



Clinical Study of Acute Scrotal Swellings

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Abstract

Introduction: Acute scrotal swelling is defined as, “the acute onset of pain and swelling of the scrotum that requires either emergency surgical intervention or specific medical therapy. “Common causes of acute scrotal swelling are epididymo-orchitis, epididymitis, testicular torsion, scrotal abscess, scrotal erysipelas, Fournier’s gangrene and trauma to scrotum.

Aims and objects: To study the causes and clinical features of acute scrotal swellings, and to evaluate the different modalities of treatment and their outcome in RIMS, Imphal.

Methods: The study was done on 86 cases, carried out in the Department of Surgery, RIMS, Imphal, Manipur. The study was carried out for a period of two calendar years from August 2017 to July 2019. Those cases with acute scrotal swelling irrespective of age were included in the study. Patients with painless/chronic scrotal swellings and already diagnosed cases were excluded.

Results: The commonest age group was below 20 years followed by 21-40 years and 41-60 years. Epididymo-orchitis and epididymitis were the commonest causes of acute scrotal pathology. There was no case of Fournier’s gangrene below the age of 20 years. Its incidence was higher in those above 60 years of age.

Conclusion: Acute scrotal swellings are more common in younger and middle-aged individuals with variable symptoms. The commonest cause for acute scrotum is epididymo-orchitis followed by epididymitis and Fournier’s gangrene. Incidence of Fournier’s gangrene is increasing owing to the rise of immunosuppressed population. Conservative treatment with rest, scrotal support, antibiotics and analgesics is more effective in case of epididymo-orchitis and epididymitis. Emergency surgical exploration proved to be the best in case of Torsion testis, Fournier's gangrene and scrotal hematoma. The primary objective of management of acute scrotum is to maximize chances of testicular salvage. Patients presenting to emergency department needs careful examination, proper evaluation and prompt treatment.

Keywords: Scrotal swelling, Epididymitis, Fournier’s gangrene, Orchidopexy

INTRODUCTION

Acute scrotal swelling is one of the commonest swellings affecting both male children and adults. 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.”¹

Common causes of acute scrotal swelling are epididymo-orchitis, epididymitis, testicular torsion, torsion of appendix epididymis and torsion of appendix testis. Infection of scrotum that is abscess of scrotal wall, scrotal erysipelas, gangrene of scrotum ‘Fournier's gangrene’ and trauma to scrotum can present with acute pain and swelling of the scrotum.

Miscellaneous causes of acute scrotum include idiopathic scrotal edema, scrotal fat necrosis, Henoch-Schonlein purpura and ischemic orchitis.

Diseases primarily located elsewhere can also present with signs and symptoms in the scrotum. Examples are hemoperitoneum and meconium peritonitis. Similarly, a torsion testis can present with abdominal pain, nausea and vomiting. This suggests that scrotum cannot be looked upon as an area isolated from the rest of the body.²

A variety of investigations have been described in the management of acute scrotal conditions. These include an array of tests from a simple urine examination to more sophisticated forms like ultrasonography, Doppler studies and radionucleotide scanning.

Testicular torsion is by far the most significant condition. It is a true surgical emergency because the likelihood of testicular salvage decreases as the duration of torsion increases.³

Testicular torsion is defined as a rotation of the testis around the longitudinal axis of the spermatic cord, resulting in obstruction of testicular blood flow. It accounts for 13–54% of acute scrotal disease.⁴ It is a surgical emergency, with an annual incidence of 3.8 per 100,000 males younger than 18 years.³ Epididymo-orchitis is an inflammatory process of the epididymis with or without testes.³⁰ *Neisseria gonorrhoea* and *Chlamydia trachomatis* are the most common pathogens in heterosexual males less than 35 years of age and are sexually transmitted.¹² In men older than 35 years of age, *Escherichia coli* and *Proteus mirabilis* are the most common pathogens, often arising from prostatitis. Epididymitis is not common in preadolescent boys unless there is an underlying genitourinary abnormality, such as a congenital anomaly or prior surgery. Systemic infections such as tuberculosis and viruses, such as mumps can cause epididymo-orchitis. Chemical epididymitis has been reported secondary to amiodarone. Henoch-Schonlein purpura has also been associated with epididymitis.³⁰ Orchitis or testicular inflammation is typically associated with epididymitis with retrograde spread of infection. Isolated orchitis can occur secondary to viral infection or post-traumatic inflammation. Certain clinical aspects help in differentiating the causes to a certain level. The age of the patient is important in this respect. Torsion is

more likely if patient is under 20 years although it can occur at any age. Henoch-Schonlein purpura and torsion of a testicular appendage typically occur in pre-pubertal boys, whereas epididymitis most often develops in post-pubertal boys.¹³

Pain in testicular torsion is sudden (within hours) in onset and is severe.^{1,14} The symptoms of epididymitis and orchitis generally arise more slowly than those of testicular torsion and there may be associated dysuria and urinary symptoms.¹⁵

A color Doppler ultrasound (duplex) may be helpful in assessing the vascularity of the testes and therefore may aid in differentiating between epididymo-orchitis and testicular torsion.^{16,17} The most common finding in testicular torsion is absence of detectable blood flow or diminished flow in the symptomatic testis when compared to the normal one. Hyperemia which is demonstrated as increased vascularity and blood flow is the hallmark of epididymo-orchitis. Another main differential diagnosis of acute scrotal swelling is Fournier's gangrene. It was first described by Baurienne in 1764 as an idiopathic, rapidly progressive soft tissue necrotizing process that led to the gangrene of the male genitalia. However, it is named after a French venereologist, Jean Alfred Fournier, following presentation of 5 cases in his clinical lectures in 1883.⁶⁶

Fournier's gangrene is a disease characterized by necrotizing fasciitis of the perineal and genital region, resulting from synergistic polymicrobial infection.¹⁸ Its incidence is on the rise owing to the increasing population of immunosuppressed individuals in this country and the frequently minimal nature of symptoms in this patient group.¹⁸ The mortality rate associated with Fournier's gangrene ranges from 3% to 38%. The mortality rate is high in immunocompromised patients.²³⁻²⁵

Although acute scrotal swelling is a common condition, most of them report very late because of different reasons. Besides we do not have proper emergency facilities to find out the cause of the disease or the condition of the testis. Hence a testis which otherwise could have been salvaged is often lost.

Through this study we attempted to get some first-hand knowledge about the clinical aspects of the different causes of acute scrotal swellings and to

initiate immediate management even before investigations are done to avoid testicular loss since early diagnosis and treatment are very important to save testis in certain conditions. It is hoped that the findings and observations of the study will be helpful in suggesting possible measures for better management of acute scrotal swellings in this geographical location.

AIMS AND OBJECTS

1. To study the causes and clinical features of acute scrotal swellings.
2. To evaluate the different modalities of treatment and their outcome.

MATERIALS AND METHODS

Study design:

Cross-sectional study

Study setting:

The study was carried out in the Department of Surgery, Regional Institute of Medical Sciences, Imphal, Manipur.

Duration:

The study was carried out for a period of two calendar years with effect from August 2017 to July 2019.

Study population:

All patients presenting to the Department of Surgery OPD and casualty, RIMS with acute scrotal swellings.

Inclusion criteria:

1. All patients presenting to the Department of Surgery OPD and casualty, RIMS with acute scrotal swelling irrespective of age were included in the study.
2. Those patients who gave assent and consent.

Exclusion criteria:

1. Patients with painless/chronic scrotal swellings eg. chronic specific infections like tuberculosis
2. Patients already diagnosed as testicular malignancies

3. Pediatric patients whose parents did not give consent

Sample Size:

The Sample size was calculated using the formula:

$$N = \frac{Z^2 P (1-P)}{L^2}$$

Where N= sample size

Z= confidence level, which was taken as 95%

P= prevalence

L= allowable error, which was taken as 5%

Taking into account the number of cases of epididymo-orchitis which is 43%,²³ and using the above formula, sample size will be

$$N = \frac{(95)^2 \cdot 0.4(1-0.4)}{5^2}$$

$$= 86$$

So, my sample size came to 86.

Sampling design:

Consecutive sampling method was adopted to reach the calculated sample size.

Study variables:

Study variables were:

1. Independent variables:
 - Age in years
 - Religion
 - Race/ethnic groups
2. Dependent variables:
 - Different causes of acute scrotal swellings.
 - Clinical presentation
 - Outcome of treatment

Study Tools:

1. Questionnaire
2. Clinical Examination
3. Laboratory investigations
4. Ultrasound machine: Medison SONOACE X8 with 3.5MHz curvilinear and/or sector transducer probe, Medison SONOACE X6

with 3.5MHz curvilinear and/or sector transducer probe and Doppler probe

5. Ultrasonographic gel (composed of propylene glycol, glycerine, phenoxyethanol and colourant)

Working definitions:

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”.¹

Patients irrespective of age coming to the Department of Surgery with complaints of acute pain and swelling of scrotum were assessed clinically along with appropriate and available investigations.

Data Collection:

1. Before taking up the study, approval for carrying out the research work was obtained from the Research Ethics Board (REB) of RIMS.
2. With due consideration of the inclusion and exclusion criteria, the patients were selected for the study.
3. Informed consent was taken for each study. A standard proforma of informed consent issued by the Research Ethics Board (REB) is enclosed in the annexure of this thesis.
4. A proforma was specially designed to suit the study. All the data of every patient, clinical details, investigations, treatment and outcome were recorded in it.

Routine investigations like urine routine examination, complete blood counts were done for all the patients. In cases of uncertainty of diagnosis after clinical examination and history, special investigations like ultrasound and Doppler were done.

At ultrasound, the findings of acute epididymitis included an enlarged hypo-echoic epididymis with hyperemia. Testicular involvement in case of epididymo-orchitis was confirmed by the presence of testicular enlargement and an inhomogeneous echotexture. Doppler sonography detected testicular torsion by the absence of testicular flow diagnostic of ischemia.

Treatment included resuscitation of the patients presenting with shock seen mostly in those with Fournier’s gangrene, starting of empirical antibiotics after sending swab/pus culture, analgesics. Debridement and daily dressings were done for these patients. Patients with testicular torsion were operated upon which included detortion and bilateral orchidopexy. Scrotal hematomas were explored and evacuated. Conservative treatment in the form of antibiotics and analgesics were given for epididymo-orchitis, epididymitis and non specific causes.

Statistical analysis:

At the end of the study the data collected from the study were tabulated and analyzed accordingly. All the data were entered in a proforma specially designed for the study and data analysis was performed using SPSS software 21 version (IBM Corp., Armonk, NY, United States).

Descriptive data was presented using proportion for race, religion, diagnosis, etc and mean and standard deviation for continuous data like age, duration of symptoms, etc.

Ethical Issues:

All the participants were informed about the nature of the study. Those who agreed to participate were asked to sign the informed consent form for above 18 years and informed assent form and consent of the parents below 18 years of age. A code number was assigned and no name was taken to maintain privacy and confidentiality. Participants were allowed to withdraw from the study at any time. The study was carried out only after obtaining approval from the Research Ethics Board, Regional Institute of Medical sciences, Imphal.

RESULTS AND OBSERVATION

The present study was conducted on 86 consecutive cases of acute scrotal swellings admitted and treated in the Department of Surgery, Regional Institute of Medical Sciences, Imphal during the period from August 2017 to July 2019.

AGE DISTRIBUTION

In this study the age ranges from 2 years to 85 years, mean being 35.98 years and the standard deviation was 22.36. The commonest age group was below 20 years accounting for 29 (33.7%) cases followed by 21-40

years and 41-60 years accounting for 22 (25.6 %) cases each, and 13 (15.1%) cases in age group above 60 years.

AGE DISTRIBUTION ACCORDING TO THE DIAGNOSIS

Epididymo-orchitis, epididymitis, secondary hydrocele and nonspecific causes were found in significant numbers below age group of 20 years. Mean age of presentation of epididymitis is 34.38 years, for epididymo-orchitis 39.18 years, Fournier's gangrene 54.6 years and for secondary hydrocele 23.82 years. There were 2 cases of testicular torsion and both were below 15 years of age.

ETHNIC GROUP

Most of the patients in the study were Hindus/Meiteis by religion (65.1%) followed by Christians (23.3%) and Muslims(11.6%).

REGIONAL DISTRIBUTION

58.1 % of the patients belonged to the urban population and 41.9% to the rural population.

MARITAL STATUS

58.1% of the patients were married and 41.9% were not married. The incidences in the married and unmarried males were nearly equal.

CLINICAL PRESENTATION

Scrotal swelling and pain are common features for all the patients. 39 (45.3%) cases had associated fever and 15 (17.4%) of them had burning micturition.

PAIN AND ITS INTENSITY:

All the patients, 86 of them presented with pain with variations in the intensity of severity. 57 (66.3%) cases had moderate pain, 17(9.8%) cases had severe pain and 12 (14%) cases had mild scrotal pain.

DISTRIBUTION OF SIDE

Right side of the scrotum was found to be more frequently affected than the left side (40.7% and 31.4% respectively) and in 27.9% cases both sides of the scrotum were affected.

PROGRESSION OF SWELLING

In 43(50%) of the cases scrotal swelling progressed rapidly and in 36(41.9%) cases there was slow

progression of the swelling. In 7(8.1%) of the cases the swellings did not progress.

DURATION OF SYMPTOMS

The duration of symptoms ranged from 1 day to maximum of 10 days. The median duration of symptoms in days was 2 ± 1.59 days. The median duration of presentation of the cases for epididymitis and epididymo-orchitis were 2 days and 2.5 days while it was 4days for Fournier's gangrene and 2 days for secondary hydrocele.

HISTORY OF TRAUMA

There was history of trauma in only 18.6% of the patients. Majority (81.4%) did not have history of trauma.

FEVER

Fever was present in 39% of the patients out of which 27% had mild fever and 12% had moderate fever.

PRESENCE OF URINARY SYMPTOMS:

Urinary symptoms like burning micturition were present in 17.4% of the population suffering from epididymitis and epididymo-orchitis.

PRESENCE OF PAST HISTORY

Significant past history was present in 11.6% of the population .Chronic diseases like Diabetes, chronic liver disease and hepatitis B and hepatitis C were present in patients with Fournier's gangrene.

INVESTIGATIONS

For all the 86 cases, routine investigations like hemogram, blood sugar, urine analysis were done. Special investigations like Doppler ultrasound of the scrotum were done in 75 cases. There was increase in total leukocyte count in 50% of the cases showing acute infection. Wound swab for culture and sensitivity was sent for all Fourniers's gangrene patients.

During routine urine examination, pus cells (>5 per high power field) were present in 15(17.4%) cases of the study population. They included 12 (80%) cases of epididymitis and 3 cases (20%) in epididymo-orchitis.

CAUSES OF ACUTE SCROTAL SWELLING:

In this study, epididymo-orchitis and epididymitis were the commonest causes of acute scrotal pathology

and accounted for 22(25.6%) cases and 21(24.4%) cases respectively. In 13(15.1%) cases the cause was non-specific while Fournier's gangrene occurred in 11(12.8%) cases and secondary hydrocele in 11(12.8%) cases. Testicular torsion was found in only 2 (2.3%) cases. There was one case of space occupying lesion which was not further studied as it was outside the purview of this series.

TREATMENT

72.1 % of the patients were given conservative treatment which included appropriate antibiotics, analgesics, rest and scrotal support. 27.9% of the patients were operated upon which included serial debridement and daily dressings in cases of Fournier's gangrene. Detorsion and bilateral orchidopexy were performed for the two cases of testicular torsion. Scrotal exploration with evacuation of hematoma was performed for testicular trauma.

OUTCOME

Most of the cases of epididymitis, epididymo-orchitis, secondary hydrocele and nonspecific causes recovered with conservative treatment without any complications.

Out of the 11 cases of Fournier's gangrene, 10 presented with features of septic shock and with co morbidities like diabetes, hypertension, chronic liver disease with hepatitis B and C. They succumbed to the disease inspite of resuscitation, debridements and daily dressings. Only 1 young patient with no significant co morbidity survived for which secondary suturing of the scrotum wound was done.

2 cases of testicular torsion were operated upon without delay and derotated with evidence of viability after detorsion and orchidopexy was done for both the testes. No complication was seen in the follow-up till date.

Scrotal exploration and evacuation of the hematoma were done in 3 out of 5 cases. The other two were managed conservatively without any sequelae.

DISCUSSION

This study was conducted with the intent of finding out the clinical trend of acute scrotal swellings in this northeastern part of the country, Manipur. It was observed that the most common causes of acute scrotal

swellings were acute epididymo-orchitis and epididymitis with incidences of 25.6% and 24.4% respectively. The two conditions together accounted for 50% of the cases in the present study. This finding compares well with the observations of A V Ingale,³³ Olga Devrim et al,³⁴ Abul F et al,³⁵ A Hazarika et al³⁶ who found acute epididymo-orchitis and epididymitis together accounted for 44%, 72.8% , 60% and 43.3% of the cases in their respective series.

Fournier's gangrene was also found in significant number of patients in our study (12.8%). A Hazarika³⁶ and AV Ingale³³ also observed similar results in their studies and its incidences in their study were 16.6% and 30% respectively. It is noted that these studies were conducted in all patients presenting with acute scrotal swelling irrespective of the age of the patient like in our study. However, Philip and J Knight et al,¹⁴ Olga Devrim et al,³⁴ Melekos et al,³⁷ Moharibet al³⁸ and Corbett Harriet et al³⁹ who studied in pediatrics and young adult population profile only did not find Fournier's gangrene as one of the causes of acute scrotum.

It is also observed that around 15.1% of patients who presented with acute scrotal swelling in our study neither had any significant findings on examination nor on ultrasound and other investigations like urine routine examination. Majority of these patients belonged to the younger age group with median age of 13 years. There was history of associated mild trauma in 30.8% of them. Apprehension and mild pain and discomfort could be the reasons for their presentation in the emergency department. The mean duration of symptoms at presentation was less than 24 hours.

Another noticeable finding in our study was the presence of secondary hydrocele in 12.8% of the patients who presented with acute scrotal swelling. Median age of presentation was 7 years with mean duration of 2.36 days at presentation. Trauma was associated in 36.4% of these cases. Majority of these patients were children, and inequality in the sizes of the scrotum and trauma drew attention to the swelling.

Less common causes of acute scrotal swellings in this study were scrotal hematoma, testicular torsion and space occupying lesion with incidences of 5.8%, 2.3% and 1.2% respectively. Testicular torsion was found only in 2 cases of our study. This finding was different from the studies done by J Knight et al¹⁴ and Olga

Devrimet al³⁴ and Moharib et al.³⁸ They found testicular torsion in 38%, 21.1% and 45.2% respectively. In another review by Abul F et al³⁵ of 40 acute patients hospitalized for acute scrotum, testicular torsion was found in 10% of the patients, while Harriet J. et al³⁹ had 90(47.4%) cases of torted testicular appendage, 23 (12.1%) cases of testicular torsion in their series. The higher incidences of testicular torsion in their series probably can be explained by the fact that their series were confined to young patients with maximum age of 18 years while all patients irrespective of age were included in our study.

In this study the age ranged from 2 years to 85 years, mean being 35.98 years. The commonest age group was below 20 years accounting for 33.7% of the cases. AHazarikaet al³⁶ and AV Ingale et al³³ found the maximum incidence in a slightly older age group occurring between the age group 21-30 years. Epididymo-orchitis was most commonly seen in the 21-40 age group in our study while epididymitis alone was more or less equally distributed in 21-40 and 41-60 age group which was in concordance with the studies conducted by A Hazarika et al³⁶ with maximum incidence of acute epididymo-orchitis in the 20-30 age group (30.77%) with similar findings as AV Ingale.³³

Reported mean age of Fournier's gangrene in studies conducted in different places by AV Ingale,³³ AHazarikaet al³⁶ were 48.3 years and 53.53 years. The corresponding figure was 51.6 years in the study of Yan-Dong Li et al.⁴³ In our study Fournier's gangrene was seen in the median age of 54.64 years of age. This shows that Fournier's gangrene is seen more commonly in the 5th to 6th decades of life.

Testicular torsion was seen in pre-pubertal age group i.e. below 15 yrs in our study, which agrees with the studies done by Skoglund et al⁴² and Barker and Raper.⁴³ It is reported that torsion of the spermatic cord typically occurs in patients younger than 25 years of age with approximately two-thirds of patients presenting in adolescence between 12 and 18 years of age.²⁰

The duration of symptoms ranged from 1 day to maximum of 10 days. The median duration of symptoms in days was 2 ± 1.59 days. AV Ingale et al³³ in their study noted that the average duration of pain from onset till presentation in case of epididymo-orchitis was 3 days. Average duration of symptoms from onset

till presentation in case of Fournier's gangrene was 5 days. The average duration of symptoms in our study was comparable to these findings, 2.5 days being the mean duration for both epididymo-orchitis and epididymis, and 4 days for Fournier's gangrene in our study. The average duration of pain from onset till presentation in the study done by AHazarikaet al³⁶ in Karnataka was 3.54 days in case of epididymo-orchitis and 9.6 days in Fournier's gangrene. In the same study shortest duration for presentation was 4 hours in case of two of testicular torsion. Both the cases of testicular torsion in our study, however, presented comparatively late with mean duration of 1.5 days. Majority of patients of scrotal hematoma following trauma presented early within hours.

Trauma was seen as a predisposing factor in 25% of secondary hydrocele and all cases of scrotal hematoma of our study. It was also present in one case of testicular torsion and epididymo-orchitis. AV Ingale³³ found that there was history of trauma in 6 (100%) cases of hemocele and in 1 case of torsion testis. Also there was history of trauma in 7 cases of epididymitis and in 3 cases of torsion testis in a study conducted by Ricardo C. Del Villar et al.⁴⁴ Trauma and vigorous exercises were present in significant number of patients of acute scrotal swelling in studies conducted by Knight and Vassy.¹⁴ It was also seen that pain following trauma drew attention to one case of space occupying lesion and presented to us as acute scrotal swelling.

Symptoms of urinary tract infection like dysuria and burning micturition were present in majority of cases of epididymitis and epididymo-orchitis. On further work-up significant pyuria were present in 57.1% of epididymitis and 13.6% of epididymo-orchitis. AV Ingale³³ noted there was history of urinary symptoms in 45 % of the cases, out of which 38 % had acute epididymo-orchitis. In a study by A Hazarika et al,³⁶ 27% had urinary symptoms.

We observed that co morbidities like chronic liver disease, hepatitis C, diabetes mellitus were seen in 11.6% of the patients. They were noted in patients with Fournier's gangrene. AV Ingale³³ found that there was history of COPD with hypertension in 4 cases of Fournier's gangrene in his study. Diabetes was found commonly in Fournier's gangrene (8 cases). 25 % cases were idiopathic. Several studies^{47,49-51} also

reported the association of Fournier's gangrene with co morbidities like diabetes mellitus(20-70%), chronic alcoholism, immunosuppressed states like HIV/AIDS.

All the 86 patients in our study presented with swelling and pain of varying severity. 66.3% had moderate pain, 19.8% had severe pain and 14% had mild scrotal pain. Same finding was noted by AV Ingale³³ with swelling of scrotum associated with pain at the time of presentation in all the cases. Knight and Vassy¹⁴ and AHazarikaet al³⁶ also found that all the cases presented with pain and swelling in their studies. Fever was present in 45.35% of our cases but higher percentages of patients with fever were observed in studies done by AV Ingale³³ (60%) and A Hazarikaet al (61.1%).³⁶ There was history of burning micturition in 17.4% of the population suffering from epididymitis and epidymo-orchitis. Similar findings were observed by Knight and Vassy¹⁴ in his study. However in other studies done by AV Ingale³³ and A Hazarikaet al³⁶ 45% and 33.3% patients had history of burning micturition respectively. 18.6% had history of trauma in our study as opposed to 6% seen in the study done by AV Ingale³³ and 5.56% in the study by A Hazarikaet al.³⁶ History of trauma was noted in all cases of scrotal hematoma, which is similar to the observation of AV Ingale³³ in his study. More than half of the patients with Fournier's gangrene presented with features of shock in our study. Similar observation was noted by A Hazarikaet al³⁶ in their study.

We observed that acute scrotal swelling was more common on the right side of the scrotum(40.7%). 31.4% of the patients had swelling on the left side while 27.9% cases presented with bilateral swelling. This finding was in concordance with the observations made by A Hazarikaet al³⁶ and AV Ingale.³³ There was right sided preponderance in their studies also. Both the cases of testicular torsion were present on the left side of scrotum. In 15 years of study of testicular torsion at Bristol, there was a slight left-sided preponderance in testicular torsion.¹

For all the 86 cases, routine investigations like hemogram, blood sugar and urine analysis were done. Hemogram, urine analysis were not conclusive, but were supportive to clinical diagnosis. USG combined with colour Doppler has high accuracy in detecting testicular torsion and differentiating it from epididymo-orchitis. In those patients with epididymo-

orchitis, scrotal ultrasonography revealed hyperemia with increased vascularization, along with enlargement of the epididymis or testis. In a four-year retrospective look for acute scrotal pathologies by Olga Devrimet al³⁴ it was found that Doppler USG was very helpful for differential diagnosis of patients with acute scrotum who reported to the hospital at an early period. Although accuracy of imaging studies is higher for the differential diagnosis of testis torsion and epididymo-orchitis, there is considerable risk of misdiagnosis. In 5 patients with a history of trauma, Doppler USG results were reported as scrotal hematoma.³⁴

Wound swab for culture sensitivity was sent for all cases of Fournier's gangrene. It is reported that most cases of Fournier's gangrene feature a combination of aerobes and anaerobes, with an average of three bacteria being cultured from each diagnosed patient.^{31,72} In many patients, anaerobes were not always cultured, which could be due to inadequate collection and sample processing.³¹ There was only a small percentage of cases in which no bacteria were identified in the wound culture.^{49,61,80} In our study wound swab culture reported monomicrobial in 58% and polymicrobial growth in 42%. In the monomicrobial group most common organisms in decreasing order were E.coli 26%, Klebsiella 16%, coagulase negative Staph aureus 13%, Citrobacter 10% and Pseudomonas 5%. The increased incidence of E.coli infection in this study could be explained by the fact that commonest sites of the infection were genitals and perineum. 7% of the cases were sensitive to only a combination of Imipenem and Cilastin.

The antibiotic regimen chosen must have a high degree of action against Staphylococcal and Streptococcal bacteria, gram-negative coliforms, Pseudomonas, Bacteroides and Clostridia. New clinical guidelines currently recommend the use of Carbapenemes or Piperacillin-tazobactam. These newer drugs have larger distribution and lesser renal toxicity in comparison to aminoglycosides.

72.1% of the patients were given conservative treatment which included appropriate antibiotics, analgesics, rest and scrotal support. Majority of them were epididymo-orchitis, epididymitis with non specific cause. 27.9% of the patients were operated which included serial debridement and daily dressings

in cases of Fournier's gangrene. Detorsion and bilateral orchidopexy were done for the two cases of testicular torsion. Scrotal exploration with evacuation of hematoma was performed for testicular trauma.

All the patients with epididymo-orchitis and epididymitis recovered with a benign course with conservative treatment. Patients with Fournier's gangrene were resuscitated and adequate broad spectrum antibiotics and analgesics were given followed by regular dressings and debridement. Mortality was very high in case of Fournier's gangrene. There were 9 deaths out of the 11 cases. This can be attributed to several factors, namely (1) late presentation of the patients, average duration at presentation being 4.45 days (2) older age of the patients, average being 57 years and (3) presence of comorbidities like diabetes mellitus, hypertension, chronic liver disease and immunocompromised status like hepatitis C and HIV/AIDS. The operated cases of testicular torsion and scrotal hematoma had good outcome with return of vascularity in ultrasound on follow up.

This study included all the consecutive cases of acute scrotal swellings presenting in the Department of Surgery, RIMS which excludes a selection bias. There was no attrition of cases throughout the study period. All cases irrespective of the age of the patient were selected. These were the merits of the study.

The limitations of this study were short duration of study and imaging from different institutes. Another major limitation of sample population was the presence of similar government tertiary care hospital nearby due to which a part of the real disease burden was not assessed in the study.

CONCLUSION

Eighty-six cases of acute scrotal swelling were studied at the Regional Institute of Medical Sciences, Imphal during the study period and the following conclusions were arrived at.

- Acute scrotal swellings are more common in younger and middle aged individuals with variable symptomatology.
- The commonest cause for acute scrotum is epididymo-orchitis followed by epididymitis (50% taken together) and Fournier's gangrene

(12.8%). Only two cases of testicular torsion were encountered. Incidence of Fournier's gangrene is increasing owing to the rise of immunosuppressed population in the country.

- Presence of scrotal swelling with pain is the most common feature followed by fever. Patients with Fournier's gangrene may present with septicemic shock. The duration of symptoms is less in case of epididymo-orchitis than in case of Fournier's gangrene.
- Presence of urinary symptoms, similar complaints in the past are important factors for acute scrotum. Involvement of right side is more common than left side (40.7% vs 31.4%).
- Routine investigations like urine analysis, hemogram and special investigations like USG are supportive to the clinical diagnosis.
- The primary objective of management of acute scrotum is to avoid testicular loss. Surgical exploration undertaken without delay maximizes chances of testicular salvage.
- Conservative treatment with rest, scrotal support, antibiotics and analgesics is more effective in case of epididymo-orchitis and epididymitis.
- Emergency surgical exploration proved to be the best in case of Torsion testis, Fournier's gangrene and scrotal hematoma.
- Follow-up of acute scrotal cases is very essential to find out the complications in the form of sterility, development of fistulas and involvement of the contralateral side at a later period.

SUMMARY

Acute scrotal swelling is one of the commonest swellings affecting both children and adults. Severe acute scrotal conditions like testicular torsion, torsion of appendix testis, epididymo-orchitis, trauma to testis, hematocele, Fournier's gangrene can present in similar ways. The knowledge about the trend and nature of the disease in this north eastern part of the country is very little considering the increased and varied causes of the disease. Thus a cross sectional study was done in the Department of Surgery,

Regional Institute of Medical Sciences, Imphal to study the clinical parameters of acute scrotal swelling. The demographic parameters, various causes, clinical presentation, treatment modalities, and complications were studied over a period of 2 years with each patient being followed up for 3 months to 6 months period. Data collected were analysed using SPSS version 21. For analytical purpose, descriptive statistics like mean, median and standard deviation were used. P -value < 0.05 was taken as significant. Acute scrotal swellings are more common in younger (<20 years) and middle age (20-40 years) individuals. All of them presented with pain and swelling in the scrotum with variable symptomatology in the emergency department. Epididymo-orchitis and epididymitis (50% together) remain the most common causes of acute scrotal swelling as seen in other parts of the country and world. Testicular torsion is a real surgical emergency as testicular salvage reduces with passage of time. Early detection and diagnosis of testicular torsion is possible through proper history and examination occasionally supported by routine investigations and imaging modalities like Ultrasound Doppler. Nevertheless, surgical intervention should not be delayed for performing investigations like ultrasound if there is high suspicion of testicular torsion to avoid testicular loss.

To conclude, any patient coming with acute scrotal swelling should be thoroughly evaluated and examined. Routine investigations like urine analysis, hemogram and special investigations like USG are not always very much conclusive for the final diagnosis, but are supportive to clinical diagnosis. Since the scrotal disease may represent inherent disease of testis, epididymis and other intrascrotal structure which may affect the entire life of the patient in the form of sterility, they need aggressive treatment.

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