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Research Article

Evaluation of Aetiopathology and Prognostic factors in the Management of Fournier's Gangrene

Authors
Dr V.K.Gupta[1], Dr O.K. Maurya[2]*
[1]M.B.B.S., M.S.(General Surgery), Asst. Professor, Department of Surgery, Nalanda Medical College & Hospital, Patna, Bihar, India
[2]M.B.B.S., M.S.(General Surgery), D.A., Associate Professor, Department of Surgery, Nalanda Medical College & Hospital, Patna, Bihar, India
*Corresponding Author
Dr O.K. Maurya
M.B.B.S.; M.S.(General Surgery), D.A., Associate Professor, Department of Surgery, Nalanda Medical College & Hospital, Patna, Bihar, India

Introduction

Fournier's Gangreneis a type of necrotising fascitis affecting external genitalia and/or perineum or peri-anal region, which commonly affects men, but can also occur in women and children. Many terms have been used to describe this clinical condition including Idiopathic gangrene of the scrotum, Synergistic necrotising cellulitis, Periurethral phlegmen, Streptococcal scrotal gangrene, and Phagedma.

Although this clinical entity has been described initially by Baurienne in 1764[1]and Avicenna in 1877[2], it is named after French Parisian Venerologist Jean Alfred Fournier, who reported 5 cases of fulminant gangrene of penis and scrotum in young men in 1883.

Initially Fournier's Gangrene was defined as an idiopathic entity, but subsequent research showed suppurative bacterial infections in majority of cases resulting in micro thrombosis of small subcutaneous blood vessels leading to development of gangrenous patches of overlying skin.

The scrotal skin is more delicate and darker than the surrounding region and quite distensible. It is the presence of subcutaneous dartos muscle, which is akin to platysma in the neck, which gives the scrotal skin this property of distensibility. The scrotum is richly supplied by blood vessels from different sources like cremasteric branch of inferior epigastric artery, a twig from testicular artery and scrotal branches of both internal and external pudendal arteries. Relative impairment of venous return due to laxity and dependency of the scrotum may be a precipitating factor in the occurrence of gangrene. Aggressive, effective and early treatment of this condition is necessary to prevent a fatal outcome.

Materials and Methods

From January 2014 to December 2017 forty patients of Fournier's Gangrene admitted in

Nalanda Medical College Hospital, Patna were selected for evaluation. All patients were managed by protocol of early and effective resuscitation with IV fluids, blood transfusion when needed, broad spectrum antibiotics with coverage to Gram positive and Gram negative organisms as well as anaerobes, wide surgical excision, repeated debridement and frequent dressings. Debridement and wide excision were done within 24 to 48 hours of presentation. In all cases swab for culture and sensitivity was taken from pus/ discharge. The type of bacteria as well as their sensitivity to antibacterial agents was determined. Antibiotics were started immediately which were later changed if required according to C/S report.

Blood investigations such as complete blood count, blood glucose levels, BUN, creatinine, serum electrocytes and viral markers were routinely done; whereas ultrasonography of scrotum, cardiac function tests were done in selected cases. Procedures were carried out after written and informed consent.

Observations

All patients were male between age group of 27 to 56 years. Almost all cases presented with fever of varying degree along with scrotal swelling. Presenting symptoms and signs in details are shown in table 1. There was no obvious focus of infection anywhere in the body. In some cases, area of the slough was so extensive that the testicles were virtually bare. Extent of visceration are shown in table 2.

Bacteriological study showed growth of E.coli & Klebseilla in 15 cases, Staphylococci and E.Coli in 12 cases, Streptococci and Staphylococci in 5 cases, Pseudomonas & Proteus in 2 cases. There was no growth of organism in 6 cases. Bacteriological pattern is shown in table 3.

Line of demarcation between the healthy and necrotic tissues were seen within 3-9 days. In all cases, the necrotic tissue was excised generously along with a small core of normal tissue and was sent for histopathological examination. In most of the cases healing of wound occurred by secondary intention. Delayed closure was done in 12 cases. Split skin Grafting was required in 3 cases. 5 patients required excision of scrotum with transposition of viable testes into upper medial part of thigh. 3 patients required split thickness graft on penis in addition to excision of scrotum and transposition of testes. 5 patients had involvement of perineum and scrotum as well as perianal sepsis. Surgical management has been shown in details in table 4. All patients had uneventful recovery. There was no death in this series. The hospital stay varied from 3 weeks to 2 months.

Table 1.Clinical presentation of patients

Symptoms and Signs	**Frequency**	**Percent**
Pain	40	100.0
Fever	38	95.0
Scrotal Oedema	40	100.0
Erythema	40	100.0
Skin necrosis	35	87.5
Crepitus	04	10.0
Leucocytosis	40	100.0
Hyperglycaemia	13	32.5

Table 2.Extent of Ulceration

Extent	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
Confined to Scrotum	30	75.0	75.0	75.0
Extending to perineum	5	12.5	12.5	87.5
Extending to penile shaft	3	7.5	7.5	95.0
Extending to perineum with perianal sepsis	2	5.0	5.0	100.0

Table 3. Type and Frequency of flora in Pus / Discharge

Type of organisms	**Frequency**	**Percent**	**Valid Percent**	**Cumulative Percent**
E.Coli&Klebseilla	15	37.5	37.5	37.5
Staphylococci &E.Coli	12	30.0	30.0	67.5
Streptococci & Staphylococci	5	12.5	12.5	80.0
Pseudomonas & Proteus	2	5.0	5.0	85.0
No Growth	6	15.0	15.0	100.0

Table 4. Surgical management

Sl.no.	Procedure	Frequency	Percent
1	Wound debridement	40	100.0
2	Delayed Closure	12	30.0
3	Split skin Grafting	3	7.5
4	Excision of scrotum + Transposition of testis into thigh	5	12.5
5	Above(4) + split skin grafting of penis	3	7.5

Figure 1: Fournier's gangrene

Figure 2: Fournier's gangrene

Discussion

Fournier's Gangreneis a devastating disease with great morbidity and mortality depending upon the severity of presentation. The most striking characteristic of this condition is that it usually occurs suddenly in patients already in good health and rapidly progresses to the gangrenous state.

The aetiology of Fournier's Gangrene is controversial[3.] Mansfield suggested that the condition was a vascular disorder of infective origin, analogous to cavernous sinus thrombosis. In the present study similar thrombosis could not be established after histopathological examination. According to Dunaif[4], the most likely cause of Fournier's Gangrene appears tobe a spreading infection from the peri-urethral glands.

It was originally described by Mr.J.A. Fournier as idiopathic entity as abrupt onset of scrotal pain and swelling leading to gangrene in young males[5]. Today the infection is not only limited to young individuals or to men, but also occurs in women and the cause of infection can always be identified in majority of the cases. Fournier's Gangreneis generally defined today as synergistic necrotising fasciitis of the perineal or genital area which leads to thrombosis of small subcutaneous vessels and results in development of gangrene of the overlying skin. The vascular thrombosis results from an obliterative endarteritis secondary to spread of micro-organisms within the fatty subcutaneous tissue [6].

Common predisposing conditions include lower socio-economic group, poor personal hygiene, alcoholism, diabetes, use of steroid and generalised debilitating disease. Anorectal or urogenital and perineal traumas, including pelvic and perineal injury or pelvic interventions, are other causes of FG .Fournier's Gangrene has also been found as presenting sign of an undiagnosed HIV infection. In spite of newer diagnostic techniques, aetiology remains unclear in 25% of cases[7].

Regardless of the mode of onset, scrotal swelling and pain are the first local symptoms, followed by progressive local necrosis of the scrotal skin and the subcutaneous tissue, without any involvement of the deeper tissues.

The key to successful outcome includes early diagnosis. Unfamiliarity with this condition results in delayed diagnosis, inadequate treatment and high mortality. Diagnosis is usually clinical. High index of suspicion is the key to success of early diagnosis. Scrotal ultra sonography is helpful in differentiating Fournier's Gangrenefrom other intrascrotal acute conditions[8].Conventional

radiography may show presence of gas in soft tissue where clinical findings are conclusive.

The testis is usually normal in Fournier's Gangrene as it receives blood supply from intra abdominal testicular artery. However it may be involved if infection spreads intra abdominally causing thrombosis of testicular artery[9].None of the patients required orchidectomy in this study. Hyperbaric oxygen decreases the spread of myofascial necrosis and gangrene, facilitates wound healing and speeds up post recovery after debridement[10]. None of the patients in this study required hyperbaric oxygen therapy. After gangrenous process has resolved, prompt healing is characteristic and re-epethelialization is often markedly complete[11].Secondary suturingand split thickness skin grafts are nearly always successful and may markedly decrease the convalescence period when the skin defect is very large. Similar experience was encountered in the present study.

Before the advent of antibiotics, there was high mortality rate in Fournier's Gangrene. Gibson[12] reported a mortality rate 26.7%. Mair[13] reported a mortality rate of 32.5%. More recent study[14,15] reported a decreased mortality of 7-25%.

Mortality is usually due to uncontrolled septicaemia, multiple organ failure and pulmonary embolism. In the present study, there was no mortality. This improvement was due to early diagnosis of the disease and an aggressive medical and surgical treatment.

Conclusion

Fournier's Gangrene is still a life threatening surgical emergency which demands prompt recognition and aggressive treatment. A delay in diagnosis may result in devastating outcome. Early and liberal surgical intervention along with proper antibiotic coverage and good supportive care is essential. Continued medical care in the form of multidisciplinary approach is necessary as these patients may require reconstructive procedures in the future. Active management of the diabetic and immunocompromised patients with perineal infection is of extreme importance to prevent the development of Fournier's Gangrene, as this condition in the presence of such comorbidities is associated with high mortality.

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