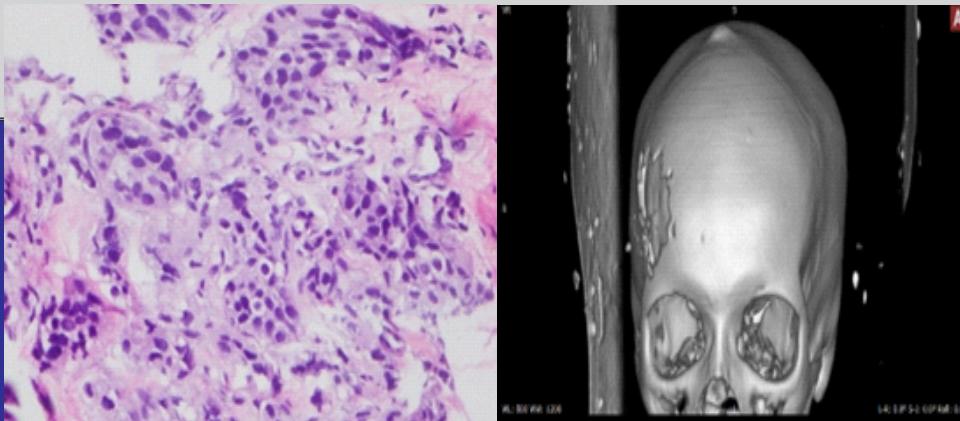




THE SRI LANKA JOURNAL OF SURGERY

November 2022 Volume 40 No.3 ISSN 1391-491X



In this issue

- Immediate outcome of microwave ablation for liver tumours
- Assessment of knowledge, attitudes and practices on arterio-venous fistula care
- Global variations in grade of pT1 non-muscle invasive urothelial bladder cancer
- Day surgery urolithiasis management in a district general hospital setting
- Recurrent acute pancreatitis: a diagnostic and therapeutic dilemma

The College of Surgeons of Sri Lanka

The Sri Lanka Journal of Surgery

Journal of
The College of Surgeons
of Sri Lanka.



November 2022 Volume 40, No.3 - Quarterly. ISSN 1391-491X

e - journal ISSN 2279 2201

Mission: "To reach the highest standard of scientific surgical practice by dissemination of high quality scientific information and to foster and promote the growth of scientific surgery in Sri Lanka and in the region"

EDITORIAL BOARD

Ajith P. Malalasekera (<i>Editor-in-Chief</i>)	Kemal I. Deen	Sivasuriya Sivaganesh
Ruvini Abeygunaratne	Naomal Perera	Hiran Amarasekara
Dulantha De Silva	Sanjeewa Seneviratne	Pramodh Chandrasinghe
Dileepa Ediriweera	Dakshitha Wickramasinghe	Rasika Jayatillake
Kesara Ratnatunga	Gayan Ekanayake	

ASSOCIATE EDITORS

Shalini Sri Ranganathan	Varuni De Silva
-------------------------	-----------------

INTERNATIONAL ADVISORY BOARD

Ian Pearce (UK)	Tom R DeMeester (USA)	Peter Hutchinson (UK)
Konstantina Karabatsou (UK)	Vinay Kumar Kapoor (India)	Anil Mandhani (India)
Michael Silva (UK)	Nimalan Pathmanathan (Australia)	Carolynne Vaizey (UK)
Janindra Warusavitarnne (UK)		

EMERITUS EDITORS

Serozsha A. S. Goonewardena	Suren C. Paul	E. D. Rodrigo	C. S. Sinnatamby
-----------------------------	---------------	---------------	------------------

EDITORIAL OFFICE

Iresha Weerasinghe (Editorial Assistant)	Nuwanthika Karunaratne (Assistant Editor)	Oshan Basnayake (Assistant Editor)
	Umesh Jeyarajah (Assistant Editor)	

The College of Surgeons of Sri Lanka
No.6, Independence Avenue
Colombo 07

Phone : 0094- 11 - 2682290
Fax : 0094- 11 - 2695080
Email : collsurgjournal@gmail.com



Published by
The College of Surgeons of Sri Lanka
No.6, Independence Avenue, Colombo 07,



Tel : +94112682290 Fax : +94112695080
Email : cssl@lankasurgeons.org; collsurg@gmail.com



THE COLLEGE OF SURGEONS OF SRI LANKA
QUARTERLY ISSN 1391-49X



Contents

Scientific Articles

Immediate outcome of microwave ablation for liver tumours in a single cohort of patients in Sri Lanka C. Appuhamy, E. Ganewatte, L. Ranaweera, A. S. Dassanayake, B. Gunathilake, S. Tillakaratne, H. P. Gunawardena, M. A. Niriella, R. Siriwardana	01 - 05
Assessment of knowledge, attitudes and practices (KAP) on arterio-venous fistula (AVF) care among end stage renal disease (ESRD) patients on hemodialysis-study in Uva province, Sri Lanka W.D.M.G. Amarasinghe, K.M.B. Pabodha, M.H.W.M.N. Wijayapala, E.M.K.G.H.B.K. Ekanayaka, J.M.M.U. Jayasinghe, D.U.S. Ratnapala	06 - 11
Global variations in grade of pT1 non-muscle invasive urothelial bladder cancer: evaluation of Sri Lankan data with meta-analysis A.P. Malalasekera, D. Ediriweera, S. Goonewardena, N. Perera, A. Abeygunasekara, R. W Jayasekara, T.K. Wettasinghe, V.H.W.D. Dissanayake, M.D.S Lokuhetty	12 - 19
Urolithiasis: a descriptive study in a single urological unit at a tertiary care hospital B. Balagobi, R. T. Brammah, V Niroshan, S. Gobishangar, R. Sripandurangana	20 - 25
Day surgery urolithiasis management: efficacy and safety of ureteroscopy and laser lithotripsy in a district general hospital setting B. Balagobi, W. Butterworth, R. Lunawat	26 - 29

Review Articles

Recurrent acute pancreatitis: a diagnostic and a therapeutic dilemma M. De Silva	30 - 33
--	---------



PROCEDURES CONDUCTED

- Shoulder tendon repairs
- Frozen shoulder treatment
- Shoulder stabilization surgeries
- Sports injury treatment

 **070 353 1077**

Welcome to the **future of Spine Surgeries** at Lanka Hospitals

We have successfully completed more than 140 Minimally Invasive Spinal Fusion Surgeries


0772 536 387

Contents

Case Reports

- | | |
|---|--|
| <p>Pulsatile secondary scalp deposit from a breast malignancy: A rare entity!
S. Janarththan, R.C. Andrew, A.N.K. Abayajeewa</p> <p>Delayed chylous ascites – unusual complication post blunt trauma abdomen
P. Sharma, V.V. Nair, S.S. Rehshi</p> <p>Cause or effect? intramural duodenal haematoma and pancreatitis
A.N. Liew, S. Ng Ying Kin, N. Naqash, W. M. Lim</p> <p>Arteriovenous fistula following total thyroidectomy treated with angioembolization
G.M. Caunter</p> <p>Retroperitoneal ovarian cyst presenting as acute abdomen – successfully managed with pre-operative prophylactic ureteric stenting and complete excision.
H. Praemanathan, C. J. Sen, T. J. Huei, R.A. Rashid</p> | <p>34 - 36</p> <p>37 - 39</p> <p>40 - 42</p> <p>43 – 45</p> <p>46 - 48</p> |
|---|--|

Rx **Urimax**
Once-Daily
Tamsulosin hydrochloride 0.4 mg



Rx **Duprostat**
Dutasteride 0.5mg



Sollact-5



Rx **Novaclav** 375 mg /625 mg
Amoxicillin + Clavulanate Potassium
Tablets



Rx **Silagra** Tablets
Sildenafil Citrate 50/100mg



Rx **Urimax**
Once-Daily
Tamsulosin hydrochloride 0.4 mg

Rx **Duprostat**
Dutasteride 0.5mg

Sollact-5

Rx **Novaclav** 375 mg /625 mg
Amoxicillin + Clavulanate Potassium
Tablets

Rx **Silagra** Tablets
Sildenafil Citrate 50/100mg

Immediate outcome of microwave ablation for liver tumours in a single cohort of patients in Sri Lanka

C. Appuhamy¹, E. Ganewatte¹, S.P.A.L. Ranaweera², A.S. Dassanayake¹, M.B. Gunathilake¹, S. Tillakaratne¹, H.P. Gunawardena¹, M.A. Niriella¹, R.C. Siriwardana¹

¹Faculty of Medicine, University of Kelaniya, Ragama, Sri Lanka.

²Colombo North Teaching Hospital, Ragama, Sri Lanka.

Keywords

Microwave ablation, liver tumours, hepatocellular carcinoma, residual, recurrence, post ablation syndrome

Abstract

Introduction and Objectives

Microwave ablation (MWA) is an emerging treatment modality for hepatocellular carcinoma (HCC) and other liver tumours. We aimed to assess the immediate success and complications of MWA in a cohort of patients.

Method

Patients were assessed retrospectively, using an interviewer-administered questionnaire and a follow-up CECT/MRI at 6-weeks

Result


55 patients underwent MWA from October 2021-May 2022, at Colombo-North Teaching Hospital, Ragama, Sri Lanka, and selected private hospitals (Durdans Hospital, Colombo, Nawaloka Hospital, Colombo, Lanka Hospital, Colombo).

The median age was 64 (40-82) years, with a male preponderance (n=45, 81.1%). The indication was HCC in 54 (98.1%) and metastatic tumour in one (1.8%). The median tumour size was 28 (10-80) mm. Segment VII was the commonest site to be involved (n=18, 34.6%). The majority (n=40, 72.7%) was a single lesion. No participant underwent the procedure twice. The mean post-procedural hospital stay was 12 hours (95%CI=11.4-12.5, SD=2.0).

In the 6-week follow-up, 2 recurrences (3.6%) and single death (1.8%) with no relation to the procedure, were reported. Another 2 (3.6%) denied the follow-up. Complete ablation was reported in 46 patients (83.7%), comparable to the rates in literature (95-97%), with only 7 patients (12.7%) having residual tumours. No major complications were reported. 9

Correspondence: C. Appuhamy

E-mail: chinthaka05a@gmail.com

 <https://orcid.org/0000-0002-1716-9721>

Received: 16-09-2022 Accepted: 27-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.9004>



patients (16.4%) developed 'Post ablation syndrome', not as common as in literature (34%). They presented with abdominal pain (7.3%), vomiting (7.3%), and fever (3.6%).

Conclusions

MWA is a successful and safe treatment option for primary liver tumours in Sri Lanka, with ablation rates comparable to the western world

Introduction

Hepatocellular carcinoma (HCC) accounts for 85% of primary malignant liver tumours [1]. Microwave ablation (MWA) is an effective thermal ablative modality in treating HCC. Of the ablation techniques, MWA is considered superior, considering its safety profile with equal effectiveness [2]. In addition, the microwave ablates a wider area while maintaining a consistent intratumoral temperature during the procedure [2]. It has a reported major complication ranging between 2.6-4.6% [1, 3, 4], mortality of 0-0.4% [2, 5], and minor transient complications of around 7.3% [3].

The incidence of HCC is rising due to the increasing prevalence of non-alcoholic steatohepatitis in Sri Lanka [6]. Colorectal carcinoma, a common malignancy to give rise to secondary liver metastasis, is also rising due to the changing population demographics [7,8]. In Sri Lankan practice, microwave ablation is gaining popularity in treating solid liver tumours. However, there is hardly any data on immediate outcomes after MWA of solid liver lesions from Sri Lanka. This study analyses a cohort of patients' tumour characteristics and outcomes at six weeks following MWA for solid liver tumours

Method

The study is a retrospective analysis of prospectively collected data at Colombo North Center for Liver Diseases, Ragama, Sri Lanka, and selected non-government institutions in Colombo, Sri Lanka (Durdans Hospital, Colombo, Nawaloka Hospital, Colombo, Lanka Hospital, Colombo), where this procedure is performed. The same team conducted it in all the institutions. Diagnosis of HCC was made based on APASL guidelines, and the same was followed as a general

guide for management [9, 10]. The best management option was decided in a multi-disciplinary team meeting comprising a hepatologist, hepatobiliary surgeons, and an interventional radiologist. Patients who underwent MWA for the first time as the primary treatment were included.

Microwave ablation technique

Microwave ablation was performed in the percutaneous route using ECO 100E microwave therapeutic system®. This system has four components; a power generator, a power distribution system, an applicator, and a cooling system. The power generator generated a high-frequency (2.45GHz) electromagnetic field. 14G, 15cm, or 20cm long ceramic antenna was used as the applicator in each patient. 0.9% Sodium Chloride circulation was used as the cooling system. The amount of Watts and the duration of application were determined using the maximum diameter of the tumour according to the ECO guideline. The higher the diameter is, the higher the amount of Watts and duration of ablation needed.

All the procedures were done under ultrasound guidance using a Mindray Resona R9® machine. As all the patients had a single lesion, only one anterior abdominal wall puncture was made in each of them to gain access.

Each patient underwent the ablation under sedation with Midazolam 1mg and Fentanyl 20-100mg. Post-op monitoring was done as per the standard practice, including oxygen saturation monitoring for 1 hour. Oxygen was provided if saturation dropped below 94%. The patient was discharged on the same day in the absence of complications.

Follow-up

Each patient was reviewed at two weeks to assess post-procedure complications. In this assessment, the presence of at least one of the symptoms/signs out of fever (temperature above 38°C), abdominal pain other than the pain at the site of the procedure, nausea, and vomiting in the first five days following the process was considered as 'Post ablation syndrome of liver' (PASL) [11, 12]. A follow-up imaging was performed at six weeks. CECT abdomen or MRI abdomen was performed as the preferred mode of imaging. During the assessment, response to treatment was defined as the absence of residual or recurrent tumours. If any degree of pre-ablation arterial phase enhancement or venous phase wash-off was persistent in the follow-up imaging, it was considered a residual lesion. If there was a newly detected arterial phase enhancement or/and venous phase wash-off in the follow-up imaging, that was considered a recurrent tumour [9].

Data collection

Data was gathered retrospectively using an interviewer-administered questionnaire. Data were recorded at discharge from the hospital, two weeks, and six weeks of assessment.

Data analysis

Statistical analysis was done using Statistical Package for Social Sciences (SPSS) version 26. Demographic details, background liver status, tumour factors, symptoms, and outcome were described using percentages, means, and medians. The associations between the outcome and the demographic details, background liver status, tumour factors, and procedural factors were analyzed using Cox regression analysis and the Chi-Squared test, where a p-value less than 0.05 was considered statistically significant.

Results

Fifty-five patients (45 males, 81.8%) underwent MWA for liver tumours from October 2021 to May 2022. The median age was 64 (40 – 82) years. One patient (1.8%) underwent MWA for liver metastases from colorectal carcinoma. All the others had HCC in a cirrhotic liver. The median tumour diameter was 28 mm (10 mm – 80 mm). The mean post-procedural hospital stay was 12 hours (6-24 hours, 95%CI=11.4-12.5, SD=2.0).

Most patients had only one lesion (40 patients, 72.7%), while the total number of lesions was 81. The most commonly involved liver segment is segment 7 (14 patients, 25.5%). In our cohort, most of the patients were child class A (41 patients, 74.5%). Most patients were T1b (36 patients, 65.5%). The complete ablation rate was 84.8% in tumours smaller than 3cm, compared to 81.8% in tumours larger than 3cm (Table 1).

Patients (3.6%) did not undergo follow-up CECT or MRI due to personal preferences. In others, 46 patients (83.7%) were found to have complete ablation. Seven patients (12.7%) were found to have a residual tumour. Two patients (3.6%) were found to have new lesions at a 6-week follow-up (Table 2).

Ablations done in Segment 6 were 100% complete. Segment 1 showed the lowest (50%) completion rate. Ablations done for the tumours sized 00-10mm were 100% complete. Ablations done for the tumours larger than 40mm were 100% incomplete. Tumour stage T1a tumours show a 100% ablation rate.

The incidence of immediate complications was assessed. Abdominal pain other than the pain at the site of the lesion was complained by four patients (7.3%). 2 patients (3.6%) developed fever (temperature above 38°C). Nausea and vomiting were complained by four patients (7.3%). PASL developed in 9 patients (16.4%). There were no major complications. One of them died two weeks following the procedure due to complications of liver decompensation (Table 3).

Discussion

In our cohort of patients, 83.7% achieved complete ablation. The best results were seen in Segment 6 while worse in Segment 1. Post-ablation syndrome was reported in 16%, while there was one mortality.

Previous data reported a complete ablation rate of over 95% [13, 14, 15]. The success of the procedure depends on technical accuracy and tumour characteristics. In our study, MWA was performed under ultrasound guidance. However, in previous studies, contrast-enhanced ultrasound scans and fusion imaging have been utilized to increase the accuracy of needle placement. The fusion imaging overlays the real-time US images with previously acquired CT or MRI images [1]. The fusion technology has shown superior results in tumours smaller than 3cm [16, 17]. In the present study, only the percutaneous route was used for MWA. In addition to the percutaneous route, laparoscopic and open approaches have been used to increase the accuracy [13, 14, 18].

This cohort's median tumour size was 2.8cm, comparable to previously published data [1]. As per available data, tumours smaller than 3cm are most likely to be ablated entirely compared to larger tumours [19]. This cohort achieved a higher complete ablation rate in patients with tumours smaller than 3cm. According to *Baker et al* [14], segment 8 was the most commonly ablated segment with HCC. In our experience, segment 7 was the most frequently ablated, followed by Segment 8. However, the highest success rate was achieved in segment 6 and the lowest in segment 1. We used USS as the preferred mode of image guidance. Segment 5 and 6 are located at the lower right side of the liver and has minor interference with the rib cage and the pleural space during needle placement. Whether simple USS guidance gives comparative results to advance image guidance in lower liver segments needs further evaluation.

Livraghi et al. [3] reported major complication rates of around 2.9 % and minor complication rates of around 7.3%. *Liu et al.* [4] reported 4.6% of major complications in their series. However, in our series, there were no direct

mechanical complications reported. PASL was seen in 16.4%, slightly lower in comparison [11, 12]. There was one mortality (1.8 %) in our patients. This patient developed post-procedure hepatic decompensation complicated by worsening pre-existing cardiac abnormality with a chest infection. Mortality with MWA was reported to be 0-0.36% [3].

In Sri Lanka, infrastructure for advanced image guidance facilities is yet to be developed. With available simple ultrasound technology, MWA gives good immediate peri-procedure results in solid liver tumours, especially in the right lower segment liver tumours, and is cheaper than alternative surgery. Our study has its strengths and limitations. This study was conducted at four centres, increasing the generalizability of our results. As a limitation, the number of patients involved was low, which was unavoidable because it is a relatively newer technique in Sri Lanka.

References

1. Amabile C, Ahmed M, Solbiati L, Meloni MF, Solbiati M, Cassarino S, Tosoratti N, Nissenbaum Y, Ierace T, Goldberg SN. Microwave ablation of primary and secondary liver tumours: ex vivo, in vivo, and clinical characterisation. *International Journal of Hyperthermia*. 2017 Jan 2;33(1):34-42. doi.org/10.1080/02656736.2016.1196830
2. Fang C, Cortis K, Yusuf GT, Gregory S, Lewis D, Kane P, Peddu P. Complications from percutaneous microwave ablation of liver tumours: a pictorial review. *The British Journal of Radiology*. 2019 Jul;92(1099):20180864. doi.org/10.1259/bjr.20180864
3. Livraghi T, Meloni F, Solbiati L, Zanus G. Complications of microwave ablation for liver tumors: results of a multicenter study. *Cardiovascular and interventional radiology*. 2012 Aug;35(4):868-74. doi.org/10.1007/s00270-011-0241-8
4. Liang P, Wang Y, Yu X, Dong B. Malignant liver tumors: treatment with percutaneous microwave ablation—complications among cohort of 1136 patients. *Radiology*. 2009 Jun;251(3):933-40. doi.org/10.1148/radiol.2513081740
5. Liu SR, Liang P. Complications of Microwave Ablation for Liver Tumors. In *Microwave Ablation Treatment of Solid Tumors 2015* (pp. 65-76). Springer, Dordrecht. doi.org/10.1007/978-94-017-9315-5_6
6. Bulathsinhala BK, Siriwardana RC, Gunathilake MB, Niriella MA, Dassanayake AS. Clinical characteristics and outcomes of hepatocellular carcinoma: results from prospective study, from a tertiary referral center in Sri Lanka. doi.org/10.4038/cmj.v63i3.8724

7. Perera T, Wijesuriya R, Suraweera PH, Wijewardene K, Kumarage S, Ariyaratne MH, Deen K. The prevalence of colorectal cancer and survival in patients from the Gampaha District, North Colombo region. *Ceylon Medical Journal*. 2008 Dec 9;53(1). doi.org/10.4038/cmj.v53i1.221

8. Chandrasinghe PC, Ediriweera DS, Hewavisenthi J, Kumarage SK, Fernando FR, Deen KI. Colorectal cancer burden and trends in a South Asian cohort: experience from a regional tertiary care center in Sri Lanka. *BMC Research Notes*. 2017 Dec;10(1):1-5. doi.org/10.1186/s13104-017-2869-1

9. Tan CH, Low SC, Thng CH. APASL and AASLD consensus guidelines on imaging diagnosis of hepatocellular carcinoma: a review. *International journal of hepatology*. 2011 Jan 1;2011. doi.org/10.4061/2011/519783

10. Heimbach JK, Kulik LM, Finn RS, Sirlin CB, Abecassis MM, Roberts LR, Zhu AX, Murad MH, Marrero JA. AASLD guidelines for the treatment of hepatocellular carcinoma. *Hepatology*. 2018 Jan;67(1):358-80. doi.org/10.1002/hep.29086

11. Ianniello A, Carrafiello G, Laganà D, Fontana F, Nicotera P, Fugazzola C. Post-radiofrequency ablation syndrome after percutaneous radiofrequency of abdominal tumours. *European Congress of Radiology-ECR 2008*. doi.org/10.1111/j.1440-1673.2007.01871.x

12. Dodd III GD, Napier D, Schoolfield JD, Hubbard L. Percutaneous radiofrequency ablation of hepatic tumors: postablation syndrome. *American Journal of Roentgenology*. 2005 Jul;185(1):51-7. doi.org/10.2214/ajr.185.1.01850051

13. Groeschl RT, Wong RK, Quebbeman EJ, Tsai S, Turaga KK, Pappas SG, Christians KK, Hohenwarter EJ, Tutton SM, Rilling WS, Gamblin TC. Recurrence after microwave ablation of liver malignancies: a single institution experience. *Hpb*. 2013 May;15(5):365-71. doi.org/10.1111/j.1477-2574.2012.00585.x

14. Baker EH, Thompson K, McKillop IH, Cochran A, Kirks R, Vrochides D, Martinie JB, Swan RZ, Iannitti DA. Operative microwave ablation for hepatocellular carcinoma: a single center retrospective review of 219 patients. *Journal of Gastrointestinal Oncology*. 2017 Apr;8(2):337. doi.org/10.21037/jgo.2016.09.06

15. Imajo K, Tomeno W, Kanezaki M, Honda Y, Kessoku T, Ogawa Y, Yoshida K, Yoneda M, Kirikoshi H, Ono M, Kaneta T. New microwave ablation system for unresectable liver tumors that forms large, spherical ablation zones. *Journal of Gastroenterology and Hepatology*. 2018 Dec;33(12):2007-14. doi.org/10.1111/jgh.14294

16. Lee MW, Kim YJ, Park HS, Yu NC, Jung SI, Ko SY, Jeon HJ. Targeted sonography for small hepatocellular carcinoma discovered by CT or MRI: factors affecting sonographic detection. *American Journal of Roentgenology*. 2010 May;194(5):W396-400. doi.org/10.2214/ajr.09.3171

17. Minami Y, Chung H, Kudo M, Kitai S, Takahashi S, Inoue T, Ueshima K, Shiozaki H. Radiofrequency ablation of hepatocellular carcinoma: value of virtual CT sonography with magnetic navigation. *American Journal of Roentgenology*. 2008 Jun;190(6):W335-41. doi.org/10.2214/ajr.07.3092

18. Della Corte A, Ratti F, Monfardini L, Marra P, Gusmini S, Salvioni M, Venturini M, Cipriani F, Aldrighetti L, De Cobelli F. Comparison between percutaneous and laparoscopic microwave ablation of hepatocellular carcinoma. *International Journal of Hyperthermia*. 2020 Jan 1;37(1):542-8. doi.org/10.1080/02656736.2020.1769869

19. Widmann G, Bodner G, Bale R. Tumour ablation: technical aspects. *Cancer Imaging*. 2009;9(Special issue A):S63. doi.org/10.1102/1470-7330.2009.9026

Table 1- Tumour characteristics of the patients

Character	Patients	Percentage with complete ablation
Number of lesions [81]		
1 lesion	40 (72.7%)	82.50%
More than 1 lesion	15(27.3%)	86.60%
Involvement of segments		
Seg1	2(3.8%)	50%
Seg2	7(13.4%)	71.40%
Seg3	5(9.6%)	60%
Seg4	5(9.6%)	80%
Seg5	9(17.3%)	88.80%
Seg6	6(11.5%)	100%
Seg7	18(34.6%)	88.80%
Seg8	17(30.6%)	94.10%
Child Turcott Pugh Score		
Non-Cirrhotic	1(1.8%) Colorectal carcinoma patient	100%
A	41(74.5%)	87.80%
B	9(16.4%)	66.60%
C	4(7.3%)	100%
Size range		
00-10mm	01(1.8%)	100%
11-20mm	12(21.8%)	83.30%
21-30mm	20(36.3%)	85%
31-40mm	20(36.3%)	90%
More than 40mm	02(3.6%)	0%
[Less than 3cm]	33	84.80%
[3cm or larger]	22	81.80%
Tumour stage		
T1a	04(7.3%)	100%
T1b	36(65.5%)	83.30%
T2	15(27.2%)	86.60%

Table 2 – Primary outcome of the microwave ablation assessed in the 6-week follow-up

The outcome in 6 weeks	Number of patients
Complete ablation	46 (83.7%)
Residual tumour	7 (12.7%)
Denied CECT or MRI	2 (3.6%)

Table 3- Complications of microwave ablation

Complication	Number of patients	Percentage
Abdominal pain	4	7.3
Fever	2	3.6
Nausea and vomiting	4	7.3
Post ablation syndrome	9	16.4
Mechanical complications	0	0

Assessment of knowledge, attitudes and practices (KAP) on arterio-venous fistula (AVF) care among end stage renal disease (ESRD) patients on hemodialysis-study in Uva province, Sri Lanka

W.D.M.G. Amarasinghe¹, K.M.B. Pabodha¹, M.H.W.M.N. Wijayapala², E.M.K.G.H.B.K. Ekanayaka³, J.M.M.U. Jayasinghe⁴, D.U.S. Ratnapala¹

¹Provincial General Hospital, Badulla, Sri Lanka

²Ministry of Health, Sri Lanka

³Base Hospital, Mahiyanganaya, Sri Lanka

⁴Distric General Hospital, Monaragala, Sri Lanka

⁴Colombo South Teaching Hospital, Sri Lanka

Keywords

Arterio-venous fistula self care, end stage renal disease, haemodialysis, knowledge

Introduction

End stage renal disease is an emerging public health burden in Sri Lanka. However, ESRD has been underreported due to the deficiency of reliable epidemiological studies in Sri Lanka.

Among the treatment modalities, hemodialysis is the most acknowledged and practiced management worldwide.¹ A good vascular access is the crucial factor for efficient hemodialysis.² Arteriovenous fistula (AVF) is a key mode of renal replacement therapy in ESRD patients as a permanent definite access.² Compared to other vascular accesses such as arteriovenous grafts and central venous catheters, AVF has lengthier patency rate, less complications, is associated with less mortality and is economical according to Foundation Kidney Disease Outcome Quality Initiative (KDOQI) guidelines.³

Despite being considered as the best access for dialysis, AVF can result in several complications like thrombosis, infection, stenosis, aneurysmal dilatation, steal phenomenon and cardiac overload.¹ In order to avoid them, proper care of AVF is required by health care team and ESRD patients.¹

Patients' knowledge, attitudes and practices (KAP) play a key role in minimizing complications and hospitalization due to AVF.⁴ Vascular access guidelines mention that patients should be provided with adequate knowledge regarding AVF

selfcare.¹ Patients should adhere to acceptable self-care behaviors with their AVFs in order to preserve it in its finest condition.⁵

Elevation of the arm, avoidance of tight circumferential dressings, assessment of AVF function daily and performance of manual compression exercises are the key factors to be highlighted during the period of maturation of AVF to provide greater fistula durability. Furthermore, venous infusions and blood pressure measurement of AVF arm should also be discouraged.⁵ Understanding of this is crucial in order to minimize AVF related complications and to increase the durability.⁵

As this vital aspect of AVF self-care has not been researched broadly in Sri Lanka, particularly in Uva province we planned to evaluate the adequacy level of KAP on ESRD patients on hemodialysis for better understanding the lapses in AVF self-care and to build a better outlook of patients towards AVF self-care.

We decided to carry out this research in Uva province, Sri Lanka because it accommodates approximately 3600 patients of chronic kidney disease of which about 9% are on renal replacement therapy primarily cared at satellite renal clinics centered around Nephrology unit, DGH Badulla.⁶ Every year 600 patients will be diagnosed with new onset chronic kidney disease.⁶

This research will also provide support for the expansion of future educational policies which would change patient's attitude towards achievement of necessary care.

Research methodology

Setting and study design

The research is a descriptive cross sectional prospective study

Correspondence: W.D.M.G. Amarasinghe

E-mail: pharmalaka@gmail.com

 <https://orcid.org/0000-0003-3868-0489>

Received: 05-08-2022 Accepted: 28-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8983>



conducted at the Nephrology unit, Uva province, Sri Lanka. All patients with ESRD who were on longterm hemodialysis through a permanent AVF access for a minimum of 30 days, coming to the Nephrology unit from 01st January 2021 to 31st January 2021 were enrolled in the survey. Patients who could not provide answers to questionnaire at the time of data collection due to drowsiness or confusion and patients who were unable to self-care were excluded from the study.

Study instrument

A structured questionnaire was designed to study the KAP on AVF care among ESRD patients on hemodialysis. Questions of the study tool were formulated on the basis of literature review and after interviewing the ESRD patients coming for hemodialysis. Questionnaire was pre validated by a pilot study. The questionnaire was divided in to four parts, which consist of patient's demographics (Part A), knowledge (Part B), attitude (Part C) and practices (Part D). The questionnaire consisted of 31 well-structured questions. These questionnaires were translated into the Sinhala and Tamil (local languages) for the better understanding of the ESRD patients.

Data collection

Ethical clearance was obtained from the Ethics review committee, Faculty of Medicine, University of Colombo prior to the study (EC-21-004).

Patient's informed written consent was taken, and each patient was assessed via an interviewer-administered questionnaire consisting of 31 questions during his/her routine dialysis with minimum interference in the treatment. This was carried out at the patient waiting area near the hemodialysis unit 30 minutes prior to the commencement of hemodialysis. Filled questionnaires were collected for analysis. Confidentiality of the patient and the records were always maintained. The analytic sample consisted of 160 questionnaires.

Data analysis

The data was analyzed using SPSS software version 26.0. Percentages were calculated to describe the demographic factors of the sample population. The level of knowledge, attitudes and practices were analyzed separately using percentages.

Knowledge was categorized into poor (<50%), average (50-70%) and good (> 70%) according to the percentage of the knowledge.

Attitudes were considered adequate when the patient describes that AVF self-care is beneficial and that he feels motivated and is ready to perform such care. In other words,

patient should answer all 3 key questions on attitudes correctly (100%), to be considered adequate.

Attitudes were taken as inadequate when the patient did not consider AVF self-care is beneficial or when he did not feel motivated to perform the required care or when he was not willing to perform it. Less than 100% of attitude was considered inadequate

Practices were considered adequate when at least, 75% of the practices were executed always.

Chi square test was used to compare the relationship between patient's demographic factors (age, sex, education level, duration of dialysis) and their level of knowledge, attitudes and practices. p value <0.05 was considered statistically significant.

Results

The sociodemographic characteristics of the 160 study population showed a male predominance of 76.3%. Almost half of the study population (50.6%) were in the age group of 40-59 years. Regarding education, 62.5% had either secondary or higher education.(Table 1)

Table 1 –Demographic profile of the study population

Socio-demographic characteristics	Total(n=160)
Age group	
20-39 years	33(20.6%)
40-59 years	81(50.6%)
>60 years	46(28.8%)
Gender	
Male	122(76.3%)
Female	38(23.8%)
Level of education	
None	6(3.8%)
Primary education	54(33.8%)
Secondary education	95(59.4%)
Graduate/ Postgraduate	5(3.1%)

Majority of patients (79.4%) in the research study had past medical history of hypertension. Diabetes mellitus was a comorbidity in 28.1% whereas, 12.5% had no previous comorbidities.

Nearly two thirds of the respondents had haemodialysis for more than one year. Most participants received haemodialysis twice a week (95%) and rest one or three times per week. Chronic kidney disease of unknown origin was the cause for ESRD in half of the patients. Approximately one third of the patients has got either diabetes mellitus or hypertension or both as the cause for ESRD.(Table 2)

Table 2: Medical characteristics of the study population

Medical characteristics	Total(n=160)
Medical background	
Diabetes mellitus (DM)	3(1.9%)
Hypertension (HTN)	70(43.8%)
Ischaemic heart disease (IHD)	10(6.3%)
HTN & IHD	15(9.4%)
DM & HTN	29(18.1%)
DM, HTN, IHD	13(8.1%)
None	20(12.5%)
Duration of haemodialysis	
< 1year	55(34.4%)
1-3 years	78(48.8%)
>3 years	27(16.9%)
Frequency of haemodialysis	
Once a week	3(1.9%)
Twice a week	152(95%)
Thrice a week	5(3.1%)
Previous experience of CV access for haemodialysis	
Yes	134(83.8%)
No	26(16.3%)
Aetiology for ESRD	
DM	28(17.5%)
HTN	27(16.9%)
DM & HTN	1(0.6%)
Glomerulonephritis	8(5%)
Reflux nephropathy	6(3.8%)
Congenital	2(1.3%)
Vasculitis	1(0.6%)
Sepsis	7(4.4%)
Unknown(CKDU)	80(50%)

The evaluation of patients' knowledge involving AVF self-care demonstrated that majority of the patients (88.1%) had good knowledge while 11.9% had average knowledge and none had poor knowledge.(Table 3)

Table 3: Evaluation of KAP among the study population

	Poor(Percentage)	Average(Percentage)	Good(Percentage)
Knowledge	0	19(11.9)	141(88.1)
	Inadequate(Percentage)	Adequate(Percentage)	
Attitudes	4(2.5)	156(97.5)	
	Inadequate(Percentage)	Adequate(Percentage)	
Practices	8(5)	152(95)	

All the patients knew why they needed AVF. A total of 134 patients(83.8%) had experience of a central venous catheter(CVC) for haemodialysis either as temporary or as tunneled line. Although 92.5% and 88.1% of respondents knew that less infection and high durability are benefits of AVF over CVC respectively, only 11.9% were aware that less thrombosis is also another benefit.

The assessment of patient's knowledge about fistula care revealed that 74.4% of the patients knew that arm should be kept straight while AVF is healing. Nearly one fifth (21.9%) of the patients did not know that AVF could not be used then and there after creation and 13.1% were not aware that at least 1 month of maturation time is needed after creation of AVF to begin haemodialysis. Significant deficiency of knowledge (78.1%) on needing to elevate the arm after creating AVF was observed. Moreover, still about the knowledge, it was identified that 30% of the study population did not know that they should feel the AVF thrill daily as surveillance.

However, some patients didn't realize the importance of not wearing tight garments around the area of fistula (15%), not holding heavy weights on access arm (6.9%) and not sleeping over AVF access arm (8.1%). Majority was knowledgeable to avoid checking blood pressure (98.1%) and drawing blood from access arm (95%).

Most respondents knew to seek medical advice when AVF site shows signs of inflammation (92.5%), bleeding (94.4%), in the absence of thrill/pulse (91.3%) and in the presence of ischemic features on access arm (93.8%).(Table 4)

Overall, our study population had a positive attitude towards AVF. Nearly all patients (99.4%) granted that fistula self-care is useful for them and 98.8% of the patients felt motivated and prepared to look after their fistula site.(Table 3)

Majority (95%) showed adequate practices towards AVF self-care. Amongst the “always practicing” category of practices that found greatest compliance are AVF access site prick avoidance (100%)”, “pre dialysis AVF cleaning (97.5%)” followed by “avoidance of tight clothes around AVF (95.6%)”. Daily AVF thrill checkup (65.6%) is the most neglected practice among the respondents.(Table 4)

In most aspects a high level of practice was reflected in keeping with the adequate knowledge. For example, 93.1% of people knew to avoid weight on AVF arm and 94.4% exercised weight avoidance. In some cases, less frequency of practice was detected along with less knowledge. For instance, only 70% people know the importance of daily AVF thrill check and only 65.6% practiced it.(Table 4)

Table 4: Patients' responses for the questions to assess their knowledge, attitudes and practices

Knowledge about AVF self care	Correct answer (Percentage)	Wrong answer/ Don't know (Percentage)
1.Why the AVF was created?	160(100)	0
2.What is the benefit of AVF over CVC (Less infection)	148(92.5)	12(7.5)
3.What is the benefit of AVF over CVC (High durability)	141(88.1)	19(11.9)
4.What is the benefit of AVF over CVC (Less thrombosis)	19(11.9)	141(88.1)
5.Do you need to keep your arm straight while AVF is healing?	119(74.4)	41(25.6)
6.Do you need to elevate your arm after creating AVF?	35(21.9)	125(78.1)
7.Can AVF be used then and there after creation?	125(78.1)	35(21.9)
8.Do you need to wait at least 1 month after creation to begin HD?	139(86.9)	21(13.1)
9.Do you need to do manual compression exercises to get the AVF matured?	156(97.5)	4(2.5)
10. Do you need to feel the thrill daily?	112(70)	48(30)
11.Can you wear tight cloths/ jewelry on access arm?	136(85)	24(15)
12.Can you carry heavy weights on access arm?	149(93.1)	11(6.9)
13.Can you sleep with your head on the access arm?	147(91.9)	13(8.1)
14.Can blood pressure be checked on access arm?	157(98.1)	3(1.9)
15.Can the blood be drawn from access arm?	152(95)	8(5)
16.Can you wash AVF once it's healed?	136(85)	24(15)
17.Do you need to go to hospital if AVF site shows signs of inflammation?	148(92.5)	12(7.5)
18.Do you need to go to hospital if the AVF thrill/pulse can't be felt?	146(91.3)	14(8.7)
19.Do you need to go to hospital if AVF site is bleeding?	151(.94.4)	9(5.6)
20.Do you need to go to hospital if you feel cold, sensory-motor deficit or discoloration on access arm?	150(93.8)	10(6.2)
Attitudes towards AVF self care	Yes	No
1.Do you think that AVF care is beneficial?	159(99.4)	1(0.6)
2.Do you feel motivated for fistula care?	158(98.8)	2(1.2)
3.Do you feel prepared for fistula care?	158(98.8)	2(1.2)
Practices on AVF self care	Always(Percentage)	Occasionally or never (Percentage)
1.Daily AVF thrill check up	105(65.6)	55(34.4)
2.Daily AVF washing	145(90.6)	15(9.4)
3.Avoid tight cloths/ jewelry on AVF site	153(95.6)	7(4.4)
4.Avoid weight lifting from the arm with AVF	151(94.4)	9(5.6)
5.Avoidance of sleep over AVF access arm	146(91.3)	14(8.7)
6.Pre dialysis AVF cleaning	156(97.5)	4(2.5)
7.Pre and post dialysis disinfection	142(88.8)	18(11.2)
8.AVF access site prick avoidance	160(100)	0

There was no statistically significant difference ($p < 0.05$) observed when knowledge scores were compared with age, gender, level of education, duration of dialysis. (Table 5)

Discussion

When a patient is on specific long duration treatments like hemodialysis through an AVF access site, knowledge, attitudes and practices play an important role in treatment success and limitation of complications.

In this study investigator classified knowledge as “good knowledge”, “average knowledge” and “poor knowledge” depending on the knowledge score of $> 70\%$, $50\%-70\%$ and $< 50\%$ respectively. According to these criteria majority (88.1%) found to have good knowledge whereas 11.9% had adequate and none had poor knowledge respectively. These results were comparable to the research conducted by Rashid et al.⁷ It is assumed that such a high level of understanding in patients at nephrology unit of Uva province (non-tertiary care setting) associates with the good communication between patient and various skilful health care providers at a minimum of two times per week during dialysis sessions.

Similar study conducted by Pessoa et al in Brazil reported that 97.7% had insufficient knowledge on AVF care.⁵ This difference could be due to the fact that in Brazil study 56.6% had incomplete primary education whereas in the current study only 37.6% had incomplete primary education.

Interestingly most patients knew when to seek medical advice for the complications of AVF such as infection, bleeding, ischaemia and absence of thrill. These factors were not assessed in other similar reviewed articles. High indices in the

patients' knowledge on the complications of AVF was thought to be contributed by the effective patient awareness programme maintained by the health care providers. Early medical advice for above mentioned complications will invariably lead to early intervention and good outcome.

This study described feeling motivated, prepared and feeling beneficial of AVF self-care as adequate attitudes. Majority (97.5%) revealed positive attitudes towards AVF self-care in the current analysis. Similarly, Rashid et al and Iqbal et al showed positive attitudes towards AVF care in majority of the study population.^{7,11}

The AVF care practiced by ESRD patients was categorized as sufficient in 95% of population in this research study compared to 97.5% categorized as insufficient in Pessoa et al. The practice that got lowest compliance in the current study is daily AVF thrill checkup which is explainable by the study population less knowledge about the importance of daily AVF thrill checkup. It is recommended that this valuable aspect of care needs to be highlighted when educating the patients regarding AVF self-care. We believe that showing the method of checking the AVF thrill will enhance self-confidence of patients.

According to Rashid et al “high frequency of practice was observed consistent with the adequate knowledge”.⁷ The Brazil study highlighted that all patients with insufficient understanding also practiced an insufficient self-care of the AVF.⁵ Similar findings were observed in the current study. None of the patients in the current study showed malpractice despite having adequate knowledge about it. This again proves the importance of an awareness programme which will invariably improve the relevant practices.

Table 5: Patients' knowledge score distribution according to age, gender, education status and duration of haemodialysis”

		Knowledge			Total	p value
		Poor knowledge (<50%)	Average knowledge (50-70%)	Good knowledge (>70%)		
Age(years)	20-39	0(0)	2(6.1)	31(93.9)	33(100)	
	40-59	0(0)	10(12.3)	71(87.7)	81(100)	
	>60	0(0)	7(15.2)	39(84.8)	46(100)	P=0.811
Gender	Male	0(0)	12(9.8)	110(90.2)	122(100)	
	Female	0(0)	7(18.4)	31(81.6)	38(100)	P=0.276
Education	None	0(0)	2(33.3)	4(66.7)	6(100)	
	Primary	0(0)	6(11.1)	48(88.9)	54(100)	
	Secondary	0(0)	11(11.6)	84(88.4)	95(100)	
Duration of HD	Graduate/ Postgraduate	0(0)	0(0)	5(100)	5(100)	P=0.343
	<1year	0(0)	8(14.5)	47(85.5)	55(100)	
	1-3years	0(0)	8(10.3)	70(89.7)	78(100)	
	>3years	0(0)	3(11.1)	24(88.9)	27(100)	P=0.465

Rashid et al concluded that “overall knowledge was acceptable among all age groups and significantly better in age group of 46-65 years”.⁷ Iqbal et al demonstrates significant differences in KAP of AVF care in both genders and different age groups.¹ Surprisingly current analysis could not demonstrate any statistically significant association between knowledge with age, gender or educational status.

Different to our expectation, there was no significant correlation of knowledge with the duration of dialysis. Lack of reiteration of important information related to AVF self-care from health care providers could be a contributing factor for this. Thus, we recommend that patients should be educated about AVF care verbally and by leaflets during every visit. Furthermore, health care provider should be encouraged to inquire whether patient has been following the instructions given to improve compliance of patients towards AVF self-care at home.

In our extended review we could not find any similar research done at other settings in Sri Lanka. Hence, we encourage research in other parallel settings in Sri Lanka to identify the different factors which can be addressed to improve the outcome. It will be beneficial to establish national guidelines to educate the population with ESRD regarding AVF self care.

Conclusion

The study demonstrates overall good knowledge, positive attitudes leading to adequate practices towards AVF self-care at the access site. No statistically significant correlation was observed between the understanding of the patients and age, gender, level of education, duration of dialysis.

Training programmes targeting the health care providers are recommended which will ultimately transfer the knowledge of the importance of AVF self care to the patients. In addition, continuous program of health education should be encouraged with use of written material which allow later reference to solve doubts that may appear. Periodic evaluation of the patient's knowledge, attitudes and practices will aid in developing future educational strategies towards achievement of necessary care.

Limitations

This study was conducted at a non-tertiary care hospital only but the level of patient knowledge, attitudes and practices in different types of settings could have given more understanding into different aspects of factors linked to patients' KAP.

References

- 1 Iqbal Q, Shareef A, Afzal A, Ashraf S. Arteriovenous fistula care; knowledge, attitude and practice in ESRD patients on hemodialysis. *Professional Med J* 2018; 25(9):1426-1431. DOI:10.29309/TPMJ/18.4422
2. Riella MC, Roy-Chaudhury P. Vascular access in haemodialysis: Strengthening the achilles heel. *Nature reviews Nephrology*. 2013; 9(6):348-357 <https://doi.org/10.1038/nrneph.2013.76>
3. Schon D, Blume WS, Niebauer K, Holenbeak CS, deLissovoy G: Increasing use of arteriovenous fistula in hemodialysis: economic benefits and barriers. *Clin JAM Soc Nephrol*. 2007; 2:268-276.
4. Metcalfe W, Khan IH, Prescott GJ, Simpson K, Macloed AM, on behalf of Scottish registry: ospitalization in the first year of renal replacement therapy for end stage renal disease. *QJM*. 2003; 96:899-909.
5. Pessoa NR, Linhares FM. Hemodialysis patients with AV fistula: knowledge, attitude and practice. *Escola AnnaNery*. 2015 mar; 19(1):73-79.
6. Atulugama NS. First Live-Donor Kidney Transplant in UVA province-Surgeon's note: *Journal of Uva Clinical Society*. 2020 Jan; 14:16-17
7. Rashid, N., M. Aamer, U. Malik, N. Arif, M.W. Akram and A. Irshad. 2018. Arteriovenous stula (AVF) self-care: A study at a Tertiary Care Hospital in Lahore, Pakistan. *Annals of King Edward Medical University*, 24(1): xxx-xxx.

Meta-analysis of global variations in grade of pT1 urothelial bladder cancer and supplementary evaluation of a Sri Lankan cohort

A.P. Malalasekera¹, D. Ediriweera², S. Goonewardena³, N. Perera³, A. Abeygunasekara⁴, R.W. Jayasekara¹, T.K. Wettasinghe¹, V.H.W.D. Dissanayake¹, M.D.S. Lokuhetty¹

¹Faculty of Medicine, University of Colombo, Sri Lanka.

²Faculty of Medicine, University of Kelaniya, Sri Lanka.

³National Hospital of Sri Lanka.

⁴Colombo South Teaching Hospital, Sri Lanka

Keywords:

Urothelial bladder cancer; pT1; tumour grade; reproducibility of results; pathology

Abstract

Introduction

Bladder cancer grading is fraught with ambiguity. We aimed to conduct a meta-analysis of grading of pT1 urothelial cancers and assess histopathology and outcomes in a Sri Lankan pT1 bladder cancer cohort.

Patients and Method

A meta-analysis of grading of pT1 urothelial cancers was conducted as per PRISMA guidelines. A second meta-analysis of the proportion of pTa/NMIBC at disease presentation was conducted to assess impact of delayed presentation on grading. Analysis was supplemented with data from a cohort of Sri Lankan patients.

Results

In the meta-analysis, the overall pooled pT1 HG prevalence was 75.3% [95% CI: 68.3%-81.7%]. The pT1 HG prevalence was significantly higher ($p=4.916878e-11$) among the European, Japanese and Taiwanese studies at 90.1% [95% CI: 85.3%-94.0%] compared to the rest of the countries at 56.1% [95% CI: 46.5%-65.4%]. The overall pooled pTa/NMIBC prevalence was 44.2% [95% CI: 36.4%-52.1%]. The pTa/NMIBC percentage among Europe, China and Taiwan was 66.9% [95% CI: 62.4%-71.2%] and it was 37.6% [95% CI: 29.0%-46.6%] in Turkey and other Asian countries indicating a significant difference ($P=1.08e-08$). In the Sri Lankan cohort of 66 enrolled patients, 31 (47%) had pT1, of which 61% were low-grade (LG). The 5-year progression-free survival (PFS) of pT1 was 60.9%. In LG it was 85.7% and 22.2% in high-grade (HG) ($P=0.0006$).

Conclusion

There is a global variation of percentages of pT1 LG versus HG disease in bladder cancer specimens at presentation which could be attributed to delay in treatment with stage migration, ethnic variations in tumour biology, and interobserver variability in assigning a grade of tumour, and needs further study.

Introduction

Histopathology is crucial in guiding bladder cancer management. However, grading systems are ambiguous with significant prognostic and management implications.

In 1973 a WHO team of pathologists proposed a three-tier system for urothelial cancers with grading being assigned from the least to the most severe degree as G1/G2/G3[1], based on the severity of anaplasia. With incorporation of the 1997 international society of urological pathology (ISUP) classification in the 2004 WHO publication, pT1 tumours (tumours invading lamina propria) were suggested to be graded as per a two-tier low-grade (LG) and high-grade (HG) system[2]. One of the main intentions of the 2004 classification was to reduce the inter-observer variability and to improve prognostication[3]. The 2016 classification also continued the two-tier LG/HG grading[4]. Despite the European association of urology (EAU) guidelines adopting the 2004/2016 systems, the use of both 1973 and 2004/2016 systems are recommended for non-muscle invasive bladder cancer (NMIBC) in their 2021 updates[5,6].

Both the 1973 and 2004 systems have their weaknesses. The 1973 3-tier system “encourages” more NMIBC patients to be assigned to the middle category (G2)[3]. In the 2004 system, a large number of G2 and all G3 patients are assigned to HG category, which may lead to the overtreatment of many patients.[3]

Many authors from North America and Europe suggest that most pT1 tumours *should* be categorized as HG.[7,8] An analysis of two large national databases from USA

Correspondence: A. P. Malalasekera

E-mail: ajith@anat.cmb.ac.lk

 <https://orcid.org/0000-0003-1274-8254>

Received: 09-09-2022 Accepted: 14-10-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8999>



(N=92,827) of mostly transurethral resection of bladder tumours (TURBT), showed pT1 LG categorization fell with time and was less likely at an academic institution.[8] The percentage of pT1 LG/pT1 total in the two studies was 15.6% and 18.5% in 2014. In two Sri Lankan studies from 2016 and 2020, the percentage of pT1 LG/pT1 total was 70% [9] and 44% [10], being much higher than in the literature from Europe and North America.

The objectives of our study were to assess the global variation in grading of pT1 urothelial cancers, and the proportion of non-invasive papillary carcinoma in non-muscle invasive bladder cancer (pTa/NMIBC) at disease presentation in order to evaluate the possible impact of delays in presentation on the tumor grade. Further we compared the global variation with local data to assess whether similar findings can be seen in Sri Lanka as well.

Patients and Methods

A review was conducted of articles on PUBMED over the last 10 years 2011-2021 by searching on keywords ('bladder cancer' or 'bladder tumor' or 'urothelial cancer' or 'urothelial carcinoma') AND ('T1'), with population-based or institution-based study recruitment, where tumor samples were obtained at TURBT. Specific searches of papers on PUBMED were also done for individual countries (India, Pakistan, Bangladesh, Nepal, Malaysia, South Korea, Egypt, Turkey, China, Iran) on NMIBC instead of pT1. We also analyzed the papers identified in the previous search for the proportion of pTa/NMIBC at presentation. This was to assess the possible impact of treatment delays on grading of pT1 disease. We excluded studies in languages other than English, case reports, letters and grading using the WHO 1973 classification (Figure 1).

The overall prevalence (pooled estimate) of pTa and pT1 HG among the studies was determined by performing a random-effects meta-analysis of proportions using the Der Simonian Laird model. The number of pTa and pT1 HG patients amongst the total sample in each study was considered for the analysis and inverse variance weighting was used to pool the studies. Cochran Q test and I^2 were used to assess the heterogeneity between the studies. A separate stratified analysis was done after categorising countries based on their geographical distribution and the observed percentages of the LG/HG and pTa/NMIBC ratios. Forest plots were developed to summarize the results of the meta-analysis.

A urothelial bladder cancer cohort who underwent TURBT, were prospectively enrolled, by convenient sampling, from June 2013 to January 2017, from two teaching hospital urology departments of Sri Lanka. All patients provided written informed consent. The histopathology of the TURBT

specimens, classified as per the WHO 2004 grading system, and the outcome details were reviewed retrospectively.

Kaplan–Meier survival analysis was used to analyze the cancer-specific survival (CSS) and overall survival (OS). OS was defined as the time from the first TURBT to death from any cause. CSS was defined as the time from the first TURBT to death from causes related to bladder cancer. Disease-free survival was defined as time to tumor progression i.e. clinical, radiological or histopathological evidence of recurrence with stage T2 or more, or metastasis. Survival rates were compared using Kaplan–Meier estimate curves with the log-rank test.

For all statistical tests a significance level of 5% was considered. Analysis was done using R software version 3.6.3.

Ethical approval was obtained from the ethical review committee of the Faculty of Medicine, University of Colombo (EC-12-088 / 19th October, 2012) and the study was conducted in accordance with the Helsinki Declaration of 1975, as revised in 2013.

Results

Meta-analysis of pT1 HG and pTa tumours

The PUBMED and GOOGLE scholar review (Figure 1) identified 23 relevant articles which showed pT1 HG percentage (c.f LG) ranging from 80-100% in reports from Europe, Canada, Japan and Taiwan [5, 11-17]. The pT1 HG percentages obtained from China, Egypt, Turkey and Sri Lanka range from 27-82% [Egypt 55-82% [18,19]; China 60-77% [20-22]; Turkey 27-66% [23-26]; Sri Lanka 30-56% [9,10]] (further details in online supplementary information 1). Overall pooled prevalence of pT1 HG among all the studies was 75.3% [95% confidence interval (CI): 68.3% - 81.7%] where the studies showed substantial heterogeneity ($I^2 = 97.4%$ [95% CI: 96.8%-97.9%]). A pooled prevalence of pT1 HG among the European, Japanese and Taiwanese studies was 90.1% [95% CI: 85.3% - 94.0%] and the rest of the countries (China, Egypt, Turkey and Sri Lanka) showed a prevalence of 56.1% [95% CI: 46.5% - 65.4%], illustrating a significant difference in the prevalence of pT1 HG between the groups ($P < 0.0001$) (Figure 2). The above categorization of countries into two groups was made arbitrarily by the authors following observation of the disparities in pT1 HG percentages.

In the evaluation of proportion of pTa/NMIBC, European reports showed a range of 50-75% [5,27-29]. Chinese studies also showed a similar percentage of 55-75% [30-32] while reports from Turkey and other Asian countries showed lower percentages of pTa/NMIBC at presentation ranging from 4-

65% (Turkey 30-65%[33-41]; Iran 58%[42]; Malaysia 54%[43]; Nepal 43% [44]; India 47-55%[45-47]; Egypt 3-33%[18,19,45-47]; Pakistan 4%[51]; Sri Lanka 17-47%[9,10,52-54] (online supplementary information 2 and Figure 3).

Overall pooled prevalence of pTa among all the studies was 44.2% [95% CI: 36.4% - 52.1%] where the studies showed substantial heterogeneity ($I^2 = 98.9%$ [95% CI: 98.7% - 99.0%]). A pooled prevalence of pTa among Europe, China and Taiwan was 66.9% [95% CI: 62.4% - 71.2%] and the rest of the countries (Turkey and other Asian countries) showed a prevalence of 37.6% [95% CI: 29.0% - 46.6%], illustrating a significant difference in the prevalence of pTa between the groups ($P < 0.0001$). The above categorization of countries into two groups was also made arbitrarily by the authors following observation of the disparities in pTa/NMIBC percentages.

Sri Lankan data

Pathological assessment of TURBT specimens of the sixty-six patients enrolled showed 71% (47/66) to be NMIBC. Of this 66% (31/47) were pT1 patients, with low grade seen in 61% (n=19) and high grade in 39% (n=12). The grading was assigned as per the WHO 2004 grading system and the standard criteria used can be seen in selected micrographs from our patients (Figure 4 and 5). The pT1 LG showed better OS and CSS over HG ($P=0.003$ and $P=0.01$ respectively) (Figure 6 and 7). The pT1 tumours showed a 5-year progression-free survival (PFS) of 60.9% (43.9% - 84.5%) where progression was considered as advance in stage to MIBC, diagnosis of metastasis, or death caused by urothelial cancer. The PFS in pT1 LG was higher than pT1 HG ($P < 0.0001$) where the 5-year PFS for pT1 LG was 85.7% (69.2% - 100.0%) and for pT1 HG 22.2% (6.5% - 75.4%) (Figure 8).

Discussion

The meta-analysis and our study findings show marked regional differences across the globe of LG and HG in pT1 disease in TURBT specimens. Predominant HG allocation of most pT1 disease is seen in studies from Europe, Canada, Japan and Taiwan, and comparatively larger proportions are assigned to LG disease in Asian studies (apart from Japan and Taiwan). Regional differences in the epidemiological pattern of grades of NMIBC have been seen in other studies as well using the 1973, G1-G3 grading system. Wang et al in their EORTC risk table study on a Chinese population identified a low percentage of G1 tumours - 18.6% in the study group; 20.0% in the validation group; 22.9% in the external validation group.[55] This phenomenon was similar in Japanese reports with G1 being 13-24% [56-58] and in Korean patients 22%.[59] This is in contrast to large population studies from Europe where the G1 percentage is

higher, 33% [5] and 43%.[60] The above studies support regional and ethnic differences in proportions of lower (G1/LG) and higher (G3/HG) grade tumours at TURBT. Ethnic differences in tumor biology are therefore a possible explanation for the findings of our study and other studies showing regional differences in grading.

In a systematic review of grading classification systems of NMIBC patients undergoing transurethral resection of bladder tumor (TURBT), the EAU Guidelines Panel found the inter-observer reproducibility for the WHO 1973 system as 'poor', with kappa values of 0.003–0.365 and that for the WHO 2004/2016 system as 'poor to fair' (kappa values 0.17–0.516).[3] A single-institution study from the UK on TURBT or biopsy specimens showed that reproducibility of grading utilizing the 2004 system was 'good' (Kappa = 0.69) and for the 1973 system to be 'fair' (Kappa = 0.25).[61] Tosoni et al found that in a single-institution series of TURBT specimens, there was a discrepancy in the grading of 38% of patients evaluated by two uropathologists.[62] In a single-institution USA study of TURBT specimens, reassessment of histopathology by dedicated uropathologists showed a change in the original diagnosis in 27% including a change in grade in 5%; this implied a potential change in treatment in 15% of patients.[63] The evidence from the above studies could imply an interobserver variation to account for the regional differences in grades of the pT1 patients in our meta-analysis.

The grade of the tumor is an important factor in identifying those NMIBC at risk of progression. The EAU guidelines panel systematic review identified progression rates in NMIBC of 3% versus 9% versus 28% in G1 vs G2 vs G3 patients, and 2% versus 4% versus 19% in PUNLMP vs LG vs HG, respectively.[3] Chen et al found 5-year progression-free survival rates in a cohort from China in NMIBC of PUNLMP vs LG vs HG at 100%, 90.9% and 54.8%, respectively.[64] While the above 2 studies as well as other reports found the 1973 system better at predicting progression in NMIBC, both systems have been validated as being a useful prognostic indicator of progression.[3,5,64]

Similarly, our study also shows a statistically significant difference in the 5-year overall, cancer-specific and progression-free survival for the pT1 LG versus HG using the 2004 system, despite the marked differences in the ratio of LG versus HG tumours in comparison to studies from countries in the west. This points towards an actual regional difference in grading rather than a grading difference merely due to inter-observer variability.

Many reports have suggested the superior ability of the WHO 1973 system to predict progression compared to the WHO

2004/2016 system.[3,5,64] In the 2004/2016 classification, essentially 80% or more of pT1 tumours in Europe and North America are classified as HG, making it a single-tier system, thereby reducing the prognostic ability of the WHO 2004/2016 system in pT1 disease within those countries. Cao et al imply that grading is of *relative* importance when classifying pT1 tumours [65]. However treating all HG patients who have similar risk factors, the same as G3 patients, may lead to overtreatment [3]. The larger proportions of LG patients within the pT1 subgroup in China, Egypt, Turkey and Sri Lanka as found in the literature and in our study, may suggest that the 2004/2016 system possibly better prognosticates pT1 patients in these countries compared to western populations.

Stage migration of pTa LG tumours to pT1 due to delays in presentation or diagnosis can also be postulated to account for these findings. Stage migration is possible due to variable delays in treatment in different countries. It is possible that stage migration of the tumours from pTa (majority LG) to pT1 accounts for observed global grade differences in pT1 disease in TURBT. The European and Chinese studies show a higher proportion of pTa/NMIBC in comparison to Turkey, Egypt and other Asian countries e.g. Iran, Malaysia, India, Pakistan, and Sri Lanka. However, in Chinese studies which have a similar proportion of pTa/NMIBC to European studies, the pT1 LG patient number is very much higher than in Europe. So this factor alone may not explain the higher percentage of pT1 LG tumours in China and other Asian regions.

The risk stratification of the EAU guidelines for the management of NMIBC, updated in 2021, is based on the EORTC risk tables [6]. The current guideline has a 4-tiered risk allotment for NMIBC patients, with a new very high-risk group identified. It includes patients based on tumor staging, grading, presence of carcinoma in situ (CIS), and risk[6]. Either the WHO 1973 or the 2004/2016 grading system can be used to stratify the patients, however, the panel recommends the WHO 1973 system if available, due to better prognostic value.[6] The ISUP expert opinion paper based on literature review strongly suggests dividing the T1 HG group into intermediate and high-grade groups based on the WHO 1973 system.[66] These guidelines and recommendations will however depend on the reliability of the assigned grading of the tumor. The regional variations in the grading of pT1 patients may lead to patients being assigned to different risk groups dependent on a contentious grade allocation.

Limitations of our study include small patient numbers in our cohort. However, a similar pattern of tumour grades was demonstrated in previous studies from Sri Lanka and is also seen in many regional Asian studies. In the pooled analysis of the meta-analysis, categorization of data from countries was

done arbitrarily following observation of the individual national data. This was with the intention of initial identification of the issues with grading. While our study identifies the issues in tumor grading and postulates possible explanations for the findings, definitive answers for the observations need to be sought by prospective studies with the participation of urologists from varying countries to overcome the possible issues due to interobserver variability.

Conclusion

There is gross variation in the percentages of pT1 LG versus HG disease in transurethral resection specimens in different countries from various regions across the globe. European, Canadian, Japanese and Taiwanese studies show a much higher percentage of pT1 HG disease when compared with other Asian studies. While ethnic variations in tumor biology could account for these differences, other factors such as interobserver variability in assigning grade of tumor and delay in treatment with stage migration could also contribute, and need further study

References

1. Mostofi FK, Sobin LH, Torloni H. Histological typing of urinary bladder tumours Geneva: World Health Organization; 1973 1973.
2. World Health Organization Classification of Tumours. Pathology and Genetics of Tumours of the Urinary System and Male Genital Organs. Lyon: IARC Press; 2004.
3. Soukup V, Capoun O, Cohen D, Hernandez V, Babjuk M, Burger M, et al. Prognostic Performance and Reproducibility of the 1973 and 2004/2016 World Health Organization Grading Classification Systems in Non-muscle-invasive Bladder Cancer: A European Association of Urology Non-muscle Invasive Bladder Cancer Guidelines Panel Systematic Review. *Eur Urol*. 2017;72(5):801-13. Epub 2017/05/02. doi: 10.1016/j.eururo.2017.04.015. PubMed PMID: 28457661.
4. Humphrey PA, Moch H, Cubilla AL, Ulbright TM, Reuter VE. The 2016 WHO Classification of Tumours of the Urinary System and Male Genital Organs-Part B: Prostate and Bladder Tumours. *Eur Urol*. 2016;70(1):106-19. Epub 2016/03/22. doi: 10.1016/j.eururo.2016.02.028. PubMed PMID: 26996659.
5. van Rhijn BWG, Hentschel AE, Brundl J, Comperat EM, Hernandez V, Capoun O, et al. Prognostic Value of the WHO1973 and WHO2004/2016 Classification Systems for Grade in Primary Ta/T1 Non-muscle-invasive Bladder Cancer: A Multicenter European Association of Urology Non-muscle-invasive Bladder Cancer Guidelines Panel Study. *Eur Urol Oncol*. 2021;4(2):182-91. Epub 2021/01/12. doi: 10.1016/j.euo.2020.12.002. PubMed PMID: 33423944.

6. Sylvester RJ, Rodriguez O, Hernandez V, Turturica D, Bauerova L, Bruins HM, et al. European Association of Urology (EAU) Prognostic Factor Risk Groups for Non-muscle-invasive Bladder Cancer (NMIBC) Incorporating the WHO 2004/2016 and WHO 1973 Classification Systems for Grade: An Update from the EAU NMIBC Guidelines Panel. *Eur Urol*. 2021;79(4):480-8. Epub 2021/01/10. doi: 10.1016/j.eururo.2020.12.033. PubMed PMID: 33419683.
7. Comperat EM, Burger M, Gontero P, Mostafid AH, Palou J, Roupert M, et al. Grading of Urothelial Carcinoma and The New "World Health Organisation Classification of Tumours of the Urinary System and Male Genital Organs 2016". *Eur Urol Focus*. 2019;5(3):457-66. Epub 2018/01/26. doi: 10.1016/j.euf.2018.01.003. PubMed PMID: 29366854.
8. Jordan B, Weiner A, Meeks J. MP71-14 FREQUENCY OF LOW GRADE T1 BLADDER CANCER HAS DECREASED BUT CONTINUES TO VARY BY INSTITUTION. *Journal of Urology*. 2018;199(4S):e948-e. doi: doi:10.1016/j.juro.2018.02.2278.
9. Sasikumar S, Wijayarathna KS, Karunaratne KA, Gobi U, Pathmeswaran A, Abeygunasekera AM. Pathological Characteristics of Primary Bladder Carcinoma Treated at a Tertiary Care Hospital and Changing Demographics of Bladder Cancer in Sri Lanka. *Adv Urol*. 2016;2016:5751647. Epub 2016/02/18. doi: 10.1155/2016/5751647. PubMed PMID: 26884756; PubMed Central PMCID: PMC4738954.
10. Jayarajah U, Fernando, H., Herath, K., Kuruppu, S., Wickramanayaka, U., Fernando, I., de Silva, C. and Goonewardena, S.,. Clinicopathological patterns and outcomes of urothelial bladder malignancies in Sri Lankan patients. *Ceylon Medical Journal*,. 2020;65(4):105-11. doi: 10.1111/bju.14238. PubMed PMID: 29637669.
11. van de Putte EEF, Bosschieter J, van der Kwast TH, Bertz S, Denzinger S, Manach Q, et al. The World Health Organization 1973 classification system for grade is an important prognosticator in T1 non-muscle-invasive bladder cancer. *BJU Int*. 2018;122(6):978-85. Epub 2018/04/11. doi: 10.1111/bju.14238. PubMed PMID: 29637669.
12. Otto W, Denzinger S, Fritsche HM, Burger M, Wieland WF, Hofstädter F, et al. The WHO classification of 1973 is more suitable than the WHO classification of 2004 for predicting survival in pT1 urothelial bladder cancer. *BJU Int*. 2011;107(3):404-8. Epub 2010/08/17. doi: 10.1111/j.1464-410X.2010.09515.x. PubMed PMID: 20707791.
13. Pellucchi F, Freschi M, Moschini M, Rocchini L, Maccagnano C, Nazareno S, et al. Oncological predictive value of the 2004 World Health Organisation grading classification in primary T1 non-muscle-invasive bladder cancer. A step forward or back? *BJU Int*. 2015;115(2):267-73. Epub 2015/03/11. doi: 10.1111/bju.12666. PubMed PMID: 25756136
14. Otsuka M, Taguchi S, Nakagawa T, Morikawa T, Maekawa S, Miyakawa J, et al. Clinical significance of random bladder biopsy in primary T1 bladder cancer. *Mol Clin Oncol*. 2018;8(5):665-70. Epub 2018/05/05. doi: 10.3892/mco.2018.1587. PubMed PMID: 29725532; PubMed Central PMCID: PMC5920156.
15. van Rhijn BW, Liu L, Vis AN, Bostrom PJ, Zuiverloon TC, Fleshner NE, et al. Prognostic value of molecular markers, sub-stage and European Organisation for the Research and Treatment of Cancer risk scores in primary T1 bladder cancer. *BJU Int*. 2012;110(8):1169-76. Epub 2012/03/28. doi: 10.1111/j.1464-410X.2012.10996.x. PubMed PMID: 22448597.
16. van Rhijn BW, van der Kwast TH, Liu L, Fleshner NE, Bostrom PJ, Vis AN, et al. The FGFR3 mutation is related to favorable pT1 bladder cancer. *J Urol*. 2012;187(1):310-4. Epub 2011/11/22. doi: 10.1016/j.ju.2011.09.008. PubMed PMID: 22099989.
17. Blindheim AJ, Fosså SD, Babigumira R, Andreassen BK. The use of reTURB in T1 bladder cancer: a Norwegian population-based study. *Scandinavian journal of urology*. 2021;1:1-7. Epub 2021/05/18. doi: 10.1080/21681805.2021.1917652. PubMed PMID: 33998957.
18. Elsayy AA, Awadalla A, Elsayed A, Abdullateef M, Abol-Enein H. Prospective Validation of Clinical Usefulness of a Novel mRNA-based Urine Test (Xpert(R) Bladder Cancer Monitor) for surveillance in Non Muscle Invasive Bladder Cancer. *Urol Oncol*. 2021;39(1):77 e9- e16. Epub 2020/08/18. doi: 10.1016/j.urolonc.2020.07.013. PubMed PMID: 32800441.
19. Wishahi M, Khalil H, Badawy MH, Elkholy A, Eseily K, Anis S, et al. Upregulation of Twist2 in Non-Muscle Invasive Urothelial Carcinoma of the Bladder Correlate with Response to Treatment and Progression. *Open Access Maced J Med Sci*. 2018;6(6):1017-22. Epub 2018/07/10. doi: 10.3889/oamjms.2018.165. PubMed PMID: 29983794; PubMed Central PMCID: PMC6026420.
20. Lu J, Zhang Y, Wu C, Chu C, Liu Z, Cao Y. Impact of immunohistochemistry-based molecular subtype on predicting chemotherapy response and survival in patients with T1 stage bladder cancer after bladder-preserving treatment. *Jpn J Clin Oncol*. 2021;51(3):424-33. Epub 2020/12/16. doi: 10.1093/jjco/hyaa219. PubMed PMID: 33319245.
21. Yang J, Li C, Tang Y, Guo F, Chen Y, Luo W, et al. Diagnostic roles of proliferative markers in pathological Grade of T1 Urothelial Bladder Cancer. *J Cancer*. 2021;12(9):2498-506. Epub 2021/04/16. doi: 10.7150/jca.52336. PubMed PMID: 33854611; PubMed Central PMCID: PMC8040703.
22. Li G, Hu J, Niu Y. Squamous differentiation in pT1 bladder urothelial carcinoma predicts poor response for intravesical chemotherapy. *Oncotarget*. 2018;9(1):217-23. Epub 2018/02/09. doi: 10.18632/oncotarget.18563. PubMed PMID: 29366854.

PMID: 29416608; PubMed Central PMCID: PMCPMC5787459.

23. Turan T, Efiloğlu, Ö., Günaydın, B., Özkanlı, Ş., Nikerel, E., Atış, G., Çaşkurulu, T., & Yıldırım, A. Comparative differences between T1a/b and T1e/m as substages in T1 urothelial carcinoma of the bladder. *International Brazilian Journal of Urology*.2018;44:267-72.

24. Mammadov E, Aslan G, Tuna B, Bozkurt O, Yorukoglu K. Can recurrence and progression be predicted by HYAL-1 expression in primary T1 bladder cancer? *Asian Pacific journal of cancer prevention : APJCP*. 2014;15(23):10401-5. Epub 2015/01/06. doi: 10.7314/apjcp.2014.15.23.10401. PubMed PMID: 25556483.

25. Eroglu A, Ekin RG, Koc G, Divrik RT. The prognostic value of routine second transurethral resection in patients with newly diagnosed stage pT1 non-muscle-invasive bladder cancer: results from randomized 10-year extension trial. *Int J Clin Oncol*. 2020;25(4):698-704. Epub 2019/11/25. doi: 10.1007/s10147-019-01581-0. PubMed PMID: 31760524.

26. Koyuncuer A. Histopathological evaluation of urothelial carcinomas in transurethral resection urinary bladder tumor specimens: eight years of single center experience. *Asian Pacific journal of cancer prevention : APJCP*. 2015;16(7):2871-7. Epub 2015/04/10. doi: 10.7314/apjcp.2015.16.7.2871. PubMed PMID: 25854375.

27. Rebola J, Aguiar P, Blanca A, Montironi R, Cimadamore A, Cheng L, et al. Predicting outcomes in non-muscle invasive (Ta/T1) bladder cancer: the role of molecular grade based on luminal/basal phenotype. *Virchows Arch*. 2019;475(4):445-55. Epub 2019/06/27. doi: 10.1007/s00428-019-02593-x. PubMed PMID: 31240474.

28. Segersten U, Spector Y, Goren Y, Tabak S, Malmstrom PU. The role of microRNA profiling in prognosticating progression in Ta and T1 urinary bladder cancer. *Urol Oncol*. 2014;32(5):613-8. Epub 2014/01/21. doi: 10.1016/j.urolonc.2013.11.001. PubMed PMID: 24439061.

29. Jancke G, Rosell J, Jahnson S. Tumour location adjacent to the ureteric orifice in primary Ta/T1 bladder cancer is predictive of recurrence. *Scandinavian journal of urology*. 2016;50(1):33-8. Epub 2015/07/24. doi: 10.3109/21681805.2015.1066849. PubMed PMID: 26202687.

30. Yan TH, Lu SW, Huang YQ, Que GB, Chen JH, Chen YP, et al. Upregulation of the long noncoding RNA HOTAIR predicts recurrence in stage Ta/T1 bladder cancer. *Tumour Biol*. 2014;35(10):10249-57. Epub 2014/07/18. doi: 10.1007/s13277-014-2344-8. PubMed PMID: 25030736.

31. Xu T, Zhu Z, Wang X, Xia L, Zhang X, Zhong S, et al. Impact of body mass on recurrence and progression in Chinese patients with Ta, T1 urothelial bladder cancer. *Int Urol Nephrol*. 2015;47(7):1135-41. Epub 2015/05/27. doi:

10.1007/s11255-015-1013-1. PubMed PMID: 26009259.

32. Lu M, Chen S, Zhou Q, Wang L, Peng T, Wang G. Predicting recurrence of nonmuscle-invasive bladder cancer (Ta-T1): A study based on 477 patients. *Medicine (Baltimore)*. 2019;98(28):e16426. Epub 2019/07/16. doi: 10.1097/MD.00000000000016426. PubMed PMID: 31305463; PubMed Central PMCID: PMCPMC6641864.

33. Arikan O, Yyldyrym A, Ysbilen B, Canakci C, Atys G, Gurbuz C, et al. Clinical significance of serum and urinary HER2/neu protein levels in primary non-muscle invasive bladder cancer. *Int Braz J Urol*. 2015;41(6):1080-7. Epub 2016/01/09. doi: 10.1590/S1677-5538.IBJU.2014.0628. PubMed PMID: 26742964; PubMed Central PMCID: PMCPMC4756932.

34. Celik O, Akand M, Keskin MZ, Ekin RG, Yoldas M, Ilbey YO. Predictive Effect of Preoperative Anemia on Long-Term Survival Outcomes with Non-Muscle Invasive Bladder Cancer. *Asian Pacific journal of cancer prevention : APJCP*. 2016;17(4):1755-8. Epub 2016/05/26. doi: 10.7314/apjcp.2016.17.4.1755. PubMed PMID: 27221848.

35. Kilinc MF, Bayar G, Dalkilic A, Sonmez NC, Arisan S, Guney S. Applicability of the EORTC risk tables to predict outcomes in non-muscle-invasive bladder cancer in Turkish patients. *Turk J Urol*. 2017;43(1):48-54. Epub 2017/03/09. doi: 10.5152/tud.2016.77603. PubMed PMID: 28270951; PubMed Central PMCID: PMCPMC5330268.

36. Dalkilic A, Bayar G, Kilinc MF. A Comparison of EORTC And CUETO Risk Tables in Terms of the Prediction of Recurrence and Progression in All Non-Muscle-Invasive Bladder Cancer Patients. *Urol J*. 2019;16(1):37-43. Epub 2018/08/19. doi: 10.22037/uj.v0i0.4091. PubMed PMID: 30120763.

37. Yuruk E, Tuken M, Colakerol A, Serefoglu EC. The awareness of patients with non - muscle invasive bladder cancer regarding the importance of smoking cessation and their access to smoking cessation programs. *Int Braz J Urol*. 2017;43(4):607-14. Epub 2017/05/26. doi: 10.1590/S1677-5538.IBJU.2016.0014. PubMed PMID: 28537702; PubMed Central PMCID: PMCPMC5557435.

38. Albayrak S, Zengin K, Tanik S, Atar M, Unal SH, Imamoglu MA, et al. Can the neutrophil-to-lymphocyte ratio be used to predict recurrence and progression of non-muscle-invasive bladder cancer? *The Kaohsiung journal of medical sciences*. 2016;32(6):327-33. Epub 2016/07/06. doi: 10.1016/j.kjms.2016.05.001. PubMed PMID: 27377847.

39. Cimen HI, Halis F, Saglam HS, Gokce A. Can neutrophil to lymphocyte ratio predict lamina propria invasion in patients with non muscle invasive bladder cancer? *Int Braz J Urol*. 2017;43(1):67-72. Epub 2017/01/27. doi: 10.1590/s1677-5538.Ibju.2016.0158. PubMed PMID: 28124528; PubMed Central PMCID: PMCPMC5293385.

40. Bolat D, Çelik S, Aydın ME, Aydoğdu Ö, Günlüsoy B,

- Değirmenci T, et al. Assessment of the quality of life and sexual functions of patients followed-up for non-muscle invasive bladder cancer: preliminary results of the prospective-descriptive study. *Turk J Urol*. 2018;44(5):393-8. Epub 2018/05/26. doi: 10.5152/tud.2018.30040. PubMed PMID: 29799404; PubMed Central PMCID: PMC6134978.
41. Ozer K, Horsanali MO, Gorgel SN, Ozbek E. Diabetes is an Important Risk Factor for Metastasis in Non- Muscle-Invasive Bladder Cancer. *Asian Pacific journal of cancer prevention : APJCP*. 2016;17(1):105-8. Epub 2016/02/04. doi: 10.7314/apjcp.2016.17.1.105. PubMed PMID: 26838193.
42. Aghaalikhani N, Zamani M, Allameh A, Mashayekhi A, Shadpour P, Mahmoodi M, et al. Involvement of haptoglobin phenotypes and genotypes in non-muscle invasive bladder cancer: A possible prognostic marker for risk stratification. *EXCLI journal*. 2020;19:351-9. Epub 2020/04/08. doi: 10.17179/excli2019-1768. PubMed PMID: 32256273; PubMed Central PMCID: PMC7105941.
43. Chai CA, Yeoh WS, Rajandram R, Aung KP, Ong TA, Kuppusamy S, et al. Comparing CxBladder to Urine Cytology as Adjunct to Cystoscopy in Surveillance of Non-muscle Invasive Bladder Cancer-A Pilot Study. *Frontiers in surgery*. 2021;8:659292. Epub 2021/06/01. doi: 10.3389/fsurg.2021.659292. PubMed PMID: 34055868; PubMed Central PMCID: PMC8155709.
44. Luitel BR, Chalise PR, Nathani S, Gupta DK, Subedi P, Chapagain S, et al. Risk-based Management of Non-muscle Invasive Bladder Cancer: Experience from Tribhuvan University Teaching Hospital. *Kathmandu Univ Med J (KUMJ)*. 2016;14(56):352-6. Epub 2016/10/01. PubMed PMID: 29371493.
45. Gupta P, Jain M, Kapoor R, Muruganandham K, Srivastava A, Mandhani A. Impact of age and gender on the clinicopathological characteristics of bladder cancer. *Indian journal of urology : IJU : journal of the Urological Society of India*. 2009;25(2):207-10. Epub 2009/08/13. doi: 10.4103/0970-1591.52916. PubMed PMID: 19672348; PubMed Central PMCID: PMC2710066.
46. Gill TS, Das RK, Basu S, Dey RK, Mitra S. Predictive factors for residual tumor and tumor upstaging on relook transurethral resection of bladder tumor in non-muscle invasive bladder cancer. *Urology annals*. 2014;6(4):305-8. Epub 2014/11/06. doi: 10.4103/0974-7796.140990. PubMed PMID: 25371606; PubMed Central PMCID: PMC4216535.
47. Mehta N, Rathore RS, Pillai BS, Sam MP, Moorthy K. Intrinsic tumour factors affecting recurrence in non muscle invasive bladder cancer: a hospital based study from India. *Asian Pacific journal of cancer prevention : APJCP*. 2015;16(7):2675-7. Epub 2015/04/10. doi: 10.7314/apjcp.2015.16.7.2675. PubMed PMID: 25854345.
48. Ali-El-Dein B, Barakat TS, Nabeeh A, Ibrahim el HI. Weekly intravesical bacillus Calmette-Guerin (BCG) alternating with epirubicin in Ta and T1 urothelial bladder cancer: An approach to decrease BCG toxicity. *Urology annals*. 2013;5(2):103-8. Epub 2013/06/27. doi: 10.4103/0974-7796.110008. PubMed PMID: 23798868; PubMed Central PMCID: PMC3685738.
49. Ali-El-Dein B, Sooriakumaran P, Trinh QD, Barakat TS, Nabeeh A, Ibrahim el HI. Construction of predictive models for recurrence and progression in >1000 patients with non-muscle-invasive bladder cancer (NMIBC) from a single centre. *BJU Int*. 2013;111(8):E331-41. Epub 2013/03/01. doi: 10.1111/bju.12026. PubMed PMID: 23445082.
50. Abdelrahman AE, Rashed HE, Elkady E, Elsebai EA, El-Azony A, Matar I. Fatty acid synthase, Her2/neu, and E2F1 as prognostic markers of progression in non-muscle invasive bladder cancer. *Annals of diagnostic pathology*. 2019;39:42-52. Epub 2019/01/27. doi: 10.1016/j.anndiagpath.2019.01.002. PubMed PMID: 30684846.
51. Rafique M, Javed AA. Clinico-pathological features of bladder carcinoma: experience from a tertiary care hospital of Pakistan. *Int Urol Nephrol*. 2006;38(2):247-50. Epub 2006/07/27. doi: 10.1007/s11255-006-6676-1. PubMed PMID: 16868691.
52. Perera ND. Characterisation of a bladder cancer cohort in a urological unit. *The Ceylon medical journal*. 2002;47(3):102. Epub 2002/11/27. doi: 10.4038/cmj.v47i3.3443. PubMed PMID: 12449781.
53. Prabath A, Goonewardena, S. Pattern of urological malignancies in 2010 – an audit from a tertiary referral centre. *Sri Lanka Journal of Urology* 2012;11(1):30-5. doi: <http://doi.org/10.4038/slju.v11i1.4060>.
54. Sathesan B, Prabath, A. Goonewardena, S., . Urological malignancies: one-year audit from a tertiary referral centre. *Sri Lanka Journal of Urology*. 2010;10(1):24-7. doi: <http://doi.org/10.4038/slju.v10i1.2414>.
55. Wang Z, Gao W, Li J, Wang T, Zhu M, Duan Y. Development and Validation of a Novel Recurrence Risk Stratification for Initial Non-Muscle Invasive Bladder Cancer in the Han Chinese Population. *J Cancer*. 2020;11(7):1668-78. Epub 2020/03/21. doi: 10.7150/jca.38649. PubMed PMID: 32194779; PubMed Central PMCID: PMC7052852.
56. Ieda T, Muto S, Shimizu F, Taguri M, Yanada S, Kitamura K, et al. Development and Validation of a Novel Recurrence Risk Stratification for Initial Non-muscle Invasive Bladder Cancer in Asia. *EBioMedicine*. 2016;12:98-104. Epub 2016/10/26. doi: 10.1016/j.ebiom.2016.08.051. PubMed PMID: 27614395; PubMed Central PMCID: PMC45078579.

57. Sakano S, Matsuyama H, Takai K, Yoshihiro S, Kamiryo Y, Shirataki S, et al. Risk group stratification to predict recurrence after transurethral resection in Japanese patients with stage Ta and T1 bladder tumours: validation study on the European Association of Urology guidelines. *BJU Int.* 2011;107(10):1598-604. Epub 2010/11/20. doi: 10.1111/j.1464-410X.2010.09850.x. PubMed PMID: 21087393.
58. Kikuchi E, Fujimoto H, Mizutani Y, Okajima E, Koga H, Hinotsu S, et al. Clinical outcome of tumor recurrence for Ta, T1 non-muscle invasive bladder cancer from the data on registered bladder cancer patients in Japan: 1999-2001 report from the Japanese Urological Association. *International journal of urology : official journal of the Japanese Urological Association.* 2009;16(3):279-86. Epub 2009/02/12. doi: 10.1111/j.1442-2042.2008.02235.x. PubMed PMID: 19207609.
59. Hong SJ, Cho KS, Han M, Rhew HY, Kim CS, Ryu SB, et al. Nomograms for prediction of disease recurrence in patients with primary Ta, T1 transitional cell carcinoma of the bladder. *J Korean Med Sci.* 2008;23(3):428-33. Epub 2008/06/28. doi: 10.3346/jkms.2008.23.3.428. PubMed PMID: 18583878; PubMed Central PMCID: PMCPMC2526537.
60. Sylvester RJ, van der Meijden AP, Oosterlinck W, Witjes JA, Bouffieux C, Denis L, et al. Predicting recurrence and progression in individual patients with stage Ta T1 bladder cancer using EORTC risk tables: a combined analysis of 2596 patients from seven EORTC trials. *Eur Urol.* 2006;49(3):466-5; discussion 75-7. Epub 2006/01/31. doi: 10.1016/j.eururo.2005.12.031. PubMed PMID: 16442208.
61. Mariappan P, Fineron P, O'Donnell M, Gailer RM, Watson DJ, Smith G, et al. Combining two grading systems: the clinical validity and inter-observer variability of the 1973 and 2004 WHO bladder cancer classification systems assessed in a UK cohort with 15 years of prospective follow-up. *World J Urol.* 2021;39(2):425-31. Epub 2020/04/09. doi: 10.1007/s00345-020-03180-5. PubMed PMID: 32266509; PubMed Central PMCID: PMCPMC7910375.
62. Tosoni I, Wagner U, Sauter G, Egloff M, Knonagel H, Alund G, et al. Clinical significance of interobserver differences in the staging and grading of superficial bladder cancer. *BJU Int.* 2000;85(1):48-53. Epub 2000/01/05. doi: 10.1046/j.1464-410x.2000.00356.x. PubMed PMID: 10619945.
63. Luchey AM, Manimala NJ, Dickinson S, Dhillon J, Agarwal G, Lockhart JL, et al. Change in Management Based on Pathologic Second Opinion Among Bladder Cancer Patients Presenting to a Comprehensive Cancer Center: Implications for Clinical Practice. *Urology.* 2016;93:130-4. Epub 2016/04/05. doi: 10.1016/j.urology.2016.01.048. PubMed PMID: 27041469.
64. Chen Z, Ding W, Xu K, Tan J, Sun C, Gou Y, et al. The 1973 WHO Classification is more suitable than the 2004 WHO Classification for predicting prognosis in non-muscle-invasive bladder cancer. *PloS one.* 2012;7(10):e47199. Epub 2012/10/20. doi: 10.1371/journal.pone.0047199. PubMed PMID: 23082147; PubMed Central PMCID: PMCPMC3474808.
65. Cao D, Vollmer RT, Luly J, Jain S, Roytman TM, Ferris CW, et al. Comparison of 2004 and 1973 World Health Organization grading systems and their relationship to pathologic staging for predicting long-term prognosis in patients with urothelial carcinoma. *Urology.* 2010;76(3):593-9. Epub 2010/04/13. doi: 10.1016/j.urology.2010.01.032. PubMed PMID: 20381131.
66. van der Kwast T, Liedberg F, Black PC, Kamat A, van Rhijn BWG, Algaba F, et al. International Society of Urological Pathology Expert Opinion on Grading of Urothelial Carcinoma. *Eur Urol Focus.* 2021. Epub 2021/03/28. doi: 10.1016/j.euf.2021.03.017. PubMed PMID: 33771477

Urolithiasis: a descriptive study in a single urological unit at a tertiary care hospital

B. Balagobi¹, R. T. Brammah¹, V Niroshan², S. Gobishangar¹, R. Sripandurangana¹
University of Jaffna¹
Teaching Hospital, Jaffna²

Keywords:

Urolithiasis, Ureteric colic, Laser lithotripsy, Renal stones

Abstract

Introduction

Urolithiasis is the most prevalent surgical disorder of urinary tract in Asia. The prevalence of urolithiasis varies with demographic factors. There are many treatment options feasible. The specific treatment approach depends on composition, location, size of the stones and preferences of the patients and hospital capability.

Objective

The aim of the study was to assess the demographic details, clinical presentation, and management of patients with urolithiasis in a single urological unit at a tertiary care hospital.

Methods

A descriptive cross-sectional study was conducted in a total of 247 diagnosed urolithiasis patients in a single urological unit at a tertiary care hospital from August 2021 to July 2022. Data were collected from patients' records; demographic details, clinical presentation and management of urolithiasis were retrieved. Collected data were analyzed with SPSS 26.0.

Results

Among the 247 patients, the majority were males (n=159, 64.4%). Patients ranged from the age of 13-83 years, with a mean age of 48.8 (SD: 15.2) years. The most common presenting symptom was pain (n=150, 60.7%). In 45.3% (n=112) comorbidities such as diabetic mellitus (n=64), hypertension (n=77), hyperlipidemia (n=29), chronic kidney disease (n=15) and ischemic heart disease (n=12) were seen. The majority had single stones (n=171, 69.2%). The commonest site of stones was on the left urinary tract (n=101,

40.9%) followed by right (n=95, 38.5%), and bilateral (11.3%), Bladder (8.5%) and urethra (0.8%) were the other sites. The ureteric stones (n=125, 50.6%), and a mean size of 14.8mm (SD: 11.7) were more common than renal stones (n=74, 30.0%), and a mean size of 19.9mm (SD 11.8). The majority (n=186, 75.3%) were treated surgically.

Conclusion

Urolithiasis was more commonly seen in males. The commonest presentation was pain, and the site was ureter. Nearly half of the patients had at least one non-communicable comorbidity, and the majority were treated surgically.


Introduction

Urolithiasis is the most prevalent urological disorder in Asia, and it is described as the formation or occurrence of stones at any level of the urinary tract [1]. The prevalence of urolithiasis varies with geographical area, race, age, occupation, and gender [1,2]. The occurrence of urolithiasis rises between 4th and 6th decade of life and symptoms vary from, being a symptomatic to mild to moderate infections, life-threatening sepsis, and obstructive renal failure [2].

Patients may be asymptomatic but typically present with acute renal colic, ureteric colic, loin pain, abdominal pain, groin pain, genital pain, dysuria, haematuria, urinary tract infection (UTI), vomiting and occasionally fever [3]. When ureteral stones obstruct the urinary system or transit through the ureter, acute renal or ureteric colic commonly occur. Urolithiasis can also be associated with medical conditions such as diabetes mellitus, hypertension, hyperparathyroidism, gout, recurrent UTI, neurogenic bladder, and congenital anomalies of urinary tract [1]

Various treatment options are available for urolithiasis: watchful waiting, medical expulsive therapy, and surgical intervention such as ureterorenoscopy (URS), Percutaneous Nephrolithotomy (PCNL), laparoscopy, extracorporeal shockwave lithotripsy (ESWL) and rarely open surgery. However, the exact therapy is determined by multiple factors: namely, stone factors (size, location, composition), patient factors (fitness, preference, anatomical anomalies) and

Correspondence: B. Balagobi
E-mail: b.balagobi@yahoo.com

 <https://orcid.org/0000-0001-7632-9644>

Received: 31-08-2022 Accepted: 29-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8995>



resource factors (facilities, surgeon's experiences) [4,5].

The aim of the study was to assess the demographic details, clinical presentation, and management of patients with urolithiasis admitted to the tertiary care hospital, Northern Province of Sri Lanka.

Methods

This study was conducted as an institutional-based descriptive cross-sectional study to assess the demographic details, clinical presentation, and management of urolithiasis in tertiary care hospital from August 2021 to July 2022. All patients who had urolithiasis treatment during the specified time and were diagnosed by USS (Ultrasound scan) or NCCT KUB (Non-contrast computerized tomography) were included. This study was approved by the ethical review committee of the institution. The convenient sampling technique was used to gather data. Data were collected including demographic details, clinical presentation and management of urolithiasis and recorded using a data extraction form based on patients' records. Collected data were explored with descriptive statistics of the statistical package for social sciences (SPSS) version 26.0.

Results

A total of 247 patients were admitted for treatment of urolithiasis during the study period. Among them, 64.4% (n=159) were males and 35.6% (n=88) females (**Figure 1**) with a male to female ratio of 1.81:1. The mean age was 48.8 (SD: 15.2) years with an age ranging from 13 to 83 years (**Figure 2**).

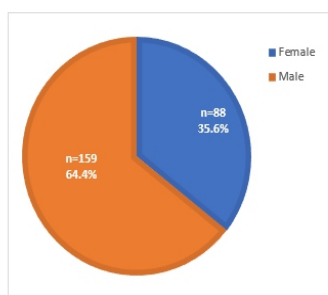


Figure 1: Pattern of urolithiasis with gender

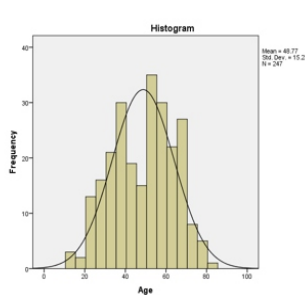


Figure 2: Age distribution of patients

The commonest presenting symptom was pain (both loin pain and ureteric colic, n=150, 60.7%) followed by dysuria (n=24, 9.7%) and lower urinary tract symptoms (n=24, 9.7%). Incidental diagnosis was made in 22 (8.9%) asymptomatic patients and visible haematuria was seen in 14 patients (5.7%) and obstructed infected kidney in 13 (5.3%) (**Table 1**).

Table 1: Clinical presentation of urolithiasis

	No	%
Presenting symptoms		
<i>Pain</i>	150	60.7%
<i>Dysuria</i>	24	9.7%
<i>LUTS</i>	24	9.7%
<i>Incidental diagnosis with asymptomatic</i>	22	8.9%
<i>Visible haematuria</i>	14	5.7%
<i>Obstructed infected kidney</i>	13	5.3%
Comorbidities		
<i>Present</i>	112	45.3%
<i>Nil</i>	135	54.7%
<i>DM</i>	64	25.9%
<i>HT</i>	77	31.2%
<i>HL</i>	29	11.7%
<i>CKD</i>	15	6.1%
<i>IHD</i>	12	4.9%
<i>Single stones</i>	171	69.2%
<i>Multiple stones</i>	76	30.8%
Site		
<i>Left urinary tract</i>	101	40.9%
<i>Right urinary tract</i>	95	38.5%
<i>Bilateral</i>	28	11.3%
<i>Bladder</i>	21	8.5%
<i>Urethra</i>	2	0.8%
Anatomical location of stone		
<i>Ureter</i>	125	50.6%
<i>Renal</i>	74	30.0%
<i>Renal & Ureter</i>	25	10.1%
<i>Bladder</i>	13	5.3%
<i>Ureter & Bladder</i>	5	2.0%
<i>Renal & Bladder</i>	3	1.2%
<i>Urethra</i>	2	0.8%
Location of ureteral stones		
<i>Proximal ureter</i>	84	55.3%
<i>Mid ureter</i>	18	11.8%
<i>Distal ureter</i>	50	32.9%

Among the 247 patients, 45.3% (n=112) had comorbidities. Diabetes mellitus (n=64, 25.9%), hypertension (n=77, 31.2%), chronic kidney disease (CKD) (n=15, 6.1%) and ischemic heart disease (IHD) (n=12, 4.9%) were documented in the given frequencies. A single stone was identified in 69.2% (n=171) of patients, whereas 30.8% (n=76) had multiple stones.

The common sites of stones in the frequency of occurrence were, left side of urinary tract (n=101, 40.9%), followed by the right (n=95, 38.5%), bilateral (n=28, 11.3%). In 50.6% (n=125) of the patients' ureteric stone (mean size of 14.8mm, SD: 11.7) was seen and in 30.0% (n=74) of

patients' renal stone (mean size of 19.9mm, SD: 11.8) were seen. Concurrent renal with ureter stones (n=25, 10.1%), bladder stones (n=13, 5.3%), ureter with bladder stones (n=5, 2.0%), renal with bladder stones (n=3, 1.2%) and urethral stones (n=2, 0.8%) were also seen in the given percentages.

The ureteral stones were most located in the proximal ureter (n=84, 55.3%) followed by distal ureter (n=50, 32.9%) and mid ureter (n=18, 11.8%); the remaining cases were combinations of the above.

There was no definitive correlation between the size of stones and patients' age (**Figure 3**)

The percentage of stones of various sizes of urolithiasis ranged from 11 to 20 mm in 40.5% (n=100), followed by 5 to 10mm in 37.2% (n=92), 21 to 30mm in 12.6% (n=31), >30mm in 8.1% (n=20) and <5mm 2% (n=5). Nearly a half (49.8%, n=123) of male patients and 25.5% (n=63) female patients were treated surgically (**Table 2**).

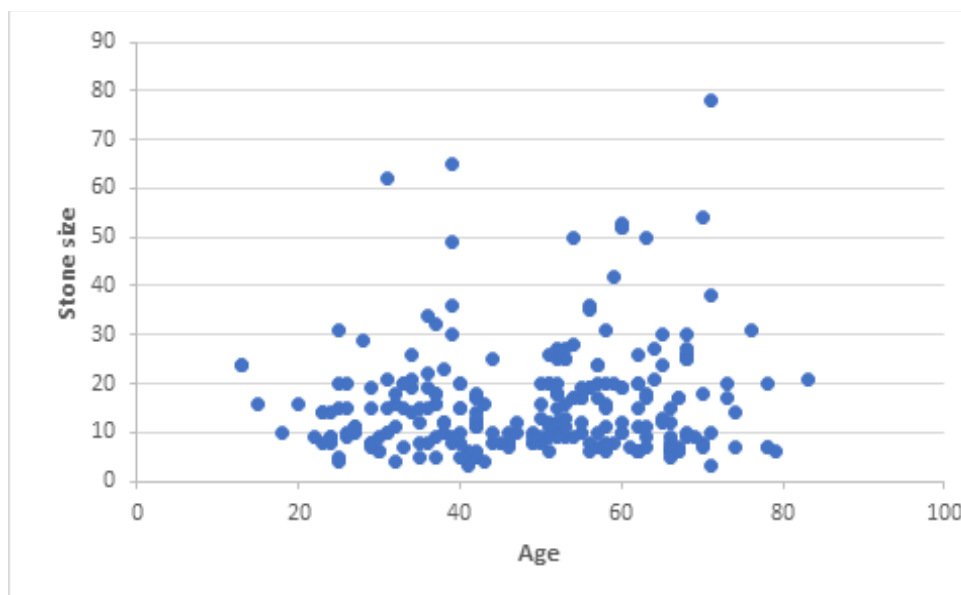


Figure 3 : Distribution of stone size with age

Table 2: Distribution of stone size with gender and treatment modalities

Stone size in mm	MET		MET Total	Surgical intervention		Surgical intervention Total	Grand Total	%
	Female	Male		Female	Male			
<5	2	2	4	1		1	5	2.0%
5-10	23	34	57	9	26	35	92	37.2%
11-20				35	65	100	100	40.5%
21-30				10	20	30	31	12.6%
>30				8	12	20	20	8.1%
Grand Total	25	36	61	63	123	186	247	100%

Among 247 urolithiasis patients, the majority (n=186, 75.3%) were treated with surgical intervention during the study period: rigid ureteroscopy with laser lithotripsy (n=110, 44.5%), percutaneous nephrolithotomy (PCNL)(n=41, 16.61%), cystolitholapaxy (n=18, 7.3%), flexible ureterorenoscopy (fURS) with laser lithotripsy (n=12, 4.9%), open surgery (n=3, 1.2%) and ESWL (n=2, 0.8%) were performed. Moreover, 24.7% (n=61) of patients were treated with medical expulsive therapy alone. The mean stone size of surgically treated and MET (Medical Expulsive Therapy) were 19.1mm (SD: 11.6) and 7.4mm (SD: 2.5) respectively. (Table 3). Except in one patient, all stones of < 5mm size were successfully expelled with medical therapy. In the stone size 5-10mm group, major part (62%) passed with medical expulsive therapy alone.

Discussion

Males are more common to have urolithiasis. It could be related to occupation and lifestyle patterns. Generally, males work outdoors as manual workers, such as fishermen, masons, carpenters, plumbers, electricians, drivers, and construct workers than females which cause more dehydration in tropical countries like Sri Lanka. Super saturation is the major cause of urolithiasis [1] and males tend to consume excessive amounts of alcohol, coffee, and meat. Additionally, androgen plays a role in enhancing oxalate excretion and stimulating stone formation [1,4,5]. Furthermore, the anatomical variations in males due to benign prostatic hyperplasia and consequent urethral blockage can also increase the risk of stone formation [1,6]. However, male: female ratio varies depending on geography and culture [1]. According to some studies, the male: female ratio ranged from 1.7:1 to 3:1 [7,8,9]. In the present study, the male-to-female ratio was 1.8:1. These results reflect that males do

more outdoor works and are exposed to more dehydration in our part of the world.

An Asian study reported that the incidence of urolithiasis peaked between the ages of 30 and 60 and it generally increased with age [1]. Another study reported that the occurrence of urolithiasis rises between 4th and 6th decades of life [2]. Likely the middle-aged population is more prone to dehydration, an unhealthy lifestyle and involvement in more strenuous work in outdoors. [1,2,6]. In the current study, the mean age was 48.8 (SD: 15.2) years. However, patients ranged in age from 13 to 83 years which is compatible with the prevalence pattern of urolithiasis in tropical countries.

A study reported that the most common symptom was loin pain (74% to 94%) [10]. Atypical stone symptoms can delay an individual without a history of stones from having prompt diagnosis and treatment. Additionally, haematuria and vague or absent pain symptoms may increase urolithiasis suspicion [10]. Furthermore, a random diagnosis of hydronephrosis, microscopic haematuria, urological x-ray examination and history of nephrolithiasis may had led to the diagnosis of asymptomatic calculi [3]. Another research revealed that most of the patients were asymptomatic at the time of presentation and were diagnosed by ultrasound scan (USS) [7,11]. However, this study statistically revealed that pain (both loin pain and ureteric colic) was commonest presenting symptoms in 60.7% of cases and 8.9% (n=22) of patients were asymptomatic and diagnosed incidentally. Non-specific back pain frequently confuses between renal pain and musculoskeletal pain which results in urolithiasis patients presenting orthopedic surgeon and vice-versa patients with back pain to an urologist.

Table 3: Treatment modalities with urolithiasis

Treatment modalities	Female	Male	Grand Total	%	Mean stone size (mm) (±SD)
Surgical intervention	63	123	186	75.3%	19.1 ± 11.6
<i>Rigid URS + Laser lithotripsy</i>	33	77	110	44.5%	
<i>PCNL</i>	18	23	41	16.6%	
<i>Cystolitholapaxy</i>	3	15	18	7.3%	
<i>Flexi URS + Laser lithotripsy</i>	6	6	12	4.0%	
<i>Open surgery</i>	2	1	3	2.0%	
ESWL	1	1	2	0.8%	
MET	25	36	61	24.7%	7.4 ± 2.5
Grand Total	88	159	247	100%	

A global study that reported most of the patients had single stones (95.4%), while approximately 5% of patients had multiple stones [5]. This study statistically demonstrated that 69.2% (n=171) of single stones and 30.8% (n=76) of multiple stones were diagnosed among 247 urolithiasis patients, whereas multiple stones rates were increased in the present study.

Several studies have implicated that associated medical conditions may be an additional risk factor for the development of urolithiasis, such as diabetes mellitus (DM), hypertension (HT), hyperlipidemia (HL), gout, obesity, and metabolic syndrome [2,5,10,12]. More than 30% of people with type II diabetes mellitus (DM) were more likely to have a history of nephrolithiasis which has been reported to increase the likelihood of stone formation. Women with DM have a 30-50% increased chance of developing stones [6,12]. In this study, 45.3% (n=112) of patients that were diagnosed to have comorbidities and DM, hypertension (HT), chronic kidney disease (CKD) and ischemic heart disease (IHD) were more prevalent. Furthermore, DM and impact of insulin resistance on ammonia genesis result in lower urine pH and greater rates of uric acid stone development. A dietary approach to stop hypertension (DASH) diet may lower the risk of kidney stone formation by raising citrate levels and volume of urine [2].

In the present study, ureter stones (50.6%, n=125) were the most prevalent site, whereas renal stones (n=74, 30%), renal with ureter stones (n=25, 10.1%), bladder stones (n=13, 5.3%), ureter with bladder stones (n=5, 2%), renal with bladder stones (n=3, 1.2%) and urethral stones (n=2, 0.8%) were recorded. The finding of this investigation closely paralleled with global trends [1].

Rigid and flexible ureterorenoscopy (URS) was commonly recommended as an invasive technique for all stone sizes and locations with good stone-free rates (SFR) and low morbidity, especially for ureteral stones [4,5]. Moreover, PCNL is a preferred treatment approach for all renal calculi more than 2cm according to European Association of Urology (EAU) guidelines [4]. URS and PCNL are safe and effective treatment modalities, and the stone clearance rates were higher. URS was associated with less morbidities compared to PCNL in the treatment of proximal ureteric and PUJ stones. Rigid URS with laser lithotripsy, PCNL and cystolitholapaxy were mostly used. In which, 44.5% of patients were treated with rigid URS and laser lithotripsy alone. URS modalities were more frequent in younger patients than in other stone-related procedures, which was associated with the lower stone size. Surgical intervention rates increased with age in both genders, especially in men like other studies [6,10]. Furthermore, it showed that the highest percentage of stones ranged from 11 to 20mm which indicates more stone burden

akin other studies from tropical countries such as India, Pakistan, Middle East countries rather than non-tropical countries.

Limitation of this study

This study had some limitations. This study did not include long-term follow-up data such as stone recurrence rate and long-term complications. Moreover, it is a single unit data over a one-year period. Therefore, further multicentric studies are required over a long period and we plan to do a prospective study that includes a larger number of samples in the future. Though, patients included were treated and followed up for a brief period, most were diagnosed and treated according to a standard protocol despite limited resources and could be considered as a strength of the study.

Conclusions

The highest prevalence of urolithiasis (64.4%) was of male predominance. The mean age was 48.8 (SD: 15.2) years. The pain (both loin pain and ureteric colic) was the most common presenting symptom (60.7%) with the common site being ureter. There were associated comorbidities in 45.3% of the patients. The majority (75.3%) of patients were treated surgically as this was a study done at a tertiary referral center. Medical expulsive therapy was successful in the majority of the patient with a stone size < 1cm and more so in < 5mm.

References

1. Liu, Y., Chen, Y., Liao, B., Luo, D., Wang, K., Li, H., & Zeng, G. Epidemiology of urolithiasis in Asia. *Asian journal of urology*, 2018 Oct; 5(4), 205-214. <https://doi.org/10.1016/j.ajur.2018.08.007>
2. Sorokin, I., Mamoulakis, C., Miyazawa, K., Rodgers, A., Talati, J., & Lotan, Y. Epidemiology of stone disease across the world. *World journal of urology*, 2017 Feb; 35(9), 1301-1320. DOI: 10.1007/s00345-017-2008-6
3. Wimpissinger, F., Türk, C., Kheyfets, O., & Stackl, W. The silence of the stones: asymptomatic ureteral calculi. *The Journal of urology*, 2007 Oct; 178(4), 1341-1344. <https://doi.org/10.1016/j.juro.2007.05.128>
4. Lee Y.H., Huang W.C., Tsai J.Y., Lu C.M., Chen W.C., Lee M.H. Epidemiological studies on the prevalence of upper urinary calculi in Taiwan. *Urol Int.* 2002;68:172-177. <https://doi.org/10.1159/000048445>
5. Castro, E. P., Osther, P. J., Jinga, V., Razvi, H., Stravodimos, K. G., Parikh, K., ... & CROES Ureteroscopy Global Study Group. Differences in ureteroscopic stone treatment and outcomes for distal, mid-, proximal, or multiple ureteral locations: the Clinical Research Office of the Endourological Society ureteroscopy global study. *European urology*, 2014 Jul; 66(1), 102-109. <https://doi.org/10.1016/j.eururo.2014.01.011>

6. Talati JJ, Tiselius HG, Albala DM, Ye Z, editors. Urolithiasis: basic science and clinical practice. Springer Science & Business Media; 2012 Dec 22
7. Edvardsson, V. O., Indridason, O. S., Haraldsson, G., Kjartansson, O., & Palsson, R. Temporal trends in the incidence of kidney stone disease. *Kidney international*, 2013 Jan; 83(1), 146-152. DOI: 10.1038/ki.2012.320
8. Indridason, O. S., Birgisson, S., Edvardsson, V. O., Sigvaldason, H., Sigfjussun, N., & Palsson, R. Epidemiology of kidney stones in Iceland A population-based study. *Scandinavian journal of urology and nephrology*, 2006, 40(3), 215-220. DOI: 10.1080/00365590600589898
9. Wang, S., Zhang, Y., Zhang, X., Tang, Y., & Li, J. Upper urinary tract stone compositions: the role of age and gender. *International braz j urol*, 2020 Jan; 46, 70-80. DOI: 10.1590/S1677-5538.IBJU.2019.0278
10. Krambeck AE, Lieske JC, Li X, Bergstralh EJ, Melton LJ, Rule AD. Effect of age on the clinical presentation of incident symptomatic urolithiasis in the general population. *The Journal of urology*. 2013 Jan;189(1):158-64. DOI: 10.1016/j.juro.2012.09.023
11. Lohiya, A., Kant, S., Kapil, A., Gupta, S. K., Misra, P., & Rai, S. K. Population-based estimate of urinary stones from Ballabgarh, northern India. *The National medical journal of India*, 2017, 30(4), 198-200. DOI: 10.4103/0970-258X.218671
12. Taylor EN, Stampfer MJ, Curhan GC. Diabetes mellitus and the risk of nephrolithiasis. *Kidney international*. 2005 Sep 1;68(3):1230-5. DOI: 10.1111/j.1523-1755.2005.00516.x

Day surgery urolithiasis management: efficacy and safety of ureteroscopy and laser lithotripsy in a district general hospital setting

B. Balagobi¹, W. Butterworth², R. Lunawat²
 Faculty of Medicine, University of Jaffna¹
 Princess Royal University Hospital, Bromley, United Kingdom²

Keywords

Day Surgery, laser lithotripsy, ureteroscopy, renal calculi, ureteric calculi

Abstract

Introduction

Incidence of urolithiasis is rising worldwide and increasingly Ureteroscopy (URS) coupled with laser fragmentation is being used safely within the day surgery setting for ureteral and renal stone management. This study is to explore whether URS guided lithotripsy could be delivered effectively as a day surgery procedure.

Method

Retrospective analysis of 118 day surgery patients who underwent URS guided laser lithotripsy for ureteric and renal calculi between November 2017 and April 2019. All patients underwent ureteric stenting during acute admission prior to the URS guided lithotripsy. Outcomes were compared against European Association of Urology (EAU) guidelines on the best clinical practice in use of URS in urolithiasis.

Results

Of the 118 patients who underwent URS and laser fragmentation, mean age was 54 years with 2:1 male:female ratio. 56% were ureteric (67% upper, 8% middle and 25% distal ureter), 44% renal stones. Mean stone size was 9.7mm, with 58% <1cm, 38% 1-2cm and 4% >2cm. 90.6% of patients following URS guided stone fragmentation were stone-free. The complication rate was 8.5% (n = 10), Clavien-dindo 3 in 4 patients and Clavien-dindo 4 in 1 patient.

Conclusion

This study demonstrated that URS guided stone fragmentation can safely deliver high stone free and low complication rates within day surgery setting.

Correspondence: B. Balagobi

E-mail: b.balagobi@yahoo.com

<https://orcid.org/0000-0001-7632-9644>

Received: 25-06-2022 Accepted: 29-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8975>



Introduction

The prevalence and incidence of nephrolithiasis is reported to be increasing across the world [1] with a peak incidence at between 40 and 50 years of age.[2] Rising levels of obesity and diabetes, environmental factors such as dietary and climate change were noted to be risk factors for increasing trend in urolithiasis.[1] This is evident by a 70% increase in UK hospital attendances with urolithiasis, from 51,035 attendances in 2000 to 86,742 in 2015.[3] Ureteroscopy (URS) guided laser lithotripsy being performed more frequently than other urological surgeries in any urological departments especially in tropical countries like Sri Lanka .[4] Day Surgery is becoming popular in surgical field because of better patient satisfaction and cost efficacy to health care system. The fact that day surgery is more efficient leads to shorter waiting lists and better service to patients [5].

Increasingly ureteroscopy (URS) coupled with laser fragmentation is being used safely within the day surgery setting for ureteral and renal stone management, with associated high stone-free levels and patient satisfaction.[5] Both rigid ureteroscopy(URS) and flexible ureteroscopy are used in most of the renal stone management(Figure 1).Although there are European guidelines for the ureteroscopic management of urolithiasis, this study set out to explore whether URS guided laser lithotripsy could be delivered effectively as a day surgery procedure within the District General Hospital (DGH) setting

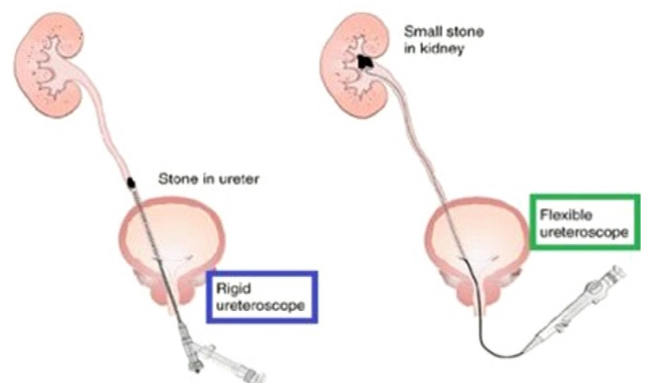


Figure 1: Types of Ureteroscopy (URS): Rigid URS (Left) and Flexible URS (right)

Method

This was a retrospective analysis of hundred and eighteen (n=118) day surgery patients who underwent URS guided laser lithotripsy for ureteric and renal calculi in a DGH in between the period of November 2017 and April 2019. All patients who underwent the URS guided laser lithotripsy had prior ureteric stenting during acute admission with obstructed infected kidney or obstructed kidney with acute kidney injury (AKI). Outcomes were compared against European Association of Urology (EAU) guidelines on the best clinical practice in use of URS in urolithiasis including the Clavien-Dindo scale for assessing complications. Standard safety techniques and image documentations practiced during ureteroscopy and laser lithotripsy (Figure 2)

Results

The average patient age of the 118 patients who underwent URS laser lithotripsy was 54 years, and 78 (66%) were male and 40 (34%) were female with male: female ratio of 2:1. The total number of stones treated was 166, of which 56% were ureteric (36% upper, 5% middle and 15% distal ureter) and 44% renal (6% upper pole, 18% middle pole, 25% lower pole and renal pelvis 51%) (Figure 3).

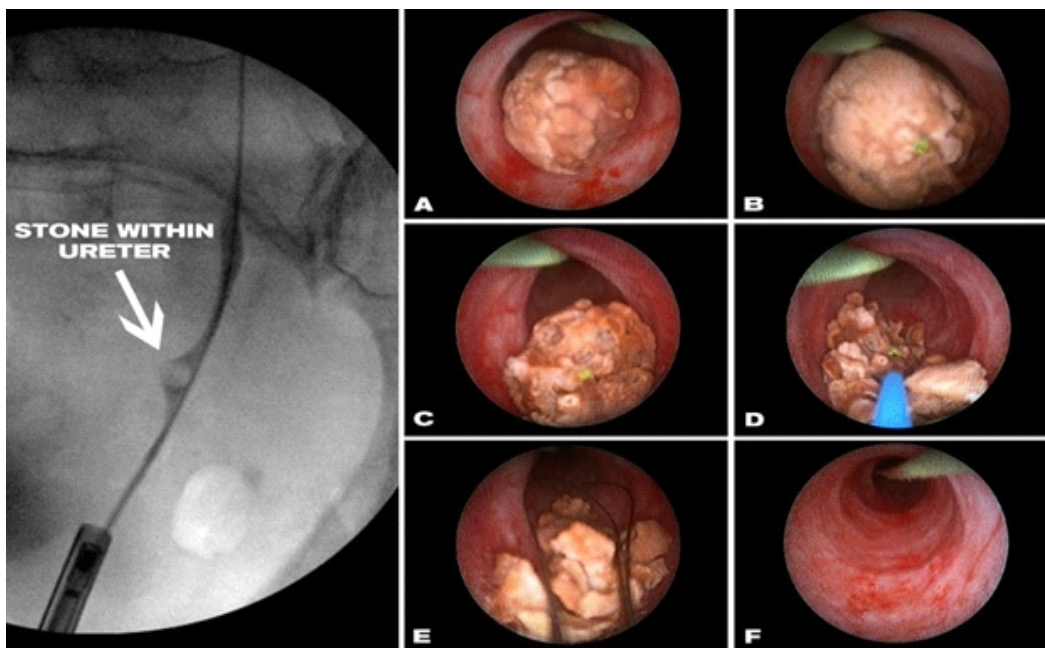


Figure 2: URS Visualisation of ureteric stone (A,B). Laser lithotripsy(C,D), basket retrieval of fragments(E) and complete stone clearance(E) and Retrograde study reveals distal ureteric calculi(G)

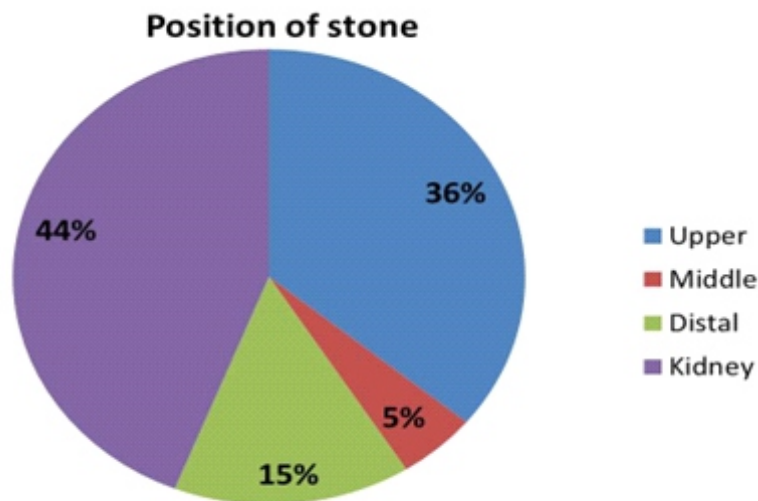


Figure 3: Positions of Urolithiasis

The average size of stone was 9.7 mm, with 58 % <1cm, 38% 1-2cm and 4% >2cm. All renal stones treated with both rigid and/or flexible URS laser lithotripsy were <2cm, which is in compliance with EAU guidelines that Percutaneous Nephrolithotomy (PCNL) should be first line for renal stones >2cm and all cases were undertaken with the use of a holmium laser and placement of safety guide wire or ureteral access sheath. 12.69 mm was the average patient stone burden. 1.41 was the average number of stones treated per case, with an average 1.12 Watts of energy used. At three month follow up clinic, 90.6% of patients following day surgery URS laser lithotripsy were found to be stone-free on abdominal X-ray (AXR) and Ultra Sound scan of Kidney Ureter Bladder (US/KUB). Of the 9.4% of patients who were not stone-free at this 3 month follow up, except three re-do URS laser lithotripsy and one PCNL other patients successfully passed their residual fragments after a further 3 month period of surveillance with medical expulsive therapy (Table I).

The complication rate was 8.5% (n=10) following the procedure, which was below '9-25% the acceptable complication rate' stated by the EAU guidelines. The Clavian Dindo classification of these complications would be 5 x(I), 1x(II), 3x(IIIb); 1 x(IV), including two patients requiring overnight admissions for analgesia, two patients representing and requiring intravenous antibiotics for post-operative urosepsis, three patients requiring repeat Computed Tomography (CT) and one patient requiring a re-do URS (Table 2). Among 118, 4 patients had failed URS due to difficult ureteric anatomy. Three underwent repeat URS later and in one case PCNL was performed due to presence of large fungal ball in renal pelvis which was difficult to retrieve by flexible URS.

Table 1: Day surgery URS guided laser lithotripsy

Day surgery URS Guided laser lithotripsy	
Cases	118
Average age	54
Gender ratio (M:F)	2:1
Total Stone treated	166
Average number of stones treated per case	1.41
Mean stone size (mm)	9.7
Average laser energy used per case (Watt)	1.12
Failed URS cases	4
Post operative Urosepsis	2
Re do URS	3

Discussion

Size and location of stone mainly determine the mode of surgical management of urolithiasis, as well as patient preference plus available local facilities and expertise [3]. With the development of technology, management of urolithiasis has drifted towards minimally invasive procedures such as Shock Wave Lithotripsy (SWL), URS Laser lithotripsy and Percutaneous Stone Removal (PSR) rather than open surgery [7, 8]. This is due in great part to the lower rates of morbidity and complications associated with current end urological operations [9]. Over past 10 years the number of URS laser lithotripsies performed in the UK has reported an increment of 127%, in 2015, there were 14,242 instances, compared to only 6283 in 2000. [4, 7] The growing popularity of URS laser lithotripsy can be attributed to technical improvements in optics and endoscope miniaturization, which have made URS faster and more efficient, with higher stone-free rates (SFR) [6]. Fewer ureteral injuries and improved fragmentation efficiency for all type of stone noted due to the transition from electrohydraulic and ultrasonic lithotripsy to Holmium or Thulium laser lithotripsy. [10] Utilization of URS is increasing in complex stone disease and patients with troubling comorbidities such as obesity, bleeding diathesis, pregnancy and solitary kidney as utilized in standard urolithiasis patients [11]. In our study most of the patient presented as emergency admission to casualty ward with AKI or obstructed infected kidney and hot laser lithotripsy not done because of non-availability of laser machine at casualty theatre and movement of laser machines between different complex of hospital was not favored by hospital administration considering damage to laser machine. Rigid URS used for ureteric stone management at day care surgical unit. Single use flexible URS (Lithovue) used in management of most of the renal stones and retro pulsed proximal ureteric stones.

Table 2: Complications following URS guided laser lithotripsy as day surgery

Clavian -Dindo Classification	Number of cases
Grade I	5
Grade II	1
Grade III	
a	Nil
b	3
Grade IV	1
Grade V	Nil

Conclusion

This study has showed how URS laser lithotripsy is achieving higher SFR (90.6%) and reduced re-do procedures (3.4%) while maintaining complication rate (8.5 %) within acceptable range as a day case procedure. This study has showed that with the facilities available in DGH setting, URS guided stone fragmentation can safely achieve high stone-free and low-complication rate as a day case surgery, which reduce patient stay at hospital and expenditure to health institution.

Limitations

This study has showed how URS laser lithotripsy is achieving higher SFR (90.6%) and reduced re-do procedures (3.4%) while maintaining complication rate (8.5 %) within acceptable range as a day case procedure. This study has showed that with the facilities available in DGH setting, URS guided stone fragmentation can safely achieve high stone-free and low-complication rate as a day case surgery, which reduce patient stay at hospital and expenditure to health institution.

References

1. Romero V, Akpınar H, Assimos DG. Kidney stones: a global picture of prevalence, incidence, and associated risk factors. *Rev Urol.* 2010 Spring;12(2-3):e86-96.
2. Oitchayomi A, Doerfler A, Le Gal S, Chawhan C, Tillou X. Flexible and rigid ureteroscopy in outpatient surgery. *BMC Urol.* 2016;16(1):6.
3. Renal and ureteric stones: assessment and 5 management. NICE England. Feb 2017.
4. Turney BW, Reynard JM, Noble JG, Keoghane SR. Trends in urological stone disease: analysis of 10 years of hes data. *Bju Int.* 2012;109(7):1082-7.
5. Wright AE, Rukin NJ, Somani BK. Ureteroscopy and stones: Current status and future expectations. *World J Nephrol.* 2014;3(4):243-8.
6. Türk C, Petřík A, Sarica K, Seitz C, Skolarikos A, Straub M, et al. EAU guidelines on diagnosis and conservative management of urolithiasis. *Eur Urol.* 2016;69(3):468-74.
7. Ho A, Sarmah P, Bres-Niewada E, Somani BK. Ureteroscopy for stone disease: expanding roles in the modern era. *Cent European J Urol.* 2017;70(2):175-8
8. Rukin NJ, Siddiqui ZA, Chedgy ECP, Somani BK. Trends in Upper Tract stone disease in England: Evidence from the hospital episodes statistics database. *Urol Int.* 2017;98(4):391-6.
9. Cui X, Ji F, Yan H, Ou T-W, Jia C-S, He X-Z, et al. Comparison between extracorporeal shock wave lithotripsy and ureteroscopic lithotripsy for treating large proximal ureteral stones: a meta-analysis. *Urology.* 2015;85(4):748-56
10. Drake T, Grivas N, Dabestani S, Knoll T, Lam T,

Maclennan S, et al. What are the benefits and harms of ureteroscopy compared with shock-wave lithotripsy in the treatment of upper ureteral stones? A systematic review. *Eur Urol.* 2017;72(5):772-86.

11. Hong YK, Park DS. Ureteroscopic lithotripsy using Swiss Lithoclast for treatment of ureteral calculi: 12-years experience. *J Korean Med Sci.* 2009;24(4):690-4.

Recurrent acute pancreatitis: a diagnostic and a therapeutic dilemma

M.de Silva

Faculty of Medical Sciences, University of Sri Jayewardenepura, Sri Lanka.

Keywords:

AP (Acute Pancreatitis), RAP (Recurrent Acute Pancreatitis), CP (Chronic Pancreatitis), SOD (Sphincter of Oddie Dysfunction), SOM (Sphincter of Oddi Manometry), PD (Pancreatic Divisum), AIP (Auto Immune Pancreatitis)

Abstract

Although uncommon, surgeons and physicians are sometimes confronted with patients who presents with recurrent episodes of acute pancreatitis. When two or more episodes of acute pancreatitis occur without an identifiable cause, it is referred to as Recurrent Acute Pancreatitis (RAP). In such patients, selecting the most appropriate management strategy continue to pose a challenge due to multiple aetiological factors, associated conditions, microanatomical and pathological processes and complex immunological mechanisms of this condition.

The identifiable causes of RAP such as bile duct stones, biliary sludge or crystals, Sphincter of Oddi Dysfunction (SOD), pancreatic duct obstructions due to benign and malignant neoplasms, genetic mutations, Pancreatic Divisum (PD), metabolic disorders, alcohol consumption and smoking may be identified in some patients. There are several other rare conditions which may be associated with RAP. However, in about 30%, no cause/s can be identified. Diagnosis is further complicated by the fact that, although the gland may appear morphologically normal following the initial episode of Acute Pancreatitis (AP), in some patients, evidence of Chronic Pancreatitis (CP) may manifest later. Furthermore, there is an ongoing debate as to whether, recurrent bouts of pancreatitis following the first; the Sentinel Acute Pancreatitis episode in patients who are 'immunologically' predisposed may lead to Chronic Pancreatitis. In such patients who subsequently develop acute episodes, i.e., Acute on Chronic Pancreatitis will further complicate recognition of aetiological factors of RAP.

The recognition of possible causes, associated factors, and understanding of pathological progressions are therefore important in the management of such patients. Detailed clinical assessment and clinical reasoning, standard haematological and biochemical workup and basic and advanced imaging studies will help identify patients who can be selected for specific invasive and medical therapy to prevent acute episodes.

This brief review is a clinical update to guide clinicians, the best way forward in the management of RAP.

Introduction

Recurrent Acute Pancreatitis (RAP) is often defined as a clinical entity when two or more episodes of acute pancreatitis occur without an identifiable cause, and when such episodes occur in a space more than 3 months between two episodes, in a setting of a 'structurally normal' gland self-limiting oedematous changes (1,17).


Despite recent understanding of pathophysiology and pathogenesis of acute pancreatitis, management of this clinical entity continues to pose a challenge. The objective of this brief review is to provide a clinical update of the way forward in the management of RAP.

Causative factors can be identified in many such patients. In clinical practice, stones, biliary sludge or crystals in the bile duct, dysfunction of the Sphincter of Oddi (SOD), pancreatic duct obstruction due to benign or malignant neoplasms, genetic mutations, Pancreatic Divisum (PD), alcohol consumption and smoking may be identified. However, approximately in 30% of patients, the aetiology of RAP continues to be elusive and the phrase, "idiopathic" is used.

It must be reiterated that, although the gland may appear morphologically normal after such an episode, in a proportion, evidence of Chronic Pancreatitis (CP) may subsequently manifest. This is because of the diagnostic difficulties of early chronic pancreatitis that may arise even with the best technology. However, if the evidence of early CP

Correspondence: Mohan de Silva

E-mail: thathya.ds@gmail.com

 <https://orcid.org/0000-0001-7905-3145>

Received: 26.06.222 Accepted: 27-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.9013>



is identified, then, the title, recurrent acute pancreatitis (RAP) may be revised to Acute on Chronic Pancreatitis, that is, Acute Pancreatitis in a setting of early Chronic Pancreatitis. However, there is an ongoing debate, whether episodes of acute pancreatitis eventually lead to chronic pancreatitis in some patients who are 'immunologically' predisposed.

The descriptive term sentinel acute pancreatitis is used by some for the initial event. In susceptible individuals, the microanatomic changes, and immunological changes will continue following the oedematous phase resulting in persistent changes that predisposes to RAP. (2,3)

Therefore, it is important to identify patients who can be selected for specific invasive or medical treatment to prevent further acute episodes following the sentinel AP event.

Management of RAP therefore requires identification of possible causes, associated issues, and ongoing pathological derangements. Detailed clinical assessment, standard hematological and biochemical workup and basic and advanced imaging will help identify such aetologically important factors in approximately 70% of the patients

Alcohol consumption and smoking are recognized as predisposing/causative factors. There is evidence that RAP typically occurs in patients who continued to be heavy drinkers (>5 drinks per day). Furthermore, cessation of alcohol reduces further attacks and progression. Smoking is recognized as an independent risk factor for AP, RAP and CP. The effect is shown to be dose dependent and worsened with drinking (4,5).

Gallstones is identified as the most common condition associated with RAP (6,7). In the absence of easily identifiable bile duct stones, Gallstone disease may present only with microlithiasis (stones less than two mm in diameter), gallbladder sludge or bile crystals. Technological advancements and standardization of interpretation of Endoscopic Ultrasound have refined the diagnosis of microlithiasis and biliary sludge and is considered superior to Computerized Axial Tomography and Magnetic Resonance Cholangio-Pancreatography (MRCP) (17). Bile Microscopy identifies Biliary Crystals. However, microlithiasis have not shown a clear relationship as a causative factor (8,9).

Sphincter of Oddi Dysfunction (SOD) is recognized as a cause of RAP especially in young females who present with biliary type pain where no apparent cause is found. SOD comprises two clinical entities: one related to a functional disorder; referred to as Sphincter of Oddi Dyskinesia where

the clinical features are brought on by episodes of transient sphincter hypertonia. Fibrosis due to ongoing chronic inflammatory process resulting in stenosis of the orifice of the ampulla of Vater is the other entity which may produce similar symptoms.

In the clinical context, SOD is classified into three types.

Type I patients present with pancreatic type pain with high serum pancreatic enzymes and/or elevated liver enzymes and a dilated common bile duct and/or main pancreatic duct: a demonstrable structural problem.

Type II patients have pancreatic type pain, associated with at least one of the type I features. In these patients, the manometry may indicate elevated basal sphincter pressures. However, no stenosis may be demonstrable in most of them.

Type III have only pancreatic type pain but no elevation of pancreatic enzymes, normal biochemistry, and normal imaging. Type III patients are generally not considered for Recurrent Acute Pancreatitis (10,11)

Sphincter of Oddi Manometry (SOM) remains the gold standard investigation for the diagnosis of SOD. Manometry is performed during Endoscopic Retrograde Cholangio Pancreatogram (ERCP) during which, selective cannulation is done through the major papilla with a catheter. Normal basal sphincter pressure is less than 35 mmHg (mean 15 mmHg) and a level more than 40 mmHg is considered abnormal. An alternative to manometry is MRCP with the secretin test (MRCP-S).

Pancreatitis susceptibility gene variants (PRSS1, SPINK1, and CFTR mutations) have been identified in some patients with RAP. The PRSS1, SPINK1, CFTR, and/or CTSC variants have been identified in 58% of patients of idiopathic RAP patients, in one study (12).

Auto Immune Pancreatitis (AIP) is described as a rare cause of Recurrent Acute Pancreatitis especially in younger patients. Some of these patients may have inflammatory bowel disease. (13)

There are several other rare conditions. Early malignancies that may occlude the pancreatic duct can induce acute pancreatitis. One such lesion is mucinous ductal neoplasm which is not infrequently associated with RAP. Other benign conditions that are implicated in RAP are Periampullary Diverticula, Pancreatic Divisum, Choledochocoele and presence of abnormally long common channel.

Periampullary Diverticula are frequently found in patients with gall stones and RAP. However, their role in the occurrence of pancreatitis is debatable.

Pancreas Divisum is identified in some patients with recurrent 'pancreatic type' pain. Pancreatic Divisum is a developmental abnormality where the dorsal and ventral ducts are partially fused. In some such patients the dorsal duct drains through the major papilla through the communicating branch which joins ventral duct and dorsal duct. In many, this communication branch is thin and not well developed. Therefore, the passage may be inadequate for draining of pancreatic fluid when the pancreas is stimulated during meals. Studies show a prevalence of PD in patients with RAP. If dilation of the dorsal duct is found in such patients, this may also indicate an obstruction at the minor papilla orifice. (14,15)

Choledochocoele is a condition where the intramural segment of the common bile duct is dilated and protrudes into duodenum. It is postulated that biliary sludge or small stones may get lodged in this dilated segment, occlude the flow of bile and pancreatic juice, and initiate pancreatitis. SOD may be considered as a cause of ampullary choledochal cysts.

Annular pancreas is a rare anatomical condition. The duodenum and the bile duct may get entrapped by the annular growth of the pancreas and in about 1/3 of such patients there is an 'entrapment' of duodenum and common bile duct by the annular growth of the gland. About one third of patients with annular pancreas may also have Pancreas Divisum. However, the relationship between PD and Annular Pancreas with RAP is far from clear.

An abnormally long common channel may facilitate reflux of bile into the pancreatic duct. This abnormality is easily diagnosed by MRCP or ERCP. Choledochal cysts are not infrequently associated with this anomaly.

Hypertriglyceridemia and hypercalcemia can cause RAP. Most patients with hypercalcemia may have Hyperparathyroidism. Unless serum calcium levels are performed during an acute episode, the diagnosis of hyperparathyroidism may be missed.

Serum triglycerides over 1000 mg/dL may be needed to precipitate an episode of acute pancreatitis. This is rare.

So how do we select patients with RAP who may be helped by specific intervention procedures or therapy? Choices include Cholecystectomy, Biliary or Selective Pancreatic

Sphincterotomy, Minor Papilla Sphincterotomy or Gallstone Dissolution Therapy. However, the impact of Biliary and Pancreatic Sphincterotomy on the Natural History of RAP is still unclear. Although the role of Biliary Sphincterotomy in the setting of Biliary Pancreatitis is well defined, the benefit of empiric biliary sphincterotomy for RAP is still unproven.

Nevertheless, because of high association between SOD and RAP, some endoscopists perform Biliary Sphincterotomy or Selective Pancreatic Sphincterotomy.

If a biliary aetiology is suspected with the presence of abnormal liver function tests (LFT) within 24 to 48 hours of the onset of AP, and it is suspected to be due to microlithiasis, many centres recommend cholecystectomy and/or ERCP with biliary sphincterotomy to prevent further attacks.

It is recommended that Biliary and Pancreatic Sphincterotomy must be performed in centres with experience and expertise to minimize the risk of post ERCP Pancreatitis. A high prevalence of post ERCP pancreatitis is observed in patients with RAP.

If the gallbladder appears normal on EUS and liver biochemistry is repeatedly within normal limits, empiric cholecystectomy may be avoided. (17)

Apart from total abstinence of alcohol and tobacco, reducing weight and control of serum triglycerides, other medical therapies such as Ursodeoxycholic acid, and Antioxidants are also shown to be effective in the treatment of RAP. However, there is no convincing data to support medical therapy for RAP. (18,19)

References

1. Al-Haddad M, Wallace MB. Diagnostic approach to patients with acute idiopathic and recurrent pancreatitis, what should be done? *World J Gastroenterol.* 2008; 14:1007–1010.
2. Whitcomb DC. Genetic risk factors for pancreatic disorders. *Gastroenterology.* 2013; 144:1292–1302.
3. Yadav D, Whitcomb DC. The role of alcohol and smoking in pancreatitis. *Nat Rev Gastroenterol Hepatol.* 2010; 7:131–145.
4. Coté GA, Yadav D, Slivka A, et al. Alcohol and smoking as risk factors in an epidemiology study of patients with chronic pancreatitis. *Clin Gastroenterol Hepatol.* 2011; 9:266–273.
5. Yadav D, Hawes RH, Brand RE, et al. Alcohol consumption, cigarette smoking, and the risk of recurrent acute and chronic pancreatitis. *Arch Intern Med.* 2009; 169:1035–1045.

6. Ros E, Navarro S, Bru C, Garcia-Pugés A, Valderrama R. Occult microlithiasis in 'idiopathic' acute pancreatitis: prevention of relapses by cholecystectomy or ursodeoxycholic acid therapy. *Gastroenterology*. 1991; 101:1701–1709.[PubMed][Google Scholar]
7. Testoni PA, Caporuscio S, Bagnolo F, Lella F. Idiopathic recurrent pancreatitis: long-term results after ERCP, endoscopic sphincterotomy, or ursodeoxycholic acid treatment. *Am J Gastroenterol*. 2000;95:1702–1707[PubMed][Google Scholar]
8. Ros E, Navarro S, Bru C, et al. Occult microlithiasis in 'idiopathic' acute pancreatitis: prevention of relapses by cholecystectomy or ursodeoxycholic acid therapy. *Gastroenterology*. 1991; 101:1701–1709.
9. Kaw M, Brodmerkel G J Jr. ERCP, biliary crystal analysis, and sphincter of Oddi manometry in idiopathic recurrent pancreatitis. *Gastrointest Endosc*. 2002; 55:157–162.
10. Coyle WJ, Pineau BC, Tarnasky PR, et al. Evaluation of unexplained acute and acute recurrent pancreatitis using endoscopic retrograde cholangiopancreatography, sphincter of Oddi manometry and endoscopic ultrasound. *Endoscopy*. 2002; 34:617–623.
11. Toouli J, Roberts-Thomson IC, Dent J, et al. Sphincter of Oddi motility disorders in patients with idiopathic recurrent pancreatitis. *Br J Surg*. 1985; 72:859–863.
12. Jalaly NY, Moran RA, Fargahi F, et al. An evaluation of factors associated with pathogenic PRSS1, SPINK1, CTFR, and/or CTRC genetic variants in patients with idiopathic pancreatitis. *Am J Gastroenterol*. 2017;112: 1320–1329.
13. Hart PA, Zen Y, Chari ST. Recent advances in autoimmune pancreatitis. *Gastroenterology*. 2015; 149:39–51.
14. Borak GD, Romagnuolo J, Alsolaiman M, et al. Long-term clinical outcomes after endoscopic minor papilla therapy in symptomatic patients with pancreas divisum. *Pancreas*. 2009; 38:903–906.
15. Chacko LN, Chen YK, Shah RJ. Clinical outcomes and non-endoscopic interventions after minor papilla endotherapy in patients with symptomatic pancreas divisum. *Gastrointest Endosc*. 2008;68: 667–673.
16. Coté GA, Imperiale TF, Schmidt SE, et al. Similar efficacies of biliary, with or without pancreatic, sphincterotomy in treatment of idiopathic recurrent acute pancreatitis. *Gastroenterology*. 2012; 143:1502–1509
17. Nalini M Guda, Venkata Muddana, D N Reddy, D C Whitcomb, Markus M. Lerch, J. Shawn Mallery, Martin L. Freeman et al. Conference report. Recurrent Acute Pancreatitis. International State-of-the-Science Conference with Recommendations. *Pancreas*. Volume 47, Number 6, July 2018
18. Testoni PA, Caporuscio S, Bagnolo F, et al. Idiopathic recurrent pancreatitis: long-term results after ERCP, endoscopic sphincterotomy, or ursodeoxycholic acid treatment. *Am J Gastroenterol*. 2000;95: 1702–1707.
19. Saraswat VA, Sharma BC, Agarwal DK, et al. Biliary microlithiasis in patients with idiopathic acute pancreatitis and unexplained biliary pain: response to therapy. *J Gastroenterol Hepatol*. 2004;19: 1206–1211.

Pulsatile secondary scalp deposit from a breast malignancy: A rare entity!

S. Janarththan, R.C.A.Arunan, A.N.K. Abayajeewa
National Hospital of Srilanka

Keywords

Pulsatile, scalp lump, breast malignancy

Introduction

According to literature pulsatile scalp lumps are usually due to arteriovenous malformations, arterial aneurysms and deposits from internal malignancies. Distant pulsatile scalp metastasis is not a common presentation of breast cancer, unless in the advanced stages of the tumour [1]. It is reported that advanced cancers, which metastasize to scalp accounts for 12.8% and among them breast cancer reported as 7.84% [2]. A patient with a breast malignancy presenting with a pulsatile scalp lump as the primary complaint is an unusual presentation.

Case Presentation

41 year old previously well female presented with a history of a right side frontal scalp lump of one month's duration. It was a painless lump which progressively increased in size. She had no history of trauma or headache. She denied any other lumps in the body. She was having loss of appetite and loss of weight. She was married and had two children. She had used hormonal contraceptives for 5 years. She denied any history of malignancy, including thyroid, breast and skin. There was no family history of malignancies as well.

On examination, she had a firm, pulsatile, non-tender lump on the right frontal region. It measured 3cm × 3cm, spherical in shape and it was attached to the bone. Thrill and cough impulse was absent. Thyroid showed mild enlargement. No cervical lymph nodes were palpated. During her breast examination she was found to have 3.5cm×2.5cm firm, mobile lump on her right breast with ipsilateral palpable axillary lymph nodes. Other examination findings were unremarkable.

Imaging studies were performed. Her mammogram and ultrasound scan of the breast showed BIRADS 5 lesion with BIRADS 4a in right side axillary lymph node. Tru cut biopsy of the breast lump was reported as an Invasive carcinoma of non-specific type and the FNAC of the suspicious axillary lymph node showed metastatic deposits from the breast lesion. Her chest x-ray showed bilateral pleural effusions. During her ward stay she developed a pathological fracture of lesser trochanter of the left femur.

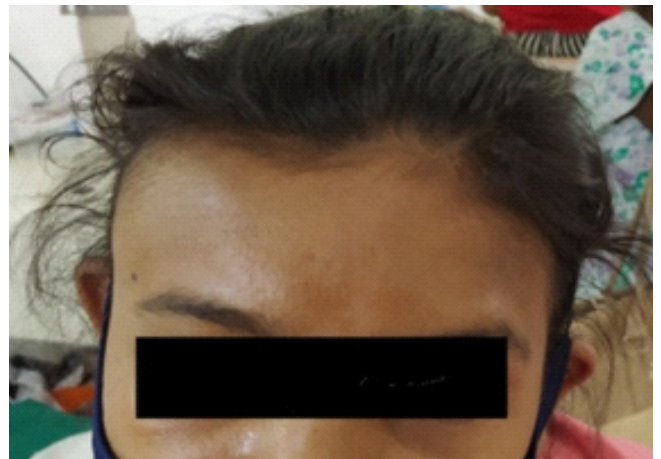


Figure 1 Scalp lump of right frontal region of a 41 year old lady

The patient underwent Contrast Enhanced CT of head, neck, chest, abdomen and pelvis. It showed a stage IV carcinoma of the right breast with a metastatic lesion in the right frontal bone which abuts the right globe involving superior rectus and superior oblique muscles and bilateral pleural effusions. She was referred to Oncologist for neo adjuvant chemo-radiotherapy.

Correspondence: S. Janarththan

E-mail: psjana007@gmail.com

 <https://orcid.org/0000-0003-06>

Received: 01-08-2021 Accepted: 09-08-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8872>



Discussion

Pulsatile bony metastatic deposits from advanced malignancies are due to increased vascularity of the lump as a result of over expression of vascular endothelial growth factor (VEGF) by tumour deposits [3]. According to literature it was reported to be associated with papillary carcinoma of thyroid, follicular carcinoma of thyroid, renal cell carcinoma and gastrointestinal malignancy [3]. Pulsatile scalp metastases are very uncommon in breast malignancy and not reported. Cutaneous metastases of breast malignancies are usually manifested in the overlying skin or adjacent to the tumour site.

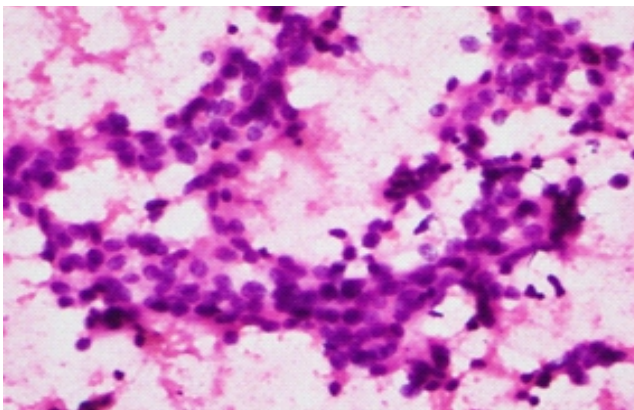


Figure 2 FNAC of the scalp lump (H & E) shows clusters of malignant cells. They contain pleomorphic hyperchromatic nuclei with scanty to moderate cytoplasm.

According to literature scalp metastases from a primary breast tumour is an indicator of progression after treatment or a widespread metastatic disease and very few cases have reported scalp metastases from a primary breast cancer without any other identifiable metastatic sites [1,2,4,5].

Scalp neoplasms represent 2% of the skin tumours and can originate as a primary tumour from epithelium, pilosebaceous, eccrine and apocrine glands or present as metastases [2]. It is reported that 12.8% tumours in the scalp are metastatic malignant lesions and among those deposits from breast cancer account for 7.84% [1].

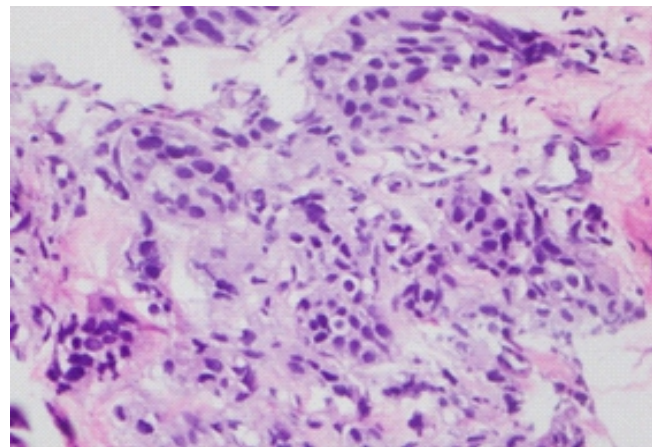


Figure 3. Histology of the right breast lump (H & E) shows an invasive carcinoma composed of infiltrating nests surrounded by a desmoplastic stroma. The cells contain enlarged hyperchromatic nuclei with scattered mitotic figures.

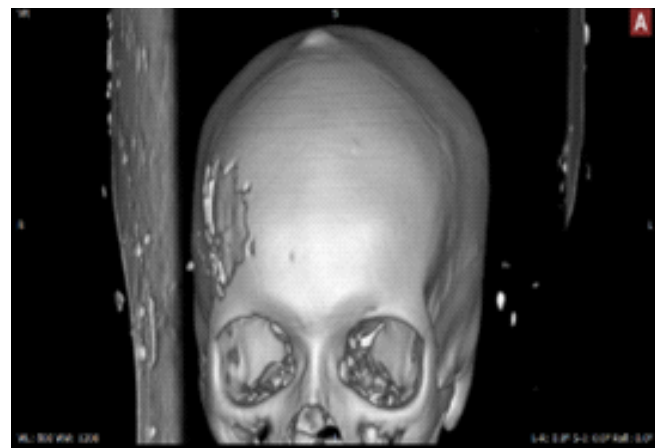
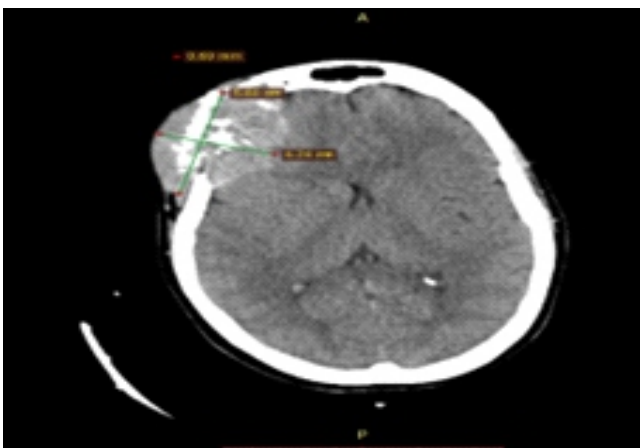


Figure 4. Axial (A) and 3DC (B) Contrast enhanced computed tomography of head showing large lytic area involving right frontal and parietal bones.

References

1. Liu Y-F, Liu L-Y, Xia S-L, Li T, Li J. An unusual case of scalp metastasis from breast cancer. *World Neurosurg.* 2020;137:261–5. <https://doi.org/10.1016/j.wneu.2020.01.230>
2. Prabhu S, Pai SB, Handattu S, Kudur MH, Vasanth V. Cutaneous metastases from carcinoma breast: the common and the rare. *Indian J Dermatol Venereol Leprol.* 2009;75(5):499–502. doi: 10.4103/0378-6323.55395
3. Velumurugan K, Veerabharappa B, Khan A, Rodrigues GS. Pulsatile bony secondaries from a GI malignancy: An unknown entity! *J Gastrointest Cancer.* 2020;51(1):317–8. <https://doi.org/10.1007/s12029-019-00257-2>
4. Alizadeh N, Mirpour H, Azimi SZ. Scalp metastasis from occult primary breast carcinoma: A case report and review of the literature. *Int J Womens Dermatol.* 2018;4(4):230–5. <https://doi.org/10.1016/j.ijwd.2018.08.002>
5. Costa RLB, Costa-Filho RB, Rosa M, Czerniecki BJ. Occult breast carcinoma presenting as scalp metastasis. *Case Rep Oncol.* 2017;10(3):992–7. DOI: 10.1159/000484346

Learning Points

- Tumours of the scalp can be a manifestation of an advanced malignancy of other organs.
- Though rare, a differential diagnosis of metastatic breast cancer should be considered when pulsatile bony secondaries are present.
- Extensive clinical examination and investigation should be carried out in patients with malignant lesion of the scalp to find the primary site.

Delayed chylous ascites – unusual complication post blunt trauma abdomen

P. Sharma, V.V. Nair, S.S. Rehsi
Armed Forces Medical College, Pune, India

Keywords

Chylous ascites, blunt trauma abdomen, delay

Abstract Delayed Chylous Ascites is an uncommon complication following blunt trauma abdomen. We present a case of an eight years old child with Grade IV pancreatic injury following blunt trauma abdomen. He underwent emergency exploratory laparotomy and distal pancreatectomy. Post-surgery he developed chylous ascites on post-op day nine. A delayed cisterna chyli injury, most likely due to autodigestion by the pancreatic juices, presenting as an uncommon complication makes this case report unique. The report also reveals, there is no significant difference in the management and natural outcome of an early and delayed chylous ascites

Background

Pancreatic injury contributes to less than 5% of injuries associated with blunt trauma abdomen. Injuries with ductal disruption are treated with distal pancreatectomy. Among various complications, associated with this surgery, chylous ascites found in 9%. The chyle is observed immediately after the patient is started on oral feeds and hence a bowel rest with total parenteral nutrition [TPN] is the treatment of choice. In this case report, the patient developed chylous ascites after nine-day after surgery and five days after starting solid diet indicating causes other than surgery and the index trauma.

Case Summary

An eight-year-old male child with no known comorbidities, presented with a history suggestive of blunt trauma to the abdomen after accidental hit by bicycle handle over the upper abdomen. On presentation, the child complained of continuous dull aching non radiating severe pain in the upper abdomen associated with three episodes of non-bilious vomiting. On general examination, the child was conscious, vitals were stable with no evidence of hemodynamic instability. The abdominal examination revealed tenderness

and guarding over the epigastric region and left hypochondrium. There was no evidence of free fluid on percussion and bowel sounds were present. Systemic examination was essentially within normal limits.

The child was evaluated and investigated as per the Advanced Trauma Life Support [ATLS] protocol. Focussed assessment by sonography in trauma (FAST) did not reveal any free fluid. On blood investigations, there was leucocytosis with neutrophils predominance. Serum amylase and lipase were increased significantly (488 U/L and 4191 U/L respectively). Liver and Renal function tests were within normal limits. Because of suspected pancreatic injury, the patient underwent Contrast-enhanced computer tomogram of the abdomen, which revealed an ill-defined poorly enhancing area from the neck to tail involving the entire anteroposterior width of the pancreas suggestive of grade IV injury to the pancreas. [Fig 1]



Fig 1. CECT Abdomen depicting complete transection of body of pancreas (marked by arrow) with poor enhancement of distal pancreas

The child underwent emergency exploratory laparotomy and distal pancreatectomy under general anaesthesia. Intraoperatively, there was a complete transection of the body of pancreas along its main body, two cms distal to the neck. The injured region was covered with clots and minimal saponification was noticed along the body and tail of the pancreas. There was associated disruption of the main pancreatic duct. Rest of the abdomen was essentially normal. Abdominal tube drains were placed along the stomach bed, Morrison's pouch and pelvic cavity. [Fig 2]

Correspondence: V.V. Nair

E-mail: vipinvenugopalnair@gmail.com

ORCID: <https://orcid.org/0000-0001-6903-6368>

Received: 28-01-2021 Accepted: 17-08-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8798>



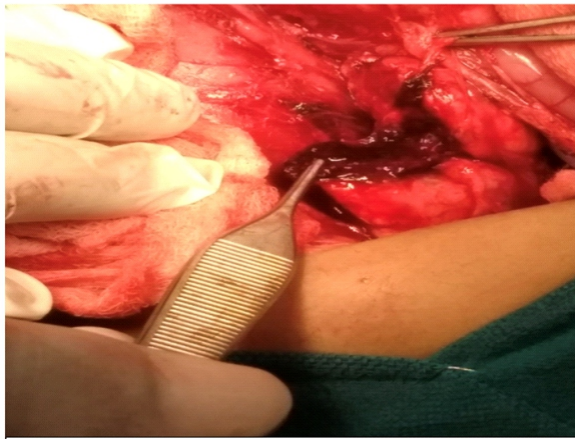


Fig 2. Intraoperative picture depicting clot at the site of transaction of pancreas. The main pancreatic duct is transected.

The immediate post-op period was uneventful and the child was started on oral fluids on the third post-op day (POD) and solid diet from the fifth POD. On POD nine, the abdominal drain was found to have chylous output. Drain fluid triglycerides were markedly raised (750mg/dl) with elevated amylase and lipase but normal leucocyte counts. Drain fluid culture was sterile. The patient remained asymptomatic and radiological investigations failed to reveal any injury to the cisterna chyli, thoracic duct or tributaries.

The patient was diagnosed as a case of delayed injury to cisterna chyli and managed conservatively with low fat, high protein medium-chain triglyceride [MCT] diet, octreotide and abdominal drain. The output reduced from 100ml on POD nine to less than 5ml on POD 21. A 15% reduction in weight was observed during this period. The drain was removed and the child was discharged on POD 23.

Follow Up

The child was followed up after 30 days of hospital discharge. He is recovering well and has regained the lost weight. He is planned for monthly follow up to monitor glycaemic control.

Discussion

Pancreatic injuries are rarely seen in a blunt trauma abdomen and contribute to less than 5%. The decision to go for conservative management versus surgery depends on hemodynamic status and ductal disruption. Chylous ascites is defined as the presence of milky non-purulent fluid with triglycerides more than 110mg/dl. The amylase level and WBC count should be normal with sterile culture. It is due to injury to cisterna chyli or its tributaries and is seen

immediately after initiation of oral feeds. It is seen in surgeries of hepatobiliary, colorectal, aorta and lymph node resection. The maximum incidence of this complication is observed with pancreatectomy (11%) and D3 resection for carcinoma stomach (11.7%) [1,2].

The diagnosis is mainly clinically supported by raised triglycerides and chylomicrons with the absence of infection. There is no consensus on the minimum quantity of the fluid, however, significant ascites is defined as drain output of more than 200ml/day in an adult. Since chyle is rich in fat, proteins and immunoglobulins, there is an increase in the rate of sepsis and malnutrition. In our case, chyle was observed in the drain after four days of starting oral feeds. Unlike previously described, the authors believe that this is due to autodigestion of the cisterna chyli or its tributaries by the pancreatic enzymes. This can explain the elevated amylase and lipase level in the chyle. [3]

There are no guidelines on the management of postoperative chylous ascites. However, the consensus is to initiate a trial of conservative management by TPN, low-fat MCT diet and abdominal drainage. This is successful in 70 to 100% of cases. The ascites resolve between 5-19 days. In our case, we started the patient on a low-fat MCT diet and the output gradually reduced to nil within 12 days. In a few case series, it is advised to undergo therapeutic lymphangiography and re-exploration if the non-operative management fails [4,5].

Patient Perspective

Mother of Patient (Wishes to be anonymous) – “I was happy with the way my son was recovering after the surgery. His pain had reduced and he was feeding well. However, the complication arising from the milky fluid as seen in drain resulted in an extension of hospital stay. This complication was promptly identified and well managed by the surgical team of this institution. Presently he is doing well. His appetite has increased and he has started gaining weight.”

References

1. Baek SJ, Kim SH, Kwak JM, Kim J. Incidence and risk factors of chylous ascites after colorectal surgery. *Am J Surg.* 2013 Oct;206(4):555-59.
2. Yol S, Bostanci EB, Ozogul Y, et al. A rare complication of D3 dissection for gastric carcinoma: chyloperitoneum. *Gastric cancer: official journal of the International Gastric Cancer Association and the Japanese Gastric Cancer Association.* 2005;8(1):35-38.
3. Noji T, Nakamura T, Ambo Y, et al. Early enteral feeding after distal pancreatectomy may contribute to chyle leak. *Pancreas.* 2012;41(2):331-33.
4. Evans JG, Spiess PE, Kamat AM, et al. Chylous ascites after post-chemotherapy retroperitoneal lymph node dissection: a review of the M.D. Anderson experience. *J Urol.* 2006 Oct;176(4 Pt 1):1463-67.
5. Alejandre LE, Krompiec C, Rau WS, Krombach GA. Effectiveness of therapeutic lymphography on lymphatic leakage. *Acta Radiol.* 2011;52(3):305-11.

Learning Points:

- Chylous ascites is usually observed after initiation of oral feeds. However, it can also happen a few days after initiation of feeds. This is due to damage to the cistern chyli by the pancreatic enzymes from the cut end of the pancreas.
- This can be supported by elevated amylase and lipase level in the drain fluid in addition to raised triglycerides and chylomicrons.
- The management and the natural outcome is similar between early and delayed chylous ascites.
- It is advisable to keep the abdominal drains at least for one week after commencing oral feeds.

Cause or effect? intramural duodenal haematoma and pancreatitis

A.N. Liew, S. Ng Ying Kin, N. Naqash, W. M. Lim
Monash Health, Australia

Keywords: intramural duodenal haematoma', 'acute pancreatitis', 'chronic pancreatitis', 'small bowel', 'traumatic pancreatitis'

Introduction

Intramural duodenal haematoma (IDH) is an uncommon pathology that occurs mainly post trauma or iatrogenically during endoscopic procedure. It remains rare in the setting of acute pancreatitis. We explore the differences in pancreatitis related vs non-pancreatitis related IDH and analyse if IDH is the cause or effect of acute pancreatitis.

Background

We present a case of a 37-year-old male who was admitted under the Acute Surgical Unit with 1-day of upper abdominal pain, nausea, and vomiting. Preceding this admission, he had repeated episodes of acute pancreatitis secondary to alcohol intake, which were treated conservatively. Since then, he had abstained from alcohol and has no history of trauma or anticoagulant use.

On review, he had epigastric and right upper quadrant tenderness with guarding. Initial biochemistry showed a haemoglobin of 174 g/L, raised inflammatory markers with white cell count of $15.8 \times 10^9/L$, and C-reactive protein of 35mg/L. Liver function tests were unremarkable and lipase level was 109U/L. Coagulation profile was normal. Amylase assay is not routinely conducted at our institution because of its short half-life and lower sensitivity.

A Computer Tomography (CT) of his abdomen revealed acute pancreatitis with peripancreatic fat stranding, right upper quadrant peritoneal free fluid with extension to the duodenal wall into the subhepatic, anterior right pararenal space, paracolic gutter. Furthermore, a 5.0 x 4.0 x 5.3cm duodenal intramural and intraluminal mass with a Hounsfield unit of 54 suggestive of acute haematoma. There was no associated gastric outlet obstruction or biliary obstruction on imaging. A follow-up CT angiography showed no pseudoaneurysm and no active bleeding into the intramural duodenal haematoma (Figure 1). Abdominal ultrasound confirmed a 5.1cm solid duodenal mass with no appreciable internal vascularity. There was no evidence of cholelithiasis or cholecystitis.

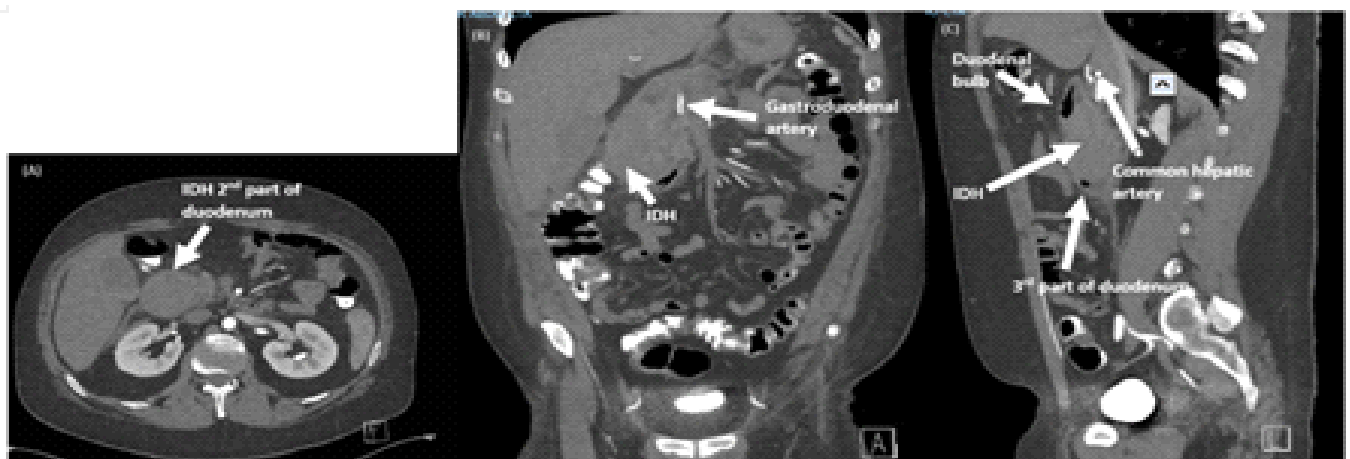


Figure 1 (A) Axial CT abdomen angiography arterial phase demonstrating a 50mm IDH in the 2nd part of the duodenum with no active contrast extravasation. (B) Coronal CT abdomen angiography with a normal calibre gastroduodenal artery and no complicating pseudoaneurysm. (C) Sagittal CT abdomen angiography showing the 1st, 2nd and 3rd part of the duodenum and common hepatic artery.

Correspondence: A.N. Liew
E-mail: liewamos@gmail.com

<https://orcid.org/0000-0002-4829-0495>

Received: 02-08-2021 Accepted: 09-08-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8874>



Based on the Revised Atlanta Criteria, our patient was diagnosed with Acute Pancreatitis with an associated intramural duodenal haematoma, plausibly from the erosion of the submucosal vessel walls. This was likely in the context of chronic pancreatitis from previous attacks of acute pancreatitis secondary to his alcoholism.

He was admitted under the Acute Surgery Unit, resuscitated with intravenous fluids, prescribed analgesia, and proton pump inhibitor. Follow-up CT 5 days post-admission showed that the haematoma had grown slightly in size, measuring 5.7 x 5.0 x 7.7cm. There were no signs of acute haemorrhage and the patient tolerated oral intake. He was discharged home with outpatient follow-up. Serial CT scan 2 months post discharge showed that the duodenal haematoma had resolved (Figure 2).

Discussion

Intramural duodenal haematomas (IDH) are uncommon pathologies secondary to blunt trauma, anti-coagulation, coagulopathies or iatrogenic causes from endoscopic biopsies(1). IDH related to pancreatic disease is an even rarer phenomenon. This can occur in the setting of acute or chronic pancreatitis, malignancy, and ectopic pancreas in the duodenal wall (2). The formation of IDH in the setting of pancreatitis remains unclear, with several theories postulated. One hypothesis is a primary spontaneous expanding intramural haematoma causing pancreatic duct obstruction resulting in acute inflammation. Uncontrolled proteolytic enzyme activation during pancreatitis can also erode the submucosal vessels in the duodenum leading to secondary haematoma formation(3). The latter was the most likely cause of IDH in our patient as there were no radiological signs of biliary or pancreatic duct obstruction.

In complicated IDH, patients can present with gastric outlet obstruction, haematemesis, duodenal necrosis/perforation, biliary obstruction or cholangitis (4). Traumatic IDH commonly occurs at the subserosa layer of the duodenum, while pancreatitis related IDH is more commonly located in the submucosal layer, increasing the risk of haematemesis due to mucosal erosion(4).

Radiological studies are the most reliable modality in the diagnosis of IDH. Ultrasound is a non-invasive imaging modality that can be used to diagnose and follow-up on the resolution of IDH. An early haematoma appears as a uniform echogenic mass on sonography. Features such as hypoechogenicity or cystic appearance indicate liquefaction and resorption of the haematoma(1). Contrast-enhanced CTs and magnetic resonance imaging (MRI) both have high sensitivities in the diagnosis of IDH. Appearance on CTs depends on age of haematoma, with fresh blood having an area of increased density. Density decreases as the haematoma ages(1).

Most pancreatitis related IDH run a benign course. In a haemodynamically stable patient, medical management is suited for patients including nasogastric tube insertion, fluid resuscitation and bowel rest, with utilisation of total parenteral nutrition if unable to feed enterally(4).

Spontaneous resorption of the IDH occurs in most clinical scenarios. Serial imaging with ultrasound or CT abdomen should be considered to ensure resolution of haematoma and exclude malignancy. In the event of an expanding IDH, endoscopic decompression is a minimally invasive technique to evacuate the haematoma into the lumen of the duodenum to relieve gastric outlet obstruction (5). Active haemorrhage

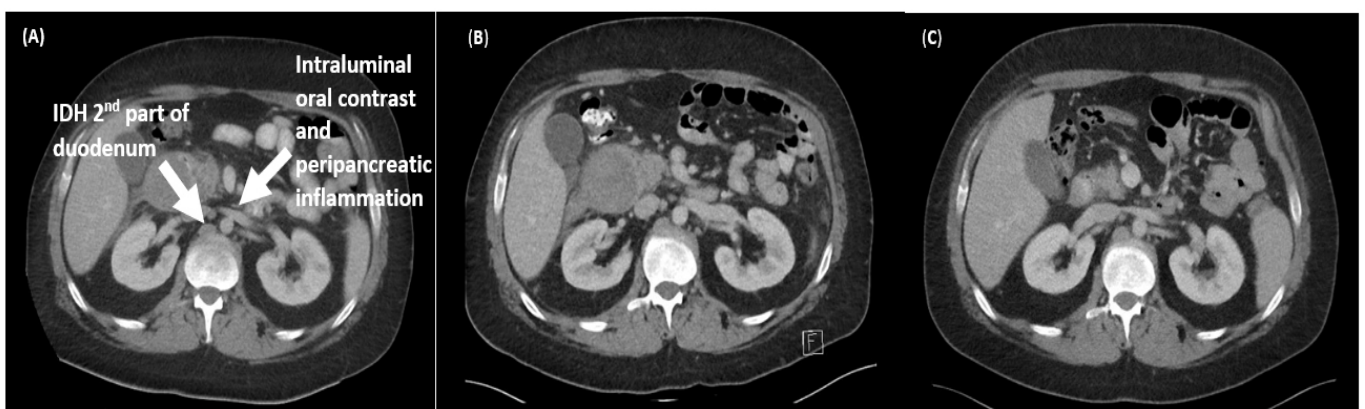


Figure 2 (A) Axial CT abdomen portal venous phase at presentation confirming acute IDH with associated pancreatitis compressing the 2nd part of the duodenum with oral contrast passing distally into jejunal loops. Inflammatory stranding of Gerota's fascia and free fluid in the subhepatic space (B) Interval inpatient CT abdomen with slight enlargement of IDH measuring 7.7cm in maximum dimension (C) Follow-up CT abdomen 2 months later confirming resolution of IDH

can be managed with arterial embolization. However, there is a risk of duodenal necrosis. Operative management should be considered in a haemodynamically unstable patient, or perforated ulcer.

Pancreaticoduodenectomy is only indicated in situations of non-viable bowel(4).

Conclusion

IDH is a rare occurrence in pancreatitis. Although the pathophysiology of primary or secondary IDH from pancreatitis differs, the management of IDH remains the same in both entities. In most patients, conservative management is sufficient, while radical surgery is only reserved for unstable patients, or in perforated viscus.

References

- 1.Niehues SM, Denecke T, Bassir C, Hamm B, Haas M. Intramural duodenal hematoma: clinical course and imaging findings. *Acta Radiologica Open*. 2019;8(4):205846011983625.
- 2.Dubois J, Guy F, Porcheron J. A pancreatic-induced intramural duodenal hematoma: a case report and literature review. *Hepatogastroenterology*. 2003;50(53):1689-92.
- 3.Shiozawa K, Watanabe M, Igarashi Y, Matsukiyo Y, Matsui T, Sumino Y. Acute pancreatitis secondary to intramural duodenal hematoma: Case report and literature review. *World J Radiol*. 2010;2(7):283-8.
- 4.Ma JK, Ng KK, Poon RT, Fan ST. Pancreatic-induced Intramural Duodenal Haematoma. *Asian Journal of Surgery*. 2008;31(2):83-6.
- 5.Lee JY, Chung JS, Kim TH. Successful endoscopic decompression for intramural duodenal hematoma with gastric outlet obstruction complicating acute pancreatitis. *Clin Endosc*. 2012;45(3):202-4.

Learning Points:

- Intraduodenal haematomas can be a cause of or be caused by acute pancreatitis.
- If patients are clinically stable, intraduodenal haematomas can be conservatively managed.
- Surgical intervention should only be considered in a haemodynamically unstable patient.

Arteriovenous fistula following total thyroidectomy treated with angioembolization

G.M. Caunter

Hospital Kajang, Malaysia

Keywords

arteriovenous fistula, thyroidectomy, embolization, interventional radiology, iatrogenic

Abstract

The development of an arteriovenous fistula as a complication following a thyroidectomy is a rare phenomenon. We report a case of a 24 year old man who developed this unusual complication post operatively. The fistula was detected during a routine follow up 3 months after the surgery when he complained of a vibration in his neck. Diagnosis of an abnormal communication between the right superior thyroid artery and the internal jugular vein was demonstrated by performing a Computed Tomography Angiography (CTA). He was successfully treated with embolization and coiling of the aneurysm.

Introduction

The development of an iatrogenic arteriovenous fistula following different types of surgical procedures have been documented multiple times throughout the years[1-2]. Thyroid surgery is a commonly performed surgical procedure with many well recognized complications. Despite the large volume of surgeries performed each year, only 15 cases of an iatrogenic arteriovenous fistula developing post thyroidectomy have been reported in English literature, dating back to the beginning of the 20th century[1-5]. All reported cases resolved after intervention, which previously mandated surgical excision of the fistula[2-3]. With the availability of modern imaging machines for diagnosis and skilled interventional radiologist, the minimally invasive approach is preferred and the fistulous communication can be successfully treated with embolization[1,5].

Case Presentation

A 24 year old man was referred to us from the Endocrine unit for surgical excision of a diffuse toxic goitre which was

causing compressive symptoms. He was diagnosed with Graves' disease 2 years earlier and was on Carbimazole 10mg daily. He complained of occasional dysphagia. Clinically he had a moderately enlarged goitre with thyroid ophthalmopathy.


The patient underwent a total thyroidectomy. Intraoperatively, the thyroid gland was enlarged with engorged veins. The recurrent laryngeal nerves and the parathyroids were identified and preserved. No difficulties were encountered during the operation. He recovered well and was discharged after 4 days. Histopathological examination of the gland confirmed a benign diffuse hyperplasia of the thyroid gland, consistent with Graves' disease.

He was seen one month after the operation in the outpatient clinic. He had recovered well and no abnormalities were noted on physical examination. However, during his second follow up 2 months later, he complained of an unusual vibration over the right side of his neck. He had noticed it during the preceding few weeks. As it was not causing him much discomfort, he did not immediately seek any medical treatment. No other symptoms were reported. On physical examination, the thyroidectomy scar had healed well and there was no neck swelling. An obvious thrill was felt over the right side of his neck just lateral to the trachea. The trachea was not deviated. There were no palpable lymph nodes. On auscultation, a bruit was heard. Distal pulses were equal. The rest of his examination was unremarkable.

The diagnosis of an iatrogenic arteriovenous fistula was suspected. An ultrasound of the neck was performed followed by a CT angiography which confirmed an abnormal communication between the right superior thyroid artery and a tributary of the right internal jugular vein (IJV), likely to be the lingular vein. The width of the fistula was 0.3cm, resulting in dilatation of the superior thyroid artery, early filling and dilatation of the IJV tributary. He underwent an angioembolization with coiling. The procedure was successful and the patient returned home the following day following a 24 hour period of observation. During his follow up one month later, he was asymptomatic and his physical examination of the neck was normal with no residual thrill or bruit.

Correspondence: G.M. Caunter

E-mail: caunter2@yahoo.com

 <https://orcid.org/0000-0003-0241-412X>

Received: 10-08-2021 Accepted: 24-10-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8878>



Discussion

Iatrogenic arteriovenous fistulas following a variety of surgical procedures have been reported in literature. Procedures include lumbar disc surgery, abdominal surgeries including nephrectomy, splenectomy, small and large bowel, gastrectomy and gynaecological procedures such as hysterectomy, mastectomy, surgery of the extremities and lymph node biopsies[1,2].

Despite the large volume of thyroid surgeries that are performed world wide each year, the development of an arteriovenous fistula as a complication of thyroidectomy has rarely been seen.

The development of such a phenomenon is assumed to be caused by a penetrating injury to the artery and vein which causes the abnormal communication to develop, as occurs when a suture needle is passed through the vessels for ligation or during *en masse* suture ligation of the two vessels[2]. The vessels most commonly involved are the superior thyroid artery and the adjacent superior thyroid vein, occasionally the internal jugular vein is directly affected[1,3,5].

Symptoms are usually mild due to local effects, with patients complaining of a neck mass[3-5], compressive symptoms[3,5] or a buzzing sensation felt in the neck or heard in the ears[3,4]. Some patients remain asymptomatic for years and only present decades later[4]. Only one case has been reported where a true steal phenomenon developed and the patient presented with symptoms of cardiac failure[3]. In this case, the fistula had developed between the thyrocervical trunk and the transverse cervical vein.

Diagnosis is confirmed through imaging. In our case, an ultrasound of the neck followed by a CT angiography were performed which clearly identified the abnormal communication between the vein and artery.

In the past, all cases were treated by surgical excision of the fistula[2-4]. With the advancement in interventional radiology, this condition can now be treated by embolization and unnecessary surgical intervention can be avoided. This method of treatment was successfully reported by Jensovsky in 2000 and Gonen in 2011[1,5]. Our patient underwent treatment with selective angioembolization. The risks of general anaesthesia and a repeated neck dissection were avoided. The procedure was well tolerated and caused minimal discomfort to the patient. During follow up, the patient was satisfied with the outcome and he reported complete symptom resolution.

Conclusion

The development of an arteriovenous fistula following a thyroidectomy is a rare complication of a commonly performed surgery. Prevention requires meticulous surgical technique with clear identification of the feeding vessels to the thyroid and careful ligation of each individual vessel is important. Mass ligation should be avoided. Open surgical excision has now fallen out of favor due to advances in interventional radiology, which allows both confirmation of diagnosis and definitive treatment with angioembolization. Complete resolution of symptoms has been seen in all cases with no reports of recurrences.

References

1. Jensovsky, J., Markova, H. and Bohutova, J., 2000. Unusual complication of total thyroidectomy: arteriovenous fistula. *Thyroid*, 10(4), pp.359-361. doi: <https://doi.org/10.1089/thy.2000.10.359>
2. Borrero, E., 1989. Arteriovenous Fistula Following Thyroidectomy Presenting with Cardiac Failure - A Case Report. *Vascular and Endovascular Surgery*, 23(4), pp.314-317. doi: <https://doi.org/10.1177/153857448902300412>
3. Beattie, W.M., Oldham, J.B. and Ross, J.A., 1961. Superior thyroid arteriovenous aneurysm. *British Journal of Surgery*, 48(210), pp.456-457 doi: <https://doi.org/10.1002/bjs.18004821019>
4. Ghani, S.A. and Hashima R., 1984. arteriovenous fistula of the superior thyroid artery:" post thyroid operation. *Med. J. Malaysia*, 39(4). doi: <http://www.ncbi.nlm.nih.gov/pubmed/6544941>
5. Gonen, K.A., Dusak, A., Erdogan, C. and Hakyemez, B., 2013. Treatment of a Symptomatic Neck Mass Appeared Ten Years After Thyroidectomy with Endovascular Embolization: Case Report. *Turkiye Klinikleri Journal of Medical Sciences*, 33(2), p.568. doi: <https://doi.org/10.5336/medsci.2011-25372>

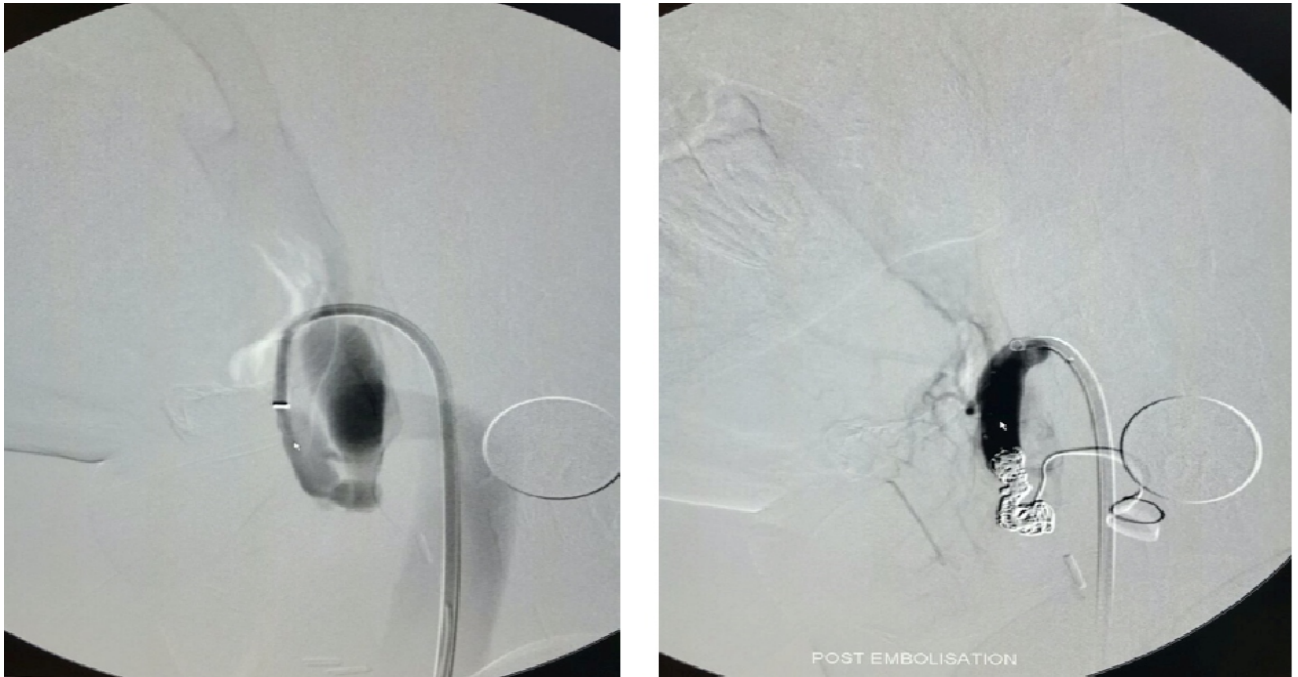


Figure 1 CTA demonstrating an abnormal communication between the right superior thyroid artery and a tributary of the right internal jugular vein

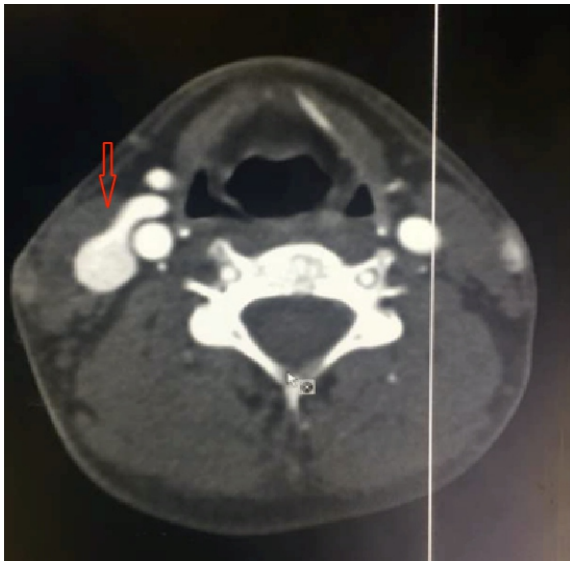


Figure 2 : Fistula between the Superior Thyroid Artery and the Internal Jugular Vein (White arrow pointing to Superior Thyroid Artery) & Post embolization : Contrast no longer visualized in the Internal Jugular Vein (white arrow)

Learning Points:

- An iatrogenic arteriovenous fistula can generally be avoided by adhering to meticulous surgical technique
- Confirmation of diagnosis can be easily achieved by non invasive methods, i.e ultrasound and CT angiography
- Interventional radiology offers a minimally invasive method to confirm diagnosis and treat this condition, and open surgery can be avoided in most cases

Retroperitoneal ovarian cyst presenting as acute abdomen – successfully managed with pre-operative prophylactic ureteric stenting and complete excision

H. Praemanathan, C. J. Sen, T. J. Huei
Hospital Sultanah Aminah, Malaysia

Keywords:

Mullerian Cyst , Retroperitoneum tumour , Ureteral Stent , Acute abdomen

Introduction

Cyst that arises from the retroperitoneum space are uncommon. Despite their possible common similarities in location and symptoms, they have known to be morphologically diverse. The incidence of such lesions is approximately 1 in 100,000 adult admissions. Retroperitoneum Mullerian cyst is rare whereby most patients are asymptomatic and usually present as an incidental finding of an abdominal mass [1]. Here, we report a case of retroperitoneum Mullerian cyst presenting as an acute abdomen.

Case Presentation

A 48-year-old lady presented with an acute onset of lower abdominal pain for 3 days associated with abdominal distention and vomiting. Physical examination revealed tenderness and fullness over the right iliac fossa and suprapubic region. White cell counts, haemoglobin, platelet count and renal profile were within normal limit and urine pregnancy test was negative. Contrast enhanced computed tomography (CT) Scan of the abdomen revealed a large and

well-defined retroperitoneal cystic tumour mass measuring about 8cm x 9cm x 15cm (AP x W x CC) with its medial side in close proximity to the right ureter and gonadal vessel (Figure 1A). There was streakiness over the Gerota's fascia above the lesion. There were no obvious paraaortic nodes or free fluid. She had worsening and persistent pain which raised the suspicion of impending tumour rupture. An early laparotomy with the intention for complete excision of cystic tumour was scheduled. The right ureter was prophylactically stented following general anaesthesia. Intraoperatively, the retroperitoneal cyst was mobilized from retroperitoneal attachments with ease. It was lying over the right lumbar muscles, inferior to the right kidney and lateral to the right ureter. It had no shared blood supply to any pelvic organs (Figure 1B). She recovered uneventfully and was discharged home on the second day of surgery and she remained well throughout her follow ups.

Histopathological examination revealed that the cyst wall was lined with cuboidal epithelium and showed fibrocollagenous tissue interspersed with smooth muscle cells; features are consistent with a Müllerian duct cyst (Figure 2A, Figure 2B). No atypical cells seen. Immunohistochemical analysis showed positive for PAX8 (Figure 2C)

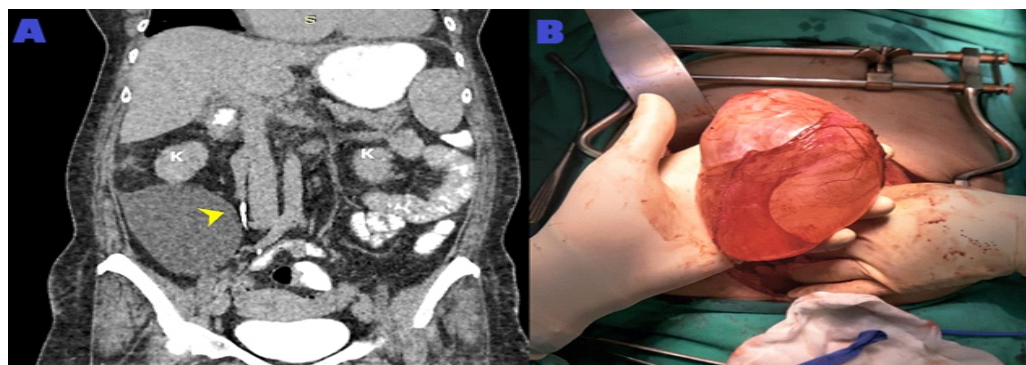


Figure 1A: Contrast CT in delay phase revealed a large and well-defined retroperitoneal cystic mass with its medial side in close proximity to the right ureter (arrowed head). K: kidney

Figure 1B: Intraoperative specimen of the retroperitoneal cyst

Correspondence: H. Praemanathan

E-mail: hemanathan.praem@gmail.com

<https://orcid.org/0000-0002-6661-5652>

Received: 11-02-2022 Accepted: 29-11-2022

DOI: <http://doi.org/10.4038/sljs.v40i3.8943>



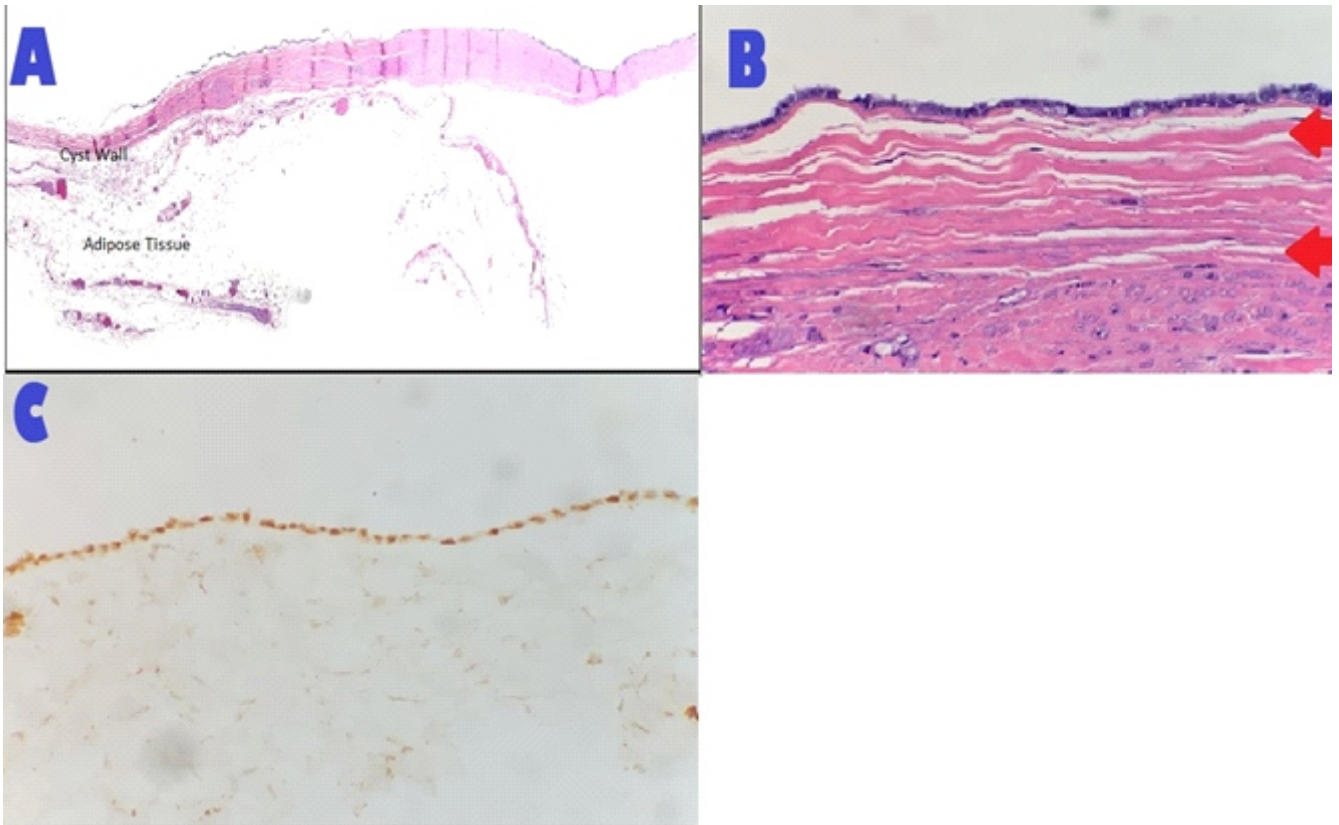


Figure 2A: Sections show a thin cyst wall lined by a single layer of flattened to ciliated cuboidal-columnar epithelium. No abnormal epithelial proliferation or cellular atypia seen. The wall is fibrocollagenous with occasional smooth muscle bundles noted. Minimal adipose tissue is also seen covering the capsule.

Figure 2B: Upper arrowhead – A Thin cyst wall lined by a single layer of ciliated cuboidal-columnar epithelium
Lower arrowhead – Fibrocollagenous wall with occasional smooth muscle bundles

Figure 2C: Immunohistochemistry: PAX 8 is positive

Discussion

Embryonically the retroperitoneal Mullerian Cyst originates from the remnants of the Mullerian system. It is uncommon for an acute presentation if is uncomplicated [2]. Imaging clue from CT scan are usually the most objective way to differentiate the lesion. There are wide variety of differential diagnosis of a retroperitoneal cystic mass, it can be either neoplastic or non-neoplastic. Neoplastic lesions include cystic lymphangioma, mucinous cystadenoma, cystic teratoma, Mullerian cyst. Nonneoplastic lesions include pancreatic pseudocyst, nonpancreatic pseudocyst and lymphocele. In this current case, the initial diagnosis was either a lymphangioma or cystic neoplasm. The indication of surgical excision in this case was due to abdominal pain and the concerns of tumor rupture. As there was an uncertain malignant potential with its large size and adjacent compression, a complete excision was planned rather than drainage.

The incidence of malignant retroperitoneal cyst reported is low at less than 3% [3]. There were reports that described the option of percutaneous drainage. However, it carries higher risk of recurrence and delayed recovery [4]. Judging by the risk of recurrence, even if it may be a benign cyst, the option of total surgical resection was performed. The excision can be performed with laparoscopy access but we embarked in laparotomy manner due to logistics circumstances (available surgeon experience and staffing at the time point of emergency time schedule).

Conclusion

Large retroperitoneal cyst is uncommon and usually benign especially when it is clear cystic content. It may present as acute abdomen though uncomplicated as in current case. However, if the patient is symptomatic, early complete surgical excision is the best option especially in a fit patient.

References

1. Yohendran J, Dias MM, Eckstein R, Wilson T. Benign retroperitoneal cyst of Mullerian type. *Asian Journal of Surgery*. 2004 Oct 1;27(4):333-5. DOI: 10.1016/S1015-9584(09)60062-2
2. Singh A, Shree S, Mishra V, Radhakrishnan G. Mullerian duct cyst misdiagnosed as ovarian cyst: a rare case report. *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*. 2016 Apr 1;5(4):1260-3. DOI: <http://dx.doi.org/10.18203/2320-1770.ijrcog20160900>
3. Kurtz RJ, Heimann TM, Holt JA, Beck AR. Mesenteric and retroperitoneal cysts. *Annals of surgery*. 1986 Jan ; 203 (1) : 109 . DOI:10.1097/00000658-198601000-00017
4. Naem A, Dlewati A, Alhimyar M, Ousta MA, Alsaid B. A rare presentation and recurrence of a retroperitoneal Müllerian cyst in a male patient: A case report. *International Journal of Surgery Case Reports*. 2019 Jan 1;65:301-4.DOI : 10.1016/j.ijscr.2019.11.001

Learning Points:

- Large retroperitoneal cyst can be benign and has a clinical course that mimics an acute abdomen
- Preoperative diagnosis of retroperitoneal cyst can be a difficult task as they are morphologically diverse.
- Best interest of the patient should always be included when formulating treatment options.