



## A Clinico-Pathological Study of Acute Scrotal Swelling

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### ABSTRACT

Acute scrotum is a surgical emergency which warrants immediate medical attention. Although these swellings are frequently encountered, many a time testis could not be salvaged due to late or incorrect diagnosis.

In this prospective observational study, a total of 50 cases of acute scrotal swellings were included for clinico-pathological analysis between August 2014 and July 2015. Acute epididymo-orchitis was found to be the commonest condition followed by Fournier's gangrene and haematocele. It was more common amongst younger individuals and people involved in strenuous works. Scrotal swelling associated with pain was the commonest presenting feature, fever and burning micturition being the next common symptoms. Total 27(54%) patients were treated conservatively and remaining 23(46%) patients received surgical interventions. Culture showed polymicrobial growth in 37.50% and monomicrobial growth in 62.50% of the examined cases. Histopathological examination was performed in two cases, one for haematocele and other for torsion of testis. There was no mortality in our study and all cases showed good recovery in six month follow up.

### KEYWORDS

Acute scrotum, Torsion of testis, Epididymo-orchitis, Haematocele, Fournier's gangrene, Polymicrobial, Histopathological.

### INTRODUCTION

Acute scrotum is defined as "the acute onset of pain and swelling of the scrotum that requires either emergency surgical intervention or specific medical therapy"<sup>[1]</sup>. Acute scrotal swellings are the commonest swellings that affect both children and adults.

The conditions of acute scrotum can occur due to a wide variety of causes. These include : torsion of testis, torsion of appendix testis, epididymo-orchitis, scrotal wall abscess, Fournier's gangrene, scrotal haematoma, testicular tumour and some of the miscellaneous conditions like 'idiopathic scrotal oedema, scrotal fat necrosis, Henoch Schonlein purpura, ischemic orchitis etc.' Amongst these conditions - testicular torsion, epididymo-orchitis & Fournier's gangrene deserve special attention because of their prevalence and severity.

Torsion of testis: Testicular torsion was first described in 1840 by Delasiauve [2]. Torsion of the testis or spermatic cord is a true surgical emergency as it causes strangulation of gonadal blood supply with subsequent testicular necrosis and atrophy. Acute scrotal swelling in children indicates torsion of the testis until proven otherwise. In approximately two third of the patients, history and physical examination are sufficient to make an accurate diagnosis [3].

Two types of testicular torsion are recognized, and each has slightly different etiologies. Intravaginal spermatic cord (testicular) torsion occurs when the testis twists within the tunica vaginalis, whereas extravaginal testicular torsion occurs in the perinatal period before fixation of the tunica vaginalis within the scrotum<sup>[4]</sup>. Testicular torsion is most common between 10 and 25 years of age, although a few cases occur in infancy<sup>[5]</sup>.

Release of torsion within 4 hours of occurrence result in complete viability of testis; up to 16 hours, 89% of testes can be salvaged, but this decreases to 25% after 16 hours. These values for testicular viability confirm that surgery should always be an emergency procedure<sup>[6]</sup>.

Acute epididymitis, Acute epididymo-orchitis and Orchitis: Epididymo-orchitis is an inflammatory process of the epididymis +/- testes [7]. This clinical syndrome most often presents with acute onset of pain and swelling. It is caused by either sexually transmitted pathogens ascending from the urethra or non-sexually transmitted uropathogens spreading from the urinary tract.

Klin et al. estimated that the prevalence of epididymo-orchitis is 65% in a retrospective analysis of 65 children who were referred within 5 hours due to acute scrotal pain. In that study 42 (65%) had epididymitis, 5 (8%) torsion of the appendix testis & 12 (18%) had torsion of the testis<sup>[8]</sup>.

Ben Chaim et al described the surgical findings in 70 children who underwent exploration of the scrotum due to acute pain. In this series 24/70 (34%) had testicular torsion and the remaining 46 (66%) suffered from acute inflammation. Out of this 46 cases, 33 (47%) were due to torsion of the gonad appendages and the remaining 13 had undefined inflammation<sup>[9]</sup>.

TB can cause focal epididymitis, draining sinus, or classical beading of the vas deferens with extensive involvement<sup>[10]</sup>.

Fournier's gangrene: Fournier's gangrene is a necrotizing infection of soft tissue that involves the deep and superficial fascia of the male genitalia. In 2014 Yan-Dong Li et al reported the average age of presentation of FG to be 51.6 years (Range: 17-80 years) in his study of fifty-one patients (49 men and 02 women)<sup>[11]</sup>. Although this disease process is more common in males, there are also several report of FG occurring in women with Male to Female ratio is 10:1<sup>[12]</sup>.

The primary objective of management of acute scrotum is to avoid testicular loss. The likelihood of testicular salvage in torsion depends on the interval between onset of pain and surgical intervention. Surgical exploration undertaken without

delay maximizes the chance of testicular salvage. Presence of scrotal swelling with pain is the most common feature followed by fever. Routine investigation like urine analysis, haemogram, blood sugar, urine C/S, wound swab C/S and special investigations like USG are not always very much conclusive to the final diagnosis but are supportive to clinical diagnosis. Pulsed Doppler sonography with mechanical sector scanner is a better method than Colour Doppler USG for the diagnosis of testicular torsion [13]. Since the scrotal disease may represent inherent disease of testis, epididymis and other intrascrotal structures which may affect the entire life of the patient in the form of sterility, so they need aggressive treatment. Conservative treatment with rest, scrotal support, antibiotics and analgesics are effective in case of epididymo-orchitis. Emergency surgical exploration proved to be the best option in case of Torsion testis, Fournier's gangrene, Pyocele & Haematocele. It doesn't involve major expenditure with negligible surgical morbidity, and also proved to be the best investigation modality as definite diagnosis can be reached in every case with exploration.

**MATERIALS & METHODS**

Place of study: Department of surgery, Assam Medical College & Hospital, Dibrugarh, Assam.

**Duration of study:** One year from August 2014 to July 2015.

**Study design:** Observational study.

**Study population:** Patient admitted with acute pain and swelling in the scrotum, in the Department of surgery, Assam medical college & hospital, Dibrugarh, Assam.

**Aim of study:** The aim of this study was to do an analytical study on clinical presentation and management of different acute scrotal conditions. Inclusion criteria: All the patients with complaints of acute pain and swelling in the scrotum irrespective of age were included in the study.

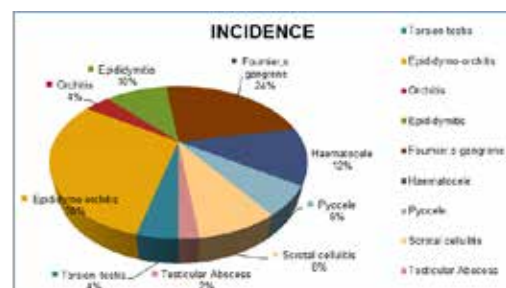
**Exclusion criteria:** Patients with painless scrotal swelling and chronic scrotal pain were excluded from the study. Open trauma to scrotum cases were also excluded from the study.

**RESULTS AND OBSERVATIONS**

In our study acute epididymo-orchitis (30%, n=15) was the commonest cause of acute scrotal pathology followed by Fournier's gangrene (24%, n=12). Incidence of haematocele, epididymitis, scrotal cellulitis, pyocele were 12% (n=6), 10% (n=5), 08% (n=4), 06% (n=3) respectively. Two cases (04%) of torsion testis were also found.

The age distribution of acute epididymo-orchitis and Fournier's gangrene were maximum in the 25-35 year age group, mean age of occurrence being 33.06 years and 33.5 years respectively.

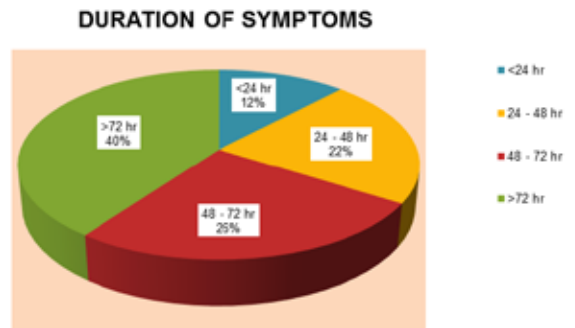
Out of 50 cases, 64% (n=32) were manual labourers and 36% (n=18) were sedentary workers such as students, clerks etc.



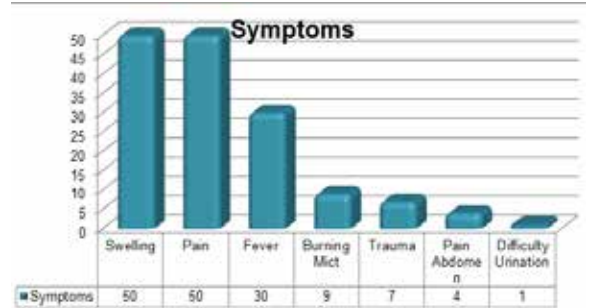
**Fig. 1. Pie diagram showing distribution of cases expressed in percentage**

Majority of patients presented late and in 20(40%) cases duration of symptoms were more than 72 hours at the time of presentation. Only 12% (n=6) cases presented within 24 hours of

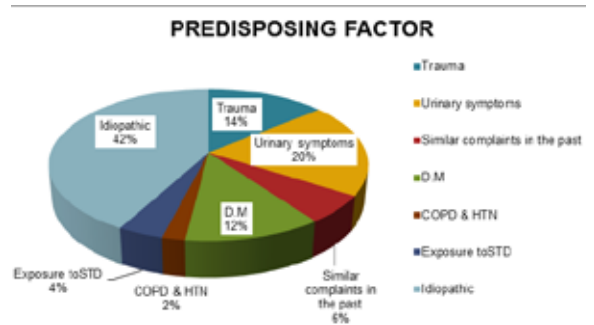
symptom. All cases had swelling of scrotum, associated with pain at the time of presentation. Out of 50 patients, 60% (n=30) patients had history of fever, 18% (n=9) patients had history of burning micturation, 14% (n=7) patients had history of trauma & 2% (n=1) had difficulty in micturation. Total 4 patients had pain in abdomen at time of presentation while one patient had history of trauma associated with pain in the abdomen. Urinary symptoms were found in 90% cases of epididymo-orchitis. History of trauma was present in all cases of haematocele.



**Fig.2. Pie diagram showing duration of symptoms of the affected patients**



**Fig.3. Bar diagram showing number of cases with presenting symptoms**



**Fig.4. Pie diagram showing the presence of predisposing factors in percentage**

In majority of cases (42%, n=21), no pre-disposing factors were found i.e. idiopathic in origin. The important pre-disposing factors encountered were UTI (20%, n=10), trauma (14%, n=7) and DM (12%, n=6).

In our study wound swab culture were done in all 12 cases of Fournier's gangrene, which showed monomicrobial growth in 66.66% and polymicrobial growth in 33.33% of examined cases. In the monomicrobial group, the most common organisms in decreasing order of frequency were gram negative E.coli (37.5%), Klebsiella (25%), Pseudomonas (25%) & Citrobacter (12.5%). Polymicrobial growth includes growth of Proteus, Pseudomonas, klebsiella, E.coli, Corynebacterium, S.Aureus, and Acinobacter.

GROWTH TYPE	NUMBER (n = 12)	PERCENTAGE (%)	ORGANISM	NUMBER (n = 12)	PERCENTAGE (%)
Monomicrobial	08	66.66	E.coli	03	37.5
			Klebsiella	02	25
			Pseudomonas	02	25
			Citrobacter	01	12.5
			Total	08	100.00
Polymicrobial	04	33.33	Proteus, Klebsiella etc	04	

**Table 1: Microbiological characteristics of wound swab cultures in patients with FG**

Only two cases (1 torsion & 1 haematocele) were subjected to histopathological examination of excised testis (orchidectomy specimen) which did not show any significant findings.

**TREATMENT:**

Out of 50 patients, 27(54%) cases were treated conservatively. Remaining cases (46%, n=23) were treated surgically by incision & drainage of pus, debridement and regular dressings, skin grafting, orchidopexy, orchidectomy etc. (Table2)

Sl No	Treatment given	No of cases	Percentage
1	Conservative	27	54%
2	Incision & drainage	3	6%
3	Debridement only	4	8%
4	Multiple debridement followed by secondary suturing	2	4%
5	Multiple debridement followed by skin grafting	7	14%
6	Scrotal exploration with evacuation of haematoma & repair of testicular tear	3	6%
7	Scrotal exploration with drainage of testicular abscess	1	2%
8	Orchidopexy	1	2%
9	Orchidectomy	2	4%

**Table 2: Treatment modalities in our series**

Out of two cases of torsion of testis, orchidectomy was performed in one case & orchidopexy in the other. Out of 12 cases of Fournier’s gangrene, single sitting debridement only was carried out in 4 patients and multiple sitting debridement followed by either secondary suturing (02 cases) or skin grafting (06) in the remaining patients. Incision and drainage of pyocoele was carried out in all cases (03). Scrotal exploration with drainage of testicular abscess was done in 1 case. Scrotal exploration with evacuation of haematoma and repair of ruptured testis was carried out in 3 patients. Orchidectomy was required in one case of haematocele. Multiple debridement followed by and skin grafting was required in one case of scrotal cellulitis.

Results of treatment: Patients treated conservatively responded well with complete recovery. In surgically treated patients, post operative recovery was uneventful in 15 cases, 4 cases developed wound infection and 4 cases left hospital on request before full recovery. In patients with Fournier’s gangrene, the average hospital stay was 39 days. In other cases treated surgically, the average hospital stay was 28 days.

**DISCUSSION**

In our study, clinical analysis of 50 cases of acute scrotal swelling is presented. Epididymo-orchitis was found to be the commonest condition followed by Fournier’s gangrene and haematocele. The rare acute conditions like scrotal fat necrosis, Henoch Schonlein purpura, testicular tumour etc. have not been encountered in the present study. So, no remarks can be made in that respect. No female case was encountered during our study period.

Incidence of various types of lesions: Abul F, Al-Sayer H, Arun N in a review of 40 acute patients hospitalized for acute scrotum showed that the most common etiology of acute scrotal edema was epididymitis (60%). This was followed by testicular torsion, torsion of the appendages and acute idiopathic scrotal edema in 27.5%, 10%, and 2.5%, respectively [14].

In comparison with the above study where the most common cause of acute scrotal swelling was epididymitis; in our study it was found to be acute epididymo-orchitis (30%) followed by Fournier’s gangrene(24%), haematocele(12%), epididymitis(10%), scrotal cellulitis(8%), pyocoele(06%), testicular torsion(04%), orchitis( 04%) and testicular abscess ( 02%).

Incidence of Age: Teoman Eskitaşoğlu et al [2014] stated that the age of the patients ranged from 19 to 82 years, and the mean age of 53.5±13.6 years in their study with the highest incidence of FG observed in the age group of 50-60 years (n=25, 31.25) [15]. Ruiz-Tovar J et al [2013] reported a mean age of 57.9 ± 13.5 years in the study of seventy patients [16].

In our study the age incidence for acute epididymo-orchitis and Fournier’s gangrene was highest in between 25 to 35 year of age, mean being 33.06 yrs for acute epididymo-orchitis and 33.5 yrs for Fournier’s gangrene. In comparison with other studies, our study showed early age of presentation for FG & acute epididymo-orchitis.

**Duration of symptoms:** Duration of symptoms varied from few hours to as long as 1 week. The shortest duration of symptoms in this study was 10 hours & longest duration was one week. The average duration of pain from onset till presentation in case of epididymo-orchitis was 3 days, where as it was 4 days in a study conducted by Ricardo et al [16]. The average duration of symptoms from onset till presentation in case of Fournier’s gangrene was 5 days in our study.

**Predisposing factors:** In a study conducted by Ricardo C. Del Villar [17] of 45 cases, history of similar complaints in the past was found in 2 cases of epididymitis & in 6 cases of torsion testis. Also there was history of trauma in 7 cases of epididymitis & in 3 case of torsion testis. In this study, apart from the idiopathic cause which compromised 37.5% of the cases, the next most common cause was trauma in 7 cases (21.8%). Dysuria was present in 7 cases of epididymitis and in 1 case of torsion.

Studies conducted by Arshad Mehmood Malik et al [2010] and B. Fall et al [2009] stated idiopathic cause in 32.8% and 25.5% cases respectively[18,19].

In our study, there was history of trauma in 6 cases of haematocele and in one case of torsion testis. There was history of urinary symptoms in 9 cases of epididymo-orchitis & in 1 case of epididymitis. Like other studies, majority of cases were idiopathic in origin (42%, n=21). The important pre-disposing factors encountered were UTI (20%, n=10), trauma (14%, n=7) and DM (12%, n=6).

**Site of involvement:** Teoman Eskitaşoğlu et al [2014] stated in his study that scrotum is the most commonly affected area in the patients of FG (n=75, 93.75%). Other affected areas, in decreasing order of frequency were perianal region (43.75%), penis (22.5%) and abdominal wall (6.25%) [15].

In this study of 50 cases, affection of FG was mainly scrotal

with perineal extension in 3 cases. It was observed that acute scrotal swelling was common on right side occurring for 52% case as compared to left side (32%). Bilateral swellings were found in 16% of cases.

**Investigations:** In our study there was increase in total leucocyte count in 35 cases, showing acute infection. In his series, Thorsteinn Gislason [20] showed that leucocytosis was present in 44% cases where as in our study it was 70%.

Teoman Eskitaşoğlu et al [2014] reported Positive bacteriologic cultures were obtained in 74 (92.5%) patients and sterile growth in 7.5%. The infection was polymicrobial in 14 patients (17.5%). *E. coli* was the most frequently identified microorganism (53.75%) followed by *Staphylococcus aureus* (15%), *Enterococcus* (11.25%), *Acinetobacter baumannii* (6.25%), *Staphylococcus epidermidis* (6.25%), Other *Streptococcus* spp. (05%), *Proteus* (05%), *Citrobacter* (1.25%) and *Bacteroides* (1.25%) [15].

Yan-Dong Li et al [2014] stated in their study that negative bacterial culture was seen in 33.3% cases [11].

In comparison to other studies, our study showed presence of Mono-microbial organism in majority of cases; however the frequently isolated organism was *E.Coli*.

**Antibiotic therapy:** In earlier days penicillin was recommended for Streptococci, metronidazole for anaerobic organisms, and a third-generation cephalosporin (with or without gentamicin) for coliform organisms and Staphylococci but recent literatures prefer "Empiric broad-spectrum antibiotic therapy" to be instituted, regardless of gram's stain and culture results after sampling of blood and wound swabs of microbiological cultures. The antibiotic regimen chosen must have a high degree of effectiveness against Staphylococcal and Streptococcal bacteria, gram-negative coliforms, *Pseudomonas*, *Bacteroides* and *Clostridia*. New clinical guidelines currently recommend the use of Carbapenems (Imipenem, meropenem, ertapenem) or piperaziline-tazobactam. These newer drugs have larger distribution and lesser renal toxicity in comparison to aminoglycosides. This new trend suggests that classical triple therapy could be replaced in certain circumstances for the use of new generation antibiotics [21].

**Surgical therapy:** Testicular salvage is critically dependent on the interval between onset of pain and surgical intervention [22]. In one series of 209 scrotal explorations, the overall rate of testicular salvage was 75%. Relief of torsion within 4 hours resulted in complete viability; up to 16 hours, 89% of testes were salvaged, but this decreased to 25% after 16 hours. However, the testis was preserved in three cases in which continuous pain had been present for more than 24 hours and where the testis was still twisted at the time of surgery. These values for testicular viability confirm that surgery should always be an emergency procedure [6].

Teoman Eskitaşoğlu et al [2014] reported the average debridement in their study to be  $1.55 \pm 1.15$  with a range of 1-8 debridements. Serial debridement was done in 30% patients with 75% patients were debrided within 24 hours of the admission [15]. They did secondary closure in 33.75% cases, scrotal flap in 13.75% cases, secondary closure with skin grafting 12.5% cases and skin grafting 10%. Scrotal flap with skin grafting was done in 7.5% and scrotal flap with primary closure in 5% cases.

In our series surgical intervention (n= 23 / 50) was done to all cases of Fournier's Gangrene, testicular torsion, pyocele & testicular abscess. However, majority of cases i.e. 27 / 50 (54%) recovered fully with conservative approach.

## CONCLUSION

The primary objective of management of acute scrotum is to avoid testicular loss. Acute scrotal swellings are common in younger & middle age individuals with variable symptomatology.

These cases need careful examination, proper evaluation and prompt treatment. The likelihood of testicular salvage in torsion depends on the interval between onset of pain and surgical intervention. The commonest cause for acute scrotum is epididymo-orchitis followed by Fournier's gangrene. Routine investigation like urine analysis, haemogram, blood sugar, urine C/S, Wound swab C/S and special investigations like USG are not always very much conclusive to the final diagnosis but are supportive to clinical diagnosis. Conservative treatment with rest, scrotal support, antibiotics and analgesics are effective in case of epididymo-orchitis. Emergency surgical exploration proved to be the best in case of Torsion testis, Fournier's gangrene, pyocele & hematocele. It doesn't involve major expenditure with negligible surgical morbidity, and also proved to be the best investigation modality as definite diagnosis can be reached in every case with exploration. Follow up of acute scrotal cases is necessary for detection of complications and proper management at the earliest.

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## Ethical clearance:

Taken.

## Conflict of interest:

None.

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