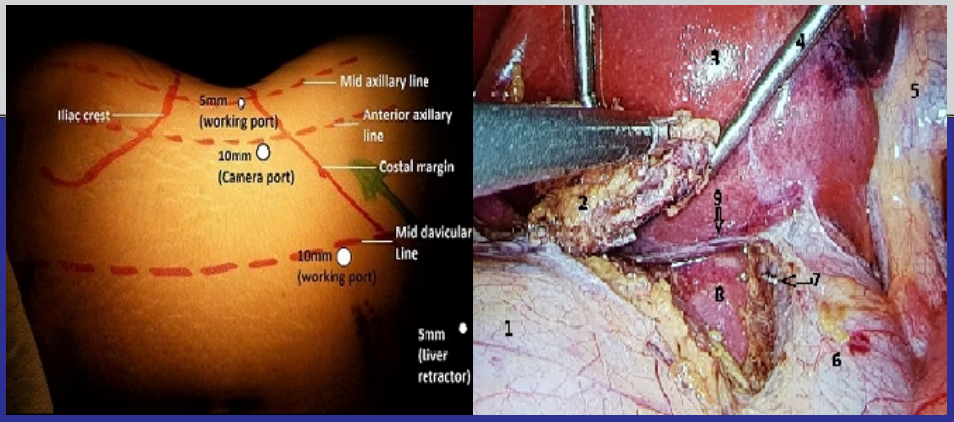
THE SRI LANKA JOURNAL OF SURGERY

August 2017 Volume 35, No.2 ISSN 1391-491X



In this issue

- Lymphoedema of limbs in the central province of Sri Lanka
- Papillary microcarcinoma of the thyroid
- Associating liver partition and portal vein ligation for staged hepatectomy
- Three dimensional laparoscopy
- Brodie abscess

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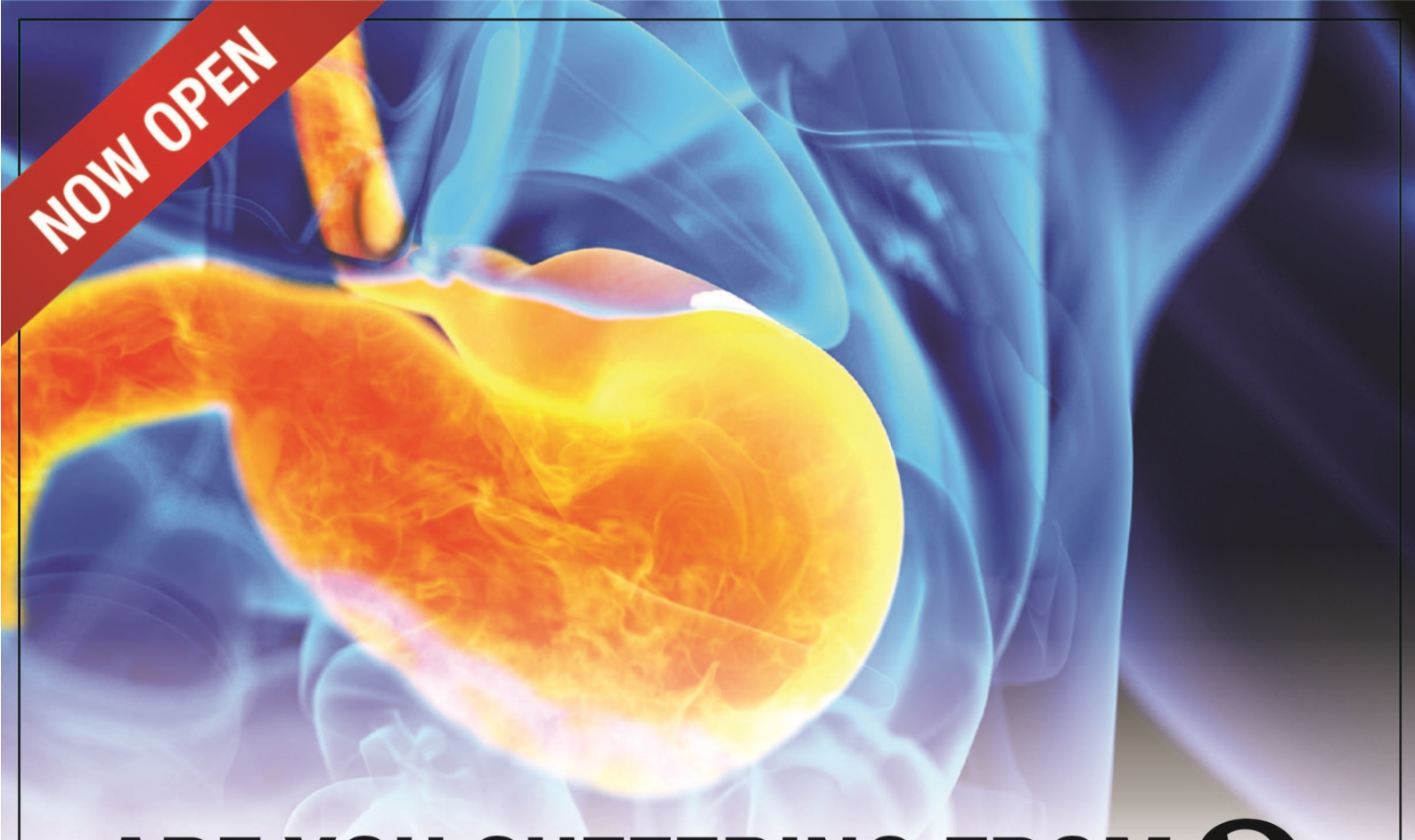

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The Sri Lanka Journal of Surgery

Journal of
The College of Surgeons
of Sri Lanka.

August 2017 Volume 35, No.2 - Quarterly. ISSN 1391-491X e - journal ISSN 2279 2201

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Printed by
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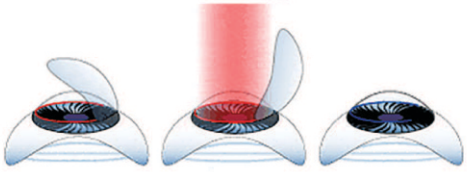

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The Sri Lanka Journal of Surgery

August 2017 Volume 35, No. 2

Contents

Lymphoedema of the limbs: an experience from a tertiary clinic in the central province of Sri Lanka

P.C.A Ratnatunga, C. Dandeniya, N. Kandappa, N. Balasuriya, E.G Manorangi
Department of Surgery, Faculty of Medicine, University of Peradeniya Sri Lanka.

Key words: Lymphoedema; limbs; audit

Abstract

Objective

A descriptive study to evaluate the pattern of presentation of lymphoedema of limbs to a tertiary care clinic in the central province of Sri Lanka.

Patients and Method

Patients with lymphoedema seen over 28 years, (1980-2007) in the vascular clinic at the General Hospital Peradeniya were reviewed retrospectively.

Results

649 cases of lymphoedema of limbs were seen. 47 were in the upper limb, 36 of whom were secondary, mostly following axillary clearance associated with a mastectomy, and 11 cases were idiopathic.

602 patients had their lower limbs involved, with 96 cases amongst them being secondary, mostly to trauma, filariasis and a few with pelvic carcinoma and lymphoma. The rest (n =506) were considered to have lymphoedema of primary aetiology. The involvement of the legs was predominantly below the knees. A late onset group of lymphoedema patients, predominantly males above 60 years posed a problem in diagnosis and is worth future study.

Complications among patients with lymphoedema of lower limbs with no overt secondary cause included inter digital cleft sepsis in 54.5 %, cellulitis or a history of the same in 66 %, lymphangitis 16 % lymphadenitis 3.5% and 11 % had septicaemia which aggravated the clinical state.

Conclusion

Primary lymphoedema needs recognition as the dominant cause of limb lymphoedema especially in the Central Province. This diagnosis is required to prevent complications which need long term treatment. A filarial aetiology for most cases, as is popularly believed, is not evidence based. Secondary causes for lower limb lymphoedema must be looked for, such as pelvic malignancy and lymphoma. Trauma or surgery over lymphatic pathways should be avoided to prevent limb lympheodema.

Introduction

No significant documentation exists on the pattern of presentation of lymphoedema in Sri Lanka, though there exists records of its presence as a disease entity since the eighteenth century [1]. Lymphoedema is a disorder that has geographical implications such as possible association to Filaria [2], bare foot walking and the soil texture as in podoconioses [3]. It also involves genetic factors [4], with a pathogenesis seen to be of protean origin.

The complications associated with lymphoedema, namely interdigital cleft sepsis, lymphangitis, lymphadenitis and cellulitis are quite disabling and aggravate the morbidity of the disease [5]. Surgical procedures that have been attempted to rectify lymphedema have yielded poor long- term results [5].

The data regarding prophylactic care given to such limbs is inadequate, and makes it difficult to adopt focused and effective remedial measures. We present a database collected and collated over twenty eight years of attending to such patients in the hope that it will provide a scaffolding for care of this as yet mostly ignored area of clinical care.

Patients and Method

Over a period of 28 years (1980-2007), 649 patients with limb lymphoedema were seen in the vascular clinic of the General Hospital Peradeniya. Majority of patients were from Central Province of Sri Lanka and their clinical and investigative records were studied retrospectively.

Other causes of limb oedema such as cardiac, hepatic, renal, hypothyroidism, hypo-proteinaemia of varying aetiology and local causes like hypertrophy, angiodysplasia, neurofibroma-

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http://orcid.org/0000-0001-5101-892X
DOI: http://doi.org/10.4038/sljs.v35i2.8381

tosis lipodystrophy, myxoedema venous and inflammatory oedema were eliminated by a careful clinical history, examination and investigation.

Filariasis was suspected as possibly being the cause if either the blood smear for microfilaria, the FAT (filarial antibody titre) or filarial antigen test were positive. The new immunochromatographic test for Wucheria bancrofti antigen was not done due to its non-availability until recently and high cost. This should be stated in the end as a limitation.

Ultrasound examinations of proximal lymphatics and lymph nodes were not routinely carried out due to unavailability during the early years. Duplex scans and isotope scintigrams were done where indicated. Ethical clearance to peruse the records was obtained from the Faculty of Medicine, University of Peradeniya.

Results

Forty seven patients had upper limb lymphoedema and 602 had lymphoedema of the lower limbs.

Lymphoedema of the upper limb (n= 47).

Thirty six patients had secondary lymphoedema (Table 1) with axillary lymph node clearance in breast cancer being the most common underlying cause. Eleven cases of lymphoedema were idiopathic. Idiopathic upper limb lymphoedema had no antecedent inflammation. The oedema was confined mostly to the subcutaneous tissue of the forearm and the dorsum of the hand. A single limb was involved in all cases and a family history of similar oedema was absent. There were no palpable lymph nodes.

Patent veins were demonstrated initially using a hand held Doppler. Later duplex scans were used when they were available in the unit. The ESR, and WBC/DC were normal. FAT titre, smears for microfilaria (mf) and filaria antigen titre were negative. Isotope scintigrams showed no obstruction in the ipsi-lateral axilla in the two cases in whom it was done. The oedema in all cases subsided spontaneously in few months without any treatment.

Table 1. Causes of Secondary Lymphoedema of the upper limb (n-47)

Breast Cancer - Post Mastectomy +/- DXT	= 29
Breast Cancer with extensive with nodal spread	= 02
Malignant Melanoma with nodal metastases	= 01
Tuberculosis with nodes and sinuses	= 01
Filariasis	= 03
Idiopathic	= 11

*** DXT = Irradiation**

Secondary lymphoedema

Forty four were females and 26 males, in those recorded (n=70/95). Ten had above knee, 53 below knee (76%) and 7 below the lower limbs.

Table 2. Causes of Secondary Lymphoedema of lower limb (n= 95)

Trauma	= 31	Post-surgery	= 13
Filariasis	= 22	Endometriosis	= 03
Tuberculosis	= 04	Irradiation	= 04
Eczema	= 05	Non-specific	= 02
Carcinoma in the pelvis	= 07		
Lymphoma with +/- DXT	= 04		

31 patients had trauma (non-surgical trauma –NST) caused by wounds over the lymphatic pathways, non-healing traumatic wounds of the feet and incision of inguinal node abscesses. The post-surgical causes included patients having persistent oedema with recurrent lymphangiitis following damage during varicose vein stripping and harvesting the saphenous vein for cardiac and arterial bypass surgery. Five patients had long term infected eczema of the legs and feet with lymphadenopathy. The demography of this group was, M: F ratio 7:15, and the mean duration to lymphoedema is 8.8 years.

Twenty two were suspected as being due to filarasis. The FAT was positive in all cases but the microfilarial smears done on all were negative. No nematodes were isolated by ultrasound when it was performed during the last few years of the study. 8/22 patients were from Kurunegala 21/22 had below knee swelling and in the other patient the scrotal skin was involved. 8/22 of the patients had bilateral involvement. There were no cases with above knee lymphoedema. The mean duration of lympoedema was 30.18 years

Lymphoedema was thought to be of tuberculous aetiology in four patients with a past history of pulmonary tuberculosis. In all, calcification was seen in para- aortic lymph nodes on X--rays. Both lower limbs were affected, ascending to above knee, lower abdomen and scrotum with time.

Malignancy was found in 11 (1.8%) patients, their mean age being 62 years and mean duration of lymphoedema at presentation was 3 months. Three had carcinoma of the prostate, one carcinoma of the penis with a block dissection of the inguinal nodes, three metastatic pelvic nodes from an unknown primary. In one of the latter, ureteric obstruction and the consequent hydronephrosis focused us to the pelvic nodal pathology. Four patients had lymphomas which included a small cell and a follicular variety in two cases. One of them presented with lymphoedema of recent onset, 20 years after being diagnosed and irradiated at the age of 18 years.

Table 3 compares the age of onset in the dominant secondary

causes (n = 68/95) for lymphoedema. The degree of lymphoedema in these secondary cases were, WHO Grade I in 42, II in 22 and III in 04. The duration of those secondary lymphoedema is often short.(Figure 1.)

Table 3. Age at onset of secondary lymphoedema

Yrs:group	NST	"Filariasis"	ST	Cancer	n =
0 – 10	00	00	01	00	01
11 – 20	04	02	03	00	09
21 – 30	05	05	03	00	13
31 – 40	06	07	01	02	16
41 – 50	07	01	02	01	11
51 – 60	04	03	00	01	08
61 – 70	02	02	00	03	07
71 – 80	00	02	01	00	03

***NST = Non Surgical Trauma *ST = Surgical Trauma**

In NST and ST the patients were often young at onset (82%, 50 yrs:or less). See Table 3

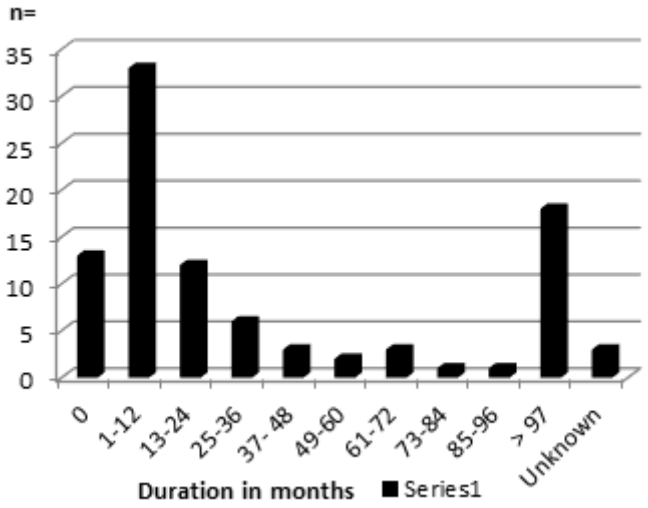

Figure 1. The duration of secondary lymphoedema in lower limbs

Primary lower limb lymphoedema (n = 507)

This group included patients with familial disease and associated congenital anomalies. The lymphoedema came on early in life (Fig 2) and was dominantly female in the 10 - 40 year group (Fig 3). The short duration of lymphoedema since onset (Fig 4) in those involved and the absence of a secondary cause is likely evidence that it is primary.

The right, left and both lower limbs were involved at presentation in 37.2%, 33.3% and 30.4 % respectively.14.2% had above knee lymphoedema, 69.2% below knee lymphoedema and 13.8% below ankle lymphoedema. There was a high prevalence of unilateral or bilateral above knee lymphoedema which are features of its possible primary nature.

According to the WHO Grade of lymphoedema, at presentation n = 463 (57.5%) was grade I, II 36.5% and III 6%, Figs: 9a-d. The FAT was negative in all 87 of 507 patients tested.

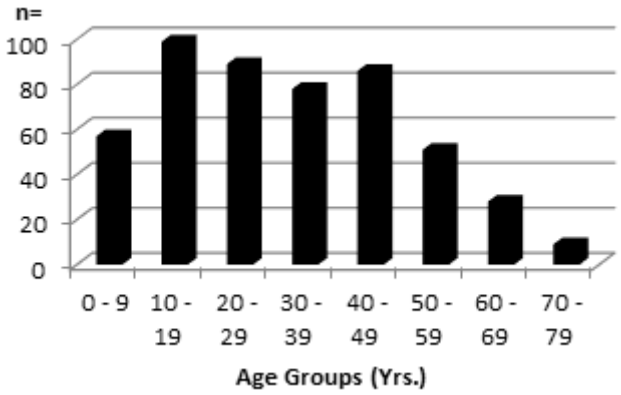

Figure2. Age at onset of primary lower limb Lymphoedema

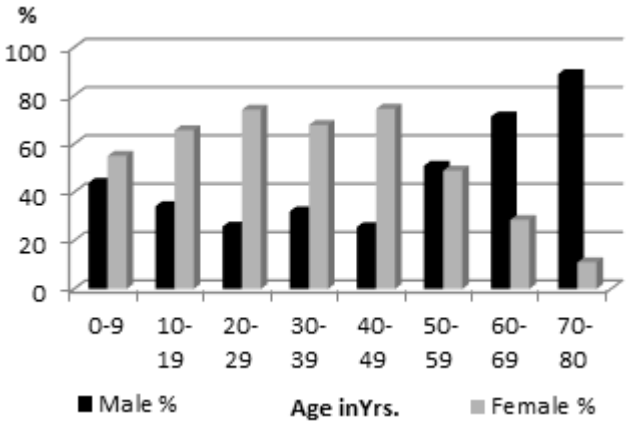

Figure 3. Age at onset of primary lymphoedema of lower limbs Gender %

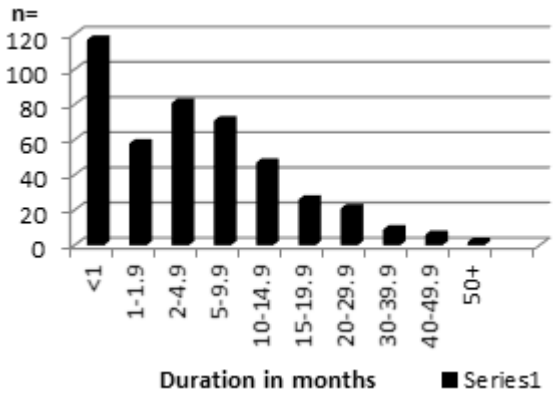

Figure 4. Primary lymphoedema of lower limbs - Duration

Familial Cases

Patterns of Primary Lymphoedema (Audit n = 507)

Family members were involved in 34 patients. Two of these patients were born with lymphoedema (Milroy's Disease). The relationships with the numbers within parenthesis were,

mother (9), daughter (4), sister (12), son (2), brother (7), father (7), and others (1).

The associated congenital anomalies observed were, Milroy's disease 2, Turner syndrome 1, Klippel Trenaunay Syndrome 1, Congenital ptosis 1, Yellow Nail Syndrome 1, Distichiaisis 1.

Table 4. Primary Lymphoedema of Lower Limbs (Audit n = 507)

Classification	Age in Yrs.	n =	M:F
Congenital	At birth	34	1 : 1.13
	1 - 1.9	6	1 : 2
	2 – 14	45	1 : 1.6
Precox	14 – 35	218	1 : 2.4
Tarda	> 35	204	1 : 1.79

The onset of lymphoedema had gender equality in the < 9 year age group (see fig 3), followed by female dominance (75%) in the middle years (10-49) as would be expected of a primary cause. The M: F ratio overall was 1:1.72.

The patterns of primary lymphoedema is shown in Table 4. The "tarda" group especially those over 40 years at the age of onset, (n =174) constituted 34.4% of patients. There was a female dominance in the 40 - 60 year group (65%) but a male dominance in those over 60 years) (Fig 3) this male dominance accounted for 28 males.

The percentage with bilateral involvement was seen in 19% in those over 50 years, and 23% in those over 60 years. At onset 97% were involved below knee.

The duration of lymphoedema at presentation in those recorded, (n = 441/507) shows that in 40%, it is of less than 2 years duration (Fig 4). Fig: 5 shows that there is no definite evidence that above knee lymphoedema ascends with increasing duration. Those with below knee lymphoedema seem to ascend from lower leg to upper with time.

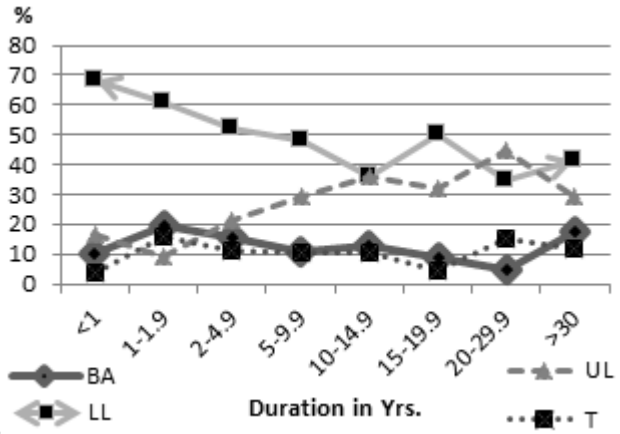

Figure 5. Extent of lymphoedema related to duration.
BA - below ankle LL - lower leg UL - upper leg T - thigh

The complications in those with primary lower limb lymphoedema.

Interdigital cleft sepsis (tinea pedis) was found on 54.5% of patients with "primary" lymphoedema on admission. The prevalence was as high as 72% if the patient had a less than a year's history on admission. Thereafter the prevalence regressed to 60, 65, and 63, to 50% over the cohorts admitted 5 - 10, 10 - 15.15 - 20, and 40 - 50 years duration respectively, prior to be seen by us. 30% of the cases were associated with cellulitis on admission and another 33% had a history suggestive of cellulitis. Bacterial cultures often grew Streptococci. 16% had lymphangitis and 3.5 % of associated ipsilateral inguinal lymphadenitis were seen to follow these attacks .Ulceration of the lymphoedema, also was seen. 57 patients (11 %) having fever, and of whom, 5 were accompanied with severe chills and rigors, were diagnosed as having septicaemia on admission.

15 patients with grade III lymphoedema, with skin changes, with or without ulceration, whose infection was controlled and who wished to undergo cosmetic surgery, were operated on with a Modified Thompson Procedure, with fair (patient satisfying) results.

Discussion

Idiopathic upper limb lymphoedema is an enigma. Aetiological possibilities include lymphatic overload due to allergy [6]. It is a self-limiting clinical condition.

It is noteworthy that 76.6% had a secondary cause in the upper limb group, while a secondary cause was detected in only 15.8 % of the lower limb group. It is a common observation that lymphoedema of the toes feet and legs go often unnoticed, leading to inter digital sepsis aggravating the clinical state [7, 8].

Filaria was suspected in only 22 cases. The mere demonstration of exposure to filaria by a positive FAT does not give validity to the claim that filaria is the aetiology in most cases of lymphoedema, at least in the central province. Data on the prevalence of FAT (Ig4) titers in the central province during the period of study is not available. Hence the significance of a positive result cannot be deduced. Had we done antigen studies, especially in "non-endemic" Kandy we might have staked a claim if it was positive. However Kurunegala in the North Western Province (8/22), showed a high prevalence in our study and lends weight to the possibility of its existence as an endemic filarial pocket. The below knee lymphoedema in almost all filaral cases (n = 21/22) is compatible with similar findings in Indian [9] and African studies [10]. Unless a co-factor exists such as secondary bacterial sepsis, above knee

lymphoedema as a manifestation of lymphatic filariasis is unlikely to take place [2]. It's localization to below knee lymphoedema is explicable based on a block at the sentinel node for the leg [11]. Unless the filarial nematode is isolated by ultrasound within the lymphatic trunks or seen in node biopsies, it would be difficult to confirm its causative role in lymphoedema [2]. The pathogenesis of the lymphangiectasia associated in the lymphatics distal to live adult Wuchereria Bancrofti filarial worms are not now considered obstructive but thought to be due to lymphatic dysfunction caused by substances released by live adult worms [2]. This dysfunction is not seen to revert even after the death of the worm by diethyl carbamazine [12]. That we did not observe live or dead worms in this study reinforces the reality that filarial causation is a myth and is not the dominant aetiology, at least among those with lymphoedema in the Central Province of Sri Lanka.

Anti-filarial drugs are not effective in chronic lymphoedema. Current pathology suggests that the block is caused by secondary sepsis. Further their indiscriminate use shows uncritical acceptance of a filarial aetiology and is a commonplace practice in non- endemic areas of Sri Lanka. It is an unwarranted practice.

In the patient group with secondary causes, the recurrent bouts of lymphangitis and para lymphangitis would leave on resolution, a distortion, both internally and externally, of these 1 mm bore tubes that form lymphatic trunks. The nodal architecture especially in the sentinel nodes (lower-most in the vertical set [11]) would be distorted and on occasion be fibrosed [5]. Hence possibly the high prevalence (88%) of below knee lymphoedema in this group, as is a feature in other international series [11]. Cellulitis is a common sequel that aggaravtes the morbidity. Bacterial entry into the subcutaneous tissue in those with skin changes is well documented [13].

Though malignancy constitutes only 11% of this secondary group, they must be diagnosed early and hence a comprehensive examination of patients with lymphoedema is mandatory. A careful but relevant history, with a careful examination, looking for pelvic malignancy is a must. This must be followed by a pelvic ultrasound examination. A hydronephrotic kidney maybe the only clue of ureteric compression by a mass of metastatic lymph nodes of a pelvic malignancy as was seen in one of our cases. Further imaging is a must in suspicious cases, especially those who are elderly and have a short duration lymphoedema which is grade I. Prostatic carcinoma was the dominant pelvic malignancy in our study, as has been in international series [14].

Lower limb Lymphoedema that did not show features suggestive of a secondary aetiology were considered to be primary. They showed the classical presentation of this group, namely the equal prevalence of genders in the congenital group, and the dominance of females in the precox group, as in other international series [7, 16]. In most international studies the tarda group in primary lymphoedema constitutes usually 10-15 % of cases [15]. In our study 40.3 % of patients based on the age of onset were in the 35 + year group.

In the 60+ and 70 +yrs. age groups (n = 37), males dominate and constitute 28 patients (75%). Fig: 3. This stresses the importance of investigating for malignancy of the prostate prior to assigning aetiology to a primary cause. This could also be contributed to by the greater exposure of cracked feet to hot silca of the soils [2, 3, 5] i.e pseudoconioses, being more common among working males. There being bilateral involvement in 23% of this group and the 97 % below knee affliction supports this possibility. This warrants further study.

The presence of a large number of lymphoedema patients with what is assumed to be of Primary origin, i.e. 506/602 (84%), more than quoted in most international series, 60% [7], 45 % [17], 62% [14], needs explanation. This may be due to most primary cases gravitating to our clinic being the only one in the central province, or maybe there could be some filarial cases unwittingly included in the primary group as we did not do a FAT on all cases. The large number of > 50 years at onset may also be contributory.

The frequency of infective attacks on their lymphatic system warrants highlighting, often originating in the frequent trichophytosis in their interdigital clefts and ensuing secondary infections between the swollen toes. Sometimes the leg remains clinically warm because of sub clinical sepsis and there could be a direct relationship between the numbers of attacks of sepsis, the duration of the illness with eventually the grade of the lymphoedema However a statistically significant correlation of these factors could not be elicited.

Conclusion

Lymphoedema is not an uncommon clinical condition, but has unfortunately been not given due consideration by the medical community in Sri Lanka, despite the morbidity, the psychological upset and the handicaps it causes. The limitations of this study include that it is a retrospective study; the lack of corroborative ultrasound or duplex in all patients; assumption of a filarial aetiology based on a positive FAT whose specificity is at best doubtful; the assumption that where a secondary cause was not found it was primary in aetiology. In the future we would like to improve our data base by studying the titre of filarial antigens on all patients and more carefully assess the prostate with ultrasound and add a routine PSA to the assessment of our senior patients with lymphoedema.

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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Transposed brachio-basilic arterio-venous fistulae versus prosthetic arterio-venous grafts; mid-term results and a review of literature

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Key words : Renal dialysis; central venous catheters; arteriovenous fistula; kidney failure chronic; axillary veins

Abstract

Introduction

With increasing prevalence of chronic kidney disease worldwide, the demand for long-term renal replacement therapy is on the incline. Apart from renal transplantation, this includes sustainable vascular access for long-term haemodialysis, often requiring secondary and tertiary access.

Objective

To assess the place of Transposed Brachio-Basilic Arterio-Venous Fistula (TBB-AVF) as a second line access compared to prosthetic Aretrio Venous Grafts (AVG), with emphasis on functional patency and access related morbidity and mortality.

Study Design

A prospective cohort study (January 2014 to March 2016) comparing TBB-AVF and AVG, at the National Institute of Nephrology Dialysis and Transplantation, Colombo, Sri Lanka.

All patients where venous mapping revealed no suitable cephalic vein were included. Those who preferentially opted for a central venous catheter, those requiring urgent initiation of dialysis or considered unfit for TBB-AVF or AVG creation were excluded. TBB-AVF was performed where the basilic vein was patent and >2 mm. AVG was used when it was <2mm or when haemodialysis was expected to commence within 4 weeks.

Results

459 patients were enrolled; 382(83%) TBB-AVF and 77(17%) AVG. Mean follow-up was 11(± 4.8) months.

There were 9 deaths, all >4 weeks from access creation and not directly related to the access. The all-cause mortality rate was 5/382 (1.3%) TBB-AVF and 4/77 (5.2%) AVG; p=0.02. Surgical site infections were seen in 24 (6.4%) TBB-AVFs and 10 (13.7%) AVGs; p=0.03. The overall functional patency at six months was 307/375 (81.9%) in TBB-AVF and 57/73 (78.1%) in AVGs; p = 0.45.

Conclusion

TBB-AVF provide comparable medium term functional patency to AVG and are associated with a significantly less incidence of all-cause mortality and surgical site infection.

Introduction

The global incidence and prevalence of End Stage Kidney Disease (ESKD) has shown a general upward trend. Although data from England show stable numbers [1], the trend in other regions including South Asia, United States and Australasia is a steady increase [2-5]. This, coupled with increased life expectancy places a constant demand for renal replacement therapy [6]. Although transplantation is the best solution for ESKD [7], the scarcity of organs is a global problem [8], resulting in an ever-expanding pool of patients requiring long-term dialysis and options for vascular access [9].

Haemodialysis requires access via an Autologous Arterio-Venous Fistula (AAVF), Arterio-Venous Graft (AVG) or a Central Venous Catheter (CVC). AAVF is considered the optimum vascular access due to long-term durability and minimum morbidity [10-12]. The preferred vein for primary AAVF is the cephalic vein at the anatomical snuff-box or ante-cubital fossa [13, 14]. When the cephalic vein is not available, there has been a general inclination to use CVC or AVG, ahead of 'second line' AAVF options such as Transposed Brachio-Basilic fistula (TBB-AVF) [15, 16].

Background

Despite global recommendations and the 'Fistula-First Breakthrough Initiative'[9], the use of TBB-AVF over AVG as a second-line vascular access has been modest [17]. AVG

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DOI: http://doi.org/10.4038/sljs.v35i2.8382

involve the use of prosthetic grafts with inherent risks of infection and thrombosis [18-20], in addition to the escalated costs of grafts and associated possible re-interventions to maintain patency [20,21].

The basilic vein lies in a deeper plane than the cephalic, hence being spared from routine cannulation. It is anatomically wider than the cephalic, making it more suitable for AAVF creation. However, its deep location and proximity to the neuro-vascular bundle make it unsuitable for regular cannulation in-situ. This is circumvented by either superficialization or transposition of the vein away from its natural lie [22-24]. Both procedures require general or regional anaesthesia and extended dissection with the possibility of wound related complications; making it a less popular option for vascular access.

'Superficialization' involves dissecting the vein along its path, ligating the tributaries, bringing it superficial to the fascia and suturing the fascia underneath the fistula [22, 25]. However, this places the fistula directly underneath the surgical scar causing increased pain during cannulation. 'Transposition' takes the vein away from its natural path altogether, superficial to the fascia and lateral to the harvesting incision [22, 26] (Figure 1). Transposition can be performed as a single-stage operation where the superficial tunneling and anastomosis of the vein is all done in one sitting. Alternatively, it can be performed in two stages; first stage involving a brachio-basilic anastomosis at the cubital fossa, followed by an interval of 4-6 weeks for maturation and a second stage of lateral transposition [27]. Studies have not shown a significant clinical difference in outcomes between primary or staged transposition [28, 29].

Aims

Although the place of TBB-AVF has been studied previously [22, 30], there is limited data comparing its efficacy compared to AVG [31-34]. The existing studies are mostly retrospective with only one prospective multicenter trial [35]. Aim of this study was to prospectively compare outcomes of TBB-AVF and AVG in terms of patency for dialysis, mean flow rates, re-intervention rate and associated morbidity or mortality.

Primary patency was defined as satisfactory patency demonstrated on Duplex Ultra Sound (DUS). Primary assisted patency was defined as patency 'maintained' by secondary interventions (fistuloplasty, thrombectomy). Secondary patency was defined as patency 're-established' after early thrombosis. Functional patency was defined as sustained patency with successful use in haemodialysis.

Study design

This was a prospective, non-randomized cohort study of all vascular access performed at the Vascular Surgical Unit of National Institute of Nephrology, Dialysis and Transplantation (NINDT), Sri Lanka from January 2014 to March 2016. Although there are over 12 centers providing vascular access services in Sri Lanka, NINDT is the only 'dedicated' center for Nephrology and Vascular access, where approximately 30% of procedures are for referrals of previously failed access procedures. NINDT Vascular surgical unit comprises of a single specialist vascular surgeon and support staff, with the specialist surgeon performing all access operations, averaging 25 procedures per week.

The selection of access site was based on National Kidney Foundation (NKF)-Kidney Disease Outcomes Quality Initiative (KDOQI) guidelines [11]. All patients underwent preliminary clinically assessment and DUS vein mapping. Clinical assessment included examination of potential veins, overlying skin, arterial pulse, blood pressure and ability to exercise the hand. DUS vein mapping was done by a trained vascular radiologist or surgeon in accordance with accepted guidelines [36]. A viable cephalic vein >2mm at the wrist or >3mm at the elbow, assessed without a tourniquet, was considered the first preference.

All patients in whom DUS revealed no suitable cephalic vein in either arm were included in the study. After initial assessment and counselling, those who preferentially requested a tunneled CVC over an AVF were excluded. Furthermore, patients who 'crash-landed' to hospital requiring urgent CVC for immediate use and those who were deemed medically unfit for anaesthesia to carry out TBB-AVF or AVG creation were also excluded.

TBB-AVF was attempted in all who had a patent basilic vein >2 mm without a tourniquet. AVG was used when no suitable basilic vein was seen or when it was presumed that haemodialysis would be initiated within 4 weeks of access creation. All AVG used Expanded Polytetrafluoroethylene (ePTFE Jotec®) grafts with a wall thickness of 0.5 mm and internal diameter of 6 mm [37, 38]. In TBB-AVF, basilic vein transposition was done in preference to superficialization, as the standard practice in the unit. Primary transposition was done when the vein diameter was > 4 mm, while all others had staged transposition after 4-6 weeks. General anaesthesia or sedation was used in all second stage transpositions, primary transpositions and AVG creations. All transposition and AVG were covered by 3 doses of prophylactic intravenous antibiotics (cefuroxime or co-amoxiclav). Intra-operative heparin 5000 IU was given 2 minutes prior to arterial clamping. Post-operative Aspirin 75 mg daily was used unless medically contra-indicated.

The arterial inflow was the brachial artery at the cubital fossa. In AVG, venous outflow was the axillary vein approached via a trans-axillary incision. All anastomoses used 7/0 polypropylene continuous suture with an end-to side

configuration. All TBB-AVF were actively encouraged on isometric hand-arm exercises at each planned patient contact [39, 40].

Primary and primary assisted or secondary patency was assessed by DUS and defined as an uninterrupted flow rate of > 600 ml/min. Functional patency was defined as the successful use in haemodialysis with a flow rate of > 600 ml/min without significant recirculation, sustaining dialysis for 4 hours [41, 42].

All patients were followed up with DUS at 1, 4, 8 and 12 weeks and whenever clinically indicated thereafter [17]. DUS was done using HDI 5000 (Philips Healthcare, USA) machine with a 7.5 MHz linear transducer. Flow rate measurements were done using doppler quantitative colour flow measurement [43, 44] before dialysis initiation and Transonic® (Transonic systems Inc. USA) ultra-sound dilution technique after initiation [45-47]. Patency assessments were done within the first hour of initiating dialysis before the onset of significant fluid shifts.

Any stenosis on DUS or persistent high venous pressures during haemodialysis were evaluated by fistulogram. Delayed maturation of TBB-AVF with a flow <400 ml/min at 6 weeks post-surgery was also referred for fistulogram [10]. Any significant stenosis confirmed on fistulogram was managed by surgical or endovascular fistuloplasty. Mechanical stents were not used due to unavailability. Surgical thrombectomy was performed wherever there was partial or complete thrombosis and when it was deemed salvageable. Successful thrombectomy was followed by oral anticoagulation for 4 weeks in addition to aspirin.

Surgical Site Infections (SSI) and other complications were documented and categorized according to the Clavien-Dindo [48], Accordion [49] classification systems. They were categorized as minor (requiring out-patient wound care), moderate (requiring admission, intra-venous antibiotics), severe (requiring admission, intravenous antibiotics, surgical drainage, exploration and/or having systemic sepsis) and death (access surgery related death). The incidence of access related 'steal syndrome' with distal ischaemia was also studied. The preferred option for management of limb threatening 'steal' was Distal Revascularization and Interval Ligation (DRIL) [50,51], using autologous great saphenous vein.

All data was collected prospectively using a computerized database in a Microsoft excel worksheet (Microsoft, USA). Analysis was done using SPSS for Windows, software version 21.0 (SPSS Inc., USA) [52]. Continuous data was described as means (± standard deviation) and compared using student t-test. Categorical data was described as percentages and compared using the Pearson's Chi-square test. A p value of <0.05 was considered statistically significant.

Results

There were 2089 consecutive vascular access procedures during this period. Among them, 541 were eligible for the study after initial assessment. 82 were subsequently excluded; 21 preferentially opting for peritoneal dialysis, 19 considered medically unfit and referred for tunneled CVC and 42 referred for CVC due to patient preference or urgency of haemodialysis. 459 patients were finally enrolled (Figure 2). Among them, 382 (83%) had TBB-AVF while the remaining

Baseline Characteristics	TBB -AVF N=382	AVG N=77	P value
Gender			
Male, number (%)	183 (48%)	36 (47%)	0.91
Female, number (%)	199 (52%)	41 (53%)	
Age			
< 40 yrs.	218 (57%)	37 (48%)	0.16
40 yrs. and over	164 943%)	40 (52%)	
Co-morbidities			
Diabetes	186 (49%)	29 (38%)	0.08
Peripheral Vascular dis.	63 (16%)	14 (18%)	0.73
Access type			
Primary access	123 (32%)	26 (34%)	0.79
Secondary access	259 (68%)	51 (66%)	

Table 1. The baseline characteristics of the two groups

77 (17%) who had no viable basilic vein on DUS, had AVG creation.

The baseline characteristics of the two groups including gender, age, presence of diabetes mellitus and peripheral vascular disease were comparable (Table-1).

The mean follow-up was 11(±4.8) months. Follow up data at six months was considered for comparison. There were 9 deaths during the first six months, all occurring beyond 4 weeks and not directly related to access surgery. The causes of death were myocardial infarction (05), left ventricular failure (02) and pneumonia (02). The all-cause mortality rate was 5/382 (1.3%) in the TBB-AVF group and 4/77 (5.2%) in the AVG group, with statistical significance at a p value of 0.02. Two patients with TBB-AVF migrated overseas within the first six months and were lost to surveillance. Calculated six-month follow up data was complete in 448 (375 TBB-AVF, 73 AVG) patients (97.6%).

Among the TBB-AVF, 23 were found to have stenotic segments or partial thrombosis during surveillance. Fifteen such fistulae were salvaged successfully by fistuloplasty or thrmobectomy, achieving satisfactory primary assisted patency. A further 49 fistulae demonstrated poor maturation [36] or complete thrombosis [13] and were considered unusable. These, along with the 08 fistuale that re-thrombosed despite initial thrombectomy, required alternate access with

AVG or CVC.

Seventeen AVG showed evidence of intra-luminal thrombi

	TBB-AVF	AVG	P value
All-cause mortality	5/382 = 1.3%	4/77 = 5.2%	0.02
Primary patency	303/375 = 80.8%	56/73 = 76.7%	0.42
Primary assisted/ secondary patency	318/375 = 84.8%	61/73 = 83.6%	0.78
Functional patency	307/375 = 81.9%	57/73 = 78.1%	0.45
Mean flow rate	733 ml/min	749 ml/min	0.11
Surgical Site Infection (SSI)	24/375 = 6.4%	10/73 = 13.7%	0.03
Haematoma	19/375 = 5%	4/73 = 5.4%	0.88
Re-intervention	23/375 = 6.1%	7/73 = 9.6%	0.28

Table 2. Comparison of Results

during DUS surveillance. Ten such AVGs presented late with associated SSI or significant inflammation, requiring graft explantation. Five had successful thrombectomy and anticoagulation going on to demonstrate sustained secondary patency. Two AVG re-thrombosed after initial thrombectomy and were referred for tunneled CVC as alternate access.

The comparison (Table – 2)

The overall patency rates between the two groups did not show any significant difference. Primary patency rates for TBB-AVF and AVG were 303/375 (80.8%) and 56/73 (76.7%) respectively, p=0.42. The primary assisted or secondary patency rates were 318/375 (84.8%) and 61/73 (83.6%), p=0.78 while the functional patency was 307/375 (81.9%) and 57/73 (78.1%) respectively, p=0.45. The mean flow rate on DUS was 733 (±147) ml/min and 749 (±118) ml/min for TBB-AVF and AVG respectively, with no significance in the difference (p = 0.11).

There were no documented anastomotic or puncture-site pseudo aneurysms during the study period. SSI was seen in 24 TBB-AVF (24/375, 6.4%) and 10 AVG (10/73, 13.7%), with statistical significance (p = 0.03). Four of these TBB-AVF progressed to thrombosis and eventual failure while the remaining 20 were successfully managed by local wound care and antibiotics. All 10 AVGs that demonstrated significant infection were explanted.

Surgical site haematoma formation was seen in 19 TBB-AVFs (5%) and 04 AVGs (5.4%), with no statistical significance at a p value of 0.88. Two TBB-AVF related haematomas required surgical evacuation due to fistula compression. Minor haematoms with no compressive features were managed

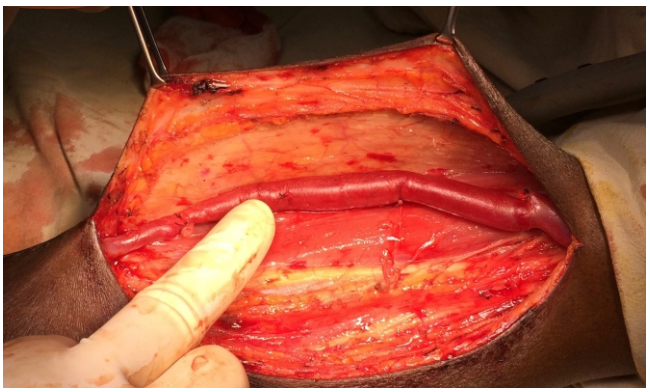

Figure 1.

conservatively. Clinically significant 'steal' with digital ischaemia was seen in one patient (TBB-AVF, 4 months after creation), requiring a DRIL procedure and index finger amputation. The re-intervention rate to maintain or re-establish patency was 23/375 (6.1%) for TBB-AVF and 7/73 (9.6%) for AVG, with no statistical significance (p= 0.28).

Discussion

The 'Fistula-first breakthrough initiative' of the NKF and its recommendations were aimed at achieving early referral for access creation. It aimed at 66% vascular access by AAVF [53-55] and at least 70% of new dialysis initiations to be via AAVF. Nevertheless, the results have fallen well below these targets with late referrals and sustained use of AVG and CVC [9]. Therefore, the exact place of TBB-AVF in the treatment algorithm where cephalic vein access in not achievable, is still somewhat controversial [21].

Many of the existing studies concerning AVG and its role in long-term haemodialysis are retrospective [22, 23, 56] with only one prospective multicenter trial comparing AVG to TBB-AVF [35]. In summary, these studies found that while AVG provided comparable access patency, they carried higher rates of all-cause mortality, morbidity, re-intervention, readmission and overall institutional costs.

An AAVF is preferable for long-term haemodialysis due to its durability, minimal risk of thrombosis and infection as well as cost-effectiveness [57,58]. The reported 1-year functional patency in brachio-cephalic fistula is 70-91% [59, 60]. Early reports of basilic fistulae reported poor patency rates at 50-60% [61, 62]. However, with protocol-based surveillance and early intervention for stenoses, the functional patency rate of TBB-AVF has increased remarkably, reaching up to 90% and comparable to brachio-cephalic fistulae [27, 59, 63]. In comparison, the 1-year patency rates of AVG have remained comparatively low around 50-70% [59].

Our results showed comparable primary, primary assisted or secondary patency and functional patency rates for TBB-AVF and AVG. Although our patency rates were for 6 months,

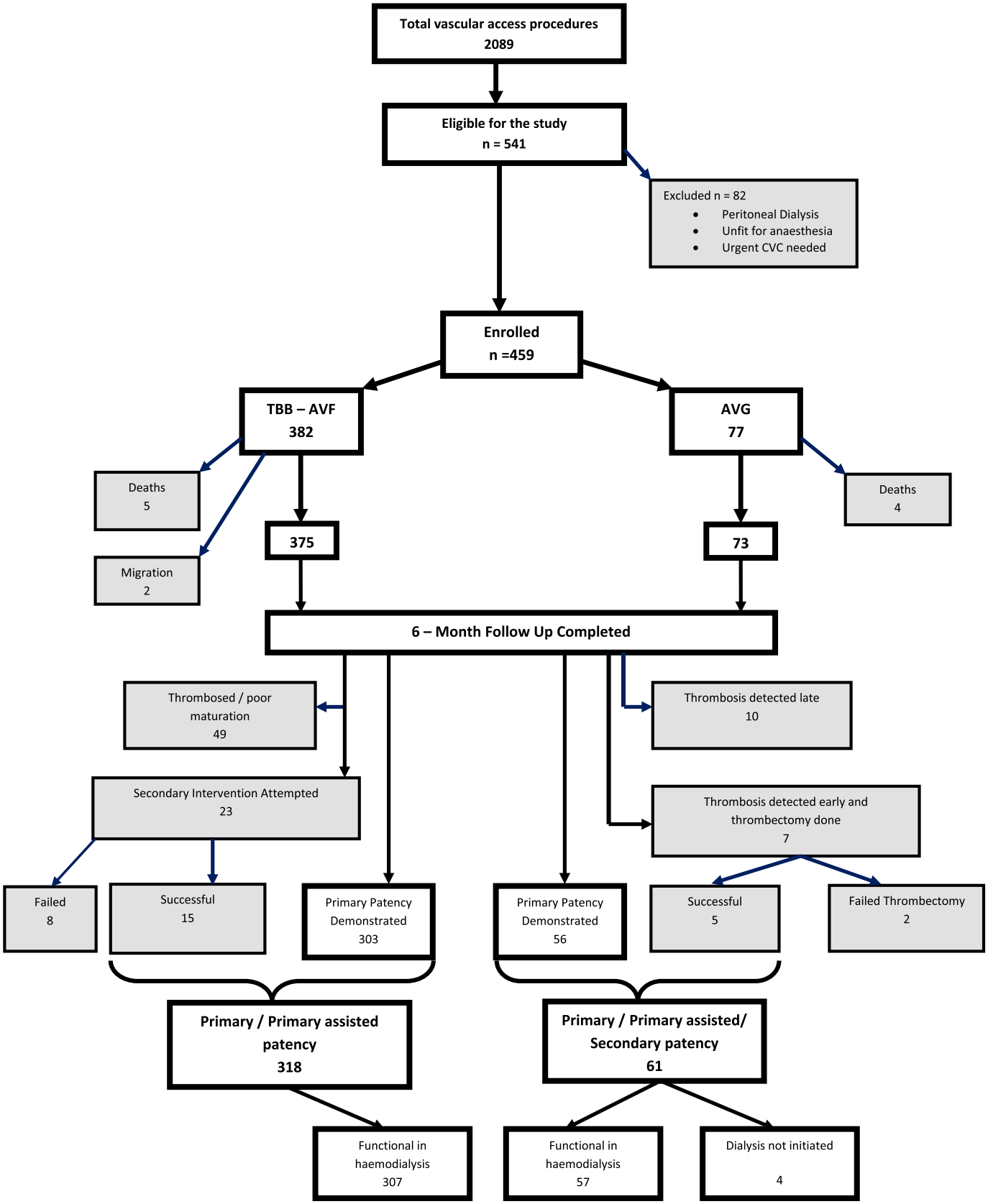
Total vascular access procedures
2089
Eligible for the study
n = 541
Excluded n = 82
Peritoneal Dialysis
Unfit for anaesthesia
Urgent CVC needed
Enrolled
n =459
TBB – AVF
382
AVG
77
Deaths
5
Migration
2
375
73
Deaths
4
6 – Month Follow Up Completed
Thrombosed / poor maturation
49
Thrombosis detected late
10
Secondary Intervention Attempted
23
Thrombosis detected early and thrombectomy done
7
Failed
8
Successful
15
Primary Patency Demonstrated
303
Primary Patency Demonstrated
56
Successful
5
Failed Thrombectomy
2
Primary / Primary assisted patency
318
Primary / Primary assisted/ Secondary patency
61
Functional in haemodialysis
307
Functional in haemodialysis
57
Dialysis not initiated
4

Figure 2.

having a centralized database and surveillance system, being the only designated hospital for renal care and being an island with a relatively small geographical distribution contributed to our very small drop-out rate. Most of the existing literature for TBB-ABF and AVG showed inherent differences in patient characteristics, with a general inclination of AVG in females, older patients and those with diabetes [64]. Our study comprised a wide cross section of patients from the entire country, where the baseline characteristics were largely comparable (Table -1).

The single most important factor attributed to poor long-term patency in AVGs is neo-intimal hyperplasia at the anastomotic site [65]. This is thought to be caused by shear-stress injury at the venous anastomotic site due to turbulent flow and intimal trauma. Numerous improvisations have been attempted to minimize this with limited success, including use of a venous cuff [66] and staples or nitinol clips instead of sutures [67, 68]. However, there are no randomized control trials to demonstrate any compelling evidence of their superiority over standard end to side anastomosis using polypropylene sutures used in our study.

The most commonly used material for AVG is expanded polytetrafluoroethylene (ePTFE). Over the last two decades, numerous modifications have been introduced to increase patency, reduce thrombosis and infection, including heparin bonding, and antibiotic impregnation. Although showing certain advantages such as the ability for early cannulation, there is paucity of robust data to prove superiority of one material over the other [69, 70].

Access flow rates can be measured in various ways including direct doppler quantitative measurement and the indirect ultra-sound dilution technique. Direct doppler quantitative testing is quick, non-invasive and simple, although carrying significant operator variability and bias based on operator experience and angle of the doppler probe [45]. Ultra sound dilution measurement is considered the 'gold standard' [45, 46], as it excludes operator variability and is more objective. However, this involves invasive testing and thereby is useful only in patients already initiated on dialysis. We used doppler method in the pre-dialysis assessments and ultra sound dilution technique after dialysis initiation.

Although not directly related to access creation, this study showed a significant increase in all-cause mortality within AVG group. This was similar to the findings in other studies showing the same increased trend of all-cause mortality with AVG or CVC [71, 72]. Numerous studies have also shown an increased risk of SSI with AVG [73, 74]. Infection was also the second commonest cause of death among patients dialyzing with AVG, after cardiac causes [75, 76]. Our results also showed a significant increase in SSI with the AVG group. However, contrary to other reports [57], we did not observe any significant increase in other morbidities such as haematoma, pseudo aneurysms or 'steal'. The management of an infected vascular access is always challenging. SSI in AAVF can often be successfully managed by oral or intravenous antibiotics alone while in AVG it often requires aggressive debridement or explantation [77].

Conclusions

- TBB-AVF shows excellent medium-term patency when constructed in a planned systematic manner. The primary, primary assisted, secondary and functional patency rates are comparable to AVG.
- A mature TBB-AVF gives comparable flow rate to an AVG, thereby allowing adequate and satisfactory dialysis.
- Use of AVG is associated with a significantly increased all-cause mortality and SSI rate compared to TBB-AVF. Management of such SSI is often difficult, expensive and requires admission, explantation and prolonged intravenous antibiotics.
- Other access complications such as haematoma, pseudo aneurysms and distal 'steal' syndrome were comparable between TBB-AVF and AVG.
- The rate of re-interventions was comparable between the two groups.

Limitations

This was a single center study involving a single unit experience. Furthermore, only medium-term results were analysed at 6 months of follow-up. The nature of the study did not allow randomization or blinding. Despite the comparable baseline characteristics, selection bias could not be eliminated based on diameter of basilic veins and availability of prosthetic grafts. Although no significant difference among commercially available grafts has been demonstrated, a bigger study involving a wider array of prosthetic grafts may have been useful.

The numbers in the two groups were not comparable. Any potential difference in the outcomes between primary and staged transposition was not considered in the analysis although this has been widely investigated elsewhere. Other confounding variables such as patient age, presence of diabetes, underlying cause of ESKD were not included. An actual cost analysis could not be carried out due to the logistical limitations in a state-run free health care system. A patient satisfaction survey for access creation and comfort during haemodialysis as well as nurse satisfaction during needling was not performed.

Future directions

Every effort should be made to construct an AAVF in preference to AVG. A prospective study undertaken to evaluate the relevant outcomes overcoming some of the above limitations would give more robust data allowing us to draw better conclusions. A longer follow up would also be useful in deciding the place of each of these vascular access modes for long term use. A proper costing structure accounting for material costs of grafts as well as operation costs for staged TBB-AVF and possible re-intervention would allow institutions to make additional recommendations on this area.

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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Papillary microcarcinoma of the thyroid: a review

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Abstract

Papillary cancers of the thyroid less than 1cm in diameter are defined as microcarcinomas. Although considered as a disease with an indolent course with excellent long term prognosis a significant proportion with this condition will have lymph node metastasis at diagnosis. Clinicians need to be aware of the pathological characteristics, natural history and the internationally accepted treatment strategies when managing patients with micropapillary cancers as increasing numbers of patients are expected to be diagnosed with this condition due to widespread use of imaging modalities for numerous other indications. This brief review aims to summarize these aspects with emphasis on management.

Introduction

Microcarcinoma of the thyroid is defined as a tumor less than 1cm in its maximum diameter [1]. Mostly they are of the papillary variety although rarely they can be of follicular or medullary in type [2]. Although epidemiological data regarding the prevalence of thyroid cancer in Sri Lanka is not readily available, international studies report a rising incidence of thyroid cancers over the past few decades. Increased diagnosis of small papillary cancers accounts for the overwhelming majority of this rise [3]. Despite this increase in the disease burden, management of this entity is controversial [3] with some advocating aggressive treatment and others a more conservative approach.

Clinical presentation

The mean age of diagnosis of thyroid microcarcinoma ranges from 41.9–55 years and there is a female preponderance. Clustering of papillary microcarcinomas (microPTCs) among family members have also been reported [4].

Most of the papillary microPTCs are usually not palpable and they are detected incidentally on thyroidectomy specimens performed for other indications [5]. The detection rate of such 'incidental' microPTC ranges from 2.2 - 49.9% in thyroid glands removed for benign causes and depends on the thoroughness of histopathological examination [2].

Asymptomatic, unsuspected thyroid lesions found on imaging studies or surgeries unrelated to the thyroid are defined as 'thyroid incidentalomas' [6]. Increased detection of such lesions mainly due to liberal use of ultra sound scanning has contributed to the rising incidence of thyroid cancer [3]. Nodules are detected on 13-67% of thyroid glands on ultrasound [4]. As they are common findings, to guide clinicians as to when to perform guided fine needle aspiration cytology (FNAC), ultrasonically suspicious features for malignancy have been described such as microcalcifications, increased vascularity in the centre of the tumor compared to surrounding normal thyroid tissue, hypoechogenicity, irregular borders and taller than wider dimensions of the nodule [5,7]. Some thyroid incidentalomas may prove to be malignant upon FNAC.

Autopsy studies have reported 'latent' microPTC in 5.6 - 28.4 % (8) of the analyzed specimens.

The entity of 'occult' microPTC includes lesions detected upon search for the origin of lymph node or visceral metastasis [10].

Pathologic characteristics

Pathologically, microPTCs do not exhibit different morphological characteristics compared to classical papillary carcinomas [11]. They are likely to be located near the capsule of the thyroid gland and are non-encapsulated. Histologically, characteristic orphan Annie eyed nuclei are seen. Variants of classical papillary carcinoma such as follicular, tall cell and oncocytic types may also be seen in the microcarcinoma counterpart [4].

Characteristically, microPTCs are slow growing [10]. A Japanese study reported that only 6.4% and 15.9% of followed up microPTCs showed an increase in the size > 3mms at 5 years and 10 years, respectively [12]. However, in contrast a significant proportion of these tumors may be multifocal or bilateral. In surgical specimens, multifocality ranged from 15% - 43.8% [9]. So et al. reported bilateral

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DOI: http://doi.org/10.4038/sljs.v35i2.8383

tumours in 63 of 277 (22.7%) patients with microPTC. They identified that nodular hyperplasia of the gland was a risk factor for both multifocal and bilateral tumors. The same authors reported that the presence of multifocal lesions in a single lobe was associated with a higher chance of bilateral tumours [13].

Lymph node metastasis are present in up to 64% of the patients at the time of diagnosis of microPTC [4]. Wada et al who did prophylactic central compartment lymphadenectomy in clinically node negative patients with microPTC who underwent thyroidectomy, reported that up to 60.9% had involved nodes [14]. Larger primary lesions, follicular variant of microPTC and the extension of the lesion beyond the thyroid capsule are identified as risk factors for lymph node metastasis [4].

Although it is a rare possibility, metastatic deposits in organs other than lymph nodes can be present at the diagnosis of microPTC. In the meta analysis published by Roti et al, they noted that out of 9313 patients with microPTC only 35 (0.37%) had such a presentation. The authors noted that larger primary tumors, presence of lymph node metastasis, follicular variant and increasing age as risk factors for distant metastasis at diagnosis [4].

Comparison of clinically overt microPTC versus incidentally detected microPTC have shown that, adverse features such as the presence of multifocality/bilaterality, extension beyond the thyroid capsule, presence of lymph node or extra lymph node metastasis were higher in the former group [4].

Genetics- BRAF mutation

Mutations in the BRAF proto oncogene is considered the most common genetic alteration in papillary thyroid cancers [25]. It is detected in up to 83% of all papillary thyroid cancers and 30% of microPTCs [25, 26]. Detection of this mutation may have a role in diagnosis, prognosis and development of management strategies for papillary cancers of the thyroid. Studies have reported a higher incidence of adverse features such as involvement of perithyroidal tissues and nodal metastasis in BRAF mutation associated microPTCs [26]. As there is a lack of specific clinicopathologic indicators to determine which microPTCs need aggressive treatment, detection of BRAF mutation may play a role in solving this dilemma [25].

Management

MicroPTC is considered as a disease with a good prognosis and the mortality is considered to be less than 1% [2]. In their meta-analysis, Roti et al. reported a disease specific death rate of 0.34% (32/9379) [4]. However, some authors describe two biologically distinct subtypes of microPTC, one type with an indolent behavior with minimal or no disease progression, the other type being more aggressive with potential for dissemination [15]. However the authors agree that clearly defined criteria to determine which type is which are still lacking.

The local recurrence rates after resection of primary microPTCs ranges from 3.8-20%, and cervical lymph nodes are the preferred site of recurrence[2]. Patient age (<45 years), clinically overt disease, lymph node metastasis at diagnosis, cancer multifocality [4], poorly differentiated cancers, presence of a desmoplastic reaction and/or invasion of perithyroidal tissue [2] have been identified as risk factors for recurrent disease. Male gender, primary tumour size and presence of tumor extension beyond the thyroid capsule have been recognized by some as predictors of local recurrence but not by others [2, 4, 16].

The long term survival is virtually 100% in microPTC without clinical evidence of nodal or distal metastasis at diagnosis, hence the aim of treatment should be to achieve disease control without undue treatment associated morbidity [2].

For unifocal microPTC with no extension beyond the thyroid capsule, lymph node or distant metastasis resection of the affected lobe is the recommended treatment [2]. National Comprehensive Cancer Network (NCCN) guidelines recommends consideration of total thyroidectomy if there are additional risk factors such as a history of irradiation of the neck, poorly differentiated tumors, or bilateral nodularity of the gland [17].

If a microPTC is detected in a lobectomy specimen performed for another indication, staging of the neck by ultrasound should be considered. Completion thyroidectomy is indicated for FNAC proven contralateral lesions or lymph node metastasis [17].

Follow up of patients who have undergone lobectomy is by physical examination, serum TSH, thyroglobulin and anti-thyroid antibodies at 6 and 12 months after surgery and annually thereafter if there is no evidence of recurrent or residual disease as recommended by NCCN guidelines [17]. However, it has been argued that patients with microPTC without risk factors on whom lobectomy has been performed have no additional risk of dying from thyroid cancer compared to the general population. Hence British guidelines for the management of thyroid cancer advocates no further follow-up regarding cancer care in such patients [2].

Total thyroidectomy is the standard treatment for microPTC with lymph node metastasis, distant metastasis, or local invasion [17]. According to British guidelines for the management of thyroid cancer, total thyroidectomy is also indicated for patients with microPTC and familial non medullary thyroid cancer [4].

For patients with multifocal microPTC total thyroidectomy should be offered [2]. According to literature lobectomy/and or isthmathectomy for multifocal disease leads to higher recurrence rates (8.2-25%) compared to total thyroidectomy done for the same indication (2.3-5%) [17].

Therapeutic neck dissection combined with total thyroidectomy should be performed for microPTC presenting with lymph node metastasis [2]. Lymph node involvement at diagnosis has a 11- 22% risk of future recurrence in lymph nodes [18]. It is also associated with higher risk of distant metastasis [4, 19].

According to British guidelines prophylactic central compartment neck dissection(PCCND) in microPTC can be considered for multi focal disease, presence of perithyroidal tissue invasion and extra thyroidal disease [2]. However, PCCND in node negative papillary thyroid carcinoma does not offer a survival benefit nor does it significantly reduce local recurrence rates [20]. Regarding the morbidity of prophylactic neck dissection Caliskan et al. reported permanent hypoparathyroidism and recurrent laryngeal nerve palsy at a rate of 2.6%. And 0.5% after performing the procedure on 842 patients with micoPTC [21].

MicoPTC presenting with extra nodal metastasis is extremely rare, and it should be managed with multimodality treatment including surgery and radioactive iodine (RAI) [18].

Routine RAI treatment for uncomplicated microPTC is not recommended [18]. According to the European consensus on management of differentiated thyroid cancer there is no benefit in RAI for unifocal microcancers without extension beyond the thyroid capsule or lymph node involvement [22]. There is place for RAI in patients with lymph node or distant metastasis, local invasion, and multifocal disease. However RAI has no proven benefit in reducing the higher recurrence rates associated with multifocal or lymph node positive disease [18].

TSH suppression for patients with micro PTC should be based on the stage of disease and risk of recurrence. For low risk patients a TSH target of 0.1– 0.5 mU/L is suggested and for those with stage III or IV disease TSH should be suppressed below 0.1mU/L [18]. Although there is evidence for benefit of TSH suppression on differentiated thyroid cancer, Noguchi et al. who studied 2070 patients with microPTC found out no increase in recurrent disease in those who discontinued suppressive treatment [23]. The risks of TSH suppression such as osteoporosis in postmenopausal women and cardio-vascular complications in the elderly warrants consideration risks and benefits of treatment rather than routine TSH suppression as advocated by some [24].

There is no role for adjuvant systemic therapy other than RAI and TSH suppression for microPTC as it is a type of differentiated thyroid cancer [5].

Observation without therapeutic intervention has been studied as a management option for microPTC. Ito et al. followed up 340 patients diagnosed with microPTC without adverse features such as unfavorable tumour location, clinically node positive disease and high grade on FNAC. At the end of 10 years 15.9 % had tumour size enlargement of >3mm and 3.4% had new nodal metastasis. Out of 340, 109 (32%) patients underwent thyroidectomy for various reasons during this period and none developed recurrent disease. Patient and clinical characteristics such as gender, age, tumour size at diagnosis, multcentricity or TSH suppression were not associated with enlargement of the lesions [12].

Conclusions

In summary, microPTC of the thyroid is a disease with an excellent prognosis. It is being more commonly diagnosed as a result of liberal use of imaging modalities. Clinicians need to be aware of the natural history and treatment options available including surgery, RAI, TSH suppression and active observation in order to avoid over/under treatment. Association of BRAF proto oncogene mutation with microPTC and its role on determining prognosis and treatment of this disease entity is an ongoing area of research with exciting prospects.

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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TECHNICAL NOTE

Associating liver partition and portal vein ligation for staged hepatectomy (ALPPS) in a hepatocellular carcinoma patient with inadequate remnant liver volume

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Key words : Liver remnant; volume; staged hepatectomy

Introduction

A 24-year-old patient was diagnosed with large hepatocellular carcinoma involving 2,3,4A, 4B, 5 and 8 segments of the liver. His background liver was normal. An extended left hepatectomy was needed for a curative resection. Future remnant liver volume was considered inadequate (Figure 1). The patient was offered Associating Liver Partition and Portal vein ligation for Staged hepatectomy (ALPPS) procedure.

Discussion

In the first session the liver hilum was dissected and the left portal vein was ligated. Subsequently the liver was completely split in to two (Figure 1) in the plane between the right anterior and right posterior sectors keeping the inflow from both hepatic arteries and right portal vein intact. After the first step, the liver functions were stable. On the seventh postoperative day following a repeat CT scan, the second step of completion hepatectomy was done after dividing the left hepatic duct, hepatic artery, left and middle hepatic veins. Significant hypertrophy was noted in the right posterior sector (Figure 2). Postoperative recovery was unremarkable.

Small size of the future liver remnant (FLR) is a limiting factor in liver resections. Portal vein embolization, portal vein ligation and staged hepatectomies are some of the techniques traditionally used to enhance the future liver remnant.

These techniques need 6 to 8 weeks and can delay further oncological management. A newly emerging technique, Associating Liver Partition and Portal vein ligation for Staged hepatectomy (ALPPS), claims to achieve rapid liver regeneration to complete the resection in a week period [1, 2].

However early data shows that ALPPS is associated with higher morbidity and mortality compared with the other procedures for managing small remnant liver [4]. ALPPS though remains a viable option to improve the resectability of liver lesions in selected patients.

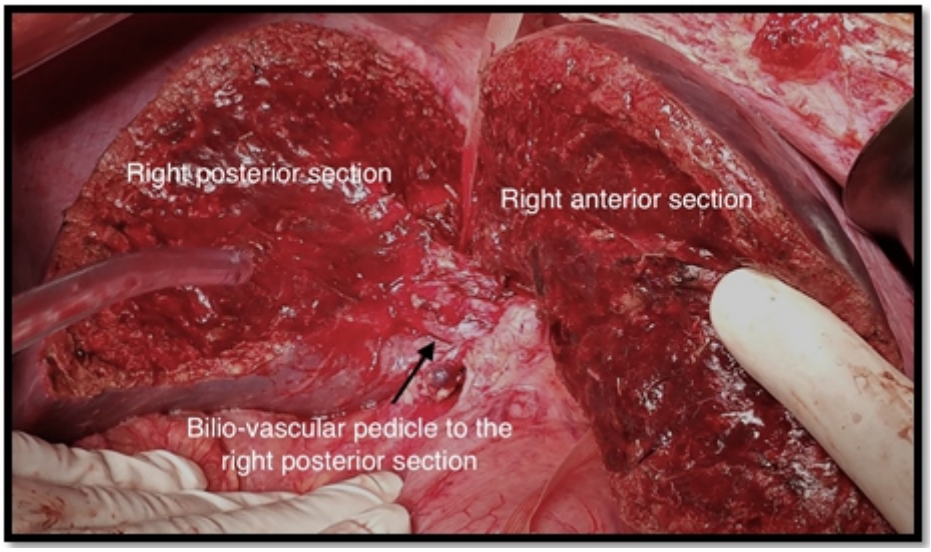

Figure 1. Ligation of the left portal vein and splitting the liver in the plane between the right anterior sector and right posterior sector.

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Figure 2. Hypertrophied right posterior sector

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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IMAGES IN SURGERY

Brodie Absces

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A 56 year old driver presented with upper shin pain for 10 months'duration.He has a history of compound fracture of tibia

1) What is the most likely diagnosis?
2) What are the differential diagnosis for the radiological appearance of above condition?
3) What are the other imaging modalities that will support your diagnosis?

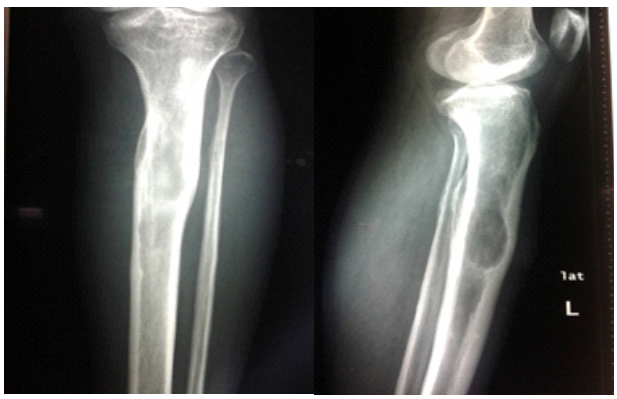

Figure 1. AP and lateral view of upper end of left tibia / fibula

4)What are the management strategies that will help in treating the above condition?

5) What is the most likely culprit organism for the above condition?

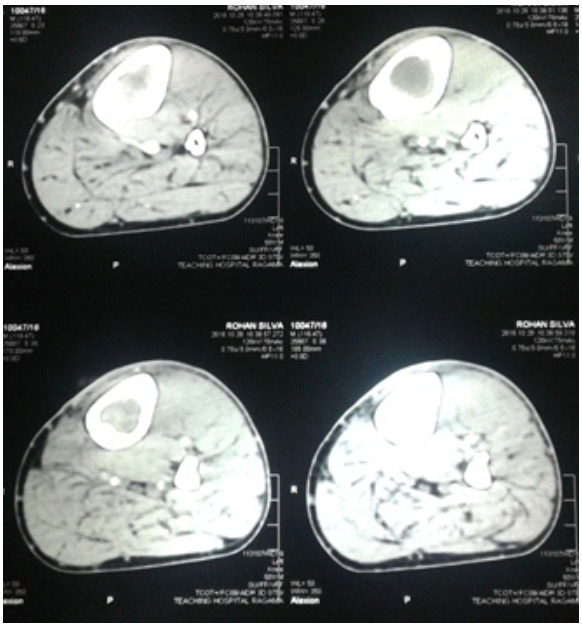

Figure 2. CT appearance of left upper tibia

Answers on page 30

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BRIEF REPORT

Three dimensional laparoscopy – maiden experience during an adrenalectomy in Sri Lanka

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Key words: Three dimensional laparoscopy; adrenalectomy

Abstract:

We describe our maiden experience of laparoscopic right adrenalectomy using three dimensional vision systems experiencing several advantages as a team experienced in laparoscopic adrenalectomy in Sri Lanka.

Introduction

We report our first experience in laparoscopic adrenalectomy using three dimensional (3D) vision systems performed for a non secreting right sided adrenal tumour. To our knowledge this is the first reported case in Sri Lanka.

Positioned in the left semi-lateral (70 degrees) decubitous position, ports were placed as for two dimensional (2D) laparoscopy with two10mm and two 5mm ports two finger breadths below the costal margin as shown.

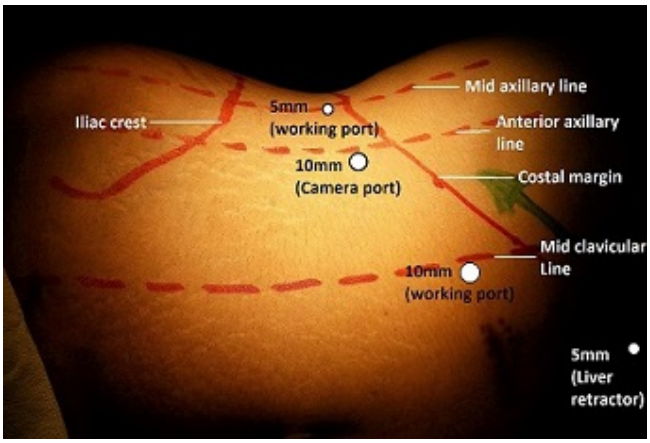

Figure 1. Positioning of ports with anatomical land marks in the right flank as viewed from front

A 3D laparoscopic camera was introduced via the 10 mm port at the anterior axillary line. Liver was retracted superiorly with a liver retractor introduced via the epigastric port. The 10mm port at the midclavicular line and a 5mm port on the mid axillary line were used as working ports. All surgeons wore 3D glasses. Gerota's fascia was opened over the left edge of the mass with hook-diathermy. IVC was identified and the right adrenal vein was clipped and divided. The tumour was mobilized off the IVC completely. Numerous arteries supplying the gland were cauterized and the gland was dissected free after opening the fascial fold laterally.

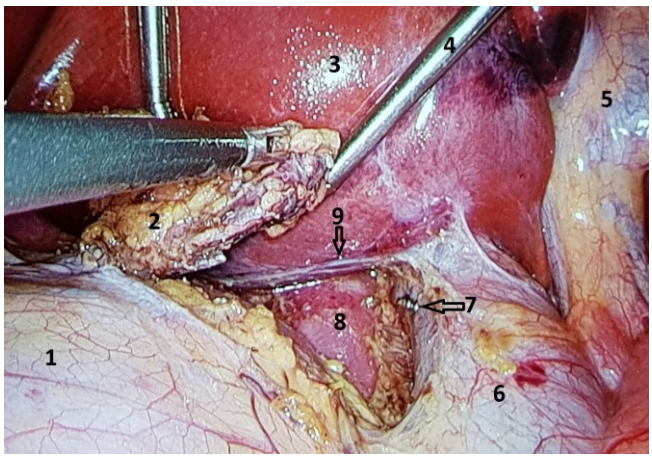

Figure 2. Laparoscopic view of the partially mobilized right adrenal mass with its surrounding relations. 1- Right Kidney, 2- Right adrenal gland, 3- Right lobe of liver, 4- Laparoscopic liver retractor, 5- Gall bladder, 6- Inferior vena cava, 7- Right adrenal vein (clipped), 8-Bare area of the liver, 9 – Right Coronary ligament

Three dimensional vision gave better spatial orientation due to good depth perception that was pivotal for both the camera holding surgeon and the operating surgeon specially when dissecting the right adrenal vein close to IVC.

Discussion

Laparoscopic adrenalectomy was first described by Gagner et al in 1992 [1]. It became the gold standard for adrenalectomy in most benign conditions.

In 2D laparoscopy, absence of depth perception and resultant spatial disorientation are felt as limitations by most surgeons in the early phase of their learning curve. This affects hand-eye coordination and potential injury to adjacent organs. With

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experience, many surgeons use certain visual cues to aid better orientation to overcome this limitation.

In two recent randomized prospective studies, 3D laparoscopy was shown to have a significant reduction of operative time and number of repetitive errors and improved accuracy of laparoscopic skills in novices [2,3] . It is also shown to reduce the learning curve of complex laparoscopic tasks on a prospective study [3].

In a recent systematic review by Fergo et al [4] on comparison of new generation 3D laparoscopy versus 2D laparoscopy in abdominal surgery found that 9 of 13 trials (69%) and 10 of 13 trials (77%) found a significant reduction in performance time and error, respectively.

To our knowledge, there is no published data on adrenalectomy with 3D laparoscopy. According to the authors, 3D vision was more useful during adrenalectomy compared to other procedures, as accurate orientation is crucial for safe clipping of adrenal vein and dissecting the gland off IVC. Furthermore, an experienced surgeon operating the camera was felt essential to operate the flexible tip of the 3D camera.

Three dimensional vision systems brings up new questions. Is it actually better or just an attractive option? Is it more comfortable to the surgeon? How does it affect the learning curve of surgeons? Is it cost effective? Well conducted unbiased prospective studies should help establishment of its place within the armamentarium of laparoscopic surgery.

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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First case of enbloc dual kidney transplantation in Sri Lanka: a case report and review of literature

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Keywords: Enbloc dual kidney transplantation; dual kidney transplantation; paediatric deceased donors

Introduction

Deceased organ donation in Sri Lanka is still in its infancy and occurs quite infrequently. Among them, paediatric Deceased donors (DD) are extremely rare. In contrast, the demand for deceased donor organs is constantly increasing, especially for Kidney Transplantation (KT). DD Dual KT means transplanting both harvested kidneys into one recipient.

Such transplants are carried out when the donor kidneys are sub-optimal or of the paediatric age group. When kidneys are retrieved from paediatric donors of less than 15 kilograms it can be transplanted as enbloc (keeping vessels of both kidneys on aorta and inferior vena cava (figure1) to avoid complications. Such a case has not been reported before in Sri Lanka.

Case report

A three and a half year old girl was admitted to the teaching hospital Anuradhapura with respiratory arrest following a snake bite. Patient was not having spontaneous breathing movements despite not being on paralytic agents for 10 days and brain death was confirmed later. Informed written consent for organ donation was obtained from parents. Her weight was 12 kilograms (kgs).

Bilateral kidneys with ureters, aorta and inferior vena cava was retrieved enbloc. (Figure1). It was transplanted into a 44 year old male weighing 50 kgs, with end stage renal failure (ESRF) due to hypertensive nephropathy. The lower end of graft IVC and aorta was anastomosed to recipients' external iliac vessels in an end to side fashion. (Figure 1, 2) ureters were joined at lower end and anastomosed to the bladder. There was immediate graft function with a serum creatinine reduction From 397 on D0 to 198 on D2.

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Discussion

En-bloc (EB) Dual KT are considered when kidneys are retrieved from marginal or paediatric donors. The first case of EB dual KT was performed in 1972 USA [1]. Kidneys from paediatric DD of less than 15kgs are considered marginal due to increased risk of vascular thrombosis, ureteric

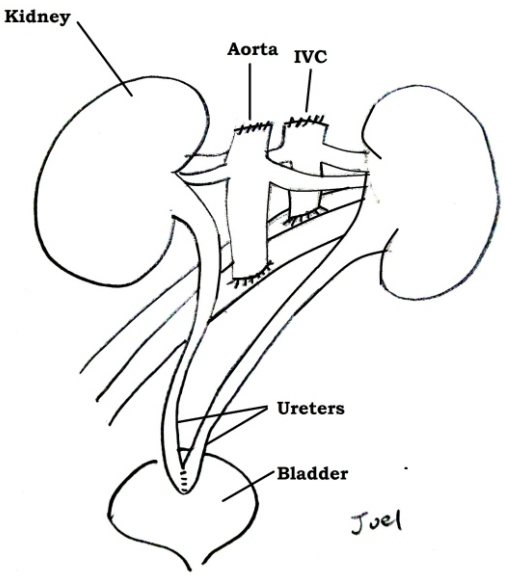

Figure 1. Enbloc Kidney Transplantation

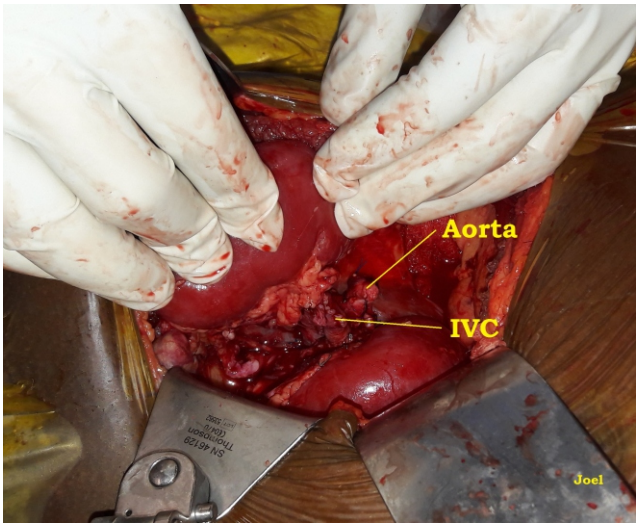

Figure 2. Following Reperfusion

complications, delayed graft function and hyper filtration syndrome [2,3,4,5]. Therefore KT from such donors were not preferred in the past. However with the current advance in techniques and improved management of donor and recipients the situation has improved. In EB dual KT both harvested kidneys are implanted together with Aorta and IVC. This will reduce the operating time and provide a larger calibre vessel for anastomosis which will minimise the surgical complications.

Splitting such kidneys and implanting into two different recipients will result in inadequate kidney mass to allow adequate function and also the surgical and postop complications are more with such splitting even if they are implanted separately into a single recipient [6]. Therefore due to the lack of adequate DD and long waiting times in cadaveric KT list, such EB dual KT should be considered more in the country.

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Key Points

- Retrieval and transplantation of marginal kidneys from paediatric donors should be considered more
- EB dual KT reduces the operating time and the complications.

Adenomyoepithelioma of breast: case report

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Keywords: Breast lump; adenomyoepithelioma; AME; myopeithelial proliferation; immunohistochemistry

Introduction

Adenomyoepithelioma (AME) is a biphasic tumour of breast composed of variable number of myoepithelial cells around small epithelial lined spaces. Breast acini and ducts usually contain epithelial cells internally which are covered by myoepithelial cells externally. Breast AME typically presents as single unilateral painless lump which usually located in a peripheral portion of the breast [5]. It has characteristic dual proliferation of glandular and myoepithelial cells and has been described by Hamperl [1], in 1970.

Benign myoepithelioma neoplasm, hyperplasia and malignant neoplasm with myoepithelial differentiation are the different types of AME. These neoplasms usually show squamous, chondromyxoid, plasmacytoid, clear cell and myoid spindle cell differentiation of myoepithelial cells. Papillary architecture is seen in most tumours, therefore it's also considered to be a variant of intraductal papilloma [2].

Most of the reported cases were female except for few male patients [3]. Although it is a benign neoplasm, failure to achieve an adequate resection margin may lead to recurrence [4]. Therefore, local resection with free margins is the treatment of choice for these patients. Malignant transformation rarely occurs [2,4].

Case report

We describe a 31 year-old Sri Lankan Tamil female patient who is generally good health with no family history of cancer. She presented with a left side breast lump for one month duration which she noticed while having a bath. She underwent clinical examination and found to be having two breast lumps at 9'o clock and 2'o clock position without any axillary lymphadenopathy on either side.

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DOI: http://doi.org/10.4038/sljs.v35i2.8388

Ultrasonographic examination revealed two well defined lesions seen in left breast at 9'o clock and 2'o clock position which favoured fibroadenomata. Her abdominal ultrasound revealed multiple fibroids in the uterus. She underwent a fine needle aspiration of the lesion which revealed blood and fibro-fatty fragments only (C1). Core biopsy was performed which showed few breast acini in a fibro fatty stroma with no evidence of insitu or invasive malignancy. It was believed that the target lesion had been missed and advised on a repeat biopsy. However the patient did not consent for repeated ultrasound guided biopsy.

So we performed excision biopsies of both lumps. They were macroscopically irregular, firm, pale brown tissue masses measuring 55x45x45 mm, 35x40x30mm and cut sections revealed a well-defined heterogeneous lesion. Microscopically there was circumscribed lesion with lobules of small and intermediate size ducts with prominent myoepithelial cells lining without cellular atypia. Background mammary tissue showed features of sclerosing adenosis and fibrocystic disease and concluded as adenomyoepithelioma. Patient was reassured about her condition and followed up in our surgical clinic three monthly for routine examination of her breast to identify local recurrence. Also she was educated on self-breast examination.

Discussion

Myoepitheliosis, adenomyoepithelioma, and myoepithelial carcinoma are various types of myoepithelial tumours. AME is characterized by proliferation of an inner epithelial cellular layer with peripherally situated myoepithelial cellular layer. Most of the tumours are benign, sporadic and rarely can it be malignant. The aetiology of the lesion is still unknown. Reported cases shows that majority of affected are in the fifth to sixth decade of life [6].

Clinical and radiological observation is inadequate for diagnosis, therefore histology needs to be obtained to confirm the diagnosis. Mammographically, it may show probably benign features (BIRADS III) while others have features suspicious for malignancy (BIRADS IV).

Adenomyoepithelioma should be differentiated from tubular adenoma, fibrodenoma pleomorphic adenoma and sclerosing

adenosis of breast [6].

Epithelial differentiation can be identified by immuno-staining of smooth muscle actin and calponin. proteins. There are various markers used to identify myoepithelial cells, S-100 protein is one of them and others are P63, smooth muscle actin, calponin, 34βE12, CK5/6 [7], but these immune-activities also observed in epithelial cells as well. Hence these markers are not reliable to identify myoepithelial cells. Recognition of biphasic cellular proliferation in histology with supportive immunohistochemistry aids diagnostic of AME. Immunohistochemistry is not freely available and selected patients undergo this investigation in our institution only for confirmation.

High mitotic rate, cytological atypia and peripheral infiltration are the potential malignant predictors in AME. Therefore, pathology report should be carefully studied to identify atypical features. To avoid recurrence and metastasis, lesion should be completely excised with margins. The prognosis of this condition is usually good.

Our patient had well defined lesions, which were excised with adequate margin, so risk of recurrence is relatively small. We are following up in surgical clinic to make sure that there is no recurrence. Also the patient is educated on self-breast examination for early detection of recurrence.

Conclusion

Adenomyoepithelioma is a benign breast lesion which can recur locally and transform into malignancy with or without metastasis. Combination of histology and immunohisto-chemistry is important in diagnosis. In case of failed biopsy, ultrasound guided biopsy should be performed for accurate diagnosis. Complete excision of tumour with margin is important to prevent recurrence. Self-breast examination may have a role in early detection of tumour recurrence.

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Key Points:

- Adenomyoepithelioma is a benign tumour with malignant potential
- Histology and immunohistochemistry is important in diagnosis
- Complete excision with margins is mandatory to prevent recurrence

Isolated thyroid metastasis from oesophageal primary- a rare clinical scenario

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Keywords: Thyroid metastases; oesophageal carcinoma; squamous cell carcinoma; dysphagia; oesophagus

Introduction

Oesophageal cancer is the second and fifth most common cancer among males and females respectively in India. Most of these cancers present at an advanced age and less than 10% patients survive beyond 5 years after diagnosis [1, 2]. Most of them present initially with dysphagia. Other symptoms include foreign body sensation in the throat, retrosternal pain, weight loss and cachexia. Presence of distant organ metastasis makes it a stage 4 disease according to the latest AJCC staging system. Synchronous occurrence of thyroid metastasis from oesophageal primary is an exceedingly uncommon scenario. Limited number of cases has been described in the English literature. The appropriate management in such group of patients remains unknown at this point of time.

Case report

A 65 years old lady presented to us with dysphagia to both solids and liquids for the last 10 months. She also complained of foreign body sensation in her throat. Epigastric pain, dyspepsia, nausea, vomiting and anorexia were absent. However she complained of losing few kilos of weight in the last 4 months. She had no other metastatic symptoms. Her past surgical and medical history was unremarkable. Her general survey was normal. On detailed physical examination a swelling was noticed in front of her neck which moved up with deglutition but did not move with protrusion of tongue (Figure .1).

On palpation the swelling was firm with ill defined margins. Rest of her physical and systemic examination was normal. A barium oesophagogram done showed a narrow irregular segment at the region of mid oesophagus (Figure.2). An upper gastro intestinal endoscopy showed presence of ulceroproliferative growth in the mid oesophagus. Biopsy

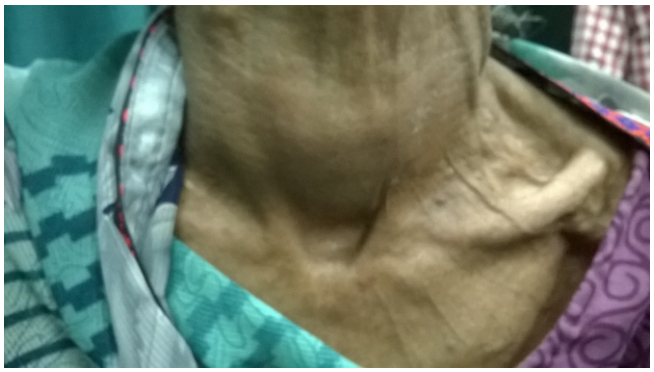

Figure 1. Showing a swelling in front of neck which moves up with deglutition.

was suggestive of moderately differentiated squamous cell carcinoma of the oesophagus. An ultrasonography neck showed presence of hypoechoic mass in the left lobe of thyroid with irregular margins. Fine needle aspiration cytology (FNAC) from the mass showed presence of atypical epithelial cells in cohesive clusters with pleomorphic nuclei and scanty cytoplasm. Overall picture was suggestive of poorly differentiated carcinoma consistent with metastatic cancer. Routine blood tests and thyroid function tests were normal.

A computed tomography scan of the chest showed presence of irregular thickening of the oesophagus without mediastinal involvement .Rest of the metastatic work up was negative. The patient was discussed in multidisciplinary tumour board

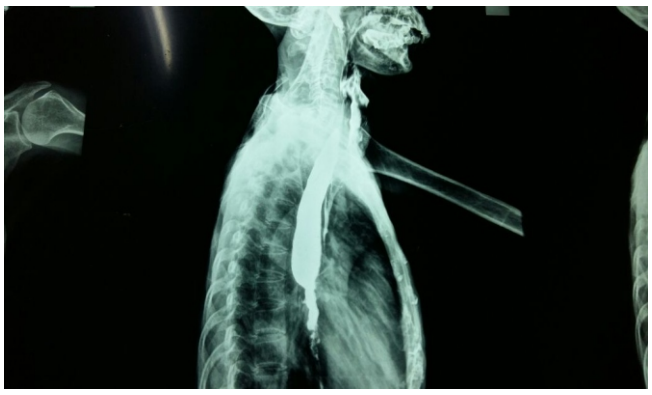

Figure 2. Barium esophagogram showing irregular filling defect in the mid esophagus.

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DOI: http://doi.org/10.4038/sljs.v35i2.8389

Cases reported	Age /sex	Chief symptoms	USG + FNAC	Barium Esophagogram	Upper G.I. endoscopy	CT Thorax	Primary site of tumor	Treatment planned/received	Follow up
Basu et al 2005	55/ Female	Thyroid lump + dysphagia	Locally advanced hypoechoic mass with neck nodes + Metastatic keratinizing SCC	Mass in cervical esophagus	N/A	N/A	esophagus	Details of surgery not available. No details on use of adjuvant therapy	N/A
Moullick et al 2012	61/Male	Neck mass and sterna lump	Left lobe of thyroid enlarge+ Metastatic SCC	N/A	Mid esophageal growth	Locally advanced thyroid and sternal mass	esophagus	Planned for external beam radiotherapy and combination chemotherapy	Patient died before receiving any therapy
Gooptu et al 2013	60/ Female	Thyroid lump with dysphagia	Left lobe nodule with neck nodes+ Poorly differentiated SCC	N/A	Mid esophageal growth	N/A	esophagus	Chemoradiation	N/A
Chen et al 2014	61/ Male	Dyspnea, dysphagia, thyroid lump	Left lobe mass with neck nodes+ Diffuse infiltration of atypical cells	N/A	Distal esophageal growth	Locally advanced thyroid mass encasing neck vessels	esophagus	Palliative B/L TT + tracheostomy f/b chemotherapy and radiation therapy.	Patient died after 11 months
Present case 2016	65/ Female	dysphagia	Hypoechoic mass in left lob e of thyroid + Poorly differentiated carcinoma	Mid esophageal growth	Mid esophageal growth	Thickening of the midesophagus with irregular growth	esophagus	Planned for 1st line chemotherapy and esophageal stenting	N/A

Table 1. Showing clinicopathologic characteristics of the published case reports.

*** SCC - Squamous cell Carcinoma, TT - Total Thyroidectomy**

where considering the stage of the disease and the good performance status of the patient a decision to start 1st line chemotherapy along with oesophageal stenting was taken. The option of palliative thyroidectomy was explained to the patient in the event of progression of the thyroid lump. However she did not turn up for the scheduled treatment and could not be traced further.

Discussion

The most common primary presenting with thyroid metastases is renal cell carcinoma [3]. Lung, breast, colon, melanoma are other primaries which can present similarly. The most common gastrointestinal primary to metastasize to the thyroid is colorectal. Thyroid metastasis from oesophageal squamous cell cancer is extremely rare and only 4 cases have been reported so far, out of which three have been reported from India. Primary SCC of the thyroid is a rarer entity which affects individuals of age group 50-60 years having history of long standing goitre. They are more common in abnormal thyroid glands. Most of them present with rapid enlargement of a long standing neck mass and are often locally advanced at presentation.

They are usually radio resistant and fatal. Prognosis tends to be poor with median survival less than 6 months. Metastatic thyroid cancer appears to be commoner. Secondary lesions of the thyroid are often solitary in nature although the more uncommon multifocal diffuse lesions have also been reported in literature [4].Most of these metastases occur either by direct extension from contiguous lesion or via haematogenous or lymphatic spread. Presence of any atypical histology in a thyroid lump should arouse suspicion of secondary metastatic deposits. FNAC can be a useful tool. Immunohistochemistry with common thyroid markers (like thyroid transcription factor 1,thyroglobulin etc) can further help in making right diagnosis [4,5]. On review of English literature we found 4 cases of squamous cell carcinoma oesophageal carcinoma with thyroid metastasis, published in the last 10 years. Chen et al5 in 2014 in their review literature presented 9 similar cases with thyroid metastasis.

It is interesting to note that although the mode of presentation and arriving at final diagnosis was more or less similar in all those cases, there was striking heterogeneity in the way they were treated and their reported outcomes. All the four cases were managed differently. Presence of synchronous thyroid metastases from oesophageal primary is extremely rare. In absence of any treatment guidelines such patients are perhaps best dealt in higher specialty centres with facilities for multimodal therapy.

Conclusion

Presence of asymptomatic thyroid metastasis in a case of primary oesophageal squamous cell carcinoma is an unusual scenario. High index of suspicion should be maintained to make right diagnosis. Due to paucity of such cases no treatment recommendations exist at present. Hence we strongly suggest reporting of such cases. Treatment of such patients should be individualized and requires multi-disciplinary tumour board for optimum treatment selection.

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Key Points

- All neck masses should prompt detailed investigation with the clinical history in mind
- High index of suspicion should be maintained for diagnosis
- Treatment of such unusual cases needs multidisciplinary board discussions and often multimodality therapy hence should be referred to higher tertiary referral centers.

Answers for images in surgery (from page 21)

1) Brodie abscess (BA)

X-rays show a well demarcated area of destructed bone surrounded by a thick rim of reactive sclerosis in cancellous tissue near the end of upper tibia. With the history of compound fracture, osteomyelitis should be suspected.

Sir Benjamin Brodie first described subacute osteomyelitis in 1832 [5]. Ever since, sub-acute osteomyelitis of the bone in the form of pyogenic abscess were named after him as Brodie abscesses.

Most of the patients present with localized pain, often nocturnal, alleviated by simple analgesics [2, 3, 4]. It often mimics the symptoms of osteoid osteoma [7]. BA has a predilection to tubular bones like tibia, fibula, femur and radius. It particularly affects the metaphyses of these bones, most commonly the distal and proximal ends of tibia [1]. However it may rarely traverse the metaphysic of tubular bones into epiphyses and diaphysis. BA is a diagnostic challenge because in the acute phase the clinical features are minimal and non-specific. The initial infection is localized to a small area and is confined by a thick rim of inflammatory fibrous tissue forming an abscess causing bone destruction.

Due to its diagnostic challenges, various imaging modalities are used to confirm the diagnosis. In the plain radiograph it usually appears as an oval lytic lesion. It may show a finger-like radiolucent tortuous channel extending towards the epiphyseal plate, which, when present, is pathognomonic. If a sequestrum is present, it may mimick an osteoid osteoma.

2) The differential diagnosis for radiological appearance of Brodie abscess include

I. Osteoid osteoma
II. Non-ossifying fibroma
III. Giant cell tumor
IV. Eosinophilic granuloma
V. Chondroblastoma
VI. Fibrous dysplasia

3) Isotope bone scan-BA typically enhances on the delayed. CT- It demonstrates a central hypodense cystic lesion with a sclerotic margin due to an extensive fibrous periosteal reaction.

MRI- It is known that the characteristic “penumbra sign” on MRI aids differentiating BA from other bone lesions. It represents a highly vascularized thick rim of granulation tissue characteristically seen on T1 weighted images. Presence of this sign excludes the possibility of a tumor [7].

4) Biopsy and curettage – More than one third of cases are indistinguishable from primary malignant tumors of the bone due to their similar appearance in imaging studies. Histological studies are required for diagnosis in these cases [1]. After the diagnosis is confirmed, parenteral antibiotics according to the culture results/antibiotic sensitivity pattern should be initiated and continued up to 7 days followed by an average 6 week course of oral antibiotics.

Surgery is generally reserved for more aggressive cases of BA. Depending on the site and size of lesions, incision, drainage and curettage are performed. Lesions in diaphysis can be hard to deal with surgically [1]. Antibiotic laden bone grafts and antibiotic cement beads are examples of other forms of temporary surgical measures which can be considered [1].

5) Staphylococcus aureus is the most common organism cultured from Brodie abscesses [7].

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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Nephrocutaneous fistula due to renal stone disease presenting as non-healing abdominal wall sinus: lessons from two cases

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Key words: Stag horn calculi; xanthogranulomatous pyelonephritis; perinephric abscess; non-healing sinus

Introduction

Stag horn renal calculi usually remain asymptomatic and may lead to xanthogranulomatous pyelonephritis, pyonephrosis and non-functioning kidney in long standing cases. If remained neglected, the inflammatory process may extend beyond kidney leading to perinephric abscess. Rarely, this abscess may rupture through abdominal wall presenting as non-healing sinus in the flank region [1,2]. The authors report two such unusual cases that were managed successfully by subcapsular nephrectomy.

Case report - Case 1

In 2012, a twenty two year old female presented with history of painful swelling in the right lumbar region of four months duration. It was clinically diagnosed as an abscess and was drained under local anesthesia in a private hospital. However, a sinus developed at the drainage site with recurrent discharge of pus that did not heal with antibiotics and regular dressings. The patient complained of off and on fever and pain at the site of sinus. A wedge biopsy from the margin of sinus came out to be non-specific inflammatory lesion. The patient also had a dull aching pain at the site of abscess for the last four years.

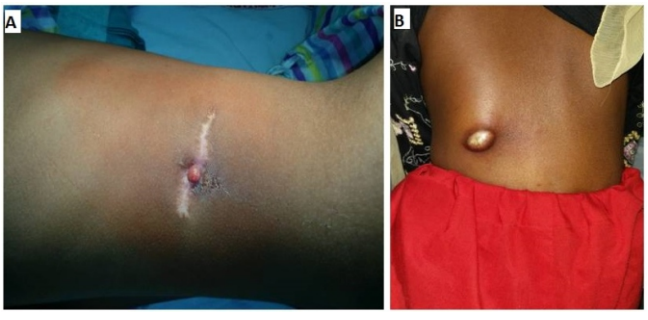

Figure 1A - Clinical photograph showing transverse scar mark with sinus opening in right flank
Fig 1B - Clinical photograph showing swelling left renal area

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There was no history of tuberculosis, diabetes or any other chronic ailment in the past.On examination there was a small sinus in the center of a transversely placed scar mark of previous incision with pouting granulation tissue located in right flank near the tip of 12th rib (Figure 1A). On investigation, her hemoglobin was 9 g/dl, white cell count 10.3 x 106/L with 62% neutrophils, urine analysis showed 20-24 pus cells/ HPF, urine culture revealed E. Coli sensitive to amikacin, serum creatinine 65 mmol/L. Her x-ray abdomen revealed multiple radio-opaque shadows in the right renal area suggestive of triple phosphate stones. Ultrasound abdomen showed a contracted right kidney with multiple calculi in it along with perinephric collection. Intravenous pyelogram revealed normal functioning left kidney and nonfunctioning right kidney with multiple stones in it. Tc99m-dimercaptosuccinic acid (DMSA) renal scan demonstrated non-functioning right kidney.

The patient underwent right subcapsular nephrectomy through flank incision including excision of sinus tract and previous scar. The kidney was small, contracted with multiple stones in it. There were dense perinephric adhesions and abscess. Post operative recovery was uneventful. The histopathology report of the surgical specimen revealed xanthogranulomatous pyelonephritis.

Case 2

In 2016, a twenty four year old female presented with a two month history of a painful swelling in the left flank. The patient also complained of dull aching pain at the site of swelling for the last one year. There was no history of fever and her bowel and bladder habits were normal. There was no past history of any medical or surgical illness, including tuberculosis, diabetes or trauma. The physical examination revealed a 5x3 cm oval swelling in the left flank region on the back with local signs of inflammation (Figure 1B). The swelling ruptured during examination with discharge of thick creamy pus. With our previous experience of a case of nephrocutneous fistula with similar presentation, the same pathology was suspected in this case and urgent ultrasound abdomen was done. It revealed dilated pelvicalyceal system in left kidney with multiple calculi and a hypoechoic collection in inter-muscular plane in the perinephric area that was

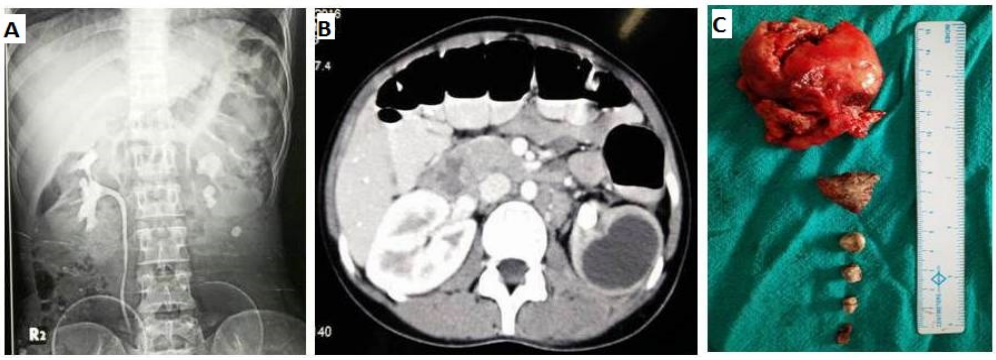

Figure 2 A,B - IVP and CECT abdomen showing non-functioning left kidney with multiple radio-opaque shadows
Figure 2 C - Nephrectomy specimen with multiple stag horn calculi

communicating to the skin surface.

Her urine and hematological investigations were normal. Her intravenous pyelogram revealed non-functioning left kidney with multiple stones (Fig 2A). CECT abdomen demonstrated non-functioning kidney with pyonephrosis and stag horn calculi along with perinephric paravertebral collection (Figure 2B). The left kidney was non-functioning on DMSA renal scan.The patient underwent subcapsular nephrectomy and excision of the fistulous tract through a left flank incision. Dense adhesions of the kidney to the psoas muscle and posterior peritoneum were carefully dissected taking care to protect descending colon. The kidney was pyonephrotic with multiple calculi in it (Figure 2C). The postoperative period was uneventful and the patient was discharged on the seventh day. The pathological examination of the surgical specimen revealed chronic pyelonephritis.

Discussion

Triple phosphate or stag horn stones are well known for remaining asymptomatic for a prolonged time and may lead to silent damage to the affected kidney. The obstruction and infection of urinary system caused by staghorn calculi might rarely lead to pyonephrosis and xanthogranulomatous pyelonephritis (XGP). In neglected and untreated cases, infection may extend to involve Gerota's fascia, perinephric fat and sometimes may rupture through overlying skin in the flank region as happened in both of our cases [2]. Both of our patients were poor, uneducated labourers with rural background and might have neglected the mild symptoms of renal stone disease leading to this complication.

Apart from causing cutaneous fistula, XGP of the affected kidney is sometimes known to involve overlying colon, thoracic cavity upwards (nephrobronchial fistula) or even unusual involvement of knee has been reported [2 - 4]. Rarely, XGP may present with spontaneous expulsion of renal calculi through nephrocutaneous fistula track [4]. In differential diagnosis, underlying renal tuberculosis and renal cell carcinoma needs to be excluded [1]. CECT abdomen is the investigation of choice that delineates the lesion with underlying stones as well as demonstrates non-functioning kidney. The recommended treatment is subcapsular nephrectomy with excision of sinus tract as was done in both of our cases. Hand-assisted laparoscopic nephrectomy after failed flank exploration has also been reported in such cases [5].

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Key Points:

- Nephrocutaneous fistula is a rare clinical entity that may present as non-healing sinus in flank region.
- It usually presents as a delayed complication of staghorn renal calculi.
- It is best diagnosed with CECT abdomen and subcapsular nephrectomy is the treatment of choice.

SELECTED ABSTRACTS

Extending aromatase-inhibitor adjuvant therapy to 10 years
Authors: Goss PE et al. N Engl J Med. 2016;375:209-19

Summary
This phase 3 randomized clinical trial included 1918 postmenopausal women with early breast cancer who had received 5 years of an aromatase inhibitor (AI) either as initial treatment or after any duration of prior tamoxifen. These women were randomised to receive letrozole or placebo for 5 additional years. After a median follow-up of 6.3 years, there were 67 events (disease recurrence or occurrence of contralateral breast cancer) with letrozole and 98 with placebo, and 200 deaths (100 in each group). Extended letrozole treatment was associated with a 34% lower risk of breast cancer recurrence compared with placebo: 5-year DFS rates were 95% and 91%, respectively (HR for disease recurrence or the occurrence of contralateral breast cancer = 0.66, p = 0.01 stratified according to nodal status, adjuvant chemotherapy, the interval from the last dose of AI therapy and the duration of treatment with tamoxifen).

However, the rate of 5-year OS was not significantly different between the groups (93% with letrozole and 94% with placebo; HR=0.97; p=0.83). The annual incidence of contralateral breast cancer was lower in the letrozole group than in the placebo group (0.21% vs. 0.49%; HR 0.42; p=0.007. Bone-related side effects were more frequent with letrozole than with placebo, including a higher incidence of bone pain, fractures and new-onset osteoporosis.

Commentary
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In this trial, women who had completed 5 years of AI therapy were randomised to receive a further 5 years of AI or placebo. Most these women had also received 5 years of tamoxifen. Additional treatment with an AI led to a small decrease in the rate of disease recurrence (including new primary breast cancers) although no difference in OS was reported. Longer duration therapy led to more frequent side effects. These findings are slightly different from ATLAS trial which reported significantly lower recurrences and improved survival with 10-years of extended versus 5-years of tamoxifen.

Conclusion
Extending endocrine therapy for 10 years with AIs may improve DFS but not OS. The decision to continue therapy should be based on individual patient risk stratification.

Treatment of Displaced Mid shaft Clavicle Fractures: Figure-of-Eight Harness Versus Anterior Plate Osteosynthesis: A Randomized Controlled Trial

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Journal of Bone & Joint Surgery - American Volume:19
July 2017 - Volume 99 - Issue 14 - p 1159–1165
doi: 10.2106/JBJS.16.01184

Methods

117 patients were randomized into two groups surgical and non- surgical. Non- surgical group was managed with figure of eight harness and surgical group was fixed with antero-inferior plate.

Primary outcome was DASH (Disability of the ARM Shoulder and Hand) Questionnaire at six months. Secondary outcomes included pain, radiographic findings, satisfaction with the cosmetic result, complications, and time to return to previous work and activities. Participants were assessed at 6 weeks, 6 months, and 1 year after the intervention.

Results

No difference between the 2 groups was detected in the DASH score at 6 weeks, 6 months, and 1 year, respectively, pain levels measured with a visual analogue scale (VAS), time to return to previous activities, or dissatisfaction with the cosmetic result. Seven patients (14.9%) developed non-union after non-surgical treatment, a non-union rate that was significantly higher than that in the surgical group, in which all fractures had healed. The patients in the non-surgical group had radiographic evidence of greater clavicle shortening ($p < 0.001$). More patients answered "yes" when asked if they felt paraesthesia in the surgical group

Commentary
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Mid shaft clavicle fractures are common in younger active age group contributing to economy of the country. Over the past decades there has been a debate whether to treat them operatively or conservatively.

Even though traditionally in a developing strained public heath system like Sri Lanka these were treated almost always conservatively there is still a debate whether surgical

treatment would be a better option in displaced mid shaft clavicle fractures. Tamaoki et al has reported a randomised control trial in above providing level-1 evidence in abovementioned article.

Authors concluded that the study did not demonstrate a difference in limb function between patients who underwent surgical treatment and those non-surgically treated for a displaced mid-shaft clavicle fracture. How ever surgical treatment decreased the likelihood of non-union.

This study demonstrates that for displaced mid shaft clavicle fractures non-operative management is still a preferred option even in a high resource setting even more important to a low resource setting like Sri Lanka.

Adjuvant radiotherapy for atypical meningioma's

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Journal of Neurosurgery, June 2017 / Vol. 126 / No. 6: Pages 1822-1828

Abstract

Objective

The aim of this paper was to evaluate outcomes in patients with atypical meningioma's (AMs) treated with surgery alone compared with surgery and radiotherapy at initial diagnosis, or at the time of first recurrence.

Method

Patients with pathologically confirmed AMs treated at the University of Utah from 1991 to 2014 were retrospectively reviewed. Local control (LC), overall survival (OS), Karnofsky Performance Status (KPS), and toxicity were assessed. Outcomes for patients receiving adjuvant radiotherapy were compared with those for patients treated with surgery alone. Kaplan-Meier and the log-rank test for significance were used for LC and OS analyses.

Results

Fifty-nine patients with 63 tumors were reviewed. Fifty-two patients were alive at the time of analysis with a median follow-up of 42 months. LC for all tumors was 57% with a median time to local failure (TTLF) of 48 months. The median TTLF following surgery and radiotherapy was 180 months, compared with 46 months following surgery alone ($p = 0.02$). Excluding Simpson Grade IV (subtotal) resections, there remained an LC benefit with the addition of radiotherapy for Simpson Grade I, II, and III resected tumors (median TTLF 180 months after surgery and radiotherapy compared with 46 months with surgery alone [$p = 0.002$]. Patients treated at first recurrence following any initial therapy (either surgery alone or surgery and adjuvant radiotherapy) had a median TTLF of 26 months compared with 48 months for tumors treated at first diagnosis ($p = 0.007$). There were 2 Grade 3 toxicities and 1 Grade 4 toxicity associated with radiotherapy.

Conclusion

Adjuvant radiotherapy improves LC for AMs. The addition of adjuvant radiotherapy following even a Simpson Grade I, II, or III resection was found to confer an LC benefit. Recurrent disease is difficult to control, underscoring the importance of aggressive initial treatment.

Commentary

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The management of Meningiomas and the controversy of treatment options available has been a long-term point of discussion within the neurosurgical fraternity. Although considered essentially as benign entity the recurrence rate of these tumors is unpredictable and is generally found to be related to the grade of the tumor histologically and the amount resected. A conclusion that is made is that if the tumor is completely resected (Simpson Grade 1) and the meningioma is histological of WHO grade1 that the recurrence rate is extremely low.

This study concluded that there is a definite benefit of lowering local recurrence even in Simpson grade on resections with adjuvant radiotherapy, which is a new concept as prior to this they were under surveillance and only treated if there was a recurrence. This should be carefully considered taking in to account the effects of radiation treatment itself.

Antibiotics Versus Surgical Therapy for Uncomplicated Appendicitis: Systematic Review and Meta-analysis of Controlled Trials (PROSPERO 2015).

Annals of Surgery. 265(5):889–900, MAY 2017

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Abstract

Objective

The aim was to investigate available evidence regarding effectiveness and safety of surgical versus conservative treatment of acute appendicitis.

Summary of background data

There is ongoing debate on the merits of surgical and conservative treatment for acute appendicitis.

Methods

A systematic literature search (Cochrane Library, Medline, Embase) and hand search of retrieved reference lists up to January 2016 was conducted to identify randomized and nonrandomized studies. After critical appraisal, data were analyzed using a random-effects model in a Mantel-Haenszel test or inverse variance to calculate risk ratio (RR) or mean difference (MD) with 95% confidence intervals (CIs).

Results

Four trials and four cohort studies (2551 patients) were included. We found that 26.5% of patients in the conservative group needed appendectomy within 1 year, resulting in treatment effectiveness of 72.6%, significantly lower than the 99.4% in the surgical group, (RR 0.75; 95% CI 0.7-0.79; P = 0.00001; I = 62%). Overall postoperative complications were comparable (RR 0.95; 95% CI 0.35-2.58; P = 0.91; I = 0%), whereas the rate of adverse events (RR 3.18; 95% CI 1.63-6.21; P = 0.0007; I = 1%) and the incidence of complicated appendicitis (RR 2.52; 95% CI 1.17-5.43; P = 0.02; I = 0%) were significantly higher in the antibiotic treatment group. Randomized trials showed significantly longer hospital stay in the antibiotic treatment group (RR 0.3 days; 95% CI 0.07-0.53; P = 0.009; I = 49%).

Conclusions

Although antibiotics may prevent some patients from appendectomies, surgery represents the definitive, one-time only treatment with a well-known risk profile, whereas the long-term impact of antibiotic treatment on patient quality of life and health care costs is unknown. This systematic review and meta-analysis helps physicians and patients in choosing between treatment options depending on whether they are risk averse or risk takers.

Commentary

Dakshitha Wickramasinghe,
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University of Colombo.

Appendicectomy is the commonest non-elective surgical procedure performed around the world. It also remains one of the first major surgeries a trainee performs independently. However, the decision to perform an appendicectomy is not always clear-cut, with the surgeon having to balance the risk of negative appendicectomies vs the risk of perforation. Different approaches have been adopted to minimize negative appendicectomies, like pre-operative CT scanning or the use of laparoscopy. Nevertheless, these too have side effects, complications and costs involved. Therefore, non-operative treatment of acute appendicitis has been attempted, with the use of antibiotics. However, due to the varying quality of the available studies, conclusions have been ambivalent.

This systematic review and meta-analysis by Harnoss et al attempts to address the question on the safety and utility of antibiotic therapy (AT) as an alternative to surgery for acute appendicitis. Their results indicate that during the first 1 year of follow-up, more than one-quarter of the patients undergoing AT required surgery. Furthermore, the patients who did not have surgery were more likely to have adverse effects related to the treatment (RR 3.18, p = 0.0007). Similarly, the risk of complicated appendicitis was doubled in patients treated with antibiotics. The patients who underwent surgery primarily had a shorter primary hospital stay as well.

The main disadvantage for the surgical group was the higher cost ($1140 226 vs $2207 357; P < 0.001). The negative appendicectomy rate was 6%.

Existing data indicate that patients with acute appendicitis in Sri Lanka have a higher chance of undergoing appendicectomy than patients in UK. The surgery is also more likely to be performed as an open procedure and CT is less often used. Despite these practices, the negative appendicectomy rates in Sri Lanka were better than in UK (6.9% vs 20.2%, p=0.003). Therefore, primary surgical management of acute appendicitis may be a better option in Sri Lanka.

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OBITUARY

Deshabandu Dr. S.J.Stephen
MS, FRCS (England), FRCS (Edin.),FACC, FACA, FCSSL(Hon.),FCCP(Hon.)

One of Sri Lanka's best known Cardiothoracic Surgeons passed away on the 14th July 2017 and his funeral took place on the 20th July in Australia.

Dr. Samuel Jeyarajah Stephen was born on 17th June 1929. He had his primary and secondary education at Central College, Jaffna. He entered the Faculty of Medicine, University of Colombo in 1949 and obtained his final MBBS with 2nd class honours in 1955. He trained in General surgery under late Prof.R.A.Navaratne and Dr.L.D.C.Austin. Susequently he trained in Thoracic surgery under Drs. A.T.S.Paul, T.D.H.Perera and N.K.G.Mendis. He also trained in Cardiovascular surgery in Hammersmith Hospital, UK under a Commonwealth Fellowship. He also trained in Cardiothoracic surgery in Germany, India and USA. He obtained FRCS (Edinburgh) in 1962, FRCS (England) in 1966 and MS (Surgery) in 1967.

After a period as Resident General surgeon in General Hospital, Colombo (1962 -1963), he was appointed the Consultant Thoracic Surgeon GH Jaffna where he served from 1964 to 1967. He was then appointed the Consultant Thoracic and General Surgeon to the GH Ratnapura for a period of 3 years from 1968 to 1970. It was here that in 1969 with the assistance of Dr. Neil Hamel who came to Sri Lanka with the Hope ship he assembled a heart lung machine which had been received as a donation. As a heart lung machine had never been used in Ratnapura, they established the safety of the equipment by initially operating on dogs. He then went on to close ASD's on pump. This was the first proper open heart surgery performed out of Colombo.

He was appointed the Consultant Thoracic surgeon, General Hospital, Colombo (presently National Hospital of Sri Lanka) in 1971. He served as the Chief Consultant Cardiothoracic surgeon, General Hospital, Colombo from 1976 to 1994. Following his retirement from the General Hospital, he served as Consultant Cardiothoracic surgeon at Sri Jayewardenepura General Hospital. He was a trainer and examiner in surgery for the Postgraduate Institute of Medicine from 1981 to 1994 and he was 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 Editor of the College Journal in 1987. He was awarded the Honorary Fellowship of the College of Surgeons of Sri Lanka in 1991. He was the President of the SLMA in 1986 and President of the Sri Lanka Heart Association from 1987 to 1988 and the Vice President, Association of Cardiology – SAARC countries from 1988 to 2000. He was also a member of the Council of Cardiovascular Surgeons of Asia from 1976 to 1988. He was awarded an Honorary Fellowship by the Ceylon College of Physicians He also served as the President of the Cancer Society of Sri Lanka from 1975 to 1977. He was a Director of the Children's Heart Project from 1993 to 2004

He had delivered many orations. Some of which are:
S.C.Paul oration (3 times) – 1969, 1979 and 1996.
Sir Nicholas Attygalle oration – 1976
SLMA oration (twice) – 1981, 1983
Cyril Fernando oration – 1984
Sir Arthur de Silva oration – 1972
Sir Marcus Fernando oration – 1980
Prof.P.B.Fernando oration – 1983
Wijerama oration – 2006

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.

Dr. Stephen was well known by his colleagues and juniors for his extraordinary skills in cardiothoracic surgery especially his closed Mitral Valvotomies and closure of Atrial Septal Defects under hypothermia which he performed with panache. He was always soft spoken and never had anybody heard his voice raised in anger, however trying the situation. He was always willing to help out his colleagues in Cardiothoracic as well as in other specialties whenever there was a problem. He was a popular and well loved consultant among all grades of staff of the General Hospital, Colombo as well as his patients all of whom swore by his ability and still continue to do so. I consider myself fortunate and privileged to have trained under him. I am sure generations of surgeons of all specialties who were fortunate enough to work or train under him will echo my sentiments. In the latter years of his life, Dr. Stephen lived in Australia with his dear wife Benitta (herself a well known ophthalmic surgeon and Professor in anatomy) and family.

He will be sorely missed by his family, colleagues and students.
"Say not in grief that he is no more;
But live in thankfulness that he was"

Dr. G.A.C.Amarasena MS, FRCS, FRCSE
Consultant Cardiothoracic Surgeon, National Hospital of Sri Lanka.

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