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Warfarin Induced Tissue Necrosis and its Management

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Abstract

Warfarin-Induced Skin Necrosis (WISN) is severe complication of oral anticoagulant therapy. Incidence is 0.01 to 0.1 percent of Warfarin-treated patients. Other cause hereditarydeficiency of protein C. patients with rapid loading of Warfarin and thrombophilic diseases is at high risk. Early recognition and prompt intervention of the condition is very important as anticoagulation is being used for major illness. Various theories of pathogenesis have been described. Skin necrosis represents as acomplicated and recalcitrant to conservative treatment. Since patient is not hemodynamically stable major surgery also cannot be done. Hence the condition remains a major diagnostic and therapeutic challenge for surgeon. We present a severe case of WISN of bilateral thigh which was managed with a minimal invasive bed side under local anesthesia by External Tissue Expansion Wound Contraction (ETEWC) and wound healed completely in short period of time.

Keywords: Warfarin; Skin Necrosis; ETEWC.

Introduction

Coumadin (Warfarin) was first introduced (Bristol-Myers Squibb, New York, NY) in 1941.

Warfarin is used to prevent thrombosis and thromboembolism and it is one of the most commonly prescribed oral anticoagulant. It has several complications and interactions. Alteration of coagulation profile is one of the serious complications of this therapy. Regular monitoring of coagulation profile is especially INR is important. High INR indicates increased risk of bleeding while low INR indicates insufficient Warfarin dose so the drug has to be kept in the effective and safe range to avoid complications.

Among other serious complications skin necrosis is most severe condition. Affected patient is characteristically middle-aged, obese, premenopausal with history of treatment for deep vein thrombosis, pulmonary embolism, and coronary or cerebrovascular thrombosis.Sited with high amount of fat are affected more for example breast, abdomen, buttock or thigh etc. commonly occurs in unilateral with multiple lesions, may also present bilaterally. Skin changes may appear from first to tenth day of starting the treatment but most commonly it occurs on three to six days after starting Warfarin [1, 2, 3].

Methodology

A 25 year old lady, a known case of Idiopathic Thrombocytopenic Purpura, was on oral prednisolone. Patient responded initially but subsequently enveloped recurrent bleeding with low platelet count she was planned for Splenectomy in surgical gastroenterology department. Postoperatively she developed Left femoral DVT, and was started on anticoagulation initially with Low molecular weight heparin (LMWH), simultaneously patient was started on Warfarin and LMWH was discontinued after 3 days of starting Warfarin. Patient developed cutaneous necrosis on posterior aspect of left thigh on 5th days of starting warfarin. Warfarin was stopped immediately and patient was again started on LMWH. Patient was referred to plastic surgery department for management of the wounds. Both patient and wound were examined systematically.

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On examination two wound were found over post aspect of left thigh. Upper wound was of size 15x6 and lower wound was of size 5x3cm. Both wounds were covered with thick and adherent black eschar. Surrounding skin was found to be indurated and unhealthy. Both wounds were found to be deep up to subcutaneous tissue with underlying slough and foul smelling discharge was noticed. Patient's was not fit for major surgical procedure under anesthesia. The patient was put on External Tissue Expansion Wound Closure (ETEWC)using rubber band and hooks under local anesthesia after bed side surgical wound debridement and irrigation with saline and silver solution. Hooks were fixed with the skin of wound margin with the help of non-absorbable sutures in such a way that tip of the hook was facing towards the centre of the wound (Fig. 1).

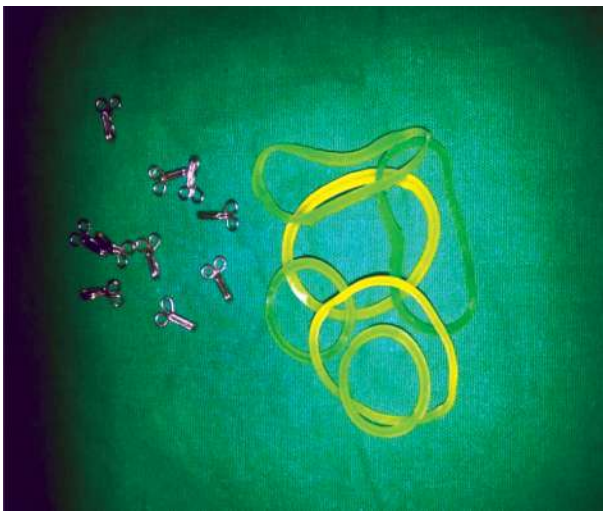

Fig. 1: Hooks and rubber band used for ETEWC

Fig. 2: Wound, before debridement

Fig. 3: Wound after debridement

After application of hooks over both the wounds the cavity was filled with collagen granules and collagen sheet. Rubber bands were applied over the hooks to exert a centripetal traction effect over the wound edge towards the centre. Wound was dressed with sterile dressing. Dressing was changed every 5th to 6th day or if soaked. With each dressing centripetal traction was increased to facilitate wound closure till wound got completely healed.

Fig. 4: Hooks applied over lower wound

Fig. 5: Hooks applied over upper wound

Fig. 6: Lower wound after 3 weeks

Fig. 7: Upper wound after 3 weeks

Results

We found external tissue expansion wound closure (ETEWC) system with as an effective and safe method for wound closure in managing such kind of complex and recalcitrant ulcer with systemic illness in which major surgical reconstructive procedure is contraindicated.

Discussion

Warfarin induced skin necrosis is a dreaded complication of Warfarin therapy. Understanding of coagulation cascade is necessary for its mechanism (Fig. 8)

Various coagulation factor have different half-lives, because of this reason Warfarin inhibits different factors in a different way. Warfarin inhibits protein C and Factor VII in a stronger way than inhibition of the other coagulation factors II, IX and X. The resulting imbalance of coagulation factors leads to

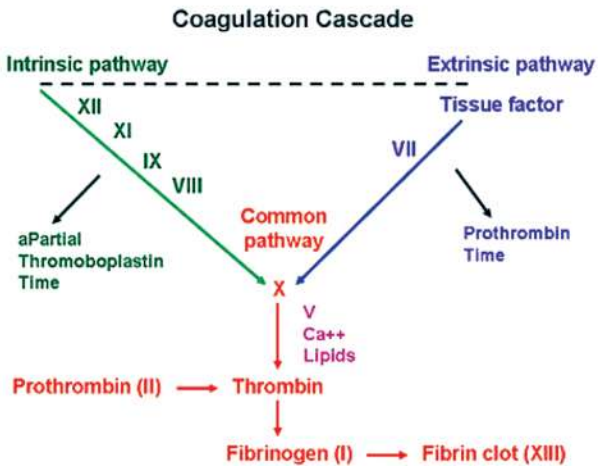

Fig. 8: Coagulation cascade

paradoxical activation of coagulation, which cause hypercoagulable state and thrombosis. As a result of thrombosis the blood supply to the skin is interrupted, causing necrosis. Protein C is a natural anticoagulant present in the body and warfarin further decreases protein C levels, which leads to massive thrombosis with necrosis and even gangrene of limbs. The prothrombin time (or international normalized ratio, INR) used to monitor the effect of caumadin [4]. Warfarin necrosis commonly occurs in patients with an underlying, coagulation disorders or deficiency of protein C, protein S etc., [5, 6]. Other factors are activated protein C resistance and antithrombin III deficiency [7, 8]. The disease follow a characteristic pattern in the sequence of paresthesias, pressure sensation , extreme pain, erythematous flush , petechiae development, hemorrhagic bullae and finally full-blown necrotic eschar which may require extensive surgical debridement [9, 10].

Several theories have been suggested related to Warfarin induced necrosis. According to Nalbadian and colleagues warfarin causes toxic vasculitis. Damaged capillaries dilate and rupture, and petechiae develop quickly. Veins distal to the injured capillaries thrombose, creating stasis of blood and tissue necrosis.Another proposed theory is Protein C and Protein S deficiencies and inadequate Antithrombin III [11]. Early diagnosis of impending Coumadin-inducedskin necrosis is necessary and necessarymeasures can significantly alter the course and improve the prognosis [12].

Conclusion

Warfarin induced skin necrosis is a dreaded complication of oral anticoagulant therapy. Often the

wound is deep and contains greater amount of necrotic tissue. Patientusually remains unfit for major reconstructive surgery due to disturbed coagulation parameters and risk of bleeding. We managed similar condition with ETEWC, which can be considered as an alternate measure in such condition.

References

1. Colman RW, Rao AK, Rubin RN. Warfarin skin necrosis in a 33-year old woman. Am J Hematol, 1993; 43: 300-3.
2. Humphries JE, Gardner JH, Connelly JE. Warfarin skin necrosis: Recurrence in the absence of anticoagulant therapy. Am J Hematol, 1991; 37: 197-200.
3. Locht H, Lindstrom FD. Severe skin necrosis following warfarin therapy in a patient with Protein C deficiency. J Inter Med, 1993; 233: 287-9.
4. McKnight JT, Maxwell AJ, Anderson RL. "Warfarin necrosis". Arch Fam Med 1992; 1(1): 105–8.
5. Sallah S, Abdallah JM, Gagnon GA. Recurrent warfarin-induced skin necrosis in kindreds with protein S deficiency. Haemostasis, 1998; 28 (1): 25–30.
6. Grimaudo V, Gueissaz F, Hauert J, Sarraj A, Kruithof EK, Bachmann F (January 1989). "Necrosis of skin induced by coumarin in a patient deficient in protein S". BMJ 298 (6668): 233–253.
7. Makris M, Bardhan G, Preston FE. "Warfarin induced skin necrosis associated with activated protein C resistance". Thromb. Haemost. March 1996; 75 (3): 523–4.
8. Kiehl R, Hellstern P, Wenzel E. "Hereditary antithrombin III (AT III) deficiency and atypical localization of a coumarin necrosis". Thromb. Res. January 1987 45 (2): 191–3.
9. Stewart AJ, Penman ID, Cook MK, Ludlam CA. Warfarin-induced skin necrosis. Postgrad Med J 1998; 75(882): 233-5.
10 Zimbelman J, Lefkowitz J, Schaeffer C, et al. Unusual complications of warfarin therapy: Skin necrosis and priapism. J Pediatr 2000; 137(2): 266-8.
11. Gibbar-Clements T, Shirrel D, Dooley R, Smiley B. The challenge of warfarin therapy. Am J Nurs 2000; 100(3): 38-40.

Original Article

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Correlation of Clinical, Sonographical, Fine Needle Aspiration Cytological and Excisional Biopsy Findings in Lymphadenopathy

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Abstract

Aim: To find out the correlation of Clinical Diagnosis and Investigative Techniques, to determine the diagnostic accuracy of Clinical diagnosis, ultrasonography and fine needle aspiration cytology (FNAC) in lymphadenopathy using histopathologic examination of the excised lymph node as gold standard. *Study:* Cross sectional study. Department of Surgery along with Department of Pathology and Department of Radiodiagnostics at Acharya Vinobha Bhave Rural Hospital (AVBRH) attached to Jawaharlal Nehru Medical College (JNMC) which come under Datta Meghe Institute of Medical Sciences (DMIMS) Deemed University.From October 2013 to October 2015. *Material and Methods:* A total of 102 patients suffering from lymphadenopathy were selected. After taking informed consent,the patients were then subject to Ultrasonography and FNAC. Thereafter the same lymph node was removed under local anesthesia for histopathology. All Specimens were sent separately to Cytology and Histopathology units at. Data was analyzed using SPSS version 10. *Result:* 102 patients with a mean age of 35.87 (±17.33) years was sampled, Commonest age group was 41-50 years. the neck was the most common site of lymphadenopathy. The most common cause found for lymphadenopathy was reactive lymphadenopathy followed by tubercular lymphadenitis. clinically size of the lymph node more than 2 cm, duration of more than 2 weeks, consistency and matting were indicators for a neoplastic aetiology. onsonological examination, Longitudinal to transverse ratio, internal echoes and presence of hilum were important finding on ultrasonography to reach at a specific diagnosis. In our study we found that FNAC had a high Specificity (100%) and positive predictive (100%) value in diagnosing secondary metastatic conditions and lymphomas. However in diagnosis of Tubercular lymphadenitis the specificity of FNAC was 81.82% . *Conclusion:* Clinical evaluation of the patient is imperative. Ultrasonography proves to be an important investigative tool that aids in the diagnostic accuracy. Ultrasonography is also important where extent and severity of the disease needs to be identified. FNAC has a high sensitivity and specificity for diagnosis of malignant condition and is useful in those conditions where tissue diagnosis is not required. Where diagnosis is questionable, early excisional biopsy is recommended.

Keywords: Lymphadenopathy; Tuberculosis; FNAC; Secondary Metastasis; Ultrasonography; Clinical Diagnosis.

Introduction

There are approximately 800 lymph nodes in the body and no fewer than 300 of them lie in the neck [1]. Lymphadenopathy is an abnormal increase in size and/or altered consistency of lymph nodes. It is a clinical manifestation of a regional or systemic disease and serves an excellent clue to the underlying disease [2]. Lymphadenopathy can arise from either benign or malignant causes [2].

In review studies done on patients with lymphadenopathy there was 17.5% malignant aetiology including, 11.4% lymphoproliferative disorders and 6.1% metastasis, 31% had reactive benign aetiologies and 34% had other non malignant diseases [3]. Benignaetiologies of lymphadenopathy can include infections, autoimmune disorders, drug hypersensitivity reactions, sarcoidosis, and amyloidosis. A metastatic solid tumour is always in

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the differential diagnosis of localised lymphadenopathy, particularly in older individuals [4, 5].

Nodes are generally considered to be normal if they are up to 1 cm in diameter [6,7]. Nodes need to have a diameter of 22.3 mm or greater to be palpated in 50% of cases [8]. The anatomic location of localised lymphadenopathy will sometimes be helpful in narrowing the differential diagnosis FNA cytology remains the first line of investigations used in cases of lymphadenopathy [9]. Limitations of FNAC include high rate of non diagnostic sampling, high rate of false-negative diagnosis in Hodgkin's disease and incomplete classification of Non-Hodgkin's Lymphoma [10-12]. FNAC is an accurate method in assessing lymphadenopathy [13].

In malignant conditions of lymph nodes, FNAC enjoys a high sensitivity and specificity, the average being 95% [14-17]. FNAC showed a sensitivity of 76.9% in the detection of TB lymphadenopathy [18-22].

High-resolution ultrasonography has been used extensively in the assessment of lymphadenopathy. Ultrasonography (97%) has higher sensitivity than palpation (73%) in the assessment of lymph nodes, and has a high specificity (93%) when combined with ultrasound-guided fine-needle aspiration cytology (FNAC) [23].

Grey scale sonographic features that help to identify metastatic and lymphomatous lymph nodes include size, shape and internal architecture (loss of hilar architecture, presence of intranodal necrosis and calcification). Soft tissue oedema and nodal matting are additional grey scale features seen in tuberculous nodes or in nodes that have been previously irradiated. Power Doppler sonography evaluates the vascular pattern of nodes and helps to identify the malignant nodes. In addition, serial monitoring of nodal size and vascularity are useful features in the assessment of treatment response [24].

When FNAC for Lymphadenopathy results in a non-diagnostic or unequivocal report, open biopsy is frequently performed as the second step in reaching the diagnosis. The advantage of open biopsy is that it nearly always provides a tissue sample sufficient for the diagnosis. However there are many disadvantages like being highly invasive, increased risk of infection, damage to nervous and vascular structures and unfavourable scarring. Open Biopsy also adds cost (because procedure requires the use of an operation theatre), delays diagnosis (because the operation theatre must be scheduled in advance), and carries the risk inherent in sedation or general anaesthesia. Moreover open biopsy carries a known risk of seeding tumour and can violate a future surgical field, making definitive surgical treatment more difficult [25,26].

Our hospital caters to the low socio-economic group and labour class where cost required to reach the diagnosis and time required matters a lot. Clinical evaluation is a must before any investigative modality is used. Yet clinical signs alone may be insufficient in reaching a diagnosis or commencing therapy. Thus selection of an appropriate investigative modality as per the clinical diagnosis will help to achieve this and to reduce the cost burden and loss of valuable time borne by the patient as well as loss of resources by the institution.It is equally necessary to evaluate what additional information these investigations will provide if the clinical diagnosis is pretty sure. It will also help to find out how many Patients have possible dual diseases.

Aims & Objectives

Aim

To find out the correlation of Clinical Diagnosis and Investigative Techniques.

Objectives

To find out clinical and aetiological pattern of lymphadenopathy.

To find out the sensitivity and specificity of Sonography, FNAC and Excisional Biopsy.

To determine a specific investigative technique depending on clinical diagnosis.

Material & Methods

Study Setting

The study will be conducted in Department of Surgery along with Department of Pathology and Department of Radiodiagnostics in a tertiary health care centre Acharya Vinobha Bhave Rural Hospital (AVBRH) attached to Jawaharlal Nehru Medical College (JNMC) which come under Datta Meghe Institute of Medical Sciences (DMIMS) Deemed University.

Duration of Study

From October 2013 to October 2015

Sample size - 100

Study Population

Patients admitted in Surgical, Medical & allied wards or visiting their OPD of AVBRH SAWANGI WARDHA, having Lymphadenopathy are included in our study by applying the following inclusion & exclusion criteria. The study will be conducted during the period from August 2013 to July 2015.

Inclusion Criteria for the Study

Patients with Lymphadenopathyof size more than 1cm6 of any age group with or without symptoms.

Exclusion Criteria

Patient with prior tissue diagnosis available Where Diagnosis has already been reached by other investigative methods.

Ex: A case of leukemia diagnosed on Haematological Evaluation with Lymphadenopathy.

Method

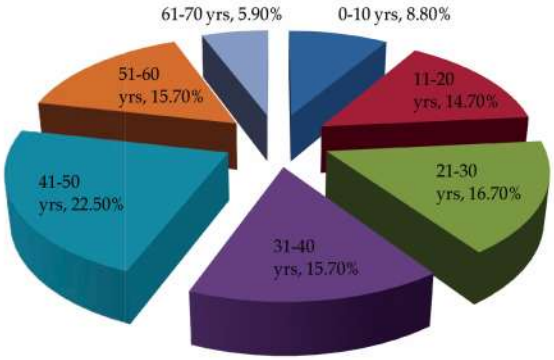
After taking informed consent patients with enlarged lymph nodes are to be included in the study. All patients are to be evaluated Clinically and by Sonographical study. Fine Needle Aspiration Cytology and Excisional Biopsy will be done later. All Specimens are to be sent separately to Cytology and Histopathology units. Each Reporting to be done by separate individuals neither of whom will be informed about the reports of the other investigations.

Observation and Results

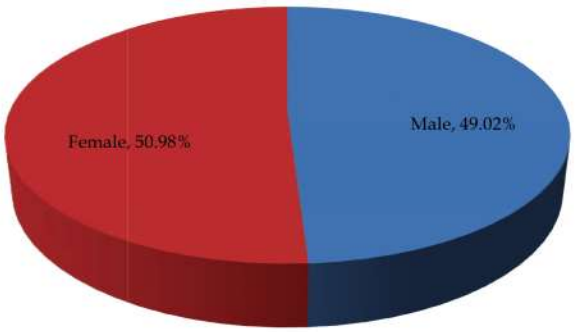
Our study was based at Jawaharlal Nehru Medical College, Acharya Vinoba Bhave Rural Hospital, Sawangi (Meghe), a rural teaching hospital in Wardha district of Maharashtra state. Between October 2013 and October 2015, we screened a total of 102 patients of all age groups presenting with Lymphadenopathy and they were subject to clinical evaluation, ultrasonography, fine needle aspiration cytology and excision biopsy followed by histopathological examination.

The Dataset comprised of 102 patients with a mean age of 35.87 (±17.33) years, with a range of 0 to 70 years of age. Commonest age group was 41-50 years (22.5%).A total of 102 patients were included in this study. Of the 102 patients 10 (9.8%) of patients were found to have lymphoma, 30 (29.41%), were found to be tuberculous, 21(20.59%) were found to have secondary metastasis and 40 (39.22 %) patients were detected with reactive lymphadenitis. In our study we found that 82.92% of patients of ages upto 30 years, 40% of patients of ages 31 to 60 years and only 16.67% of patients beyond 60 years of age had a benign cause for their lymphadenopathy.

In our study we found that 50 (49.02%) patients were males and 52 (50.98%) were females. The study found no significant gender bias for lymphoma.



Graph 1: Age wise distribution of patients



Graph 2: Sex wise distribution of patients

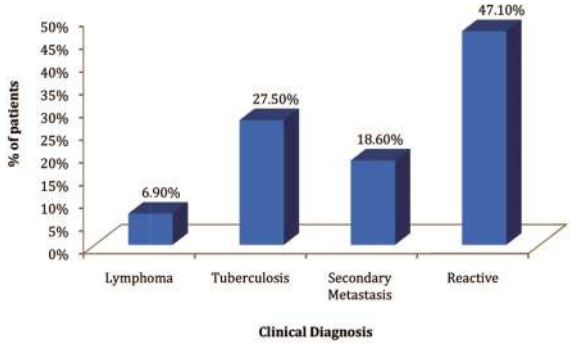
Table 1 shows that the neck was the most common site of lymphadenopathy, 58 (56.86%) of patients presented with cervical lymphadenopathy. Majority of the cases presented with localised (81.37%) lymphadenopathy and a relatively small number presented as generalised (18.62%) lymphadenopathy. 31(30.39%) patients had neoplastic pathology whereas 71 (69.61%) had a non neoplastic aetiology of the localised lymphadenopathy 64 (77.10%) were found to be non-neoplastic and 19(22.89%) were found to be neoplastic. of the 19(18.62%) generalised lymmphadenopathies 12 (63.15%) were found to be neoplastic and 7(36.84%) were non neoplastic. Tuberculosis (4.90%) presented with multiple lymph node enlargement as well and should be kept in mind when making a clinical diagnosis. Lymph node group involved showed statistical significance in distinguishing between neoplastic and non neoplastic groups.

Table 1: Correlation of lymph node involved with Histopathological diagnosis

Diagnosis	Lymphoma	Tuberculosis	Secondary Metastasis	Reactive	Rosai-Dorfman	Total
Submental	0(0%)	2(1.96%)	1(0.98%)	0(0%)	0(0%)	3
Submandibular	1(0.98%)	4(3.92%)	2(1.96%)	11(10.78%)	0(0%)	18
Jugular	3(2.94%)	7(6.86%)	1(0.98%)	14(13.73%)	0(0%)	25
Posterior Triangle	0(0%)	5(4.90%)	1(0.98%)	0(0%)	0(0%)	6
Supraclavicular	0(0%)	3(2.94%)	1(0.98%)	2(1.96%)	0(0%)	6
Axillary	0(0%)	2(1.96%)	3(2.94%)	7(6.86%)	0(0%)	12
Inguinal	0(0%)	2(1.96%)	6(5.88%)	5(4.90%)	0(0%)	13
More than one group involved	6(5.88%)	5(4.90%)	6(5.88%)	1(0.98%)	1(0.98%)	19
Total	10(9.80%)	30(29.41%)	21(20.59%)	40(39.22%)	1(0.98%)	102

2-value

chi=52.16,p-value=0.004,S,p<0.05



Graph 3: Distribution of patients according to clinical diagnosis

Table 2: Distribution of patients according to clinical signs and symptoms

Signs and symtoms	Clinical Signs and symptoms	No of patients	Percentage(%)
Number	Single	58	56.9
	Multiple	44	43.10
Duration	<2 wks	46	45.1
	>2 wks	56	54.9
Size	1-2 cm	68	66.7
	>2 cm	34	33.3
Shape	Round	79	77.5
	Irregular	23	22.5
Matting	Absent	79	77.5
	Present	23	22.5
Surface	Smooth	84	82.4
	Irregular	18	17.6
Consistency	Firm	85	83.3
	Hard	17	16.7
Fixity to surrounding structure	Present	17	16.7
	Absent	85	83.3
Fixity to skin	Present	6	5.9
	Absent	96	94.1
Fever	Absent	83	81.4
	Low Grade	16	15.7
	High Grade	3	2.9
Pain/Tenderness	Present	25	24.5
	Absent	77	75.5
Weight Loss	Present	17	16.7
	Absent	85	83.3

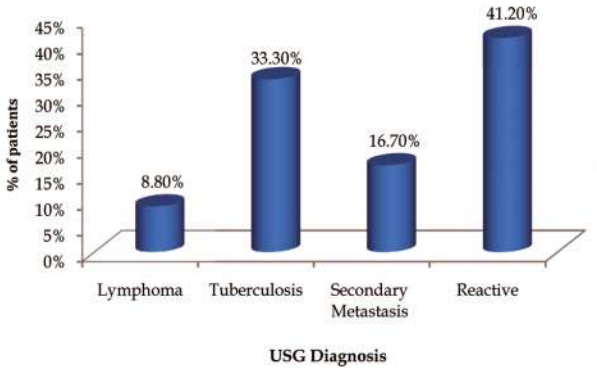
Rashes	Present	12	11.8
	Absent	90	88.2
Cough	Present	15	14.7
	Absent	87	85.3
Dyspnoea	Present	6	5.9
	Absent	96	94.1

In our study we found thatthat on Clinical Examination most of the patients were diagnosed with having reactive lymphadenitis (47.1%) followed by Tuberculosis (27.5%) and Secondary Metastasis (18.6%) with lymphoma (6.9%) as the rarest clinical diagnosis.

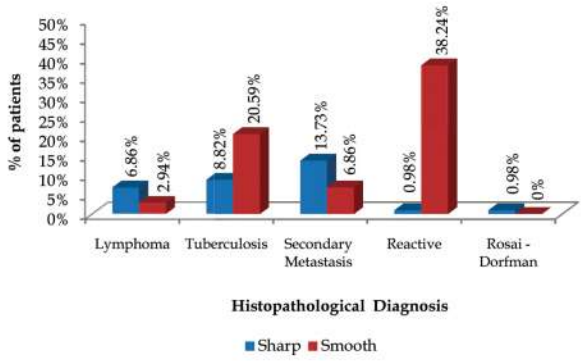
Table 2 shows that 68(66.7%) of patients with lymphadenopathy had lymph node sizes between 1 - 2 cm (66.67%), 51.96% were non-neoplastic and 14.70% were neoplastic. 34(33.33%) of patients had a lymph node size of >2 cm, 15.68% were neoplastic and 26.47% were non-neoplastic. Of the patients with reactive hyperplasia, 87.5% of the cases had a lymph node size of between 1 to 2 cm, while 12.5% of the cases had a lymph node size of more than 2 cm. A consistency of soft to firm was seen in 85(83.3%) of patients and hard consistency was found in 17(16.7%). On comparing the consistency of the lymph nodes all the non neoplastic nodes were soft to firm in consistency where as 51.61% of the neoplastic lymph nodes were hard in consistency. Hard consistency correlated with lymphomas and secondary metastasis. Matting was noted in 23 (22.5%) of nodes and it correlated with tuberculosis, lymphomas and secondary metastasis. In 66.67% of secondary metastasis, 66.67% of tuberculosis and 50% of lumphomas, no matting was found on palpation. In 85 (83.33%) patients the clinically palpable nodes were mobile. Durations of less than 2 weeks was seen in 46 (45.09%) of patients and was associated with a benign aetiology.

In our study we found thaton Ultrasonological Examination Reactive lymphadenitis was seen in 42 (41.2%) and Tuberculosis was found in 34 (23.3%)of cases. Secondary Metastasis was seen in 17 (16.7%) and Lymphoma was seen in 9 (8.8%) of patients.

Distribution of patients according to USG characteristics



Graph 4: Distribution of patients according to USG diagnosis



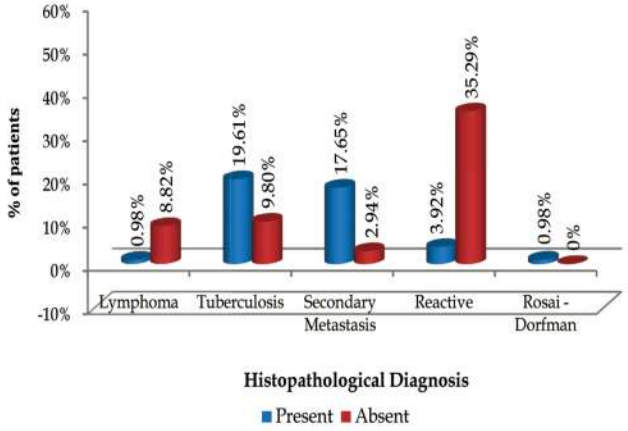
Graph 5: Distribution of patients according to internal echoes

Graph 6 shows that 39(38.24%) with reactive lymphadenitis had smooth borders and 21(20.59%) of patient with tubercular lymphadenitis had smooth borders. 7 (6.86%) of patients with lymphoma and 14 (13.73%) of patients with metastasis had sharp borders. Sharp borders were noted in 14.28% of non-neoplastic and 67.74% of neoplastic cases. Smooth borders were noted in 85.71% of non-neoplastic and 32.25% of neoplastic cases.

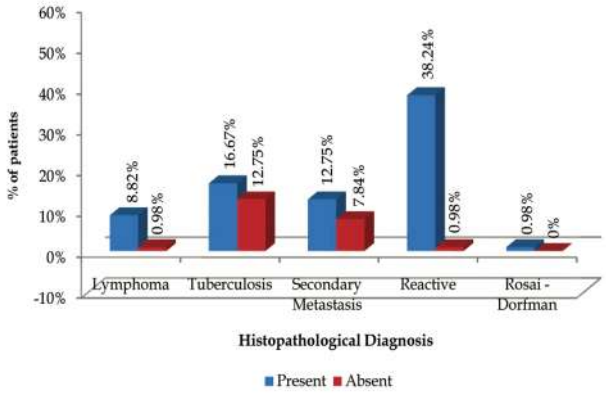
Internal echoes was seen in 20(66.67%) of Tuberculous lymphadenitis and 18(85.71%) of secondary metastasis. absence of internal echoes was seen in 36 (90%) of reactive lymphadenitis and 9 (90%) of lymphomas. The Presence of internal echoes was suggestive of a diagnosis of tuberculosis (45.45%) followed by secondary metastasis (40.90%).

Graph 7 shows that internal echoes were noted in 1 (10%) of lymphoma patients and 8 (39.10%) of secondary metastasis cases. 17(56.67%) of tuberculous lymph nodes and 39(97.5%) of reactive lymph nodes showed presence of echogenic hilum. There was considerable overlap noted between the different groups.

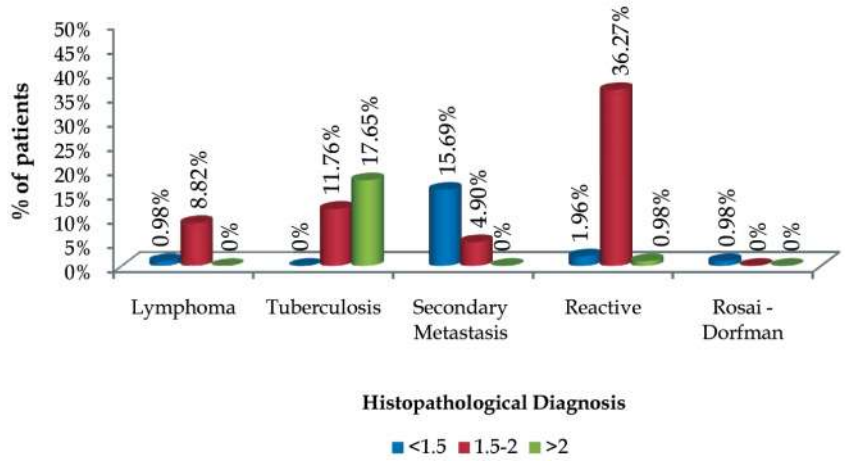
Calcification was seen in 5(4.90%) of lymphomas and 5 (4.90%) of Secondary metastasis. Absent calcification on ultrasound examination was found in 35 (34.31%) of reactive lymphadenitis and 26 (25.49%) of tubercular lymphadenitis. There was no statistical significance between the different groups based on calcification on ultrasonographical examination.



Graph 6: Distribution of patients according to internal echoes



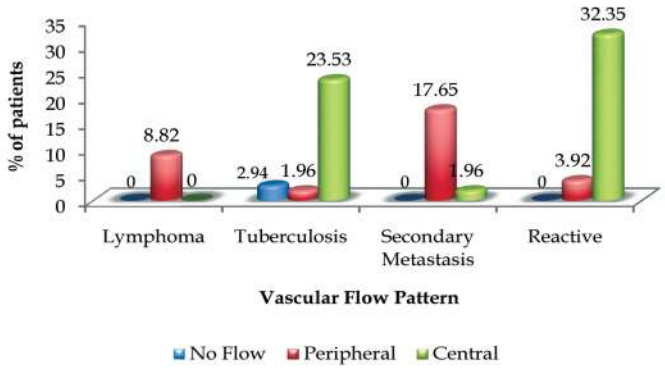
Graph 7: Distribution of patients according to hilum



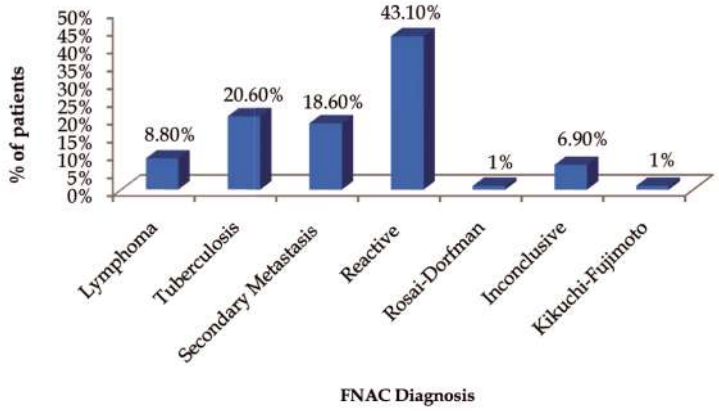
Graph 8: Distribution of patients according to L/T Ratio

A longitudinal to transverse ratio of more than 2 was seen in 18 (60%) of tuberculous lymphadenitis. Secondary metastasis showed a longitudinal to transverse ratio of less than 1.5 in 16(76.19%) of patients and 9 (90%) of patients with lymphoma and 37(92.5%) of patients with reactive lymphadenitis showed a longitudinal to transverse ratio of between 1.5 to 2. There was considerable overlap among different diagnostic groups.

Peripheral Vascular flow was observed in 9(90%) of lymphoma and 18 (85.71%) of patients in secondary metastasis. Central vascular flow was found in 24 (80%) of tuberculous lymphadenitis and 33(82.5%) of reactive lymphadenitis. Thus peripheral vascular flow was seen more commonly in neoplastic (79.41%) cases and central vascular flow was found more commonly in non-neoplastic (96.61%) cases.



Graph 9: Distribution of patients according to vascular flow pattern

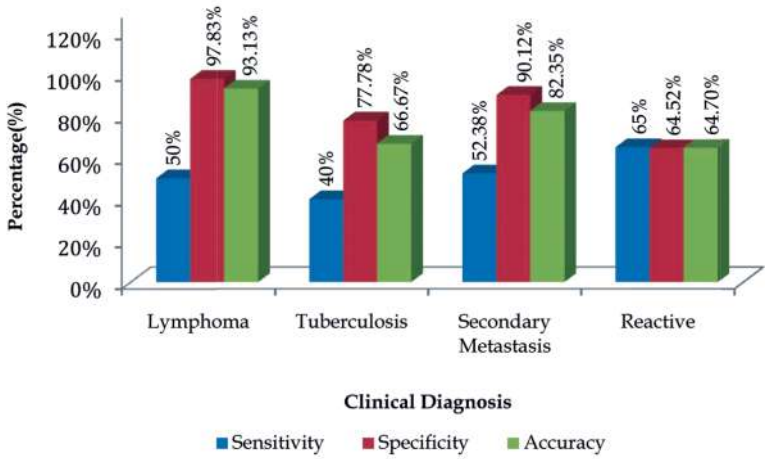


Graph 10: Distribution of patients according to FNAC diagnosis

Fine needle aspiration cytology diagnosed 9 (8.8%) of patients with lymphoma 21(20.6%) of patients with tuberculous lymphadenitis, 19(18.6%) of patients with secondary metastasis and 44 (43.1%) patients with reactive lymphadenitis. 7(6.9%) of the FNACs proved to be inconclusive and 1(0.98%) patient was diagnosed as Kikuchi Fujimoto disease which on histopathology was found to have lymphoma.

Binary Classification of Clinical Diagnosis Versus Histopathological Diagnosis

Binary classification for Clinical diagnosis in Lymphoma revealed a Sensitivity of 50% and specificity of 97.83% with a positive predictive value of 71.43% and an accuracy of 93.13%. Binary classification for Clinical diagnosis in Tuberculosis revealed a Sensitivity of 40% and specificity of 77.78% with a positive predictive value of 42.86% and an accuracy of 66.67%.Binary classification for Clinical diagnosis in secondary metastasis revealed a Sensitivity of 52.38% and specificity of 90.12% with a positive predictive value of 57.89% and an accuracy of 82.35%.Binary classification for Clinical diagnosis in Reactive Lymphadentits revealed a Sensitivity of 65% and specificity of 64.52% with a positive predictive value of 54.17% and an accuracy of 64.70%.



Graph 11: Binary Classification

Binary Classification of USG Diagnosis Versus Histopathological Diagnosis

Binary classification for Ultrasonography in lymphoma revealed a Sensitivity of 60% and specificity of 98.91% with a positive predictive value of 85.71% and an accuracy of 95.09%.Binary classification for Ultrasonography in tuberculous lymphadenitis revealed a Sensitivity of 86.67% and specificity of 88.89% with a positive predictive value of 76.47% and an accuracy of 88.23%.There is an increase in sensitivity (86.67%), specificity (88.89%) and accuracy (88.23%%) over sensitivity (40%),

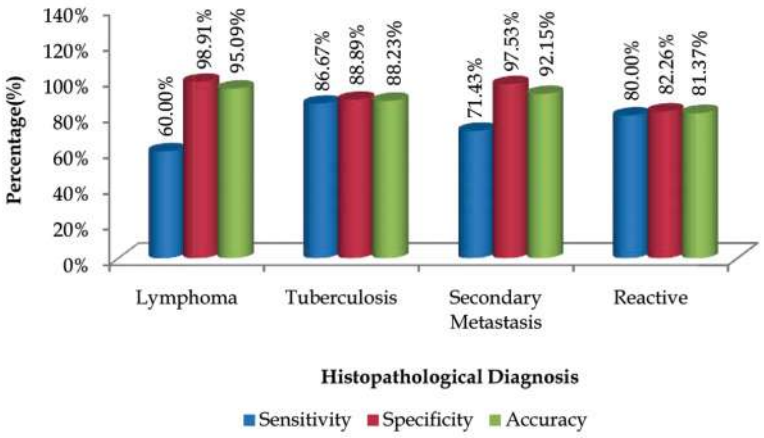
specificity (77.78%) and accuracy (66.67%) of a clinical diagnosis in tuberculous lymphadenitis.Binary classification for Ultrasonography in Secondary metastasis revealed a Sensitivity of 71.43% and specificity of 97.53% with a positive predictive value of 88.24% and an accuracy of 92.15%.Binary classification for Ultrasonography in Reactive lymphadenitis revealed a Sensitivity of 80% and specificity of 82.26% with a positive predictive value of 74.42% and an accuracy of 81.37%.There is an increase in sensitivity (80%), specificity (82.26%) and accuracy (81.37%) over sensitivity (65%), specificity (64.52%) and accuracy (64.70%) of a clinical diagnosis in tuberculous lymphadenitis.

Ultrasonography had a specificity of 80% and accuracy of 81.31% with a specificity of 97.53% in diagnosis of secondary metastasis. there is an increase in the diagnostic accuracy, specificity and sensitivity of ultrasonography over clinical evaluation for identification of tuberculous lymphadenitis and reactive lymphadenitis.

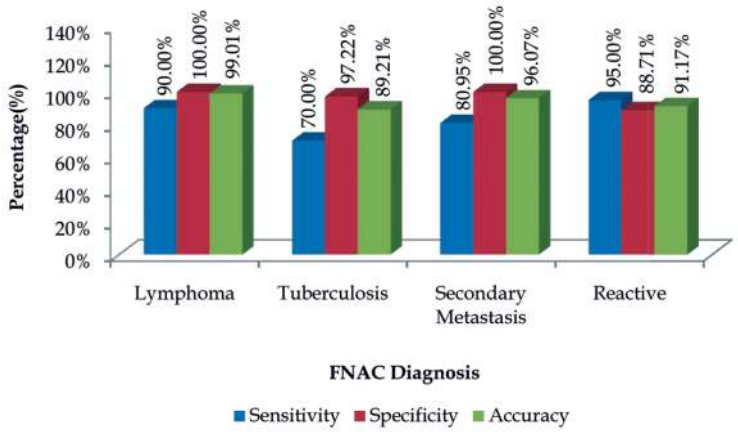
Binary classification for fine needle aspiration cytology in lymphoma revealed a Sensitivity of 90% and specificity of 100% with a positive predictive value of 100% and an accuracy of 99.01%.Binary classification for fine needle aspiration cytology in tuberculous lymphadenitis revealed a Sensitivity of 70% and specificity of 97.22% with a positive predictive value of 91.30% and an accuracy of 89.21%. Binary classification for fine needle aspiration cytology in secondary metastasis revealed a Sensitivity of 80.95% and specificity of 100% with a positive predictive value of 100% and an accuracy of 96.07%.

Binary classification for fine needle aspiration cytology in reactive lymphadenitis revealed a Sensitivity of 95% and specificity of 88.71% with a positive predictive value of 84.44% and an accuracy of 91.17%.

Thus due to its high sensitivity FNAC is a reliable tool for screening of reactive lymphadenopathy. However a negative FNAC report does not rule out other pathologies. FNAC had a high Specificity (100%) and positive predictive (100%) value in diagnosing secondary metastatic conditions and lymphomas. However in diagnosis of Tubercular lymphadenitis the specificity of FNAC was 81.82%.



Graph 12: Binary Classification



Graph 13: Binary classification for FNAC diagnosis

Table 3: Correlation of sensitivity and specificity of clinical, USG and FNAC with histopathological diagnosis

	Clinical Diagnosis		USG Diagnosis		FNAC Diagnosis	
	Sensitivity	Specificity	Sensitivity	Specificity	Sensitivity	Specificity
Lymphoma	50%	97.83%	60%	98.91%	90%	100%
Tuberculosis	40%	77.78%	86.67%	88.89%	70%	97.22%
Secondary Metastasis	52.38%	90.12%	71.43%	97.53%	80.95%	100%
Reactive	65%	64.52%	80%	82.26%	95%	88.71%

Discussion

We studied the diagnostic accuracy of clinical signs and symptoms along with clinical judgement and compared it with the accuracy, sensitivity and specificity of investigative modalities of ultrasonography and fine needle aspiration cytology to delineate the pathology of lymphadenopathy and to identify an investigation of choice based on clinical presentation and suspected aetiology.

Age Wise Distribution of Patients

A total of 102 patients were included in this study. Most of study population was in age group between 41 to 50 years of age. Most of study population was middle aged, about 87.5% of patients below 50 years of age. Commonest age group was 41-50 years (22.5%). Least affected age group was above 60 years (5.9%). These finding are comparable to studies by Jha B C et al, Bedi R S et al. and Kim LH et al. However proportion of age group up to 20 year was lesser 23.5% as compared to about 30% as in study by Bedi R S et al [27-29]. In our study we found that 33.26% of patients had a benign cause of lymphadenopathy for ages upto 30 years, 34.3% of patients aged 31 to 60 years and only 9.8% of patients beyond 60 years of age had a benign cause for their lymphadenopathy.

Lee et al [30] analyzed 925 pathology reports from lymph node biopsies done at the Los Angeles County Hospital from 1973-1977 and found that the cause of lymphadenopathy was benign in 79% of the patients under 30, in 59% of the patients aged 31-50 and only 40% of the patients aged 51-80 had a benign cause for their lymphadenopathy.

Gender Wise Distribution of Patients

49.02% patients were males and 50.98% were females. There was no gender bias found in our study in relation to pathology. Most of the studies show female preponderance. About 50.98% of population in this study comprised of females. studies done by Purohit S.D. et al. And Tripathy S et al found results similar to this study [31].

Lymph Node Involvement

In our study we found that the neck was the most common site of lymphadenopathy, 58 (56.86%) of patients presented with cervical lymphadenopathy. Majority of the cases presented with localised (81.37%) lymphadenopathy and a relatively small number presented as generalised (18.63%) lymphadenopathy. 31 (30.39%) patients had neoplastic pathology whereas 71 (69.61%) had a non neoplastic aetiology. Of the localised lymphadenopathy 64 (77.10%) were found to be non-neoplastic and 19 (22.89%) were found to be neoplastic. Of the 19 (18.62%) generalised lymphadenopathies 12 (63.15%) were found to be neoplastic and 7 (36.84%) were non neoplastic. Tuberculosis (4.90%) presented with multiple lymph node enlargement as well and should be kept in mind when making a clinical diagnosis. Lymph node group involved showed statistical significance in distinguishing between neoplastic and non neoplastic groups. Although localised lymph node enlargement does not rule out malignancy. Generalised and progressive lymphadenopathy often indicates a significant disease.

Karadeniz and colleagues reported that pyogenic infections more frequently manifested with localised lymphadenopathy, while non infectious causes like Hodgkin's and non-Hodgkin's lymphoma (NHL) and Secondaries frequently manifested with generalised lymphadenopathy. Nohaet al noted that all cases presenting as isolated axillary, inguinal, and mediastinal lymphadenopathy had a non-neoplastic aetiology. Among the 30 cases presenting with generalised lymphadenopathy involving the peripheral lymph node groups, 21 cases were non-neoplastic (70%), and among the 27 cases presenting with generalised lymphadenopathy involving both peripheral and central lymph node groups, 17 cases were neoplastic (63%). Chhabra and colleagues16 found in their study that most common site of lymph node involvement was neck. Shaik and colleagues10 described that posterior group of lymph node was most commonly affected in Tubercular lymphadenitis (49.5%).

Clinical Diagnosis

In the Present Study we noted that on Clinical Examination most of the patients were diagnosed

with having reactive lymphadenitis (47.1%) followed by Tuberculosis (27.5%) and Secondary Metastasis (18.6%).

Mohan et al [32] in their study found that the majority (35.6%) of these patients had non-specific lymphadenitis. Tuberculous lymphadenitis (31.3%) was the second most common cause followed by Secondary Metastasis (25.9%).

Clinical Signs and Symptoms

In our study we found that of the patients with lymph node size between 1 - 2 cm (66.67%), 51.96% were non-neoplastic and 14.70% were neoplastic. Of the patients with a lymph node size of >2 cm (33.33%), 15.68% were neoplastic and 26.47% were non-neoplastic. Of the patients with reactive hyperplasia, 87.5% of the cases had a lymph node size of between 1 to 2 cm, while 12.5% of the cases had a lymph node size of >2 cm. Most of the palpable lymph nodes (83.3%) were soft to firm in consistency as compared to proportion of hard lymph nodes (16.7%). On comparing the consistency of the lymph nodes all the non neoplastic nodes were soft to firm in consistency where as 51.61% of the neoplastic lymph nodes were hard in consistency. Hard consistency correlated with lymphomas and secondary metastasis. Matting was noted in 77.5% of nodes and it correlated with tuberculosis, lymphomas and secondary metastasis as final diagnosis. 83.33 % of clinically palpable nodes were mobile and fixity was associated with malignancy. Durations of less than 2 weeks was seen in 45.09% of patients and was associated with a benign aetiology. that These findings are comparable to classical finding described in literature.

Noha et al noted that out of the 48 cases with a lymph node size of between 1 to 2 cm, 79.2% were non-neoplastic and 20.8% were neoplastic. Out of the 51 cases with a lymph node size of >2 cm, 52.9% were neoplastic and 47.1% were non-neoplastic. In the group of reactive hyperplasia, 60% of the cases had a lymph node size of between 1 to 2 cm, while none of the cases had a lymph node size of >2 cm. By comparing the consistency of the lymph nodes all the non-neoplastic nodes were soft to firm in consistency where as 8.3% of the neoplastic lymph nodes were hard in consistency. Hard consistency correlated with lymphomas and secondary metastasis. Matting was noted in 15.83% of lymph nodes. Fixedlymph nodes were found only in the neoplastic category. A significant difference was found related to the duration of symptoms where a duration of less than 2 weeks suggested a non-neoplastic course.

Ultrasonographic Characteristics

Lymph Node Borders

Smooth borders on ultrasonographical examination correlated with a non-neoplastic (85.71%) aetiology whereas sharp borders correlated with a neoplastic (67.74%) aetiology. Reactive (38.24%) and tuberculosis (20.59%) cases had predominantly smooth borders whereas lymphoma (6.86%) and secondary metastasis (13.73%) had predominantly sharp borders. This was comparable with the literature given below.

In tuberculosis, node borders are not sharp probably due to active inflammation of the surrounding soft tissues. Malignant nodes (including metastases and lymphoma) tend to have sharp borders, whereas benign nodes usually do not have such sharp borders. Similar results were reported by Ahuja and Ying where 94% of metastatic cervical lymph nodes had sharp nodal borders and 100% of reactive cervical lymph nodes had smooth nodal borders Esenet al also found similar results in their studies.

Internalechoes

The Presence of internal echoes was suggestive of a diagnosis of tuberculosis (19.61%) followed by secondary metastasis (17.65%). However the absence of Internal echoes does not rule out an underlying pathology. This when compared with literature showed similar results.

Asai et al reported that strong internal echoes and echogenic thin layer were characteristic of tubercular cervical lymphadenopathy. The echogenic thin layer histopathologically corresponded to a specific granuloma tissue layer surrounding a caseous necrosis. It is to be noticed that hypoechoic mass is the common finding described in the literature as characteristic of tubercular lymphadenopathy [25]. Tuberculous nodes are predominantly hypoechoic, which is probably related to the high incidence of intranodal cystic necrosis. The metastatic nodes are usually hypoechoic as reported by Lindeboom et al when compared with the adjacent muscles. However, metastatic nodes from papillary carcinoma of the thyroid tended to be hyperechoic. Lymphomatous nodes were reported to have a 'pseudocystic appearance' and hypoechoic with posterior enhancement.

Intranodal Hilum

In our study we found that the presence of intranodal echogenic hillus was observed in

predominantly reactive lymphadenopathy (38.24%) followed by tubercular lymphadenopathy (16.67%). However an echogenic hills was found in lymphoma (8.82%) and Secondary metastasis (12.75%) as well. Presence of echogenic hilum did not rule out malignancy however absence of echogenic hilum must cause a suspicion of malignancy.Therefore, the presence/absence of an echogenic hilus within lymph nodes should not be the sole criterion in the evaluation of cervical nodes.

The presence of an intranodal echogenic hilus was considered a sign of benignity. Previous studies have reported that 84–92% of benign nodes demonstrate an echogenic hilus. However, 4–51.5% of metastatic nodes may also have an echogenic hilus. Therefore, the presence/absence of an echogenic hilus within lymph nodes should not be the sole criterion in the evaluation of cervical nodes. In an Indian study for paediatric age group, hilum was present in 73.53% tubercular lymphadenitis 40% lymphoma and 62.5% cases with metastatic lymph nodes. Hypo-echoic centre was present in 88.24% tubercular lymphadenitis cases followed by 62.5% metastatic and 60% malignant lymphoma cases.

Longitudinal to Transverse Ratio

An L/T ratio more than 2 was indicative of tuberculosis and a smaller L/T ratio correlated with malignancy however there was considerable overlap among different diagnostic groups.

Steinkamp HJ et al report that 95% of metastatic nodes had L/T ratio of less than 2.116 Similar findings were recorded in an Indian study for paediatric age group echogenic thin layer and strong internal echoes were identified as specific for tuberculosis. Long axis to transverse axis ratio was more than 2 in most of the tubercular nodes (85.71%). Hilum was present in 73.53% tubercular lymphadenitis 40% lymphoma and 62.5% cases with metastatic lymph nodes. Hypoechoiccentre was present in 88.24% tubercular lymphadenitis cases followed by 62.5% metastatic and 60% malignant lymphoma cases. *Chang et al.* noticed that benign lymph nodes had a significantly larger Longitudinal to Transverse ratio than did malignant nodes Na D G et al noticed that Longitudinal to Transverse ratio <2 had a sensitivity of 85% and a specificity of 61% for malignancy, which has not been supported by *Moritz et al* .

Vascular Flow Pattern

In our study we found that there Peripheral Vascular flow was observed more commonly in lymphoma(90%) and secondary metastasis (85.71%) cases. Central vascular flow was found more commonly in tuberculous (80%) lymphadenitisand reactive (82.5%) lymphadenitis. Thus peripheral vascular flow was seen more commonly in neoplastic (79.41%) cases and central vascular flow was found more commonly in non-neoplastic (96.61%) cases.

Gupta and Colleagues has reported that power Doppler ultrasonographic evaluation of the vascular pattern of cervical nodes is highly reliable with a repeatability of 85%. In the normal neck, about 90% go lymph nodes show hilar vascularity. Normal and reactive lymph nodes tend to demonstrate hilar vascularity or appear apparently avascular. However, metastatic lymph nodes usually have a peripheral or mixed vascularity. The presence of peripheral vascularity in malignant nodes is thought to be related to tumour angiogenesis and the associated recruitment of capsular vessels. Because peripheral vascularity is common in malignant nodes, its presence, regardless of the presence or absence of hilar vascularity, is highly suggestive of malignancy. On ultrasound, tuberculous nodes have varied vascular pattern, which simulates both benign and malignant conditions. In spite of the varied vascular pattern, displaced vascularity and apparent avascularity are common in tuberculous nodes, which are related to the high incidence of cystic necrosis in tuberculous lymph nodes as was reported by Ahuja and colleagues.

The ultrasonographical characteristics showed considerable overlap in the various pathologies. Vascular pattern and Longitudinal to transverse ratio were important finding on ultrasonography to reach at a specific diagnosis. However since there was considerable overlap between the various finding, no significant association emerged regarding which of these factors or combinations of these factors were important in diagnosing an underlying disease. The association of USG characteristics and specific diagnosis is comparable to studies by Chang et.al and Asai et.al.

Binary Classification of Clinical Diagnosis Versus Histopathological Diagnosis

In our study we noted that clinical diagnosis had an accuracy of 93.13 for lymphoma and 82.35 for Secondary metastasis however the diagnostic accuracy for tuberculosis was 66.67 and reactive lymphadenitis was 64.70.

An increase in the specificity and accuracy was seen in the clinical diagnosis of lymphoma as most patients present late when the disease has advanced

usually aiding clinical diagnosis however the low diagnostic accuracy seen in tuberculous and reactive lymphadenitis is due to the paucity of clinical sings and symptoms associated with the disease making clinical judgement inadequate.

Binary Classification of Ultrasonography Diagnosis Versus Histopathological Diagnosis

In our study we found that Ultrasonography had a specificity of 80% and accuracy of 81.31% with a specificity of 97.53% in diagnosis of secondary metastasis.There is an increase in sensitivity (86.67%), specificity (88.89%) and accuracy (88.23%%) over sensitivity (40%), specificity (77.78%) and accuracy (66.67%) of a clinical diagnosis in tuberculous lymphadenitis. and sensitivity (65%), specificity (64.52%) and accuracy (64.70%) of a clinical diagnosis in reactive lymphadenitis. Ultrasonography did aid in diagnostic accuracy however in many instances it provided diagnostic clues that were inconclusive.

Andrea Frasoldati et al [34] reported the presence of metastatic lesions was confirmed in 46 of 95 patients with suspicious neck nodes. Ultrasonography sensitivity and specificity were 82.1% and 91.2%, respectively. D B Chang and colleagues [35] found 16 benign lymph nodes (four were tuberculous lymphadenitis, four were reactive hyperplasia, and eight were unspecified) and 32 malignant lymph nodes (13 were squamous cell carcinomas, nine were adenocarcinomas, four were small-cell carcinomas, three were lymphomas, and three were miscellaneous. Colour Doppler flow patterns were seen in six (38%) of the 16 benign lymph nodes and in 29 (91%) of the 32 malignant lymph nodes.

Ultrasonography as a diagnostic modality in lymphadenopathy does confer an added benefit in improving the overall accuracy of diagnosis due to its increased sensitivity and specificity over clinical judgement, however ultrasonography alone may not be sufficient as the diagnostic investigation of lymphadenopathy as a tissue diagnosis would still be mandatory before initiation of therapy. Where clinical diagnosis is certain ultrasonography confers little advantage to the diagnosis and where the clinical diagnosis is questionable ultrasonography may prove useful in improving diagnostic accuracy yet it will require a tissue diagnosis for confirmation. Even so the utility of sonography will always be preserved in identifying the extent of the disease.

Binary Classification of FNAC Diagnosis Versus Histopathological Diagnosis

In our study we found that FNAC had a high Specificity (100%) and positive predictive (100%) value in diagnosing secondary metastatic conditions and lymphomas. However in diagnosis of Tubercular lymphadenitis the specificity of FNAC was 81.82% which is comparable with the literature. Due to its high sensitivity FNAC is a reliable tool for screening of reactive lymphadenopathy. however a negative FNAC report does not rule out other pathologies.

In a study by Dong Hoon and Colleagues, the sensitivity, specificity, positive-predictive value, negative-predictive value, and accuracy for diagnosing pediatric lymphadenopathy was 100, 75, 93.3, 100, and 94.4%, respectively. These values suggest that FNAC is an accurate method in assessing lymphadenopathy [15]. Fine needle aspiration cytology (FNAC) has been used extensively for the diagnosis of primary and secondary malignant disorders involving lymphnodes, though the same does not hold true for non-neoplastic disorders. Engzell and colleagues 17 reported that Sensitivity and specificity of cytology approaches 95% and 96.5% respectively specially in diagnosis malignant conditions. However in a study by S. K. Lauaet al [24] FNAC showed a sensitivity of 76.9% in the detection of TB lymphadenopathy.

Fine Needle Aspiration Cytology is a minimally invasive, simple economical and quick procedure that is easily carried out in the out patient department or at the bed side. it is useful in the preliminary evaluation of superficial lymphadenopathy. As a result of its high sensitivity and specificity and due to its high diagnostic accuracy FNAC is useful in those conditions where tissue is not required for further evaluation. Though FNAC has a relatively high sensitivity and specificity in diagnosis of lymphoma, tissue will be required for further evaluation in the form of immunohistochemistry and thus FNAC falls short of an excisional biopsy followed by histopathological evaluation. However it should be made clear that a negative FNAC does not rule out the pathology. The accuracy of FNAC in reactive lymphadenitis is comparatively low.

It is always very difficult to make an accurate diagnosis in the early stages of the disease. As the disease advances the clinical features get more pronounced and thus aids in accuracy of clinical diagnosis. As our patients are rural based and come late due to referrals from primary health centers or due to socio economic reasons, the clinical accuracy is more. In such a situation one can always select an investigation according to the clinical diagnosis. Thus

reducing unnecessary investigations, its cost burden and time spent before definitive therapy can be commenced.

The real problem remains when reactive lymph nodes are encountered. Clinical examination and investigations such as ultrasonography and FNAC may not contribute much to the diagnostic accuracy. Empirical lymph node biopsy may be warranted in such situations, failing which there is a chance that an underlying pathology may be missed as patients seldom turn up for regular follow up. Most of these patients have been provided primary care with antibiotic regimens before they seek care at a tertiary care center. Considering these factors it is justified in doing a lymph node biopsy before an antibiotic trial at a tertiary institute if lymphadenopathy is significant at the time of presentation. In our study we have found that 45.83% patients diagnosed clinically as reactive to have false positive values. Biopsy is thus the best modality to reach to a diagnosis in clinically reactive lymph nodes.

Summary and Conclusion

This prospective study of 102 patients on correlation of clinical, sonographical, fine needle aspirationcytological and excisional biopsy findings in Lymphadenopathy is based in a tertiary health care centre rural teaching hospital.

Clinical evaluation of the patient is imperative. Most patients withlymphadenopathyare in the age groups between 41 to 50 years with no male or female preponderance. Cervical group of lymph nodes are the most commonly involved group. Among all clinical features, consistency, group of lymph nodes involved, duration and presence of matting correlates strongly with the final diagnosis.

Standard clinical examination has high diagnostic accuracy. It also provides diagnostic clues for further evaluation. However in manycases a diagnosismay not be established on clinical judgement alone.

In cases where the clinical judgement is suspect ultrasonography proves and important investigative tool that aids in the diagnostic accuracy, however ultrasonography alone may not be sufficient to make a diagnosis and will require tissue diagnosis for confirmation. Ultrasonography is also important where extent and severity of the disease needs to be identified.

The ultrasonographical characteristics showed considerable overlap in the various pathologies. Vascular pattern and Longitudinal to transverse ratio were important finding on ultrasonography to reach at a specific diagnosis. However since there was considerable overlap between the various finding, no significant association emerged regarding which of these factors or combinations of these factors were important in diagnosing an underlying disease. Ultrasonography improved diagnostic accuracy in non neoplastic conditions like tuberculosis and reactive lymphadenitis.

Fine needle aspiration cytology is simple, economical and minimally invasive procedure that can easily be carried out in the out patient setting or at the patients bed side. FNAC is useful in the preliminary evaluation of superficial lymph node enlargements. FNAC has a high sensitivity and specificity for diagnosis of malignant condition and is useful in those conditions where tissue diagnosis is not required.

The most common cause found for lymphadenopathy was reactivelymphadenopathy followed by tubercularlymphadenitis.

To conclude, for most patients presenting with lymphadenopathy clinical evaluation must precede any and all investigations. If however a suspicion of lymphoma is made clinically the patient must be subject to excision biopsy and histopathology as despite high specificity of other modalities immunohistochemistry will be required.

If malignancy is suspected clinically FNAC can be preferred over biopsy.

Ultrasonography is an important tool in identifying extent of disease but offers little to establish a diagnosis. Tubercular and reactive lymphadenitis requires multiple modalities of investigative techniques bearing in mind that a negative report does not rule out a pathology.

Limitations

Clinical diagnosis alone is suspect in cases that tend to present early with low symptomology. Subjectivity of the clinician is also an important factor in varying diagnostic accuracy of a clinical diagnosis.

Ultrasonography is a subjective investigation and user dependant. Thus the findings may vary resulting in a varied diagnostic accuracy. Ultrasonography alone may not be sufficient as the diagnostic investigation of choice for lymphadenopathy as a tissue diagnosis would still be mandatory before initiation of therapy. Where clinical diagnosis is certain ultrasonography confers little advantage to the diagnosis and where the clinical diagnosis is questionable ultrasonography may prove useful in

improving diagnostic accuracy yet it will require a tissue diagnosis for confirmation.

Microscopic evaluation of the FNAC slides depends on many factors like the experience of the reporting cytopathologist, the clinical information, good technique of aspiration, adequacy of material, well made and well stained smears, and gross observations made at the time of aspiration.

Though FNAC has a relatively high sensitivity and specificity in diagnosis of lymphoma, tissue will be required for further evaluation in the form of immunohistochemistry and thus FNAC falls short of an excisional biopsy followed by histopathological evaluation. However it should be made clear that a negative FNAC does not rule out the pathology. The accuracy of FNAC in reactive and tubercular lymphadenitis is comparatively lower.

References

1. Howard D J, Lund V J, Pharynx Larynx and Neck. In: Williams N S, Bulstrode C J K, O'Conell P R, editors, Bailey & Love's Short Practice of Surgery. 25th Edition London: Edward Arnold (Publishers) Ltd; 2008; 702 - 33.
2. Malik G A, Rehan T M, Bhatti S z, Relative frequency of different diseases in patients with lymphadenopathy. Pak J Surg 2003; 19(2): 86 - 9.
3. Chau I, Kelleher MT, Cunningham D. Rapid access multidisciplinary lymph node diagnostic clinic: analysis of 550 patients. Br J Cancer 2003; 88: 354-36.
4. Moore SW, Schneider JW, Schaaf HS. Diagnostic aspects of cervical lymphadenopathy in children in the developing world: a study of 1877 surgical specimens. PediatrSurgInt 2003; 19(4): 240-244.
5. Brown JR, Skarin T. Clinical mimics of lymphoma. The Oncologist 2004; 9(4): 406-416.
6. Morland B. Lymphadenopathy. Arch Dis Child. 1995; 73: 476–9.
7. Slap GB, Brooks JS, Schwartz JS. When to perform biopsies of enlarged peripheral lymph nodes in young patients. JAMA. 1984; 252: 1321–6.
8. Skandalakis JE, Gray Russell RCG, Williams NS, Bulstrode CJK (eds) New York: : McGraw-Hill, 1983
9. R.K. Narang, S. Pradhan, R.P. Singh and S. Chaturvedi.Place of Fine Needle Aspikraction Cytology in the diagnosis of Lymphadenopathy. Ind. J. Tub; 1990; 37: 29.
10. Das D K. Value and limitations of fine-needle aspiration cytology in diagnosis and classification of lymphomas: A Review. DiagnCytopathol. 1999 Oct; 21(4): 240-9.
11. Kline T S, Kannan V, Kline I K. Lymphadenopathy and aspiration biopsy cytology.: review of 376 superficial nodes. Cancer 1984; 54: 1076 - 81.
12. Lioe T F, Elliot H, Allen D C, Spence R A, The role of fine needle aspiration cytology (FNAC) in the investigation of superficial lympadenopathy: uses and limitations of the technique. Cytopathology 1999; 10: 291 - 7.
13. Dong Hoon Lee Hee Jo BaekHoon Kook Tae Mi Yoon JoonKyoo Lee Sang ChulLim .Clinical value of fine needle aspiration cytology in pediatric cervical lymphadenopathy patients under 12-years-of-age International Journal of Pediatric Otorhinolaryngology. January 2014; 78(1): 79-81.
14. Frable, WJ. andFrable, MA. Fine Needle Aspiration Biopsy revisited; Laryngoscope. 1982; 92(2): 1414.
15. Engzell, U., Jakobbsen, PA. andZajicek, J. Aspiration biopsy of metastatic carcinoma in lymphnodes of the neck A review of 1101 consecutive cases; Act. Otolaryng. 1972; 72: 138.
16. Ross, J.E., Scanlon, E.F. and Christ, MA. Aspiration cytology of Head and Neck masses; Am. J. Surg. 1978; 136: 342.
17. Gupta, S.K., Dutta, J.K., Aikat, M. and Gupta, B.D. Evaluation of Fine needle biopsy technique in diagnosis of tumours; Ind. J. Can. 1975; 12: 257.
18. Rajwanshi, A., Bhambani, S. and Das, D.K. Fine Needle Aspiration Cytology in the diagnosis of Tuberculosis; Diagn.Cytopatho. 1987; 3 (1): 13
19. Metre, M.S. and Jayaram, G. Acid Fast Bacilli in aspiration smears for tuberculous lymphnodes; Acta.Cytol.1987; 31(1): 17.
20. Baily, T.M., Akhtar, M. and Ali, MA. Fine Needle Aspiration Biopsy in the diagnosis of tuberculosis; ActaCytol. 1985; 29(5): 732.
21. Tripathi, S.N., Mishra, N., Patel, N.M., Samantray, D.K., Das B.K. and Maria, R.N. Place of Aspiration biopsy in the diagnosis of lymphadenopathy. Ind. J. Tub.1985; 32: 130.
22. S. K. Laua1, W. I. Weia, C. Hsua, U. C. G. Engzella. Efficacy of fine needle aspiration cytology in the diagnosis of tuberculous cervical lymphadenopathy. The Journal of Laryngology & Otology; Jan 1990; 104(01): pp 24-27
23. Baatenburg de Jong RJ, Rongen RJ, Lameris JS, Harthoorn M, Verwoerd CD, Knegt P. Metastaticneckdisease. Palpationvs ultrasound examination. ArchOtolaryngol Head NeckSurg. 1989; 115: 689.
24. A T Ahuja, M Ying, S Y Ho, G Antonio, Y P Lee, A D King, K T Wong. Ultrasound of malignant cervical lymph nodes. Cancer Imaging. 2008; 8(1): 48–56.
25. Nyquist G G, Tom W D, Mui S, Automatic Core Needle Biopsy: Adiagnostic Option for Head and Neck Masses. Arch Otolaryngol Head Neck Surg. 2008;

134 (2): 184 -9.

26. Kim B M, Kim E K, Kim M J, Yang W, Park C S, Park S. Sonographically guided Core Needle Biopsy of Cervical Lymphadenopathy in patients without Known Malignancy. J Ultrasound Med, 2007; 26: 585 - 91.
27. Bedi RS et al. clinicopathological study of superficial lymphadenopathy in Northern India. Indian J of Tuberculosis 1987; 34: 189-91.
28. Jha BC, Dass A, Nagark ar NM, Gupta R, Sighal S. Cervical tuberculous lymphadenopathy: Changing clinical patterns and concepts in management. Post-graduate Med. J. March, 2001; 77(905):185-7.
29. Kim LH, Peh SC, Chen KS, Chai SP. Pattern of lymph node pathology in a privatelaboratory. Malays J Pathol 1999 Dec; 21(2): 87-93.
30. Lee Y, Terry R, Lukes RJ. Lymph node biopsy for diagnosis: a statistical study. J SurgOncol 1980; 14: 53-60.
31. Purohit SD, Gupta RC, Bhatara VK. Pulmonary tuberculosis and human immunodeficiency virus infection. Lung India 1994; 12: 173
32. Mohan A, Reddy MK, Phaneendra BV, Chandra A. Aetiology of peripheral lymphadenopathy in adults: Analysis of 1724 cases seen at a tertiary care teaching hospital in southern India. Natl Med J India. 2007; 20: 78–80
33. Ahuja A, Ying M, Yuen YH, Metreweli C. Power Doppler Sonography to Differentiate Tuberculous Cervical Lymphadenopathy from Nasopharyngeal Carcinoma. Am J Neuroradiol 2001; 22: 735-740.
34. Andrea Frasoldati and Roberto Valcavi; Challenges in Neck Ultrasonography: Lymphadenopathy and Parathyroid Glands. Endocrine Practice: May 2004; 10(3): 261-268.
35. D B Chang, A Yuan, C J Yu, K T Luh, S H Kuo and P C Yang; Differentiation of benign and malignant cervical lymph nodes with color Doppler sonography. American Journal of Roentgenology. 1994; 162: 965-968.

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Original Article

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Window Colostomy as a Preliminary Diversion Procedure in Cases of Congenital Short Colon-Lessons Learnt in 10 Years

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Abstract

Purpose: Congenital short colon (CSC) is an unusual abnormality in which a pouch like dilatation of a shortened colon is associated with ano-rectal malformation (ARM). The clinical features and anatomical features are very well described in the literature but the management remains difficult and controversial. The present paper aims to study the effectiveness of window colostomy (WC) as preliminary diversion procedure in the management of congenital short colon (CSC). *Methods:* All patients of CSC admitted to our department during a period of 10 years, in whom the WC was performed have formed the basis of this study. Out of total 137 patients admitted with CSC, window colostomy was done in 125 patients. These patients were retrospectively studied and the data sheets were analyzed regarding complications related to WC and the management offered. 5 patients expired before the procedure was undertaken, and transverse colostomy was done in 7 cases of incomplete CSC. *Results:* Eighty six patients were followed-up after WC and underwent all stages of management (WC followed by coloplasty and ileostomy and ileostomy closure in last stage).The procedure was associated with some distressing complications. Stenosis of the window colostomy needing dilatation was seen in 22 patients. 19 patients had minor prolapse of the pouch, while 6 of the patients had significant amount of prolapsed pouch needing revision procedures.18 patients had significant periostomy excoriation. The overall mortality related to the procedure was 11%. *Conclusion:* The formation of an initial window colostomy in the cases of CSC, may lead to incomplete fecal diversion, and the pouch fails to decompress properly. There are also complications associated with the stoma itself. However the procedure is short, easy to perform, and is life-saving and provides adequate time period to allow weight gain and be fit for second stage surgery. It eventually does not affect the final outcome in these patients with congenital short colon.

Keywords: Anorectal Malformations; Congenital Short Colon; Window Colostomy.

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Introduction

Congenital short colon (CSC) is an uncommon condition associated with anorectal agenesis in which a pouch like dilatation of a shortened colon is associated with an anorectal malformation. The condition is more common in northern Indian population and neighboring countries, with almost 90% of the cases being reported from India. With growing awareness, there are few reports pouring in from around the globe. The anomaly and its diagnostic features are well described (1, 2, and 3). The surgical treatment however remains challenging. The aim of treatment is to achieve an available length of the colon, for absorption and storage capacity as well as propelling fecal matter onward with adequate continence. At present single stage surgery for patients with CSC is not advocated keeping in view of its high complication and mortality rates. For staged surgery various procedure for the initial diversion are described. These procedures include- end colostomy after division of the fistula and excision of the pouch in incomplete CSC, end colostomy and coloplasty in complete CSC, proximal ileostomy in cases of complete CSC. Window colostomy as an initial diversion procedure was described in early series but was later condemned by many authors owing to high incidence of complications.

A temporizing window colostomy (WC) however, has remained the procedure of choice for initial diversion at our centre. It includes making a small stoma on the anterior surface of the pouch without disconnecting the recto urethral communication. The procedure done in shorter time and with minimal anaesthetic requirement and is lifesaving. The present paper shares our experience with WC as a preliminary diversion procedure in CSC and highlights the advantages and pitfalls of this procedure.

Materials and Methods

All patients admitted to our centre with a diagnosis of CSC in the last ten years (1999-2009); were included and were retrospectively analyzed in the study. Total 137 patients of CSC were admitted in the above period. 6 patients of CSC with colostomy done elsewhere were not included in the study. Window colostomy was performed in 125 patients. Five patients expired before being taken up for procedure, while transverse colostomy was performed in 7 cases of type 3 and 4 of CSC. Out of these, 86 patients underwent definitive procedure and were retrospectively analyzed for efficiency and complications related to WC. All patients were adequately resuscitated in the pre-op period and a nasogastric decompression was done. Broad spectrum antibiotics were also started. The patients underwent investigations including plain erect x-ray of the abdomen which was diagnostic in all cases, except in cases where the short colon was perforated (n=19).Routine investigations including haemogram, blood glucose and serum creatinine was done in all cases. Our protocol for the surgical management has remained three stage since 1997. It includes-(a) Preliminary window colostomy, (b) Coloplasty and proximal ileostomy and, (c) Ileostomy closure.

Technique of Window Colostomy

It entails making a small stoma of the pouch onto the abdomen. The procedure is performed at the left Mc Burney's point, at the junction of the medial two thirds and lateral one third of the left spino-umblical line. After opening the peritoneum the pouch is identified and an opening is made on the anterior surface of the colonic pouch without attempting to ligate the fistulous communication. We try to make the window colostomy as small as possible (Fig 1). The smallness of the window colostomy preempts the prolapse of the pouch subsequently.

Results

Out of the 125 patients who had window colostomy done for CSC, there were 101 male patients and 24 female patients.14 patients expired after the window colostomy because of low general condition secondary to delayed presentation and associated septicemia. Most of them had perforation of the pouch at the time of presentation. The WC was associated with stenosis (figure 2) that needed dilatations in 22 patients. There were 19 patients who had some amount of pouch prolapse, needing additional care and were managed conservatively. The procedure was associated with 6 cases of severe prolapse of the pouch with bleeding from the mucosa and subsequent failure to gain weight (figure 3). These patients were managed by circumferential suturing under sedation. There were 18 patients who had substantial peri-ostomy excoriation (figure 4) and were advised application of zinc oxide powder in coconut oil. However a mild degree of erythema of the surrounding skin was seen in nearly all cases. There were 5 patients who had evidence of enterocolitis, secondary to stasis and infection. These patients were managed by pouch washes and antibiotics. Overall mortality related to the procedure was 11.2%.Complications associated with window colostomy and their subsequent management may be summarized in the following table 1:

Fig. 1:

Table 1: Complications related to window colostomy

Complication	No. of cases	%	Management
Stenosis	22	25.5	Dilatation
Prolapse	19	22.0	Conservative
Massive Prolapse	6	6.9	Reduction and circumferential suturing
Significant excoriation	18	20.9	Application of zinc oxide with coconut oil
Mortality	14	11.2	-

Fig. 3:

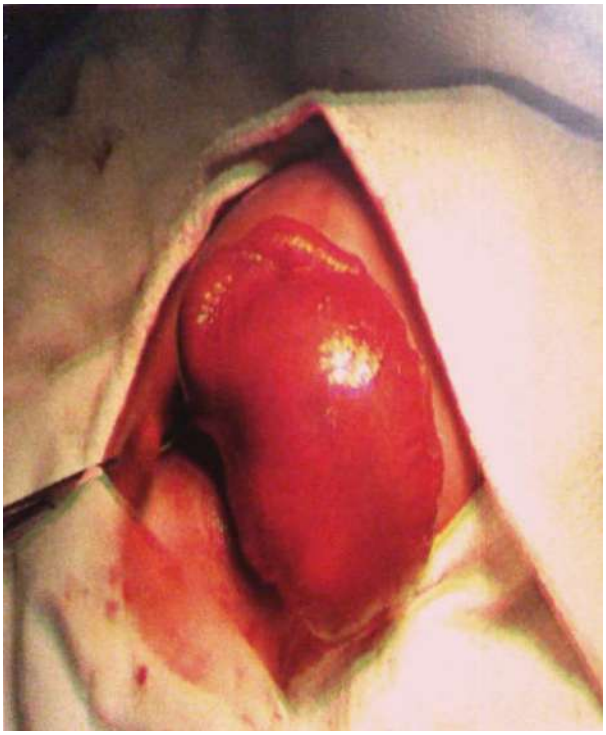

Fig. 4:

Fig. 5:

Fig. 6:

Fig. 7:

Discussion

Congenital short colon (CSC) is a malformation, where whole or part of the colon is replaced by a dilated pouch associated with an anorectal malformations (ARM).This is a variant of ARM and comprises from 6.3% to 26.8% of all cases of ARM in some series from India [3,4]. Till now in the literature majority of cases have been reported from India, but now being reported from other parts of the world. The etiology for this sharp geographical variation is not known [4].

The majority of patients present in the early neonatal period life within 7 days of life. Occasionally if the fistula is large especially in female child with colo cloacal anomaly, the presentation may be late as the child remains decompressed. The association of bilious vomiting with early gross distension of abdomen in a case of ARM strongly suggests a CSC. The management of CSC depends on the type of anomaly and the general condition of the child. Rao et al [5] have classified the anomaly into four types1-4, depending upon the length of the normal colon (type 1, no normal colon and type 4, normal colon till sigmoid).Wakhlu et al [6] describe only two types, complete and incomplete types of CSC.

In a stable child with a diagnosis of CSC the first priority is to disconnect the colo-urinary fistula and provide bowel decompression and diversion with various methods already described. End colostomy with ligation and division of the fistula with colorraphy is preferred by many workers [7], because it disconnects the urinary tract from the fecal stream and diminishes the risk of prolapse and urinary tract infections. This is an acceptable procedure for a healthy neonate who is seen by an experienced surgeon, but the procedure entails a larger incision and more dissection than a window colostomy, making subsequent pull through more difficult. Moreover the end colostomy is prone to stenosis. However a great majority of patients present late, with gross abdominal distension and features of septicemia especially in developing countries like ours. These patients are at times treated by persons not expert in handling these pathologies, before being referred to our centre. Sometimes a child presents with a colostomy done by person not aware of this condition (Figure 5). Usually in these cases the presentation is with complications of colostomy like stenosis or prolapse. The diagnosis may be apparent in a child with prolapse but in a stenosed colostomy the diagnosis can be made only on doing the contrast radiography (Figure 6). Window colostomy is being described by many as a procedure of past, associated with grave complications and to be avoided at all costs. However we have stood with this simple and safe procedure for a long time, which has served the purpose of initial diversion very well in all cases of CSC.

We perform window colostomy as a diversion procedure in all cases of CSC, including those having type 3 or type 4 defects. It is a short procedure, can be easily performed even under local anaesthesia, and does not involve pelvic dissection. The procedure is life saving for most of the neonates. There is a significant (25%) incidence of stenosis and prolapse (22%) associated with window colostomy in our hands (table 1); however, they do not affect the final outcome of our patients. We have not had any major problem (e g, absorptive hyperchloremic acidosis and urinary tract infections) such as those reported by other investigators [4, 5 and 8]. This is because, although the external diameter of the colo-urinary fistula can be up to 2 cm, the size of the mucosal communication is very small [9]. Our mortality rate after window colostomy is 11.2%.The babies who died were in poor general condition because of late presentation, most of them had perforation of the colonic pouch and were septicemic. The mortality after WC has decreased considerably, as described in the previous literatures [6].This may be attributed to the better knowledge gained about the anomaly and improvements in the neonatal care facilities.

Conclusion

Although associated with significant morbidity and mortality, the window colostomy is quick and

easy to perform. It has been life saving for most of the neonates. Our method has lead to more incidence of stenosis, which is not a major problem because this can be managed at home by simple dilatations. We found patients growing well with such colostomy and the procedure did not affect the final outcome.

References

1. Singh S, Pathak K. Short colon associated with imperforate anus. Surgery 1972; 71: 781–786.
2. Narasimha Rao KL, Yadav K, Mitra SK, Pathak IC. Congential short colon with imperforate anus (CPC syndrome). Ann PediatrSurg 1984; 1: 159–162.
3. Wakhlu AK, Tandon RK, Kalra R. Short colon associated with anorectal malformations. Indian J Surg 1982; 44: 621–629.
4. Chadha R. Congenital pouch colon associated with anorectal agenesis. PediatrSurgInt 2004; 20: 393–401.
5. Rao KLN, Yadav K, Mitra SK et al. Congenital short colon with imperforate anus (pouch colon syndrome). Ann PediatrSurg. 1984; 1: 159-167.
6. Wakhlu AK, Wakhlu A, Pandey A et al. Congenital short colon. World J Surg. 1996; 20: 107-114.
7. A. K. Singal, V.Bhatnagar. Colostomy prolapse and hernia following window colostomy in congenital pouch colon.PediatrSurgInt. 2006; 22: 459–461.
8. Chaddha R, Bagga D, Malhotra CJ et al. The embryology and management of congenital pouch colon associated with anorectal agenesis. J PediatrSurg. 1994; 29: 439-446.
9. Wakhlu AK, Pandey A, Wakhlu A, Tandon RK, Kureel SN. Coloplasty for congenital short colon. J PediatrSurg. 1996; 31: 344–348.

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Original Article

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Is Single Incision Laparoscopic Cholecystectomy Really Less Invasive than Traditional Laparoscopic Cholecystectomy

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Abstract

Objective: Our objective was to assess the clinical outcomes (benefits and drawbacks) and change in level of inflammatory parameter IL-6 in patients undergoing single incision laparoscopic cholecystectomy and comparison with classical four port laparoscopic cholecystectomy. *Methods:* Between September 2013 to July 2015 a prospective randomised study was conducted. Sixty patients were included in the study and they underwent elective gall bladder removal by applying the laparoscopic technique. All the patients were divided into two groups. Single incision laparoscopic cholecystectomy (group I) and four port laparoscopic cholecystectomy (group II). Outcome Measures included operative time, pain intensity post operatively and consumption of pain killers, hospital stay, need for conversion, complications, cosmetic effects and change in the level of serum Interleukin-6 post operatively as an inflammatory marker. *Results:* Mean operating time in group I was 71 min and group II 39 min. Intensity of pain evaluated by using the VAS at 8 hours after surgery in group I was 6.5 and in group II 6.5, whereas after 7 days in group I it was 2.7 and in group II 3.6. The pain killer requirement in group I was smaller than group II. Mean hospital stay after the operation in group I was 2.2 days and in group II 2.0 days. There were 2 conversions in group I and 1 in group II. Cosmesis evaluated by a 0 to 10 scoring system which showed better cosmesis in group I patients. Change in the serum level of IL-6 post operatively was more in case of multiport laparoscopic choecystectomy than single incision laparoscopic cholecystectomy. *Conclusion:* Single incision laparoscopic cholecystectomy is a safe and feasible procedure which has a better cosmesis and faster recovery.

Keywords: Laparoscopic Cholecystectomy (LC); Symptomatic Gallstone Disease; Single Incision Laparoscopic Cholecystectomy (SILC).

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Introduction

Laparoscopic cholecystectomy (LC) is the gold standard treatment for benign and symptomatic gallstone disease [1,2]. Its main advantages over open cholecystectomy are the reduced early post-operative pain, shorter hospital stay, rapid return to the normal activity and better cosmesis. The continuous endeavour to reduce the invasiveness and thus the reduction of wound related complications and betterment of cosmesis following surgery has led the surgeons to further reduce the number and size of access ports during laparoscopic procedure. Various natural orifices including the trans-gastric, trans-rectal, and trans-vaginal route have been used as access although limited by lack of reproducibility, longer learning curve and ethical issues [3-6]. To reduce the invasiveness of standard four port cholecystectomy, single incision laparoscopic cholecystectomy (SILC) has also become an attractive option of the performance of laparoscopic cholecystectomy [7-10]. Navarra et al first reported trans-umbilical single incision laparoscopic cholecystectomy in 1997 and proposed that SILC might be associated with less pain and reduced hospitalization [11]. However, there was not enough data to support SILC as the standard of care as compared to multiport laparoscopic cholecystectomy as it was associated with longer operating time and required additional instruments more frequently. Inteleukin-6 (IL-6) is an inflammatory marker assessed post operatively which can be used as a surrogate marker of inflammation and can predict

the overall surgical stress, an important factor for recovery. There are many studies comparing laparoscopic cholecystectomy and open cholecystectomy reported significantly lower level of IL-6 post-operatively in the laparoscopic groups, which suggests that the minimally invasive approach is less stressful. There are very few studies comparing the rise of IL-6 post operatively between SILC with conventional laparoscopic cholecystectomy and the results are inconclusive also.

Hence, we planned a study to compare the various outcome parameters and level of rise of IL-6 between SILC and traditional four port LC.

Material and Methods

The study was conducted at a University hospital between September 2013 to July 2015 among consecutive patients undergoing elective LC for ultrasonographically diagnosed symptomatic gallstone disease aged between 18-70 years with ASA I/II score. The exclusion criteria were suspected Mirrizi syndrome, common duct stones or malignancy, deranged coagulation profile and with acute cholecystitis or choledocholithiasis proven on ultrasound. After enrollment in the study the patients were randomly allocated to Single incision Laparoscopic Cholecystectomy (SILC) group, Three port LC (3LC) group or Conventional four port LC (4LC) group by use of computer generated random number table.

Anaesthesia Technique

The anaesthesia techniques, anaesthetic drugs and surgical techniques were standardized. Anesthesia was induced with propofol 2–2.5 mg/kg IV, glycopyrrolate 0.2 mg IV, and fentanyl 2 ìg/kg IV. Endotracheal intubation was facilitated with vecuronium 0.15 mg/kg IV. Anesthesia was maintained with 1.0%–2.5% (inspired concentration) isoflurane in oxygen. Ventilation was controlled mechanically and adjusted to keep an end-tidal CO2 partial pressure of 30–40 mm Hg. Neuromuscular block was maintained with vecuronium IV. After tracheal intubation, a nasogastric tube was placed to promote baseline emptying of the stomach of air and gastric contents.

Surgical Technique for Single Incision Laparoscopic Cholecystectomy (SILC)

Patient was placed in reverse trendelenburg leg apart position with the table tilted downward to the patient's left (15 degree). After infiltration of 5 ml bupivacaine solution around the umbilicus, transumbilical 2.5-3.5 cm incision was given and SILC port was placed in the umbilicus through the same skin incision. Pneumoperitoneum was created with insufflation of the abdomen with C02 using SILS port inlet at 15 mm Hg. The two 5mm trocars were used for introducing the convention LC hand instruments. The central 5 mm port was used to introduce 30 degree long telescope (50 cm). An initial gross examination of the entire abdomen cavity was made primarily to exclude injury/bleeding during the creation of the pneumoperitoneum. The anatomy was visualized. A Maryland dissector and a grasper were introduced through other 5mm trocars introduced in SILS port. The fundus of the gallbladder was grasped initially and progressing gradually to Hartman's pouch doing necessary adhesiolysis and flipped upwards over the superior edge of the right lobe by a curved grasper through the SILC port. The sufficient length of cystic duct and cystic artery on gallbladder side were skeletonized, clipped with liga-clips and divided making sure to visualize the gallbladder cystic duct junction and common bile duct cystic duct junction wherever possible. The dissection of the gallbladder from the liver bed was done by laparoscopic hook with monopolar cautery. The gallbladder was then held with toothed grasper and brought out through the umbilical incision. Any bile spill was irrigated with normal saline and suctioned and any stone spill were retrieved. Rectus sheath at umbilicus was closed with vicryl no 1 and skin was approximated with stapler.

Surgical Technique for Standard 4 port Laparoscopic Cholecystectomy

All patients were placed in reverse Trendelenburg position with 15 degree left lateral tilt. Premptive analgesic with 5 ml bupivacaine solution was given at the site of incision and pneumoperitoneum was created via Veress needle with closed technique. A 10-mm supraumbilical port was placed for camera and 3 working ports were made- 10mm port in the mid-epigastrium just to the right of the falciform ligament, and two 5-mm ports in the right upper abdomen two finger breadths below the right margin in the mid-clavicular and the anterior-axillary line. A 10 mm 0° laparoscope was used. An initial gross examination of the entire abdomen cavity was made primarily to exclude injury/bleeding during the creation of the pneumoperitoneum and secondly to identify any gross macroscopic additional disease. The fundus of the gallbladder was grasped by the

assistant and flipped upwards and over the superior edge of the right lobe. A Maryland dissector and a grasper was used to identify the structures in the Calot's triangle using monopolar cautery. The sufficient length of cystic duct and cystic artery on gallbladder side were skeletonized, clipped with 10 mm liga-clips and divided making sure to visualize the gallbladder cystic duct junction and common bile duct cystic duct junction wherever possible. The dissection of the gallbladder from the liver bed was done by laparoscopic hook with monopolar cautery. The gallbladder was then held with toothed grasper and brought out through the epigastric incision. Any bile spill was irrigated with normal saline and suctioned and any stone spill were retrieved.

Assessed Factors

In this study we assessed the conversion rate, duration of surgery, degree of postoperative pain, use of analgesics, hospital stay, complications, cosmetic satisfaction and change in serum level of interleukin 6 postoperatively.

Conversion was assessed by change from one surgical procedure to another for successful removal of gallbladder. The reasons for conversion were recorded.The port site wound infections were classified according to the CDC classification [12] for surgery site infections. Operative time was measured in minutes defined as time taken from, start of giving first incision to skin closure of the last incision. Severity of postoperative pain was recorded at 8hrs after operation and during follow up at 1 week, 3 months by using Visual Analogue Scale (VAS). Hospital stay was calculated as the number of days in the hospital after the surgery until the patient was deemed fit for the discharge by operating surgeon. Cosmetic satisfaction of surgical scar was rated on a scale [range, 0(worst) to 10(best)] and was evaluated at POD 7 or stitch removal which one is earlier and at the 3 month and 6 month follow up visit.

Pre operatively serum level of IL-6 was measured in all patients. Post operatively after 24 hr serum level of IL-6 was re-measured. IL-6 estimation was done by chemiluminesence immunoassay system kit. Then level of increase of this inflammatory mediator was compared between the groups.

Statistical Analysis

Statistical analysis was done using SPSS version 16.0. For continuous data ANOVA test was used to compare the significant difference in mean for more than two groups. For categorical variables Chi-square test and Fisher's – exact test were used. The P-value of < 0.05 considered as statistically significant.

Results

Of 46 patients enrolled in the study 40 patients completed the study. One patient had incidentally diagnosed carcinoma gallbladder on laparoscopy, two had uncontrolled comorbidity, one patient had Mirrizi syndrome and two patient lost to followup after discharge. A total of 40 patients were randomized into two groups. Group I underwent SILC and Group II 4 port LC. The patient characteristics between the two groups were comparable (Table 1a and 1b). There were 2 conversions in Group and 1 in Group II (pvalue-0.804) all because of non progression due to dense Calot's adhesions. There was no difference in the post operative analgesic intake, type of analgesic used and the rate of surgical site wound infection rate (Table 2). The postoperative outcomes are shown in Table 3.The SILC group significantly longer operating time when compared to conventional LC group (Mean time 71 versus 39.5 minutes) although the duration of hospital stay was similar. The VAS was similar on day 0 but was significantly less in SILC group on day 7 and at 3 months postoperatively. Similarly, the day of resuming work was significantly shorter in SILC group compared to conventional LC. The rise in IL-6 level was significantly higher in conventional group compared to SILC group (p-value-<0.001). The cosmesis as assessed by the patient was

Table 1a: Comparison of preoperative parameters between the groups

Variables (N=40)		SILC		4 port		p-value
		No.	%.	No.	%.	
Sex	Male	3	15.0	1	5.0	0.418
	Female	17	85.0	19	95.0	
Socio-economic Status	High	3	15.0	2	10.0	0.767
	Middle	17	85.0	17	85.0	
	Low	0	0.0	1	5.0	
Dyspepsia	Yes	20	100.0	20	100.0	0.001
	No	0	0.0	0	0.0	
Pain abdomen	Yes	20	100.0	20	100.0	0.362
	No	0	**0.0**	0	0.0	

Acid Peptic Disorder	Yes	20	100.0	18	90.0	0.006
	No	0	0.0	2	10.0	
Previous operation	Yes	2	10.0	1	5.0	0.804
	No	18	90.0	19	95.0	
Diabetes Mellitus	Yes	0	.0	2	10.0	0.349
	No	20	100.0	18	90.0	
Tenderness	Yes	1	5.0	0	0.0	0.362
	No	19	95.0	20	100.0	

Table 10b: Comparison of pre-operative parameters between the study groups

Variables (N=40)	SILC (Mean±SD)	4 port (Mean±SD)	F-value	P-value
Age	36.60±9.087	41.15±13.299	.775	.465
Hemoglobin	12.1350±1.30436	12.4150±0.96860	.830	.441
Total Count	8266.50±1481.792	7650.00±1612.615	.830	.441
Creatinine	0.8050±0.19861	0.6550±0.25021	2.474	.093
Urea	25.125±8.7778	31.600±8.3376	2.956	.060
SGPT	33.760±8.8448	48.200±20.0935	3.495	.037
SGOT	35.775±7.7366	43.100±10.0990	1.945	.152
Direct Bilirubin	0.260±0.1429	0.340±0.1314	1.950	.152
Total Bilirubin	0.7200±0.24192	0.8450±0.16694	4.048	.023
Alkaline Phosphatase	103.305±26.8524	110.700±18.4622	.538	.587
Total Protein	7.8050±0.57626	7.7650±0.69606	6.733	.002
Albumin	4.3550±0.56240	4.0050±0.47404	3.181	.049

Table 2: Comparison of conversion rate, analgesic use and wound infection

		SILC		4 port		P-value
		No	%	No	%	
Failure of the technique (n=60)	Yes	2	10.0	1	5.0	**0.804**
	No	18	90.0	19	95.0	
Nature analgesic agents (n=60)	NSAIDs	15	75.0	14	70.0	**0.377**
	NSAIDs and opioid	5	25.0	6	30.0	
Wound infection (n=60)	Yes	2	10.0	1	5.0	**0.765**
	No	18	90.0	19	95.0	

Table 3: Comparison of post-operative parameters

Variables	Group 1 Mean±SD	Group 3 Mean±SD	F-value	P-value
Duration surgery	71.00±9.403	39.50±9.162	92.209	<0.001
Duration hospital stay	2.20±0.523	2.00±0.459	1.541	0.223
Pain day 0 (VAS score)	6.50±0.889	6.50±1.100	2.367	0.103
Pain day 7 (VAS score)	2.70±0.979	3.60±1.046	18.455	<0.001
Pain 3 month (VAS score)	1.60±0.821	1.90±0.788	6.077	0.004
Resuming daily work POD	6.65±1.182	5.75±1.070	5.443	0.007
IL6 preop	15.3185±7.13412	21.5100±11.30472	1.060	0.353
IL6 postop	76.15 ? 19.83	155.23±80.50240	12.04	<0.001
Cosmetic satisfaction Day 7	7.20±1.361	5.20±1.196	16.964	<0.001
Cosmetic satisfaction 3months	9.30±1.342	7.20±1.196	31.683	<0.001
Cosmetic satisfaction 6months	9.60±0.821	7.80±0.894	34.977	<0.001

significantly better in SILC group at day 7 and 3 and 6 months after the operation.

Discussion

LC is the gold standard treatment for gall stone disease. The technique of LC has been standardised and the outcome of the patients following LC is almost stable with a conversion rate of 0.2% [13], biliary complication rate of 0.26 to 0.6% [14,15] and bowel injury rate of 0.14 to 0.35 % [14,15]. Majority of the morbidity related to pain, wound complications and cosmetic outcomes are related to the access sites for

LC. There has been a continuous endeavour to reduce the invasiveness and thus wound related complications of LC and also improve the cosmetic outcomes of LC.

The risk of conversion seems to be higher with SILC as compared to three and four port cholecystectomy. In a metaanalysis by Mate Milas et al, overall conversion of procedure was 69 (6%) among 1142 SILC [16]. The incidence of conversion with SILC was 4.39% vs. 0.53% with LC although the difference was statistically not significant (p value = 0.019). However with increasing experience with SILC the risk of procedure failure seems to have been reduced. In 10 trials with >40 SILC procedures, failure was 3.30% [17]. In our study there were 2 (10%) conversions in the SILC group as compared to 1 in conventional four port group(5%), and conversion rate was not significant (p=0.804). Conversion was mainly due to adhesions which interfered during dissection. Although the incidence appears to be higher than that reported in published literature but no definite inference could be drawn as the number of patients are quite less.

Milas M et al observed higher postoperative wound infection found following SILC. This may be due to longer periumbilical incision and its contamination during the delivery of the gallbladder, suboptimal hygiene of umbilicus itself despite cleaning [16,18]. Because anatomically umbilicus is probably the most difficult location for antiseptic and aseptic precautions and most SILC incision were given through umbilicus. Thus postoperative wound infection at the umbilical site has been a major concern [17] although infection seen was of minor SSI. In our study there has been a marginally higher incidence of wound infection but the difference was not statistically significant (p=0.765). Similar findings were also reported in metanalysis by Geng et al and Allemann et al [17,19]. During follow-up no incisional hernias were noted and it was ensured that sheath closure was done by the operating consultant. However, we need to have a longer follow-up to draw any inference on the development of incisional hernia from the present study.

We found in this study that the total operative time required for SILC (71.00 ± 9.403) as compared to (39.50 ± 9.162) in 4 port LC group which was significantly higher (p<0.001). This is in agreement with the metaanalysis by Liangyuan Geng et al which also concluded a longer operative time for SILC (p=0.005) [17]. Similar results were seen from other mata-analysis [20-23]. However the metaanlysis by Zhong et al including 7 RCT including 611 patients concluded that there was no significant difference in the operative time [24]. Similar metaanalysis by Lai EC et al [25] and Chang SK et al [26] did not find a significant difference in the operative time between the SILC and conventional LC groups.

Postoperative pain is a useful surrogate marker of procedure related trauma. It is often the predictor for early ambulation and return to work. SILC is being introduced as a less invasive procedure with lesser pain. Outcome of SILC in terms of postoperative pain is variable in literature. Meta-analysis of various studies suggest no difference in postoperative pain in both the techniques [16,17,19]. However studies included in these meta-analysis were often heterogenous and there was no uniformity in measure of pain. In our study we found no significant difference in the pain score at 8 hr after surgery (p=0.103), but on 7th day post operatively and after 3 months significantly low pain score was seen in SILC group. According to Geng et al there was no significant difference between post-operative pain in SILC and conventional laparoscopic cholecystectomy [17]. On the other hand, many studies showed a significant increase in post-operative [27-33]. On the other hand pain can be assessed by number of analgesics and nature of analgesics needed on the day of surgery. In our study patients undergone SILC require mostly single analgesics agent (p=0.223) and that too NSAIDS group (p=0.214). But these parameters are not statistically significant. As pain is felt differently for each patient, it is difficult to conclude on whether or not there is less post-operative pain in either of groups. In our study resuming daily work in SILC cases was significant (p=0.007) which may be due to decreased post operative pain, patients resumed in daily work early than the other two groups.

SILC was said to have a significantly shorter stay in the hospital [34-37]. Many though, didn't find a much significant difference in hospital stay [38-39]. In this study we did not find any significant difference in hospital stay among the two groups (p=0.223).

Cosmetic outcome is a very important parameter in assessing out come in laparoscopic surgeries. In a meta-analysis by Mate Milas et al, 5 trials with non-blinded patients (N=513) in favour of SILC (SMD=T.83, p value=0.037), but in 6 trials with blinded patients (N=719) difference was small and insignificant (SMD=0.42, p value=0.548) [16]. The reason for high cosmetic satisfaction score in SILC was attributed to the fact that the scars receded into the umbilicus and was hardly visible following SILC and patients were very satisfied with the cosmetic results. In our study, overall cosmetic satisfaction score was higher in SILC group. The cosmetic

satisfaction was assessed at day 7($p<0.001$), after 3 months ($p<0.001$) and 6 months ($p<0.001$).

In this study after 24 hr of surgery inflammatory parameter IL-6 found to be significantly lower in SILC group ($p<0.001$) than the 4 port LC group, which may explain the fast recovery in these cases by reducing surgical stress and infectious complications correlated to the surgical procedure. According to Luna et al serum IL-6 level after 6hr of surgery was found to lower in SILC group than conventional laparoscopic cholecystectomy group, but it was not statistically significant [39].

Conclusion

The SILC is associated with a longer operating time. This procedure has a lower incidence of early postoperative pain but no pain difference in immediate post-operative period. There is no additional complication associated with SILC as compared to the other 2 groups. There is no difference in the wound healing in three groups. Patients undergone SILC resume daily work early. SILC provide better cosmetic outcome. In SILC group post-operative inflammation is less which may explain the fast recovery in these cases by reducing surgical stress and infectious complications correlated to the surgical procedure. SILC is a safe and feasible procedure.

References

1. De U. Evolution of cholecystectomy: A tribute to Carl August Langenbuch. Indian J Surg 2004; 66: 97-100.
2. Mouret P. From the first laprospective futures. Dig Surg 1991; 8: 124.
3. Santos BF, Teitelbaum EN, Arafat FO, Milad MP, Soper NJ, Hungness ES. Comparison of short-term outcomes between transvaginal hybrid NOTES cholecystectomy and laparoscopic cholecystectomy. SurgEndosc. 2012 Nov; 26(11): 3058-66.
4. Auyang ED, Hungness ES, Vaziri K, Martin JA, Soper NJ. Human NOTES cholecystectomy: transgastric hybrid technique. J Gastrointest Surg. 2009; 13(6): 1149-50.
5. Lehmann KS, Ritz JP, Wibmer A, et al. The German registry for natural orifice translumenal endoscopic surgery: report of the first 551 patients. Ann Surg 2010; 252: 263-70.
6. Hodgett SE, Hernandez JM, Morton CA, Ross SB, Albrink M, Rosemurgy AS. Laparoendoscopic single site (Less) cholecystectomy. J Gastrointest Surg. 2009; 13(2): 188-92.
7. Oruc MT, Ugurlu MU. Extraumbilical single-incision laparoscopic cholecystectomy with standard laparscopic instruments. Scand J Surg. 2013; 102(3): 209-14.
8. Rao PP, Bhagwat SM, Rane A, Rao PP. The feasibility of single port laparoscopic cholecystectomy: a pilot study of 20 cases. HPB (Oxford). 2008; 10(5): 336-40.
9. Kravetz AJ, Iddings D, Basson MD, Kia MA. The learning curve with single-port cholecystectomy. JSLS. 2009; 13(3): 332-6.
10. Shussman N, Schlager A, Elazary R, Khalaileh A. Single-incisio Laparoscopic cholecystectomy: lessons learned for success. SurgEndosc 2010; 24(4): 1177-1179.
11. Navarra G, Pozza E, Occhionorelli S, Carcoforo P, Donini I. One-wound laparoscopic cholecystectomy. Br J Surg 1997; 84(5): 695.
12. Kulaylat MN, Dayton MT. Surgical Complications. In: Townsend CM, Beauchamp RD, Evers BM, Mattox KL, editors. Sabiston Textbook of Surgery, 18th ed. Philadelphia: Saunders: 2008; p. 331.
13. Zhu JF, Hu H, Ma YZ, Xu MZ, Li F. Transumbilical endoscopic surgery: a preliminary clinical report. SurgEndosc. 2009; 23(4): 813-7.
14. Strasberg SM, Hertl M, Soper NJ. An analysis of the problem of biliary injury during laproscopic cholecystectomy. J Am CollSurg 1995; 180: 101.
15. Thurley PD, Dhingsa R. Laparoscopic cholecystectomy: postoperative imaging. AJR Am J Roentgenol 2008; 191: 794.
16. Milas M, Devidija S, Trkulja V. Single incision versus standard multiport laparoscopic cholecystectomy: Up-dated systematic review and meta-analysis of randomized trials. Surgeon. 2014 Feb 11; pii: S1479-666X(14)00015-18.
17. Geng L, Sun C, Bai J. Single incision versus conventional laparoscopic cholecystectomy outcomes: a meta-analysis of randomized controlled trials. PLoS One. 2013 Oct 2; 8(10): e76530.
18. Sinan H, Demirbas S, Ozer MT, Sucullu I, Akyol M. Single-incision laparoscopic cholecystectomy versus laparoscopic cholecystectomy: a prospective randomized study. SurgLaparoscEndoscPercutan Tech 2012; 22(1): 12-6.
19. Allemann P, Demartines N, Schafer M. Remains of the day: biliary complications related to single-port laparoscopic cholecystectomy. World J Gastroenterol. 2014 Jan 21; 203: 843-51.
20. Wang Z, Huang X, Zheng Q. Single-incision versus conventional laparoscopic cholecystectomy: a meta-analysis. ANZ J Surg. 2012 Dec; 82(12): 885-9.
21. Sajid MS, Ladwa N, Kalra L, Hutson KK, Singh KK, Sayegh M. Single-incision laparoscopic

cholecystectomy versus conventional laparoscopic cholecystectomy: metaanalysis and systematic review of randomized controlled trials. World J Surg 2012; 36(11): 2644-53.

22. Trastulli S, Cirocchi R, Desiderio J, Guarino S, Santoro A, Parisi A, Nova G, Boselli C. Systematic review and meta-analysis of randomized clinical trials comparing single-incision versus conventional laparoscopic cholecystectomy. Br J Surg 2013; 100: 191-208.
23. Arezzo A, Scozzari G, Famiglietti F, Passera R, Morino M. Is single-incision laparoscopic cholecystectomy safe? Results of a systematic review and meta-analysis. SurgEndosc. 2013 Jul; 27(7): 2293-304.
24. Zhong X, Rui YY, Zhou ZG. Laparoendoscopic single-site versus traditional laparoscopic surgery in patients with cholecystectomy: a meta-analysis. J LaparoendoscAdvSurg Tech A. 2012 Jun; 22(5): 449-55.
25. Lai EC, Yang GP, Tang CN, Yih PC, Chan OC, Li MK. Prospective randomized comparative study of single incision laparoscopic cholecystectomy. Am J Surg. 2011 Sep; 202(3): 254-8.
26. Chang SK, Wang YL, Shen L, lyer SG, Shaik AB, Lomanto D. Interim report: a randomized controlled trial comparing postoperative pain in single-incision laparoscopic cholecystectomy and conventional laparoscopic cholecystectomy. Asian J Endosc Surg. 2013 Feb; 6(1): 14-20.
27. Marks, J. Tacchino, R. Roberts, K. Onders, R. Denoto, G. Paraskeva, P.Shah. Prospective randomized controlled trial of traditional laparoscopic cholecystectomy versus single-incision laparoscopic cholecystectomy: report of preliminary data. The American Journal of Surgery, 2011; 3: 369-373.
28. Lirici, M. M., Califano, A. D., Angelini, P., &Corcione, F. Laparo-endoscopic single site cholecystectomy versus standard laparoscopic cholecystectomy: results of a pilot randomized trial. The American Journal of Surgery, 2011; 202(1): 45-52.
29. Ma J, Cassera MA, Spaun GO, Hammill CW, Hansen PD, Aliabadi-Wahle S. (2011). Randomized controlled trial comparing single-port laparoscopic cholecystectomy and four-port laparoscopic cholecystectomy. Annals of surgery, 2011; 254(1): 22-27.
30. Phillips MS, Marks JM, Roberts K, Tacchino R, Onders R, DeNoto G, Shah S. Intermediate results of a prospective randomized controlled trial of traditional four-port laparoscopic cholecystectomy versus single-incision laparoscopic cholecystectomy. Surgical endoscopy, 2012; 26(5), 1296-1303.
31. Lee PC, Lo C, Lai PS, Chang JJ, Huang SJ, Lin MT, Lee PH. Randomized clinical trial of single incision laparoscopic cholecystectomy versus minilaparoscopic cholecystectomy. British Journal of Surgery, 2010; 97(7): 1007-1012.
32. Ostlie DJ, Sharp NE, Thomas P, Sharp SW, Holcomb GW, St. Peter SD. Patient Scar Assessment After Single-Incision Versus Four-Port Laparoscopic Cholecystectomy: Long-Term Follow-Up from a Prospective Randomized Trial. Journal of Laparoendoscopic& Advanced Surgical Techniques, 2013; 23(6): 553-555.
33. Moreira-Pinto J, Lima E, Correia-Pinto J, Rolanda C. Natural orifice transluminal endoscopy surgery: A review. World journal of gastroenterology: WJG, 2011; 17(33): 3795.
34. Antoniou SA, Pointner R, Granderath FA. Single-incision laparoscopic cholecystectomy: a systematic review. Surgical endoscopy, 2011; 25(2): 367-377.
35. Gill ISA, Aron AP, Caddedu M, Canes J, Curcillo D, Teixeira PG. Consensus statement of the consortium for laparoendoscopic single-site surgery. Surgical endoscopy, 2010; 24(4): 762-768. http://dx.doi.org/10.1007/s00464-009-0688-8.
36. Bucher P, Pugin F, Buchs NC, Ostermann S, Morel P. Randomized clinical trial of laparoendoscopic single site versus conventional laparoscopic cholecystectomy. British Journal of Surgery, 2011; 98(12): 1695-1702. http://dx.doi.org/10.1002/bjs.7689.
37. Gangl O, Hofer W, Tomaselli F, Sautner T, Függer R. Single incision laparoscopic cholecystectomy (SILC) versus laparoscopic cholecystectomy (LC)—a matched pair analysis. Langenbeck's Archives of Surgery, 2011; 396(6): 819-824.
38. Barband A, Fakhree MB, Kakaei F, Daryani A. Single-incision laparoscopic cholecystectomy using glove port in comparison with standard laparoscopic cholecystectomy SILC using glove port. SurgLaparoscEndoscPercutan Tech. 2012; 22(1): 17-20.
39. Luna RA, Nogueira DB, Varela PS, Rodrigues Neto Ede O, Norton MJ, RibeiroLdo C, Peixoto AM, de Mendonca YL, Bendet I, Fiorelli RA, Dolan JP. A prospective, randomized comparison of pain, inflammatory response, and short-term outcomes between single port and laparoscopic cholecystectomy. SurgEndosc. 2013 Apr; 27(4): 1254-9.

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A Clinical Study on Chronic Leg and Foot Ulcers

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Abstract

An observational to study and analyze the Age and sex distribution, Types, Etiology, Co-morbid factors, Microbiology, Treatment modalities Outcome and follow up of various leg and foot ulcers. Peripheral neuropathy, peripheral vascular diseases are the significant contributing factors in diabetic ulcers. All Malignant ulcers are treated in a multimodality approach like surgery, radiotherapy. Amputations can be prevented by health education and proper care.

Keywords: Leg and Foot Ulcers; Clinical Presentation; Management.

Introduction

Ulceration of the leg and foot is a frequent condition seen in most of the surgical wards and out-patient department. The main causes are trauma, chronic venous insufficiency, lower extremity arterial disease and diabetes. Less frequent conditions are blood dyscrasias, infections, skin malignancies, vasculities . But even rare condition exists such as recently discovered combination of vasculities and hypercoagulability. For a proper treatment of patients with leg ulcers, it is important to be aware of the large differential diagnosis of leg ulcers. The best treatment of any leg ulcer depends upon the accurate diagnosis and the underlying etiology.

Materials and Methods

Source of data: 600 cases of ulcers of leg and foot admitted to the Department of General Surgery, between JUN 2010 and JUN 2012.

Method of Collection of Data

1. Definition of a study subject: Patients with symptoms pertaining to leg and foot ulcers admitted to Department of General Surgery.
2. The method of study: Consists of- Detailed history taking & clinical examination as per the proforma.

Investigations after Taking Written Informed Consent

- Routine blood and urine investigations: Hb%, TC, DC, Peripheral smear, ESR, Renal function tests, Liver function tests, Lipid profile, FBS/ PPBS, HIV, HBsAg, VDRL test, Urine for albumin, sugars, ketone bodies, microscopy.
- Specific investigations: ABPI, X-ray of the chest and the affected foot, Wound culture & sensitivity, Biopsy from the ulcer edge, Skin biopsy, Colour doppler imaging, FNAC (Fine Needle Aspiration Cytology) of the lymph node, Nerve biopsy if required. Diagnosis of the primary cause of the ulcer. Appropriate management of the ulcer and the primary cause.

Results

Among the 600 cases were studied traumatic ulcers accounting for 334 cases (55.6%), Followed by Diabetic ulcers (29.11%), Venous ulcers (7.6%), Arterial ulcers (6.63%), Malignant ulcers (1%). Incidence of leg ulcers age group of above 50 yrs (82.6%). Chronic leg ulcers were more common in males than in females accounting for about 79.3%. Smoking is is seen in 386 (64.3%) cases. counterirritant application is seen

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in 376(62.6%) cases. Klebseilla pneumonia isolated in pus culture accounting 62.6%.

Traumatic Ulcers

Out of 600 cases were studied traumatic ulcers accounted for 334 cases. Majority of the cases were treated by thorough debridement in 228(68.26%) cases. Among the 24 patients who underwent different types of amputations, BKA amputation is done in 14 cases, sepsis seen in 38 cases, 4 cases died due to sepsis.

Diabetic Ulcers

Out of 600 cases were studied diabetic ulcers accounted for 174 cases. Most of the cases presented to our op department in wagner grade2 (114 cases; 65.51%) followed by grade 1(13.21%)>grade 3(9.77%)>grade 4(6.32%)>grade 5(5.17%). In present study peripheral vascular disease is seen in 62 (35.63%) cases. Peripheral neuropathy is seen in 58(33.3%) cases. Osteomylitis of bones seen in 8(4.6%) cases92 cases were treated by thorough debridement with split skin grafting.36 amputations were done of those 18 were ray amputations, 14 were BKA amputations and 4 were AKA amputations. Diabetic ketoacidosis is observed in 33 patients. 14 patients died due to diabetic ketoacidosis with sepsis.

Venous Ulcers

Out of 600 cases were studied venous ulcers accounted for 46 cases(7.6%%). 24 of cases were treated with trendelenberg operation + stripping.18 patients were treated with trendelenberg operation. Pigmentation around the ulcer is seen in 44 (95.65%) cases.

Arterial Ulcers

Out of 600 cases were studied Arterial ulcers accounted for 40 cases.70% of the arterial ulcers were due to atherosclerosis.14 cases underwent lumbar sympathectomy, 14 cases underwent minor amputations followed by 10 cases underwent major amputations. Sepsis is seen in 2 cases, Myocardial infarction is seen in 4 cases, 1 case got ischemic stroke. one patient died due to myocardial infarction.

Malignant Ulcers

Out of 600 cases were studied malignant ulcers accounted for 6 cases. Of those 3 cases were having malignant melanoma, 3 cases were having squamous cell carcinoma.

Malignant Melanoma

3 Cases were noted, 2 cases were treated by wide local excision+split skin grafting. 1 case was treated by wide local excision+local rotation flap.

Squamous cell carcinoma:3 Cases were noted 2 of them were treated by wide local excision+split skin grafting. One case underwent BKA amputation.

Table 1: Type of ulcers

Type of ulcer	No of cases	%
Traumatic ulcers	334	55.6%
Diabetic ulcers	174	29.11%
Venous Ulcers	46	7.6%
Arterial Ulcers	40	6.63%
Malignant Ulcers	6	1%
Total	600	100%

Table 2: Age distribution of ulcers

Age	No of cases	%
>60 yrs	254	42.3%
50-60 yrs	242	40.3%
40-50 yrs	62	10.4%
30-40 yrs	25	4.2%
<30 yrs	17	2.8%
Total	600	100%

Table 3: Sex distribution of ulcers

	No of cases	%
Male	476	79.3%
Female	124	20.7%
Total	600	100%

Table 4: Various organisms isolated in pus culture & sensitivity

Organism	No. of cases	%
Klebseilla pneumonia	376	62.6%
Pseudomonas species	312	52%
Proteus species	257	42.3%
E.coli	62	10.3%
Staphylococci	52	8.9%

Table 5: Distribution of various types of amputations in traumatic ulcers

Type of amputation	No of patients	%
Ray Amputation	6	25%
BKA Amputation	14	58.33%
AKA Amputation	4	16.67%
Total	24	100%

Table 6: Mode of clinical presentation of diabetic ulcers

Wagner grade	No of patients	%
Wagner Grade I	23	13.21%
Wagner Grade II	114	65.51%
Wagner Grade III	17	9.77%
Wagner Grade IV	11	6.32%
Wagner Grade V	9	51.7%
Total	174	100%

Table 7: Peripheral vascular disease in patients

Peripheral vascular disease	No of patients	%
Present	62	35.63%
Absent	112	64.37%
Total	174	100%

Table 8: Surgical treatment of diabetic ulcers

Treatment received	No of patients	%
Thorough debridement without SSG	42	24.16%
Thorough debridement with SSG	92	52.87%
Thorough debridement with local flaps	4	2.29%
Amputations	36	20.68%
Total	174	100%

Table 9: Treatment received in venous ulcers

Treatment received	No of patients	%
Bisgards line of management	4	8.7%
Trende lenberg operation+ Bisgards line of management	18	39.13%
Trendelenberg operation+stripping+ Bisgards line of management	24	52.17%
Total	46	100%

Table 10: Treatment received in arterial ulcers

Treatment	No of patients	%
Conservative management	2	5%
Lumbar symp athectomy	14	35%
Minor amputations	14	35%
Major amputations	10	25%
Total	40	100%

Discussion

Traumatic ulcers accounting for 334 cases (55.6%), Followed by diabetic ulcers (29.11%).This may be as result of low incidence of arterial and venous diseases in developing countries like India. Traumatic ulcers incidence is more as agricultural laborers, barefoot individuals are more in our study group and they are more prone for trauma. In this study, chronic ulcer with vascular etiology accounted for only 14.23% [1,2] of all chronic ulcers. Out of this, venous ulcers accounted for 7.6% [1,2] and arterial ulcers accounted for 6.63% [1,2].

Incidence of leg ulcers in our study was found to be maximum in patients above 50 yrs (82.6%) [3]. It is more common in males than in females accounting for about 79.3% [4]. Smoking is the most common associated factor is seen in 386 (64.3%) cases. We found counterirritant application in 376(62.6%) cases. We found that it is a significant contributing factor in ulceration and progression of the ulceration. Klebseilla pneumonia is the most common organism isolated in pus culture [5].

Traumatic Ulcers

In our study majority of the cases were treated early thorough Debridement [6]. Uncontrolled infection was the major complication and it was the major indication for amputation.

Diabetic Ulcers

Most of the cases presented to our department in Wagner grade II. In the present study out of 174 cases 58 were having neuropathy accounting for 33.3% of study sample, which is correlated with the Walter DP et al 99(39.4%). In our study associated peripheral vascular disease (PVD) is seen in 62(35.63%) cases correlated with the study of Moss et al 98 (39%). In our study osteomylitis was found in 18(4.6%) cases out of 174 cases. All cases were treated with broad spectrum antibiotics and local resection of the bone. According to WHO Study incidence of osteomylitis in diabetes is 15%. In our study RBS was done 8th hourly to monitor the blood sugar level of the patient. Based on the RBS levels we have used oral hypoglycemic drugs or insulin regime or both. Debridement has given a favorable outcome [9]. Cases where debridement was not done properly came late, progressed and eventually some of them underwent amputation. In the present study diabetes accounted for majority of the major extremity amputation. This was due to the fact that health awareness was low in the population studied and many of the patients were diagnosed with diabetes only following admission for advanced lower limb infections and /or gangrene. Diabetic ketoacidosis is seen in 33 patients and Out of 174 patients 14(8.04%) patients died due to uncontrolled diabetes and septic shock. This high mortality due to the fact that many of the patients were diagnosed with diabetes only following admission for advanced lower limb infections and / or gangrene Venous ulcers: In this study, long saphenous system was found to be by far the

commonest system [11]. All patients were treated with Bisgard's line of management initially [12] 24 cases were treated with Trendelenberg operation + stripping. Mc complication: pigmentation around the ulcer.

Arterial Ulcers

Most of them are due to atherosclerosis [13]: lumbar sympathectomy was found to be a good option in some cases for pain relief and healing.

Duration of Hospital Stay

In the present study duration of hospital stay is more in diabetic ulcers (45.6 days) when compared with ulcers of other etiology. It is due to the fact that many cases were presented to us in advanced disease and also uncontrolled sepsis & with diabetic neuropathy and vasculopathy were also the contributing factors.

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Conclusions

M/C were Traumatic ulcers. M/C age group was > 50 years.Males predominanted . M/C association was smoking. Counter irritant application was observed in majority cases.Broad spectrum antibiotics should be used. Peripheral neuropathy, peripheral vascular diseases are the significant contributing factors in diabetic ulcers. Meticulous glycemic control has given the good results in wound healing. Various off loading methods should be advised to all patients with diabetic ulcers. Colour Doppler is a very useful diagnostic tool in evaluating vascular ulcers. Elevation of limb and compressive therapy are gold standard in treatment of venous ulcers. Implement anticoagulant therapy in cases of DVT. Lumbar sympathectomy can be done where pain could not be relieved with analgesics or narcotics in arterial ulcers. All Malignant ulcers are treated in a multimodality approach like surgery, radiotherapy.An Amputee is a burden not only for himself, but to the total Community as well.Amputations can be prevented by health education and proper care.Foot must be taken care equal to face

Referrences

1. Gilliland E. L., John H. N. et al. ABC of vascular diseases: Leg ulcers. Br Med J. 303: 776-779.
2. H Callam MJ, Harper DY, Dale JJ, et al. Chronic ulcer of the leg: clinical history. BMJ. 1987; 294: 1389-1391allbook T. Leg ulcer epidemiology. Acta Chir Scand. 1988; 544(suppl): 17-20.
3. P K Sarkar, S Ballantyne.Postgrad Med J. 2000; 76: 674–682.
4. Guobjorg palsidottir, Asta Thoroddsen et al. Ewma Journal. 2010; 10(1): 21).
5. Delbridge L, Ctercteko G, Fowler C et al. the etiology of diabetic neuropathic ulcerations of the foot, Br. J. Surg. 1985; 72: 1-6.
6. G.A Rahmen,I.A Adigun,A Fadeyi.Annals of African Medicine. 2010; 19(1): 1-4.
7. Aplequist J, Castenfor J, Larson J, Stenstolm A, Agardha CD. Wound classification is more important than site of ulceration in the outcome of diabetic foot ulcers. Diabetic Med 1989; 6(6) :526–30.
8. Moss SE, Klein R, Klein BEK. The 14 years incidence of lower extremity amputation in diabetic population. Diabetes care 1999; 22(6) :p.148 – 56.
9. Walter D.P Gatting, W;Mulle P et al.the distribution and sverity of diabetic foot disease.Diabetes Med 1992; 9: 354-358.
10. Rubinstein A, Pierce CE Jr. Rapid healing of diabetic foot ulcers with meticulous blood glucose control. Acta Diabetol Lat. 1988; 25(1): 25–32.
11. T.sakurai, P.C Gupta, M.Matsshushista; correlation of the anatomical distribution of venous reflex with clinical symptoms and venous hemodynamics in primary varicose veins Br J Surg feb-1998; 85: 213-216.
12. Herouy Y, May AE, Pornschlegel G, et al. Lipodermatosclerosis is characterized by elevated expression and activation of matrix metalloproteinases: implications for venous ulcer formation. J Invest Dermatol 1998; 111: 822-827.
13. Moffatt CJ, Franks PJ , Doherty DC , Martin R . Prevalence of leg ulceration in a London population. QJM (2004); 97(7): 431-437.

Original Article

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A Clinical Study of Cervical Lymphadentis in Hiv Patients

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Abstract

Cervical lymphodenopathy is a common clinical condition. A study was conducted to evaluate the incidence in HIV patients. 54% of the cervical lymphodenopathy was due to Kochs lesion. 11% of the Koch's lymphaadenitis patients were found to be HIV positive.

Key words: Cervical Lymphadenitis; Koch's Lymphadenitis; HIV Positive.

Introduction

Neck swelling is one of the common symptoms we see in surgical opd. cervical lymphadenitis is a major problem of which majority could be due to TB in our country, Other conditions like secondaries in neck, lymphoma and in patients with HIV positive are rare. The age, sex incidence and investigations to confirm the diagnosis were studied. Tuberculosis cervical lymphadenitis being the commonest, their associations with pulmonary tuberculosis and HIV status were studied.

Meterial and Methods

100 case of cervical lymphodenopathy were studied with neck swelling excluding thyroid swelling... Male, female ratio was also noted. Symptoms in adition to the swelling were also recorded,. Unilateral, Bilateral and groups of lymph nodes involved were also studied. After confirming the diagnosispatients were managed accordingly. Most of them are symptom free. Non specific lymphadenitis patients were given broad spectrum antibiotic for a week and followed up.

Observations and Results

Out of 100 cases 54% of them are clearTuberculous lymphadenitis and 46% are non specific lymphadenitis. 90% of them are below the age of 40 years. 57 cases were females and 43 cases were males. 60% of Kochslymphadenitispatients gave history of constitutional symptom (Fever, loss of weight and appetite) where as only 30% of non specific lymph nodes have these symptoms. 8% of people had history of exposure. Upper deep cervical lympnodes. Level II were involved in both specific and non specific lymphadenitis, followed by level V posterior triangle lymph nodes. Unilateral involvement is more common in both specific (98%) and non specificlymphadenitis(87%). Right sided involvement was more (59%) in specific on (52%) in Non specificlymphadenitis.11% of specific lymphadenitiswere HIV positive and 2% of non specific lymphadenitis were HIV positive. FNAC is sensitive and specific in diagnosis of tuberculosis cervical lymphadenitis. Excision biopsy was done only in 10 cases where FNAC was in conclusive.

Dots treatment was given for all the specific lymphadenitis patients and they were followed up for 6 months. All most all them were relieved of constitutional symptoms, improved their appetite and size of the swelling decrease in 60% cases and disappeared in 40% cases in 6 months and non specific lymphadenitis was treated by 10 days broad spectrum antibiotic and counseled and assured. All patients with HIV positive were treated with zidovidine as per regimen after recording basal cd4 count levels.

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Discussion

Cervical lymphadenitis is one of the presentationswith neck swellings to the surgical OPD's. Females are more affected than males. 50% of neck masses are found to be tuberculosis. This could be confirmed by FNAC. Rarely It is needed to open or excision biopsy. Commonest lymph node involved was upper deep cervical lymph nodes. Different stages of tuberculosis lymphanodentis were presented but mostly they are in Matting and cold abscess stages. Ever though cervical Koch's is Lymphadenitis is primary. Cervical lymphadenitis was found to be HIV positive, in comparison with 2% in Non specific lymphadenitis s patients. TB is more common in HIV patients are also revealed in our study. Dots regimes taken properly can cure the Koch's lymphadenitis. Whereas nonspecific lymphadenitis needs only reassurance. Follow up of these patient revealed very good results.

Conclusion

Tuberculosis is an important disease, one of the commonest disease affecting lymph nodes, it is curable with antituberculos drugs if administered as per the accepted regimen. HIV positive patients can also present with cervical lymphadenitis or with constitutional symptoms mimicking TB. FNAC can be deemed as a frontline investigation. However, histopathological examination remains the most dependable diagnostic tool. Most of the diseases are medically curable with limited role for surgery in non-neoplastic lesions. Cervical Lymphadenopathy is an important disease, commonly seen in surgical OP and always calls for meticulous attention. With definitive assessment and evaluation it can be managed effectively.

References

1. Appling D and Miller RH. Mycobacterial cervical lymphadenopathy, update, 1981.
2. Cantrell RW et al. Diagnosis and management of tubercular cervical lymphadenitis. Arch Otolaryngol, January, 1975.
3. Rao KN. Tuberculosis of lymph glands, Textbook on Tuberculosis,1970.
4. Sin KF et al. TB Lymphadenopathy, a reviewing results of surgical treatment, Arch Otolaryngol, 1983.
5. Gupta AK,Nayar M and Chandra M.Critical appraisal of fine needle aspiration cytology in tuberculosis lymphadenitis. ActaCytol. 1992.
6. Lau SK, Wei Wl, Hsu C, Engzell UC. Efficacy of fine needle aspiration cytology in the diagnosis of tuberculosis cervical Lymphadenopathy. Laryngol, 1990.
7. JhaBC,DassA,Nagarkar NM,Gupta R, Sighal S.Cervical tuberculosis Lymphadenopathy: Changing clinical patterns and concepts in management. Post-graduate Med.J. 2001; March.

Original Article

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The Role of Fournier's Gangrene Severity Index as a Predictor of outcome and a Tool for Optimum Management of Patients with Fournier's Gangrene : A Prospective Clinical Study at a Tertiary Care Center

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Abstract

Background: Fournier's gangrene is a potentially fatal acute, necrotizing fascitis of the scrotum and perineal region associated with a synergistic bacterial infection of the subcutaneous fat and superficial fascia with a mortality rates ranging from 20-30%. *Aims and objectives:* The study was carried out with the objective to assess the role of Fournier's gangrene severity index (FGSI) as a predictor of outcome in patients with Fournier's gangrene. *Materials and Methods:* A prospective study was carried out on 54 consecutive male Fournier's gangrene cases. The data was collected in the Department of Surgery, Vardhman Mahavir Medical College, Safdarjang Hospital. All patients were treated with broad spectrum antibiotics and serial surgical debridements. *Results:* Age of the patients varied from 27 yrs to 62 yrs with the mean duration of stay being 19.6 days. Mortality rate observed in our study was 17(31.5%) out of the 54. 38.9%(21) of the cases were diabetic and 51.9%(28) were alcoholics. 22(40.7%) cases had no significant history before the development of the disease, whereas 32(59.3%) had some predisposing condition prior to onset of gangrene. Majority of our patients 24(44.4%) had a polymicrobial infection with Pseudomonas aeruginosa 11(20.4%) being the next most common organism. The Fournier's gangrene severity index score in the survivors (n=37) varied from a score of 1 to 7 compared to the non survivors in whom it was more than 7. All 17 cases who succumbed to the disease had an average Fournier's gangrene severity index score of 9.4 (Range: 8-18) at the time of admission. The average FGSI score in the survivors was 3.8 (Range 0-7). *Conclusions:* Fournier's gangrene still persists in our country and is a lethal condition, if not treated early and energetically. Diabetics are more susceptible to developing the disease and more often than not there is a definite predisposing factor before the onset of disease. Most of the cases have poly-microbial infection and some secondarily get infected by hospital acquired organisms. Fournier's gangrene severity index is a simplified way of comparing patients with the disease and also has significance in predicting outcome and guiding management.

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Background

Fournier's gangrene is an uncommon, rapidly progressive infection of the male genital, perineal and perianal regions with occasional extension to the abdominal wall. It is characterized by a synergistic, necrotising fascitis leading to the thrombotic occlusion of small subcutaneous vessels and the development of gangrene, which contributes to the rapid spread of infection [1]. Majority of patients with Fournier's gangrene are immuno-compromised [2]. Diabetes Mellitus, obesity, peripheral vascular disease, local trauma, urethral stricture and perianal disease have been cited as the main predisposing factors [3-5].

Fournier's gangrene is a life threatening illness requiring emergency surgery, despite which the patient may still not survive. Mortality rates as high as 20 to 30 percent have been described in some studies [3]. Certain factors influencing the survival of these patients, primarily relating to the patient's metabolic status and the extent of the disease, were evaluated by Laor *et al.* from which the Fournier's gangrene severity index (FGSI) was formulated [6]. In FGSI, nine parameters are measured and the degree of deviation from normal is graded from 0 to 4. The individual values are summed to obtain the FGSI score (FGSIS). These parameters are: temperature, heart rate,

respiratory rate, levels of serum sodium, potassium, creatinine and bicarbonate, haematocrit and leukocyte count. In a study by Yeniyol *et al.* the accuracy of this index was tested. They found that the duration of symptoms before presentation was statistically important [4]. Out of the nine parameters, temperature, heart rate and respiratory rate were considered to be the most important by these authors. In patients who died, however, all the parameters were abnormal. The authors also found that lower serum albumin and total protein levels indicated the degree of debilitation and a poor prognosis. Lin E, Yang S, et al. suggested that a FGSI cutoff of 9 was an excellent predictor of outcome of cases [7]. However, early diagnosis and treatment and the arrest of the gangrene at an early stage markedly improve outcome. A study carried out by Tuncel et al. on 20 Fournier's gangrene patients concluded that FGSI did not predict the disease severity and the patient survival.

There is lack of Indian literature on the use of Fournier's Gangrene Severity Index as a prognostic marker in cases.

Table 1: Fournier's Gangrene Severity Index Parameters

Physiologic Variables	High abnormal values				Normal	Low Abnormal Values			
	+4	+3	+2	+1	0	+1	+2	+3	+4
Temperature(c)	>41	39-40.9	-	38.5-39	36-38.4	34-35.9	32-33.9	30-31.9	<29.9
Heart Rate	>180	140-179	110-139	-	70-109	-	55-69	40-54	<39
Respiratory rate	>50	35-49	-	25-34	12-24	10-11	6-9	-	<5
Serum sodium (mmol/L)	>180	160-179	266-159	350-354	130-149	-	120-129	111-119	<110
Serum Potassium (mmol/L)	>7	6-6.9	-	5.5-5.9	3.5-5.4	3-3.4	2.5-2.9	-	<3.5
Serum Creatinine(mg/100/ml*2 for acute renal faliure)	>3.5	2-3.4	1.5-1.9	-	0.6-1.4	-	<0.6	-	-
Hematocrit	>60	-	50-59.9	46-49.9	30-45.9	-	20-29.9	-	<20
WBC(total/mm*1000)	>40	-	20-39.9	15-19.9	3-14.9	-	1-2.9	-	<1
Serum bicarbonate(venous, mmol/l)	>52	41-51.9	-	32-40.9	22-31.9	-	18-21.9	15-17.9	<15

Aims and Objectives

The study was carried out with the objective to assess the role of Fournier's gangrene severity index (FGSI) as a predictor of outcome in patients with Fournier's gangrene.

Materials and Methods

A prospective study was carried out on 54 consecutive male Fournier's gangrene cases at the Department of Surgery, Vardhman Mahavir Medical College, Safdarjang Hospital. After taking an informed consent from the patient, detailed history and physical examination were recorded. The duration of the study was one year. The diagnosis of Fournier's gangrene was made by the attending physician. The site, extent and origin of the ulcers were documented. Foci of infection in their perineum and anorectal regions were sought. All patients were treated with empirical broad spectrum antibiotics (combination of a 3rd generation cephalosporin, an aminoglycoside & metronidazole or clindamycin) and serial surgical debridements. Initial debridement was carried out under general or regional anesthesia followed by serial bed side debridements under sedation. Urinary and fecal diversion was carried out in patients with urethral and anal involvement. Tissue and swabs for culture were sent in an appropriate manner before starting the patients on antibiotics. Anaerobic cultures were not sent. After receiving the culture sensitivity reports, antibiotics were changed accordingly. FGSI was calculated in all the patients at the time of admission.

Results

The age of the patients varied from 27 yrs to 62 yrs (mean 46.3 yrs). The mean duration of hospital stay was 19.6 days (Range: 5-31 days). 17(31.5%) out of the 54 patients succumbed to the disease. 38.9%(21) of the cases were diabetic and 51.9%(28) were alcoholics. 9 patients (16.7%) had a history of predisposing perineal or rectal abscess, 6(11.1%) had a history of burning micturition, 6(11.1%) cases had a history of urethral instrumentation prior to the development of symptoms, 5 (9.3%) had a history of perineal itching prior to the development of the gangrene, 3(5.6%) had a history of hemorrhoid surgery prior to development of symptoms and 3 case (5.6%) had a history of hydrocele operation before the onset of disease. The rest of the 22(40.7%) cases had no significant history before the development of the disease. 29(53.7%) patients required urinary diversion along with 11(20.3%) patients who required

fecal diversion (colostomy). No orchidectomies were carried out during debridements.

24 (44.4%) had a polymicrobial infection, 11 (20.4%) had Pseudomonas aeruginosa, 7(12.9%) had Klebsiella species, 5(9.3%) had Proteus mirabilis and 7(12.9%) cases had contaminants in the cultures. In 23(42.5%) patients the antibiotics were changed based on the culture sensitivity reports.

The Fournier's gangrene severity index score in the survivors (n=37) varied from a score of 1 to 7 compared to the non survivors in whom it was more than 7. All 17 cases who succumbed to the disease had an average Fournier's gangrene severity index score of 9.4 (Range: 8-18) at the time of admission. The average FGSI score in the survivors was 3.8 (Range 0-7).

Review of Literature

Study	Country	N	Mortality Rate	Mean duration of Hospitalization (days)
Present Study (200 9)	India	54	31.5%	19.6
Tuncel et al. (2006) [8]	Turkey	20	30%	-
Brissiaud et al. (1998) [9]	Senegal	44	34%	42
Clayton et al. (1990) [10]	Chicago	57	18%	48
Hosseini et al. (2006) [11]	Iran	12	16.7%	24.9
Picramenos et al. (1995) [12]	Greece	10	30%	38
Corcoran et al. (2008) [13]	USA	68	10%	

Conclusions

Fournier's gangrene is still a life threatening disease requiring early diagnosis and aggressive management. Diabetics are more prone to suffer from Fournier's gangrene and most of the cases (59.3%) have a predisposing event before the onset of the disease. The cases have either polymicrobial infection (44.4%) or get secondarily infected from hospital acquired organisms. The Fournier's gangrene severity index is an easy score to calculate at the time of admission can help determine the prognosis and hospital course of a case.

References

1. Patankar SP, Lalwani SK. *Fournier's gangrene. J Indian Paediatr* 2004; 41: 511.
2. McLatchie GR, Leaper DJ. Oxford Handbook of Clinical Surgery. *2nd ed. Oxford UK: Oxford University Press, 2003; 53: 890.*
3. Pawlowski W, Wronski M, Krasnodebski IW. *Fournier's gangrene. Pol Merkuriusz Lek* 2004; 17(97): 85-7.
4. Yeniyol CO, Suelozogen T, Arslan M, Ayder RA. *Fournier's gangrene: Experience with 25 patients and the use of Fournier's gangrene severity index score. Urology* 2004; 64(2): 218-22.
5. Chintamani, Shanker M, Singhal V, Singh JP,Bansal A, Saxena S. *Squamous cell carcinoma developing in the scar of Fournier's gangrene-Case Report. BMC Cancer* 2004; 4: 16.
6. Laor E, Palmer LS, Toila BM. *Outcome prediction in patients with Fournier's gangrene. J Urol* 1995; 154: 89-92.
7. Lin E, Yang S, Chiu AW, Chow YC. *Is Fournier's Gangrene Severity Index useful in predicting outcome of Fournier's Gangrene. Urol. Int.* 2005; 75(2): 119-22.
8. Tuncel A, Aydin O, Tekdogan U, Nalcacioglu V, Capar Y, Atan A. *Fournier's gangrene: Three years of experience with 20 patients and validity of the Fournier's Gangrene Severity Index Score. Eur Urol.* 2006 Oct; 50(4): 838-43.
9. Brissiaud JC, Azam P, Paret B, Lopy J, Louis C, Collet F. *Skin gangrene of the external genitalia. Report of 44 cases. Chirurgie.* 1998 Sep; 123(4): 387-93.
10. Clayton MD, Fowler JE Jr, Sharifi R, Pearl RK. *Causes, presentation and survival of fifty-seven patients with necrotizing fasciitis of the male genitalia. Surg Gynecol Obstet.* 1990; 170: 49-55.
11. Hosseini SJ, Hosseini SJ, Rahmani M, Razzaghi M, Barghi M, Hosseini Moghaddam SM. *Fournier gangrene: a series of 12 patients. Urol J.* 2006 Summer; 3(3): 165-70.
12. Picramenos D, Deliveliotis C, Macrichoritis K, Alexopoulou K, Kostakopoulos A, Dimopoulos C. *Fournier's gangrene: etiology, treatment, and complications. Prog Urol.* 1995 Nov; 5(5): 701-5.
13. Corcoran AT, Smaldone MC, Gibbons EP, Walsh TJ, Davies BJ. *Validation of the Fournier's gangrene severity index in a large contemporary series. J Urol.* 2008 Sep; 180(3): 944-8.

Case Report

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Bilateral Single System Ectopic Ureter with Bladder Agenesis Opening Intovaginalised Urogenital Sinus

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Abstract

Single system ectopic ureters are rare and bilateral single system ectopic ureters (BSSEU) are even rarer. Common locations of openings of such ureters include vagina and vestibule in the females, and posterior urethra and seminal vesicles in the males. BSSEU opening into a vaginalized urogenital sinus with absence of urinary bladder is an extremely rare occurrence. Such a case is being reported and its management is discussed briefly.

Keywords: Single System Ectopic Ureters ; Vaginalized Urogenital Sinus; Bladder Agenesis; Continent Cutaneous Diversion.

Introduction

Almost 80% of ectopic ureters are associated with duplicated system and 5-17% of them are bilateral [1]. Bilateral single system ectopic ureters (BSSEU) is a rare entity that may be associated with a hypoplastic bladder and bilateral renal abnormalities, typically dysplasia [2]. Vaginalized urogenital sinus is the term used when ureters drain into a well developed vagina that has a near normal vaginal introitus.3 We report a case of BSSEU opening into vaginalised urogenital sinus with bladder agenesis. Only four other similar cases have been reported so far in the literature [3,4,11,12].

Case Report

A 5 year-old girl presented with continuous dribbling of urine without any voiding stream since birth. There was no history of any bowel complaints. Her mother denied use of any drugs or history of fever during pregnancy. Family history for congenital disorders was negative. On examination, the external genitalia were of female phenotype. On separating labia majora, a single opening with continuous urine leakage was seen (Figure 1). There was no skeletal defect or any other associated anomaly. Rest of the general physical examination, neurological examination and anal tone were normal. Routine blood and urine tests were all normal. On ultrasonography (USG) bilateral mild to moderate hydroureteronephrosis with good parenchymal thickness was noted. Intravenous urography (IVU) revealed bilateral mild to moderate hydroureteronephrosis with bilateral ectopic ureters

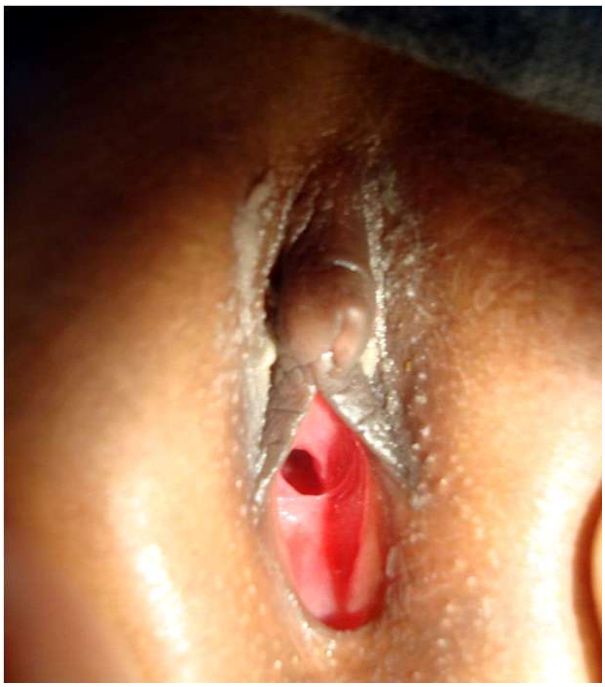

Fig. 1: Normal appearing external genitalia with a single opening

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Fig. 2A: Intravenous urography (IVU) film showing bilateral mild to moderate hydroureteronephrosis with bilateral ectopic ureters. **Fig. 2B:** Magnetic resonance imaging (MRI) film showing bilateral ureters opening into the vagina

Fig. 3: Endoscopic examination through vaginal opening revealed bilateral dilated ureteral orifices opening into a vaginaliged urogenital sinus without any identifiable trigone and bladder neck

(Figure 2A). However, no contrast was seen in the urinary bladder. Rather, small amount of contrast was seen in the vagina. Magnetic resonance imaging (MRI) with urography was performed which revealed absence of the urinary bladder, with bilateral ureters opening into the vagina (Figure 2B). Uterus and ovaries were normal. Karyotyping revealed normal 46XX genotype. On endoscopic examination under anesthesia, bilateral dilated ureteral orifices were seen opening into vaginaliged urogenital sinus without any identifiable trigone and bladder neck (Figure 3).

Continent cutaneous diversion using a segment of sigmoid colon and Mitrofanoff's principle with bilateral ureteral reimplantation was performed. Clean intermittent catheterization of cutaneous stoma was started 3 weeks after the procedure. At 9 months of follow up, patient is doing well, has capacious neobladder (Figure 4A and 4B) and continence for 4-6 h of dry intervals. She has preserved renal function without any metabolic abnormality.

Fig. 4A: Follow up imaging showing prevoid capacious neobladder. **Fig. 4B:** Postvoid film showing adequate emptying

Discussion

Ectopic ureter is the term used to denote any ureter whose orifice terminates anywhere (inside or outside urinary tract) other than the normal trigonal location [5]. Approximately, 80% of ectopic ureters are associated with duplicated pelvicalyceal system. Single system ectopic ureters are rare as do bilateral ectopic ureters (5-17%) [1]. BSSEU is even a rarer entity that and may be associated with hypoplasia of the urinary bladder and bilateral renal abnormalities, typically dysplasia [2]. The embryological basis of single system ectopic ureter is the cranial origin of ureteral bud from the mesonephric duct, which results in its delayed incorporation into the urogenital sinus, and thus abnormally limited ingrowth of the mesenchyme required for normal development of the trigone and bladder neck [6]. In patients with bladder agenesis and without any hind gut abnormalities like in our case, it is proposed that the division of cloaca is normal but there is either a primary developmental failure or secondary atrophy of the urogenital sinus. The latter phenomenon is due to failure to incorporate the mesonephric ducts and ureter into the trigone leading to lack of distension with urine and consequent atrophy [7].

Further, vaginalized urogenital sinus is the term used to describe when BSSEU are inserted into a well developed vagina that has a normal or near normal introitus [3].

Kesavan et al, showed that the bladder neck and trigone is maldeveloped in 75% of bilateral and 54% of unilateral ectopic ureters [8]. The ectopic ureter itself is also abnormal, usually to a greater degree in the single system than in the duplicated system. It is variably dilated and drainage is impaired [9]. Muscle cells may show severe alterations on ultra-structure studies. Whether these changes are developmental or acquired is not yet known [10].

Present case of BSSEU with openings into vaginalized urogenital sinus associated with absence of bladder and urethra is extremely rare. Only four such cases are on record so far in the literature [3,4,11,12]. Sheldon and Welch4 reported first such case in which the urogenital anomalies were more severe with a rudimentary vagina and bilateral dysplastic kidneys, resulting in end stage renal failure. In the second case BSSEU were opening into a vaginalized urogenital sinus with capacity of 20 ml and poorly developed trigone and bladder neck [3]. Nazimet al [11] reported another case of BSSEU draining into the urogenital sinus with right non-functioning kidney. Mandalet al [12] reported another similar case in which BSSEU were draining into dilated vagina with bladder being absent.

Our case was more typical. Bladder and urethra were absent. BSSEU were opening into vaginalized urogenital sinus with no identifiable trigone or bladder neck. There were no other associated abnormalities making the management relatively

easier. Attainment of continence with preservation of renal function is the primary issue in these cases. This re-emphasizes the need for continent diversion as the primary procedure in complex cases of BSSEU with absent or poorly developed trigone and bladder neck. So in our case continent cutaneous diversion with bilateral ureteric reimplantation was the viable option. Although bladder preservation and bladder neck reconstruction have been advocated by many in case of BSSEU or solitary ectopic ureter, in these cases ectopic ureter opened either into a normal urethra or vagina with a normal urethra.

Our case report adds to the spectrum of literature on BSSEU. In our opinion, continent cutaneous diversion should be adopted as a single stage definitive procedure in such rare and difficult cases to avoid continuing disabilities and poor outcomes in terms of upper and lower tract function. Further, management modalities should be tailored according to the anomalies in urinary tract as well as the reproductive tract in an individual patient.

Conclusion

A rare case of bilateral single system ectopic ureters with agenesis of bladder and ureters opening into a vaginalized urogenital sinus is reported. Continent cutaneous diversion as a single stage definitive procedure is a viable treatment option to avoid disabilities and deterioration of upper and lower tract function in such rare and complex cases.

References

1. Ahmed S, Barker A. Single-system ectopic ureters: A review of 12 cases. J PediatrSurg 1992; 27: 491-6.
2. Johnin K, Narita M, Kim CJ. Bilateral single system ectopic ureters with hypoplastic bladder: how we treat these challenging entities? J Pediatr Urol. 2007; 3: 243-6.
3. Singh BP, Pathak HR, Andankar AG. Bilateral single system ectopic ureters opening into vaginalized urogenital sinus. Indian J Urol 2010; 26: 126-8.
4. Sheldon CA, Welch TR. Total anatomic urinary replacement and renal transplantation: A surgical strategy to correct severe genitourinary anomalies.JPediatrSurg. 1998; 33: 635-8.
5. Glassberg KI, Braren V, Duckett JW, Jacobs EC, King LR, Lebowitz RL, et al. Suggested terminology for duplex systems, ectopic ureters and ureteroceles. J Urol 1984; 132: 1153-4.
6. Redman JF, Lightfoot ML, Reddy PP. Bilateral single ureteral ectopia in a boy. Urology 2002; 60: 514.
7. Krull CL, Heyns CF, de Klerk DP. Agenesis of the bladder and urethra: a case report. J Urol. 1988; 140: 793-4.

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[1] Flink H, Tegelberg Å, Thörn M, Lagerlöf F. Effect of oral iron supplementation on unstimulated salivary flow rate: A randomized, double-blind, placebo-controlled trial. J Oral Pathol Med 2006; 35: 540-7.

[2] Twetman S, Axelsson S, Dahlgren H, Holm AK, Källestål C, Lagerlöf F, et al. Caries-preventive effect of fluoride toothpaste: A systematic review. Acta Odontol Scand 2003; 61: 347-55.

Article in supplement or special issue

[3] Fleischer W, Reimer K. Povidone iodine antisepsis. State of the art. Dermatology 1997; 195 Suppl 2: 3-9.

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[4] American Academy of Periodontology. Sonic and ultrasonic scalers in periodontics. J Periodontol 2000; 71: 1792-801.

Unpublished article

[5] Garoushi S, Lassila LV, Tezvergil A, Vallittu PK. Static and fatigue compression test for particulate filler composite resin with fiber-reinforced composite substructure. Dent Mater 2006.

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[6] Hosmer D, Lemeshow S. Applied logistic regression, 2nd edn. New York: Wiley-Interscience; 2000.

Chapter in book

[7] Nauntofte B, Tenovuo J, Lagerlöf F. Secretion and composition of saliva. In: Fejerskov O, Kidd EAM,

editors. Dental caries: The disease and its clinical management. Oxford: Blackwell Munksgaard; 2003. p. 7-27.

No author given

[8] World Health Organization. Oral health surveys - basic methods, 4th edn. Geneva: World Health Organization; 1997.

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[9] National Statistics Online—Trends in suicide by method in England and Wales, 1979-2001. www.statistics.gov.uk/downloads/theme_health/HSQ 20.pdf (accessed Jan 24, 2005): 7-18. Only verified references against the original documents should be cited. Authors are responsible for the accuracy and completeness of their references and for correct text citation. The number of reference should be kept limited to 20 in case of major communications and 10 for short communications.

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