10]. During this pandemic, the COVIDSurg Collaborative conducted evidence-generating global studies with the collaboration of surgeons and surgical trainees globally using a web-based platform [11, 12].

Conclusion

Surgical speciality is always full of challenges. However, time to time we do face some exceptional challenges such as the current COVID-19 pandemic. The ongoing outbreak may hinder the usual training process and the global pandemic may continue onto the foreseeable future. Embracing the positive aspects and implementing alternative options to mitigate the negative effects on surgical training would be the way forward.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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CASE REPORT

Acute suppurative inflammation in dual appendix

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Keywords: Appendix; suppurative inflammation; preoperative diagnosis; histological

Introduction

Even though appendicitis is a common entity in surgical practice, the incidence of the dual appendix is rare which ranges from 0.004%-0.009% [1]. The dual appendix is an incidental finding intraoperatively which makes surgeon evaluate any associated anomaly. We present a case of a young boy with suppurative inflammation of dual appendix in a single presentation.

Case presentation

An 11-year-old boy presented to surgical casualty ward with right iliac fossa pain over three days duration. The boy was well 3 days back and developed central colicky abdominal pain for the one-day duration which shifted to the right lower abdomen and accompanying nausea and vomiting. There was no history of fever. On examination, found rebound tenderness over right iliac fossa while supportive investigations revealed elevated WBC (13.7) and neutrophilic leukocytosis (77%) and elevated CRP (11.8) and ultrasonography revealed acute appendicitis with significant right iliac fossa inflammation. Patient underwent laparotomy with Lanz incision and found dual appendix with two separate bases 2cm apart in anterior taeniae coli and convergence of taeniae coli respectively (Figure 1a). Appendices were sent for histology and confirmed acute suppurative inflammation of both vermiform appendices. The boy was discharged on a postoperative day 2 without any complications.

Discussion

The appendix has many variations in their position and anatomy with rarely duplication and agenesis noted in the literature. Even though embryogenesis of the appendix is well known, the incidence of appendiceal duplication is not clear, ranging from 0.004%-0.009% [1].

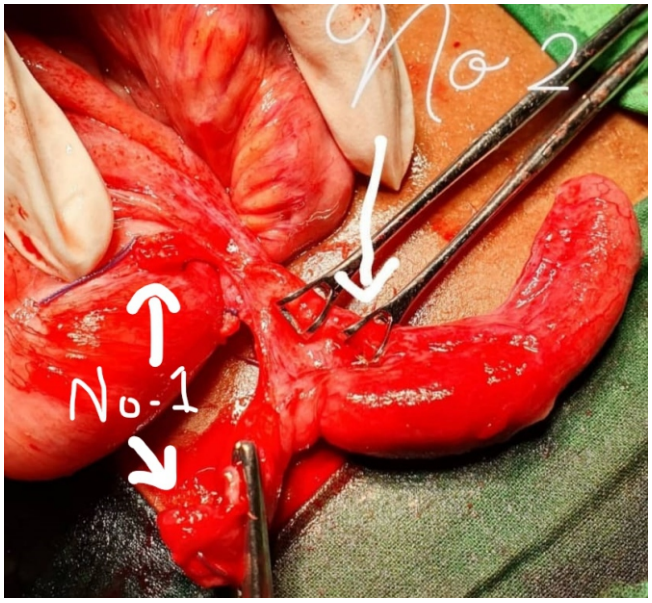
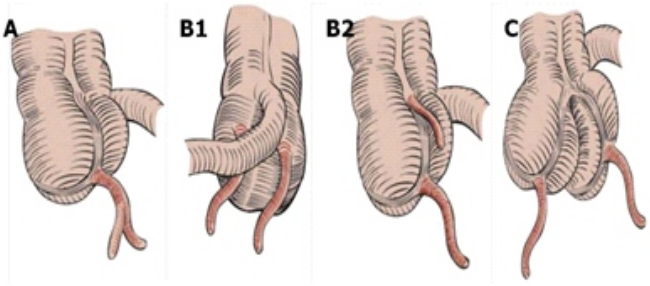


Figure 1a. Inflamed dual appendix with short mesentery and one appendix ligated and divided noted as No-1



The Cave Wall bridge classification [2].

Type A: Normally situated single appendix with partial duplication

Type B: two appendices on separate location on single caecum. Further subdivided to

Type B1: Appendices positioned on both side of the ileocaecal valve,

Type B2: First appendix located on convergence of tenia coli as usual position with another appendix located on tenia coli at varying distance

Type C: Dual caecum with its appendix.

Type B2 variety of appendix duplication anomaly was found in our case according to Cave-Wall bridge classification. It is

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DOI: http://doi.org/10.4038/sljs.v38i3.8743

the commonest variety of duplication of the appendix [3]. In our patient, both appendices were inflamed and histologically proven suppurative inflammation on both appendices. The type B2 replication may be the vestige of a "transient appendix" which appears during the sixth and seventh week of embryological development according to most authors belief [5]. Most of the instances, other congenital anomalies are associated with type B1 and C [1]. Although duplication of the appendix may be related with other congenital anomalies, there were no other anomalies found in our case. Even In type B2, easy identification of both appendices is possible when their origin is close to each other, and if not retrocaecal. It could have led to lethal consequences [5] when 2nd appendix was retrocaecal or far away from 1st appendix. As the position of the appendix was preileal and duplicated appendices were close by, patient got the benefit of dual appendicectomy at the same occasion. In the previous case reports the patient had undergone appendicectomy on two occasions which can give rise to significant morbidity and mortality[3]. In selected cases, the caecum should be carefully examined for appendices anomalies [4]. To the best of our knowledge, this is the 1st case reported from Sri Lanka.

Conclusion

Duplication of appendix occurs rarely. Imaging modalities will not usually reveal the duplication. Intraoperative vigilance is necessary to ensure the diagnosis of the dual appendix. Histological appearance of the macroscopic and microscopic view is pathognomonic. The surgeon should have a suspicion of dual appendix when clinical and biochemical evidence does not correlate with 1st appendix. Detection of both appendeces on the same occasion will reduce morbidity and mortality.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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Learning Points:

- During appendectomy, caecum should be inspected on selected cases when clinical and intraoperative findings do not correlate.
- Even though dual appendix is rare, it can give rise to lethal and medico-legal consequences.
- It may be associated with other congenital malformations.

CASE REPORT

Ectopic pancreatic rest in the stomach

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Keywords: Ectopic pancreas; heterotopic pancreas; subepithelial lesion; GIST

Introduction

Ectopic pancreas (EP) also known as the heterotopic pancreas, aberrant pancreas or pancreatic rest is relatively a rare development anomaly. It is defined as pancreatic tissue that lacks anatomical or vascular continuity with the pancreatic gland. EP was first described in the 18th century by Schultz but confirmed by Klob histologically a century later [1]. Misplaced pancreatic tissue during gut rotation or metaplasia of pancreatic endodermal tissue during development are among the few theories discussed at present on the origin of EP [2]. Incidence of EP at autopsy is in a wide range of 0.5 – 13.7% [3]. It is most commonly found in the stomach, duodenum and the jejunum. The rest of the gastrointestinal tract (GIT) are also possible sites [2]. Rarely EP is found in the mediastinum, lung and brain [4].

Mostly asymptomatic, it may present with dyspeptic symptoms and abdominal discomfort. EP is occasionally associated with gastric outlet obstruction, GIT bleeding, pancreatitis and rarely adenocarcinoma [2, 5]. Upper GI endoscopy (UGIE) would classically reveal a subepithelial lesion (SEL) with normal overlying mucosa, which would at times demonstrate a central umbilication, denoting a pancreatic duct opening. Imaging modalities like contrast-enhanced CT (CECT) and MRI render limited assistance in diagnosing EP. Punch biopsy at UGIE is generally non-diagnostic, yet endoscopic ultrasound (EUS) and guided fine needle aspiration biopsy (EUS-FNAB) or core biopsy may demonstrate EP preoperatively. Surgical excision with a minimum margin is advocated for diagnosis and eliminate the premalignant potential of EP. No further problems are anticipated following complete excision.

Case presentation

Our patient was a 27-year-old male, who was previously healthy and of average built. He presented with dyspeptic symptoms for 9 months duration without any red flag signs. He was already using proton pump inhibitors (PPI) on regular basis but his symptoms had prevailed. An UGIE showed a

Figure 1. UGIE showing a SEL with central umbilication. Note background gastritis.

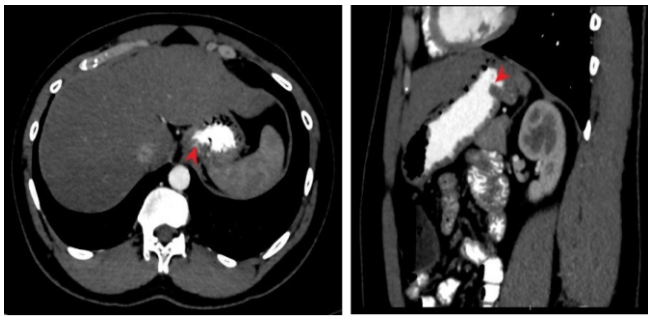

Figure 2. CECT with oral and intravenous contrast. Arrowheads in axial and sagittal sections point to the SEL

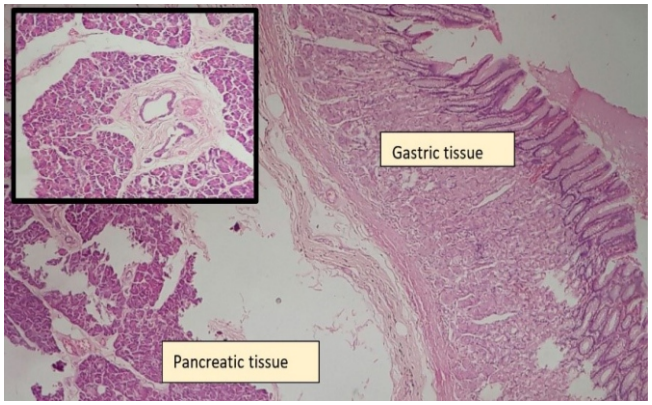

Figure 3. Organized mature pancreatic tissue in the gastric wall. H&E 10 x 4. Insert: Pancreatic acini arranged around ducts H & E 10 x 20

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SEL with central umbilication on the greater curvature of the stomach, 15cm from the pylorus (Figure 1).

A biopsy was not attempted but an ultrasound scan (USS) and a CECT of the abdomen were planned with a working diagnosis of a Gastro-Intestinal Stromal Tumour (GIST), a common SEL. CECT showed a 1.8 x 1.7 x 1.2cm oval-shaped solid mass in the greater curvature of the stomach. The slow heterogeneous enhancing pattern was noted suggestive of a GIST, GIT schwannoma or a leiomyoma (Figure 2). EUS and MRI were unavailable.

Due to equivocal radiological data and unavailability of EUS-FNAB, surgical excision was planned. India ink was injected to the SEL, 1 week before the surgery for external identification of lesion during the procedure. Laparoscopic exploration was undertaken where a wedge resection of the dyed lesion was made. The peritoneal survey was normal otherwise. The patient had an unremarkable recovery period and was discharged on postoperative day 2. Histopathology showed unencapsulated pancreatic tissue organized into lobules comprising acini and ducts with scattered islets of Langerhan, distributed through the stomach wall (Figure 3). No pathology was identified in the pancreatic tissue. The lesion was complete excised.

Discussion

Pathologic classification of EP was formed by Heinrich in 1909. A modification of this by Gaspar-Fuentes (1973) is currently in use (Table 1). According to the classification, this patient belongs to Type 1. Pathologies associated with the orthotopic pancreas can occur within EP as well [2, 5].

The endoscopic appearances were of a benign gastric tumour. Possible diagnoses of a GIST, leiomyoma or EP can be differentiated by non-invasive methods (Table 2). EUS and EUS-FNAB are sensitive methods of diagnosis which were unavailable for this patient.

Table 1. Histopathological types of EP

	Heinrich	Gaspar-Fuentes
Type 1	Consists of all components of pancreatic tissue (acini, ducts and islet cells)	Same
Type 2	Acini and ducts only, no islet cells	Ducts only
Type 3	Ducts only	Acini only (exocrine)
Type 4	-	Islet cells only (endocrine)

Table 2. Imaging features of EP and common SELs of GIT

	This lesion (EP)	GIST	Lipoma
USS	Not detected	Iso-hypo echoic	Hyper-iso-hypoechoic
CECT	Hypo-vascular (Low enhancing)	Hyper-vascular	Soft tissue density lesion
MRI	No data		
T1		Low	High
T2		High	High

EP of GIT is diagnosed incidentally in the majority of cases during endoscopy or surgery for other indications [6]. The main symptom of EP is pain and is thought to be due to tissue irritation by pancreatic secretions. This patient had clinical features of gastritis and was confirmed endoscopically. Symptomatic EP should be excised. Current literature advocates excision in asymptomatic, incidentally found cases as well to avoid future complications [6].

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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Learning Points:

- EP is a rare developmental anomaly which is usually found incidentally.
- It is best excised to avoid complications.

CASE REPORT

Well leg compartment syndrome: an uncommon and devastating complication of advanced pelvic laparoscopic surgeries

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Keywords: Laparoscopic pelvic surgeries; radical cystectomy; Lloyd Davis position; Trendelenburg position; fasciotomy

Introduction

Well, leg compartment syndrome[WLCS] is the development of acute compartment syndrome in the absence of trauma which may occur in a patient without any pre-existing vascular disease[1]. It is an uncommon complication, with dire consequences with loss of a limb in the failure of early diagnosis and prompt intervention. We present a 60-year-old male who developed WLCS following a laparoscopic Radical cystectomy discussing the prevention, management and the outcome.

Case presentation

A 60-year-old male with non-muscle invasive high grade papillary transitional cell bladder carcinoma with synchronous right renal pelvic urothelial tumour [fig 1] underwent laparoscopic nephroureterectomy and radical cystectomy with ileal conduit urinary diversion. He was positioned in calf supported lithotomy position with elastic stockings and intermittent pneumatic compression. Operating time was 7½ hours with a head low tilt. Surgery was otherwise uneventful and managed at the ICU with epidural analgesia.

After ten hours he developed severe left calf pain followed by left leg swelling, restricted toe movements with decreased toe sensation, movements associated and severe pain on passive movements of the foot. Limb pulses were unaffected. A clinical diagnosis of compartment syndrome was made with rising creatinine kinase levels [26577 IU] after excluding the possibility of Deep Vein Thrombosis [DVT] with Doppler studies. Urgent four-compartment fasciotomy revealed that over 50% of peroneal and anterior compartment muscles were non-viable. which needed successive debridement procedures [Fig 2] and skin grafting for the wound closure. Residual defects included foot drop with a mild sensory deficit which was managed on standard orthopaedic guidelines and physiotherapy. Finally, he partially retained the ability to walk with residual neuralgic pain.

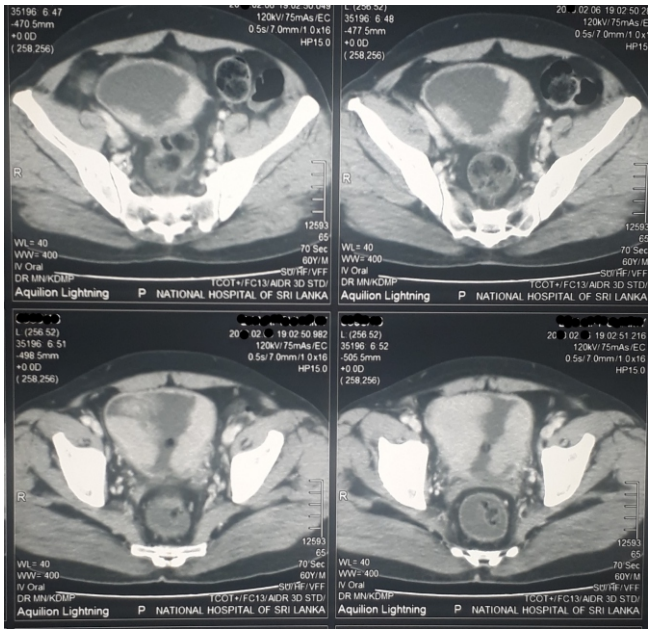

Figure 1. CT image of his bladder carcinoma

Figure 2. Fasciotomy wound upon recovery

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Received: 02-08-2020 Accepted: 18-12-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8669

Discussion

WLCS was initially reported in the literature by Leff et al in 1979 after a prolonged urological surgery where the patient developed bilateral anterior compartment syndrome post-operatively[2]. Since then cases were reported in a wide range of surgical specialities such as orthopaedic, gynaecological, colorectal and 0.02%-0.03% of abdominopelvic surgeries using lithotomy, Lloyd Davis or Trendelenburg position. In cystectomies, the incidence rises from 1:3500 to 1:500 patients[1].

The underlying pathophysiology is mainly explained by the elevated compartmental pressure and hypoperfusion[1]. It is demonstrated that during prolonged periods of raised leg positions reduction any in systolic pressure below perfusion pressure causes ischaemia [3, 4]. For each 2.5cm elevation of the limb above the cardiac level leads to 2mmHg decrease in mean arterial pressure[3]. It is further enhanced by dorsiflexed ankles and head low position especially if it is beyond 15tilt. Increased compartmental pressure over 18mmHg has been reported during lithotomy position[1, 2, 4]. Subsequently, reperfusion injury-causing membrane injury, capillary leakage, oedema leads to a vicious cycle of ischaemia and increased compartment pressure characterised by pain disproportionate to the injury.

Risk factors can be patient-related or surgery-related factors. As mentioned earlier, patients with high BMI, young age and vascular diseases are more susceptible to this condition. Major intra-operative risk factors include the type of surgery and the specific position for a prolonged duration. Any abdominopelvic surgeries with leg elevation, knees and hips flexion are more susceptible.

Laparoscopic and robotic procedures are having a high likelihood of developing WLCS than open procedures due to the additional factor of reduced venous return associated with the pneumoperitoneum [1].

Risk has been shown to rise steeply for procedures extending over 4 hours and the median duration of surgery to develop this condition is reported as 7.5 as depicted in the present case[5].

In addition, focal compression with improperly placed stirrups and calf support also seems to influence the outcome. Meyer et al demonstrated that there is a favourable effect of 10mmHg decrease in compartmental pressure in heel supported position than calf support[4]. Intraoperative hypotension, circumferential wrappings and vasoactive drugs may also potentiate the occurrence of WLCS[1, 4].

As the complete recovery is unlikely in the majority of cases, proactive measures play a vital role in preventing this complication especially intraoperative concerns regarding the positioning. Periodical lowering of the limb from lithotomy position is recommended. Heel supported lithotomy position is more favourable than calf supported stirrups[4]. Whenever WLCS has anticipated it is advisable to use pharmacological anti-thromboembolic prophylaxis rather than rely on mechanical compression stockings.

As the diagnostic delay is an independent predictor of the severity of outcome, an early precise diagnosis is crucial to avoid reported complications which vary from minor sensorimotor deficit to loss of limb or life in a worst-case scenario [5].

A reliable clinical sign is calf pain especially upon passive stretching of the relevant compartment muscles. It is crucial to note that pain could be undermined by the postoperative epidural analgesia. Presence of paraesthesia or paresis is late features of neural ischaemia. It is important to note that limb pulses could be present up to the last phase which could give a false notion of security. Because of its relatively rare occurrence, often the possibility of WLCS is often clinically misdiagnosed as DVT. Epidural analgesia was also considered to be associated with delayed diagnosis due to its masking effect on pain, however, the evidence is still lacking. Elevation of serum creatinine kinase[>2000U/l] is supportive but should not delay the decisions taken on clinical grounds for decompression with four compartment fasciotomies to save the limb.

Conclusion

Awareness and early clinical detection are the keys to avoid this rare but detrimental vascular complication and the above case report highlights the importance of post-operative vigilant surveillance before the appearance of symptoms. As exemplified in the report, potential misdiagnosis as DVT and masking pain with epidural analgesia should be kept in mind which could cause delay the proper surgical treatment. Thus, it is important to highlight the need for monitoring against this in pelvic laparoscopic surgeries carrying a higher risk special perioperative measures should be carried out to prevent WLCS.

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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Learning Points:

- All the surgeons and anaesthetists involved in major laparoscopic pelvic surgeries, especially in Lloyd Davis and lithotomy positions should be more vigilant towards well leg compartment syndrome.
- Diagnosis can be made on clinical grounds and immediate decompression is mandatory in this limb/life-threatening emergency.
- Proactive intraoperative measures like preventing intraoperative hypotension and proper care in positioning are simple but efficient steps in avoiding this complication
- It should be kept in mind that the use of epidural analgesia and misdiagnosis of deep vein thrombosis could delay the diagnosis of well leg compartment syndrome.

CASE SERIES

Hemi-hamate autograft arthroplasty for dorsal proximal interphalangeal fracture-dislocation: a case series of two patients

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Keywords: Pilon fracture; arthroplasty; autograft; hamate bone; proximal phalanx

Introduction

Volar lip fractures of the base of the proximal interphalangeal joint (PIPJ) are triggered by axial loading and hyperextension injuries causing the volar plate to avulse with a ventral fragment of the base of the middle phalanx [1]. These fractures are commonly encountered during athletics and combat sports [1]. If more than 50% of the joint surface is involved, it is considered an unstable fracture [2]. Osteochondral grafts are preferably used to treat unstable fracture-dislocations [2]. Moreover, grafting is preferred in late presenters [3] compared to those who present early, where the fracture could be fixed with a higher success rate. Here, we report two cases of ventral fractures of the PIPJ managed with hemi-hamate osteochondral autografts.

Case presentation

Two male patients, aged 28 and 31 years, presented with ventral PIPJ fractures while playing basketball and following a fall in the bathroom respectively. Patients presented one week and three weeks after the injury respectively. X-rays showed comminuted unstable fracture-dislocations of the middle phalanges of the index fingers (Figure 1). Percentage involvement of the articular surfaces were more than 40%. There were no concomitant injuries. Both patients were operated under general anaesthesia. The distal half of the hamate was harvested using a vertical incision (Supplementary Figure 1). A Brunner type incision was made to access the site of the fracture of the index finger. Accessory collateral ligaments were partially divided to dislocate the PIPJ. Fracture segment was removed en bloc to adequately fit the block of the hamate to achieve proper articular contour (Supplementary Figure 2). Fixation was done with two 1.3 mm titanium screws (Figure 2). An acceptable range of passive mobility was observed intraoperatively. Gentle active mobilization was started in the immediate postoperative period with a dorsal blocking splint and buddy strapping of the index to the middle. Both had an uneventful recovery. Screws were removed six months postoperatively in the second patient to achieve further flexion. A ninety-degree flexion of the PIPJ could be achieved after eight months of surgery and the resting pain score measured by the visual analogue scale was zero.

Figure 1. X-ray of the fracture dislocation of the middle phalanx of the index finger

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Received: 24-05-2020 Accepted: 08-10-2020
DOI: http://doi.org/10.4038/sljs.v38i3.8705

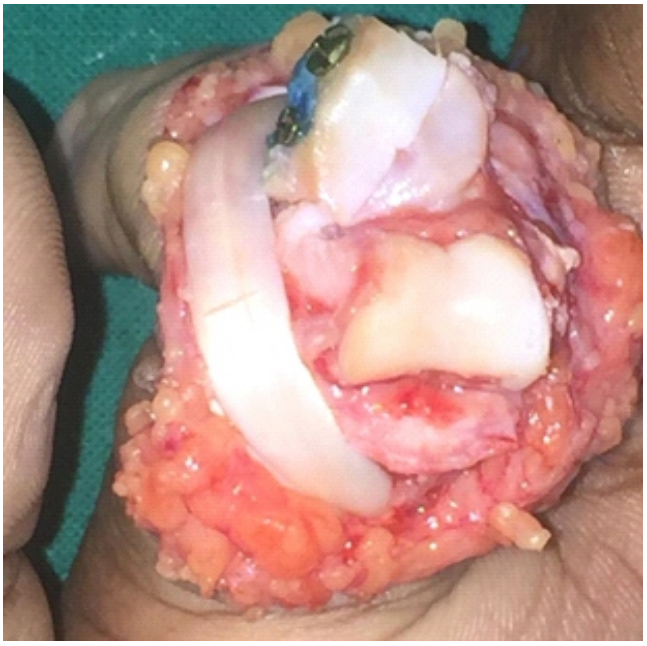

Figure 2. Fixation of the hemi hamate autograft to the middle phalanx of the index finger using titanium screws.

Discussion

Management of volar fractures of the proximal interphalangeal joints is challenging because the inability to restore the functional range of motion, dexterity, versatility and stability of the joint may compromise the activities of daily living significantly. A functioning index finger is extremely important in hand function; thus, it is essential to achieve an acceptable range of motion postoperatively.

To achieve this purpose, the treatment strategy should be personalized based on patient factors such as age, functional demand, time at presentation, comorbidities, and surgical factors such as available resources and expertise [1]. Reconstruction of the joint using autografts can be performed when a repair is not possible due to extensive comminution, late presentation and when the quality of the fractured bone fragment is poor [1].

Hemi-hamate autograft for proximal interphalangeal joint reconstruction was first described by Hasting and colleagues in 1999 [4]. The geometry of the distal hamate resembles the contours of the proximal part of the middle phalanx, therefore the distal hamate can be grafted to recreate the damaged volar buttress of the base of the middle phalanx. Soon after its original description, this surgical technique was widely adopted with minor modifications in many specialized institutions worldwide. This procedure was not performed in Sri Lanka until recently due to the sparsity of surgical expertise. We were able to perform two successful hemi-hamate autografts procedures in Sri Lanka as reported here.

Advantages of hemi-hamate arthroplasty include good union rates and high grip strength in long term follow up [2]. Afendras and colleagues showed a preserved range of movement of the proximal interphalangeal joint and a high level of patient satisfaction, in the majority of a follow-up cohort [5].

It is usually impossible to restore the complete range of motion of an interphalangeal joint fracture [3], however, 90 degrees of flexion is adequate to carry out most of the activities of daily living as in our case. Intra-articular screw migration, tendon irritation by screws, osteoarthritis and joint stiffness are commonly reported complications of the hemi-hamate arthroplasty procedure [1, 5], however, we observed none of these complications during eight-months follow-up of our patients. Moreover, anatomical matching of the surfaces and meticulous surgical technique to prevent damage to the articular cartilage may help in minimizing long term complications [5].

All authors disclose no conflict of interest. The study was conducted in accordance with the ethical standards of the relevant institutional or national ethics committee and the Helsinki Declaration of 1975, as revised in 2000.

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Learning Points:

- Volar lip fractures of the base of the proximal interphalangeal joint (PIPJ) are triggered by axial loading and hyperextension injuries.
- Osteochondral grafts are preferably used to treat unstable fracture-dislocations, especially in late presenters.
- Hemi-hamate autograft is the treatment of choice for proximal interphalangeal joint reconstruction in these fractures.
- Anatomical matching of the surfaces and meticulous surgical technique to prevent damage to the articular cartilage may help in minimizing long term complications.

Dr. S. J. Stephen Gold Medal 2020

The Dr S J Stephen Gold medal and research award is awarded by the College of Surgeons of Sri Lanka, for the best research paper published over the preceding year in the Sri Lanka Journal of Surgery.

Dr. Samuel Jeyarajah Stephen had his primary and secondary education at Central College, Jaffna and obtained his final MBBS from the University of Colombo in 1955. He pursued General Surgery and later trained in Cardiovascular surgery in UK, Germany, India and USA and obtained FRCS and MS.

In 1964, he was appointed the Consultant Thoracic Surgeon, GH Jaffna and later on, in GH Rathnapura. It was here in 1969, with the assistance of Dr. Neil Hamel, he assembled a heart lung machine. He then went on to close ASD's on pump which was the first proper open-heart surgery performed out of Colombo.

He served as the Chief Consultant Cardiothoracic surgeon, General Hospital, Colombo from 1976 to 1994. Following retirement, he served as in the Sri Jayewardenepura General Hospital.

He was a trainer and examiner in surgery for the Postgraduate Institute of Medicine and the Chairman, Board of Study in Surgery for many years. He was the President of the College of Surgeons of Sri Lanka from 1988 to 1989. He was the President of SLMA, Sri Lanka Heart Association and Association of Cardiology – SAARC countries along his career. He was awarded the prestigious title of Hunterian Professor by the Royal College of Surgeons of England in 1988 for the lecture on "Changing patterns of mitral stenosis in childhood and pregnancy". He had published numerous papers in local and international journals on many aspects of cardiac and thoracic surgery. He was honoured with the National Honour "Deshabandu" for meritorious service to the nation by the President of Sri Lanka in 1987.

S. J. STEPHEN GOLD MEDAL 2020 was awarded to Dr. Sittampalam Rajendra.

Rajendra S. Chronic autoimmune thyroiditis: a challenging clinical entity in surgical practice. Sri Lanka Journal of Surgery. 2019;37(4):03–10.
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