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Original Research Article

A study of clinico pathological evaluation of acute scrotum and its management in adults in a tertiary care hospital

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ABSTRACT

Background: The acute scrotum is a surgical emergency. It is defined as scrotal pain, swelling, and redness of acute onset. Scrotal abnormalities can be divided into three groups, which are extra-testicular lesion, intra-testicular lesion and trauma. Acute scrotal pain, once diagnosed, can be treated appropriately with either conservative or surgical measures. The appropriate management pathway is determined by proper history taking, clinical examination and investigations in a restricted time frame. Objectives were to evaluate clinical presentation, diagnosis, management, complications, and short-term outcomes of acute scrotum, including hospital stay and mortality.
Methods: A descriptive cross-sectional study was conducted at Dhaka medical college hospital from January to September 2013, including 210 adult patients (≥18 years) with acute scrotal pathology. Purposive sampling was used. Data on demographics, clinical features, investigations [complete blood count (CBC), urine routine examination (R/E), ultrasonography (USG)], management, and outcomes were collected prospectively. Statistical analysis was performed using SPSS, with results expressed as mean, standard deviation, and percentages.
Results: Among 210 patients with acute scrotum, acute epididymitis (24.28%) was the most common diagnosis, followed by epididymo-orchitis (13.80%) and testicular torsion (12.38%). Most patients were aged 21-30 years (27.76%) with normal body mass index (BMI) (85.07%). Scrotal swelling (79.52%) and fever (64.76%) were predominant symptoms, while only 15.23% presented within 6 hours. Surgical intervention was required in 53% of cases, with debridement (22.86%) being the most common. The mean hospital stay was 1.34 weeks, with 66.70% discharged within a week.
Conclusions: Acute scrotum requires urgent diagnosis and treatment; surgery for torsion and trauma, conservative care for infections ensures better outcomes.

Keywords: Acute scrotum, Testicular torsion, Epididymo-orchitis, Scrotal trauma, Fournier's gangrene

INTRODUCTION

Acute scrotum is characterized by the sudden onset of painful swelling involving the scrotum and its contents. Several underlying surgical conditions may present in this manner. These include ischemic causes such as testicular torsion; infective causes like acute epididymo-orchitis, orchitis, scrotal abscess, and severe necrotizing infections such as Fournier's gangrene; and traumatic causes such as haematocele. Diagnosing acute scrotal pain and swelling, particularly in adolescents, is often challenging yet crucial, as testicular torsion remains the leading cause of testicular loss. Salvage rates are highest when surgical detorsion is performed promptly-approaching 100% if undertaken

within the first 6 hours of symptom onset. However, testicular viability drops dramatically with delay, with only about 20% survival beyond 12 hours, and almost no viability if intervention occurs after 24 hours.[1]

In hospitalized patients presenting with acute scrotal pain or swelling, a practical method of evaluation is to categorize them into four groups: those with recurrent intermittent pain, those demonstrating pathognomonic clinical signs, those with a confirmed diagnosis of epididymitis, and a final group with nonspecific swelling and tenderness. In this series, approximately 5% of boys reported repeated episodes of scrotal pain, for whom a minor scrotal surgical procedure provided excellent outcomes. About 8% displayed clear pathognomonic findings, making their management relatively straightforward. A further 18% were diagnosed with acute epididymitis, defined by either three suggestive but non-pathognomonic clinical features, or two such features supported by a radionuclide scan indicating bilateral perfusion; these patients were managed conservatively without surgery. For the remaining group, scrotal exploration served both as a diagnostic tool and, in most cases, as the definitive therapeutic intervention.[2]

Blunt trauma to the scrotum can lead to a range of injuries, such as testicular rupture, torsion, dislocation, hematoma, contusion, as well as damage to the epididymis, scrotal wall, or urethra. Testicular rupture is seen in nearly half of the cases presenting with traumatic hematocele and is often underdiagnosed. Without prompt recognition and surgical repair, rupture may progress to testicular atrophy or complete loss. Similarly, traumatic torsion of the testis must be identified quickly to prevent irreversible damage. A radionuclide scan, if readily accessible, is recommended in cases with suspected torsion. However, when this imaging is not available or results are inconclusive, surgical exploration remains the preferred approach. After torsion has been excluded, USG serves as a valuable tool in assessing acute scrotal trauma, helping to distinguish injuries that require operative management from those amenable to conservative care.[3]

A global review of 1,726 cases reported in the English literature between 1950 and 1999 documented a mortality rate of 16%. In a later analysis of 3,297 cases of Fournier's gangrene spanning 1950 to 2007, the mortality rate was noted to have increased to 21.1%, despite improvements in diagnostic methods and medical care. Interestingly, both studies found higher mortality rates in developed regions such as North America and Europe compared to resource-limited countries.[4] Clinical presentation typically includes scrotal skin discoloration, erythema, swelling, and tenderness. Some patients may also exhibit systemic features like fever and chills, although these are not universal.[5] Superficial scrotal abscesses often arise from infected hair follicles, traumatic scrotal wounds, or following minor scrotal procedures. In addition, they may result from leakage of infected urine in patients with urethral strictures or neurogenic bladder who are managed with external urine collection devices.[6]

An incarcerated inguinal hernia most commonly presents as a visible or palpable bulge in the groin, caused by a segment of intestine protruding beneath the skin. This swelling typically appears along the inguinal crease but may extend into the scrotum in males or the labia in females. Other associated features include progressive enlargement of the hernia, localized pain, scrotal or groin swelling, abdominal discomfort or distension, constipation, and systemic symptoms such as fever, nausea, and vomiting. Management in the majority of cases requires urgent surgical intervention, during which the herniated bowel is repositioned within the abdominal cavity and the weakened area of the abdominal wall is reinforced.[7]

Objectives

General objective was to evaluate the clinical and pathological presentation and management of acute scrotum.

Specific objectives were to record clinical presentation according to etiology of acute scrotum, to evaluate different modalities of investigation to diagnose of acute scrotum, to record different management strategies depending upon diagnosis, to find out rate of mortality and morbidity related to surgery and to find out the postoperative complications in these cases.

METHODS

Study design

This study was a descriptive cross-sectional type of observational study conducted at the department of surgery, Dhaka medical college hospital (DMCH), Dhaka, over a period of nine months, from January 2013 to September 2013. The study population included patients presenting with acute scrotal conditions, such as torsion of testes, acute epididymitis, acute epididymo-orchitis, scrotal trauma, Fournier's gangrene, scrotal cellulitis, and scrotal abscess.

Sampling method

A biased purposive sampling technique was employed in this study to select participants who met the inclusion criteria. A total of 210 cases were included during the study period. Data were collected on various variables, including age distribution, presenting symptoms, BMI status, and the presence of comorbidities. Investigations such as CBC, urine R/E, culture and sensitivity (C/S), USG, and duplex study were conducted. The study also analyzed patterns of management (conservative vs. surgical), time lapse between onset of disease, hospitalization, and surgical intervention, the operative procedures performed for different conditions, the need for

second surgical interventions, and requirements of blood transfusion. Postoperative outcomes such as complications, operative morbidity and mortality, and the duration of hospital stay were also documented.

Inclusion criteria

The study included all adult male patients aged 18 years and above who presented with acute scrotal conditions to the tertiary care hospital during the study period. This encompassed both non-traumatic and traumatic causes of acute scrotum, such as testicular torsion, epididymo-orchitis, and scrotal abscesses. Only those individuals who provided informed written consent were enrolled in the study. For patients who were incapacitated or unable to provide consent themselves, authorization was obtained from a legally recognized guardian.

Exclusion criteria

Patients under the age of 18 were excluded from this study to maintain a consistent adult population sample. Additionally, individuals with chronic or recurrent scrotal conditions were not included, as the focus was on acute presentations. Patients who declined to participate or were unable to give informed consent, and for whom no legal guardian was available to provide consent, were also excluded from the study.

Data collection procedure

Data were collected prospectively from all eligible patients presenting with acute scrotal conditions at the department of surgery, Dhaka medical college hospital, during the study period of January to September 2013. After obtaining informed written consent, relevant clinical history, physical examination findings, and demographic details were recorded using a pre-designed data collection sheet. Diagnostic investigations such as CBC, urine routine and microscopy, urine C/S, scrotal USG, and duplex scans were performed as appropriate to aid diagnosis. Details of management strategies, whether conservative or surgical, including the type of surgical procedures performed, timing of intervention, need for blood transfusion, and any secondary procedures, were documented. Postoperative outcomes, including complications, mortality, morbidity, and duration of hospital stay, were also systematically recorded.

Statistical analysis

After collecting information, data was checked, verified for consistency and edited for the final result. After editing and coding, the coded data was analysed by computer with the help of SPSS/PC software. Data cleaning, validation and analysis is performed using the SPSS/PC software and graphs and charts by MS excel. The result is presented in tables in mean, standard deviation (SD) and the percentage.

Ethical implication

Participation in the study was entirely voluntary, and informed consent was obtained from all respondents after providing a clear explanation of the study in Bangla. It was emphasized that participants were free to participate or decline any part of the study without any consequences. All responses were kept strictly confidential. Interviews were conducted at a time and place convenient for the respondents, with every effort made to ensure privacy. Additionally, surgeons retained full autonomy in their clinical decision-making, and no external influence was exerted regarding the choice of surgical procedures.

RESULTS

Table 1 illustrates the age and BMI distribution among the 210 patients. The highest proportion of patients belonged to the 21-30 years age group (27.76%), followed by those aged 31-40 years (21.90%) and 41-50 years (18.09%). Younger adults aged 18-20 years constituted 13.80% of the population, while older age groups, 51-60 years and above 60 years, made up 11.90% and 9.50% respectively. In terms of BMI, the majority of patients (85.07%) had a normal BMI range of 19-24, whereas 9.52% were underweight (BMI <19) and only 4.76% had a BMI greater than 24.

Table 1: Age distribution of the patients (n=210).

Variables	N	Percentage (%)
Age (in years)		
18-20	29	13.80
21-30	52	27.76
31-40	46	21.9
41-50	38	18.09
51-60	25	11.90
>60	20	9.50
BMI (kg/m^2)		
<19	20	9.52
19-24	180	85.07
>24	10	4.76

Table 2 presents the distribution of various diseases among 210 patients who presented with acute scrotum. The most common diagnosis was acute epididymitis, affecting 51 patients (24.28%), followed by acute epididymo-orchitis in 29 patients (13.80%) and torsion of the testes in 26 patients (12.38%). Fournier's gangrene was observed in 25 cases (11.90%), while scrotal trauma accounted for 18 cases (8.57%). Scrotal abscess and scrotal cellulitis were noted in 17 (8.09%) and 15 (7.14%) patients, respectively. The least common condition was incarcerated strangulated inguinal hernia, seen in only 5 patients (2.38%).

Figure 1 shows that most of the patients present with scrotal swelling 79.52% (n=167), followed by fever 64.76% (n=136), and lowest presentation is intermittent pain 09.04% (n=19).

Table 2: Distribution of the diseases, presents with acute scrotum (n=210).

Diseases	N	Percentage (%)
Torsion of testes	26	12.38
Acute epididymitis	51	24.29
Acute epididymo-orchitis	29	13.81
Scrotal trauma	18	8.57
Fournier's gangrene	25	11.90
Scrotal cellulitis	15	7.14
Scrotal abscess	17	8.10
Incarcerated strangulated inguinal hernia	9	4.29

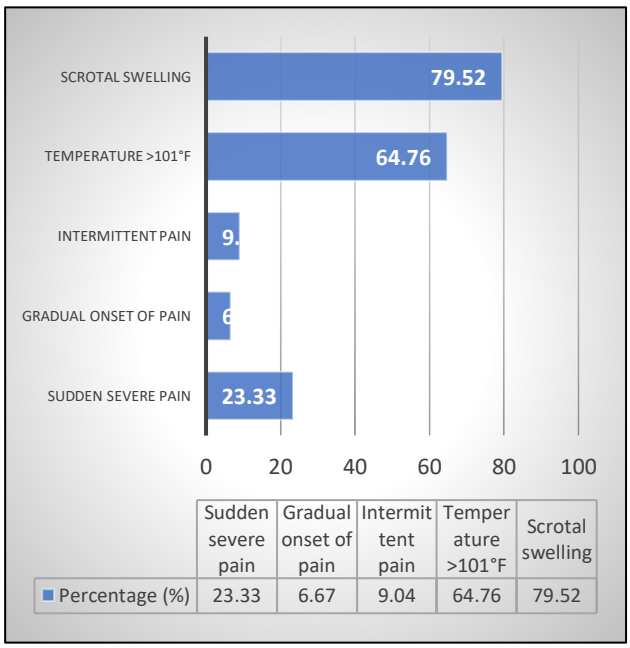

Figure 1: Presenting symptoms.

Table 3 summarizes the time interval between the onset of symptoms and hospitalization among 210 patients presenting with acute scrotum. The largest proportion of patients (24.76%) sought hospital care between 12 to 24 hours after symptom onset, followed by 19.52% within >6 to 12 hours, and 16.19% within >24 to 36 hours. Only 15.23% of patients presented within the first 6 hours, indicating delayed response in a majority of cases. Additionally, 14.28% and 10.00% of patients presented between >36-48 hours and >48-72 hours respectively. Table illustrates the pattern of management adopted for 210 patients presenting with acute scrotal conditions. It shows that 53% of the patients (n=112) underwent surgical intervention, making it the more commonly employed approach. In contrast, 47% of patients (n=98) were managed conservatively with non-surgical measures.

Figure 2 shows Most of the patients underwent surgical intervention within 6 hours of hospitalization, 71.42% (n=112).

Table 3: Time required to passed from onset of disease to hospitalization and distribution of pattern of management (n=210).

Variables	N	Percentage (%)
Time (in hours)		
0-6	32	15.23
>6-12	41	19.52
>12-24	52	24.76
>24-36	34	16.19
>36-48	30	14.28
>48-72	21	10.00
Pattern of management		
Conservative	98	47.0
Surgical	112	53.0

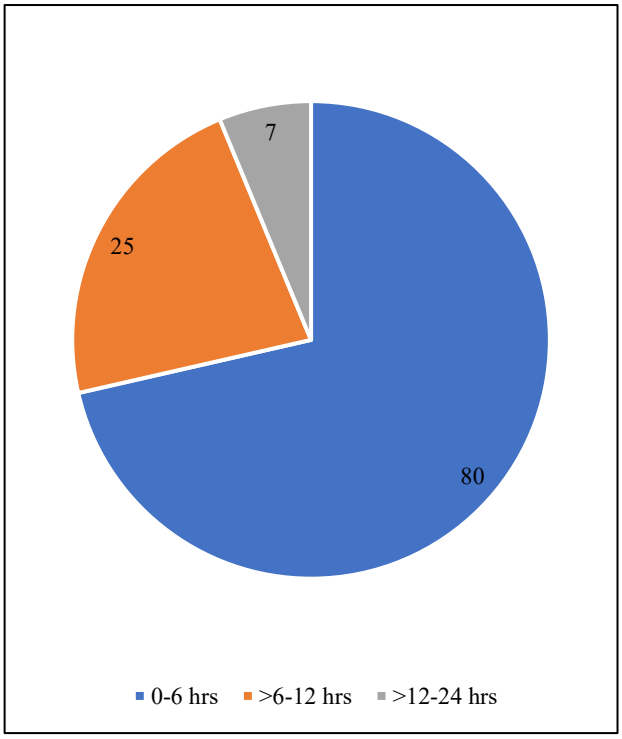

Figure 2: Time required to passed from hospitalization to surgical intervention.

Table 4 summarizes the laboratory and imaging findings among 210 patients with acute scrotal conditions. Neutrophilic leucocytosis was the most common laboratory abnormality, found in 61.90% of cases. Urinalysis abnormalities included pus cells ≥10/HPF in 29.04% of patients, RBCs ≥10/HPF in 15.23%, and the presence of bacteria in 9.04%. Duplex ultrasound of the scrotum revealed that 3.80% had testicles without perfusion, 5.71% had normal perfusion, and 7.14% showed increased perfusion.

On scrotal USG, no patients had normal findings. Notable USG abnormalities included haematocele (7.14%), enlarged testes (8.57%), and enlarged epididymis (16.66%), indicating varied pathological changes in scrotum among the study population.

Table 4: Patterns of laboratory findings (n=210).

Findings	N	Percentage (%)
Neutrophilic leucocytosis	130	61.90
Abnormal urinalysis		
Pus cell ≥10/HPF	61	29.04
RBCs≥10/HPF	32	15.23
Presence of bacteria	19	9.04
Duplex study of scrotum		
Testicle without perfusion	8	3.80
Testicle with normal perfusion	12	5.71
Testicle with increased perfusion	15	7.14
USG of scrotum		
Normal	21	0.00
Haematocele	15	7.14
Enlarged testes	18	8.57
Enlarged epididymis	35	16.66

Table 5 presents the distribution of comorbidities among 210 patients. The majority, 80.47%, had no associated comorbidities. Among those with comorbidities, diabetes mellitus was the most common, affecting 10.95% of patients. Hypertension and bronchial asthma or chronic obstructive pulmonary disease (COPD) were less prevalent, seen in 4.76% and 3.80% of patients, respectively. No patients were reported to have cardiac disease, chronic liver disease, chronic kidney disease, or hypoproteinaemia in this study population. Table illustrates the distribution of blood or packed cell transfusion requirements among 210 patients. The vast majority of patients (88.09%) did not require any transfusion during their treatment. A small proportion required transfusion, with 5.71% receiving 1 unit, 3.80% receiving 2 units, and only 2.38% needing 3 or more units.

Table 5: Patients associated with comorbidities and requirements of blood/ packed cell transfusion (n=210).

Variables	N	Percentage (%)
Comorbidities		
No comorbidities	169	80.47
Diabetes mellitus	23	10.95
Br. Asthma/ COPD	08	3.80
Hypertension	10	4.76
Cardiac disease	00	00
CLD	00	00
CKD	00	00
Hypoproteinaemia	00	00
Requirements of blood/ packed cell transfusion (No. of unit/bag)		
0 unit	185	88.09
1 unit	12	5.71
2 units	08	3.80
3 or more units	05	2.38

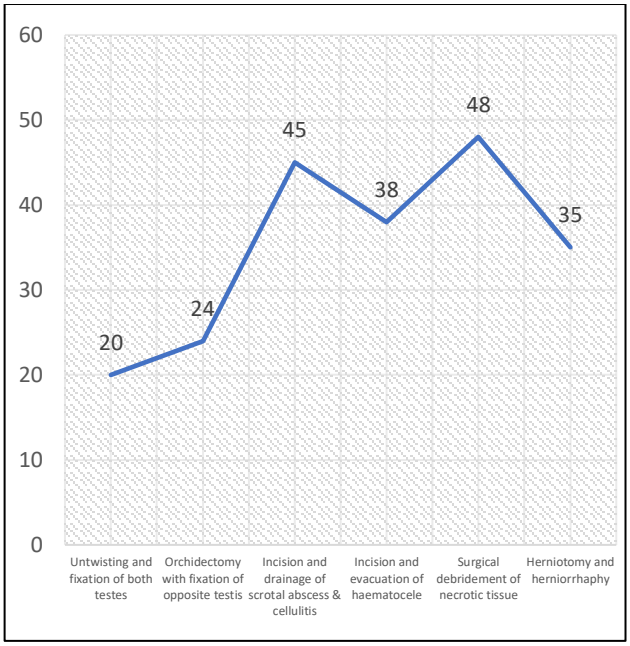

Figure 3: Operative procedures followed (n=210).

Figure 3 shows the distribution of surgical interventions performed on 210 patients. The most common procedure was surgical debridement of necrotic tissue, accounting for 22.86% (48 patients) of the cases, followed by incision and drainage of scrotal abscess and cellulitis at 21.43% (45 patients). Incision and evacuation of haematocele was performed in 18.10% (38 patients), while herniotomy and herniorrhaphy accounted for 16.67% (35 patients). Orchidectomy with fixation of the opposite testis was done in 11.43% (24 patients), and untwisting and fixation of both testes was the least common, performed in 9.52% (20 patients).

Table 6 presents the distribution of second interventions performed on patients requiring further surgical management. Secondary closure was the most commonly performed procedure, accounting for 41.90% (88 patients) of cases, indicating that many wounds were suitable for direct closure after initial treatment. Split thickness skin grafting was required in 21.43% (45 patients), reflecting the need for skin replacement in patients with larger or more complex wounds. Flap coverage was performed in 36.67% (77 patients).

Table 6: Second intervention (n=210).

Name of operation	N	Percentage (%)
Secondary closure	88	41.90
Split thickness skin grafting	45	21.43
Flap coverage	77	36.67

Table 7 shows most of the patients leaved hospital within 1 week, 66.70% (n=138) and maximam duration >4

weeks, for flap coverage due to Fournier's gangrene 3.80% (n=8). The mean hospital stay was 1.34 weeks.

Table 7: Total hospital stay of patient (n=210).

Hospital stays (in weeks)	N	Percentage (%)
< 1	138	65.70
>1-2	40	19.04
>2-3	14	6.66
>3-4	10	4.86
>4	08	3.80

DISCUSSION

The present study evaluated the clinical presentation, management, and outcomes of 210 patients with acute scrotal conditions. The most common diagnosis was acute epididymitis (24.28%), followed by acute epididymo-orchitis (13.80%) and testicular torsion (12.38%). This aligns with previous studies where epididymitis was reported as the leading cause of acute scrotum, particularly in sexually active young males.[8] Testicular torsion, though less frequent, remains a critical diagnosis due to its time-sensitive nature, as delayed intervention can lead to irreversible testicular damage.[9] The age distribution revealed that the majority of patients (27.76%) were between 21-30 years, consistent with findings by Kadish et al who reported a peak incidence of acute scrotal conditions in young adults.[10] The predominance of normal BMI (85.07%) suggests that metabolic factors may not significantly influence the occurrence of acute scrotal pathologies, though underweight patients (9.52%) could be at higher risk for infections due to compromised immunity.[11] Clinically, scrotal swelling (79.52%) and fever (64.76%) were the most common presentations, while intermittent pain (9.04%) was rare. This correlates with a study by Yang et al where swelling and localized tenderness were predominant symptoms, whereas atypical presentations like intermittent pain were associated with partial torsion.[12] The delay in hospitalization was notable, with only 15.23% presenting within 6 hours, similar to findings by Mansbach et al where patient delay contributed to higher orchidectomy rates in torsion cases.[13] Surgical intervention was required in 53% of cases, with debridement (22.86%) and abscess drainage (21.43%) being the most frequent procedures. This is comparable to studies on Fournier's gangrene, where aggressive surgical debridement was essential for reducing mortality.[14] Orchidectomy was performed in 11.43% of cases, primarily due to delayed presentation in torsion, reinforcing the need for early diagnosis.[15] Laboratory findings showed neutrophilic leucocytosis (61.90%) as the most common abnormality, consistent with inflammatory or infective etiologies.[16] Scrotal ultrasound played a crucial role, with no normal findings reported, highlighting its diagnostic utility in acute scrotum, as emphasized by Yusuf et al.[17] Comorbidities were present in 19.53% of patients, predominantly diabetes (10.95%), which is a known risk factor for severe infections like Fournier's gangrene.[18] Transfusion requirements were low (11.91%), suggesting that most cases did not involve significant hemorrhage or sepsis.[19] The mean hospital stay was 1.34 weeks, with most patients (66.70%) discharged within a week. Prolonged stays (>4 weeks) were seen in flap coverage cases, similar to outcomes in reconstructive surgeries for necrotizing infections.[20]

Limitations

This study has some limitations. The sample size of 210 patients, while adequate for initial observations, may limit the generalizability of the findings to broader populations or other geographic regions. Additionally, the study was conducted at a single centre, which might introduce selection bias related to local demographics and healthcare practices.

CONCLUSION

Acute scrotum represents a clinical emergency with diverse etiologies requiring prompt diagnosis and appropriate management to prevent significant morbidity and mortality. This study highlights that timely clinical evaluation combined with relevant diagnostic investigations such as USG and laboratory tests play a crucial role in differentiating between surgical and non-surgical causes of acute scrotal conditions. Surgical intervention remains the mainstay of treatment in cases such as testicular torsion, traumatic injuries, and Fournier's gangrene, while conservative management is effective for infections like epididymitis.

Recommendations

Management of acute scrotum is now considered teamwork. We need to include the plastic surgery team in the surgical ward. One should think about the use of a Doppler ultrasound machine in the surgical ward to assess the viability of testes and testicular perfusion to make the decision of scrotal exploration.

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REFERENCES

1. Knight PJ, Vassy L E. The diagnosis and treatment of acute scrotum in adolescents. Ann Sur. 1984;200(5):664-73.
2. Williamson RC. Torsion of the testis and allied conditions. Br J Surg. 1976;63(6):465-76.
3. Mulhall JP, Gabram SG, Jacobs LM. Emergency management of blunt testicular trauma. Acad Emerg Med. 1995;2(7):639-43.
4. Smith GL, Bunker CB, Dinneen MD. Fournier's gangrene. Bri J Urol. 1998;81(3):347-55.

5. Haery B, Rodeheaver G. *Streptococcal* cellulitis of the scrotum and penis with secondary skin gangrene. Br J Surg. 1975;141(1):35-9.
6. Lee YC, Wu WJ, Huang Sp. Scrotal abscess originating from appendicitis. Taiw J Sur. 2003;19(5):242-5.
7. Brereton R J Manly S. Acute scrotal pathology in boys. British J Surg. 1980;29(3):343-57.
8. Tracy CR, Steers WD, Costabile R. Diagnosis and management of epididymitis. Urol Clin North Am. 2008;35(1):101-8.
9. Ringdahl E, Teague L. Testicular torsion. Am Fam Physician. 2006;74(10):1739-43.
10. Kadish HA, Bolte RG. A retrospective review of pediatric patients with epididymitis, testicular torsion, and torsion of testicular appendages. Pediatrics. 2002;102(1):73-6.
11. Awasthi S, Agarwal GG. Determinants of childhood mortality and morbidity in urban slums in India. Indian Pediatr. 2003;40(12):1145-61.
12. Yang C, Song B, Tan J, Liu X. Intermittent testicular torsion in children: Clinical characteristics and outcome. J Pediatr Surg. 2015;50(7):1178-80.
13. Mansbach JM, Forbes P, Peters C. Testicular torsion and risk factors for orchiectomy. Arch Pediatr Adolesc Med. 2005;159(12):1167-71.
14. Sorensen MD, Krieger JN. Fournier's gangrene: Epidemiology and outcomes in the general US population. Urol Int. 2016;97(3):249-59.
15. Boettcher M, Bergholz R, Krebs TF, Katharina W, Daniel CA. Clinical predictors of testicular torsion in children. Urology. 2012;79(3):670-74.
16. Lau KK, Stoffel JT. Acute scrotal pain: A clinical review. Emerg Med Pract. 2013;15(6):1-20.
17. Yusuf GT, Sidhu PS. A review of ultrasound imaging in scrotal emergencies. J Ultrasound. 2016;19(4):227-38.
18. Eke N. Fournier's gangrene: A review of 1726 cases. Br J Surg. 2000;87(6):718-28.
19. Corman JM, Moody JA, Aronson WJ. Fournier's gangrene in a modern surgical setting: Improved survival with aggressive management. BJU Int. 1999;84(1):85-8.
20. Chen SY, Fu JP, Wang CH, Tzu-Peng L, Shyi-Gen C. Fournier gangrene: A review of 41 patients and strategies for reconstruction. Ann Plast Surg. 2010;64(6):765-9.

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