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Clinical Study of Fournier's Gangrene – Management and Outcome

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Abstract

Background: *Fournier's gangrene is a necrotising fasciitis of the genitalia and perineum, with associated polymicrobial infection and risk of organ failure or death.*

Patients And Methods: *We studied 40 during January 2012 and December 2013.*

Results: *the mean patient age was 48.3 years (range 28 - 66 years), with a peak age incidence of 50 - 59 years. The majority of patients were farmers and manual labourers . The site of gangrene was scrotal in 31 patients (77.5%), penoscrotal in 3 (12.5%), abdominoscrotal in 2 (5%) and scroto-perianal in 1 (5%).Systemic predisposing factors identified were diabetes mellitus in 12 patients (30%), congestive cardiac failure in 1 (2.5%) and hiv infection in 3 (7.5%). In 24 patients (60%) no systemic factor was identified. Local predisposing factors identified were chronic scrotal skin itching in 20 patients (50%), scrotal thorn injury in 2 (5%) and urethral catheterisation in 2 (5%).The common clinical features were fever, scrotal swelling/pain, and later a malodorous painless wound. Treatment involved fluid administration, correction of electrolyte imbalance, antibiotics, debridement and daily wound inspection/ dressing with hydrogen peroxide soaks and sodium hypochlorite. The mean duration of hospital stay was 40.days (range 20 - 80 days). Two patient died (5%).*

Conclusion: *Fournier's gangrene is a challenging surgical problem, with significant morbidity. Diabetes mellitus is a significant systemic risk factor. Local risk factors, especially chronic scrotal itching, were contributory. With proper management, mortality is low.*

Key Words: *Diabetes Mellitus, Gangrene, Necrotising Fasciitis, Debridement.*

INTRODUCTION

According to Ong and Ho[1] fournier's gangrene was originally described by Baurienne in 1764, but named by jean Alfred Fournier(1832 - 1914) in 1883 when he described the occurrence of a condition characterised by sudden onset in previously healthy young men, rapid progression to gangrene and absence of a definite cause, as quoted by Stephens *et al.*[2] and Laor *et al.*[3] the Persian physician Avicenna (980 - 1037) had

earlier described the same condition in his book *the Canon of Medicine*, as quoted by Nathan.[4] it is now known that Fournier's gangrene is caused by acute infection of the tissues of the perineum, evolving in a sudden and unpredictable manner to necrotising cellulitis due to anaerobic bacteria, gram-negative bacteria, or both. Although the condition is rare in absolute terms, over 1726 cases have been reported in the English literature, with a male/female ratio of 10:1. There have been 502 cases from Africa, which ranks second to the USA/Canada.[6]

Controversy exists regarding the difference between primary and secondary fournier's gangrene, and the condition has several other names: necrotising fasciitis, peri-urethral phlegmon, phagedena and necrotising cellulitis. However, there appears to be no significant dif-ferences between the definitions offered.[6] necrotising fasciitis in the region of the perineum and genitalia should be termed fournier's gangrene, regardless of the aetiology or the presence of infection, because the prognosis and treatment are the same.[7]

Fournier's gangrene is no longer considered idiopathic, because the pathological features are well defined and the portals of entry of causative organisms well known.[8] the disease is an obliterative endarteritis caused by the spread of organisms.[8] the relentless necrotising cellulitis may be localised to the perineum, genitalia and groin.[9] causative factors are known to arise in the local skin, colorectal region and urinary tract.[10-12] systemic illnesses such as diabetes mellitus and alcoholism are also implicated.[1,5,13,14]

This study examines the presentation, management and outcome of fournier's gangrene in SKNMC and GH, Pune.

MATERIALS AND METHODS

Between January 2012 and December 2013, 40 patients treated for Fournier's gangrene who had complete records were assessed at SKNMC and GH, Pune. Data collected were the patients' age at presentation, clinical features, investigations, treatment given, problems with management and outcome.

The diagnosis of Fournier's gangrene was made on clinical grounds after a detailed history and physical examination. Baseline evaluation consisted of full blood count, serum electrolytes, urea and creatinine, fasting or ran-dom blood sugar estimation and culture of a wound swab. Routine testing for HIV was done. Radiographs were taken and abdominal ultrasonography done in patients with abdominal involvement to assess the presence and extent of gas in the abdominal wall and the condition of the intra-abdominal viscera.

The successful passage of an average-sized Foley catheter (18G) and no prior history of lower urinary tract symptoms served to rule out any significant urethral stricture in the acute period.

Antibiotics (ceftriaxone 1 g daily, gentamicin 80 mg 8- hourly and metronidazole 500 mg 8-hourly) were commenced till culture and sensitivity results. Resuscitation with intravenous crystalloids was carried out, after which debridement was done to remove all non-viable tissue.

Dressings were with hydrogen peroxide and sodium hypochlorite. Secondary closure or reconstruction was done when the wounds were clean and granulating.

RESULTS AND DISCUSSION

Forty male patients (mean age 48.3 years, range 28 - 66 years) were seen during the study period. Only 25% of patients were in the second and third decades of life, the majority (28.6%) being 50 - 59 years old.

Evaluation of patients' occupations showed that the majority (64.2%) were low-income earners, mostly subsistence farmers, and 35.8% were middle-income earners.

According to their histories, all patients experienced fever, malaise, scrotal pain and swelling, and at presentation all had painless and malodorous wounds; 30 (75%) were febrile.

The site most commonly involved s scrotal in 31 patients (77.5%), penoscrotal in 3 (12.5%),

abdominoscrotal in 2 (5%) and scroto-perianal in 1 (5%). Two (5%) diabetic patient with scrotal and extensive perianal involvement and septicaemia had organ failure.

Systemic predisposing factors identified were diabetes mellitus in 12 patients (30%), congestive cardiac failure in 1 (2.5%) and HIV infection in 3 (7.5%). In 24 patients (60%) no systemic factor was identified. Local predisposing factors identified were chronic scrotal skin itching in 20 patients (50%), scrotal thorn injury in 2 (5%) and urethral catheterisation in 2 (5%). Scrotal carbuncle and scrotal surgery each accounted for 2 patientseach (5%), and ischiorectal abscess occurred in 2 patient (5%). No local predisposing factor was identified in 12 patients (30%)..

In this series, the mean interval between onset of symptoms and presentation was 7.5 days (range 3 - 14 days). Six patients (15%) presented within 3 days, and 10 (25%) within 4 - 6 days. The majority of the patients (60%) presented after 7 days.

At baseline assessment of haematological indices, 25 patients (62.5%) were anaemic (haemoglobin concentration <10 g/dl), the mean haemoglobin concentration being 8.5 g/dl. The anaemic patients received PCV transfusions to attain a haemoglobin concentration of 10 g/dl. Mild leucocytosis (neutrophilia) was noted in 30 patients (75%), 2 (5%) had renal failure, and 32 (80%) had evidence of dehydration as evidenced by slight elevations in urea levels but normal creatinine levels.

Wound swab culture results were available in all 40 patients and showed mixed growth of *Escherichia coli* and *Pseudomonas* in 15 patients and *E. coli* and *Proteus* in 5. The remaining 20 patients had single-organism isolates, mainly *E. coli*. Isolates were sensitive to cephalosporins and/or gentamicin.

Treatment consisted of antibiotic therapy using a combination of ceftriaxone, gentamicin and metronidazole, fluid resuscittion, urine output monitoring and tetanus prophylaxis. Antibiotic therapy was modified when culture results were received. Debridement was carried out to remove all necrotic tissue and the wound was cleaned with hydrogen peroxide and dressed with gauze soaked in sodium hypochlorite. Daily wound inspection was carried out and repeat debridement was performed if indicated. Wounds were allowed to granulate and subsequently closed or reconstructed.

Most patients were fed enterally. When this was impossible, patients were maintained on intravenous dextrose containing solutions until they could eat, which was usually within 48 - 72 hours.

DISCUSSION

Fournier's gangrene is considered rare in terms of absolute numbers, with about 1700 cases reported in the English literature up to 2000.[6] Factors arising in the perianal and perineal regions are often reported as the commonest causes of this ailment.[1,15] However, in our series, 50% of patients had had scrotal itching and ensuing microtrauma might have led to a local skin infection that was made unidentifiable by the ensuing gangrene.[5,15] This is in agreement with the findings of other workers.[10] It is postulated that poor hygiene may increase the risk of scrotal skin infection and subsequent gangrene, or that the scrotal itching is an early symptom of dermatitis of unidentified aetiology.

The average age of the patients in our series was 48.3 years (range 28 - 66 years). An intriguing finding was the long interval between onset of symptoms and presentation to hospital (mean 7.5 days, range 3 - 14 days). This was consistent with the reports of Beniziri *et al.*,[5] Ayan *et al.*[15] and Safioleas *et al.*,[17] but much longer than the findings of Nisbet *et al.*[18] and Dahm *et al.*[19]

Delay in presentation did not seem affect outcome negatively, and the patients who died presented early; this suggests that the biological characteristics of each infection are distinct. With regard to the clinical features, the prevalence of fever, malaise, scrotal swelling and pain was similar to the findings of earlier workers.[5]

The leading isolate was *E. coli*, which is in

agreement with the findings of others.[5,15]

Our patients were treated with intravenous fluid resuscitation, blood transfusion where necessary and urine output monitoring, with emphasis on the more ill patients in full realisation of the lethal complications of these physiological upsets. Tetanus prophylaxis was given to all patients, and hyperimmune tetanus globulin was administered when available to prevent possible tetanus infection due to faecal contamination. Debridement of necrotic tissue was done once these measures were in place, after an interval of 5 - 40 hours.

The association between diabetes mellitus and Fournier's gangrene is well known.[14,22,23] Eight of our patients were known diabetics with poor or no control and 4 were newly diagnosed during the admission . It is well known that patients with diabetes have immune suppression and poor cellular immune response.

Various dressings have been used for Fournier's gangrene. We used hydrogen peroxide soaks as an oxygen donor to increase oxygen tension in the wound and counter the growth of anaerobes. This was followed by sodium hypochlorite solution. We did not use honey, though its salutary effect in malodorous wounds has been reported.[8,9] Also, no patient in our series received hyperbaric oxygen therapy as this facility was not available to us, though we noted the reported salutary effects[5] and equivocal results in some series.[24] Orchidectomy was not done in our series.

The average duration of hospital stay (40 days) is similar to the figures reported by Ayan *et al*.[15] and Safioleas *et al*.,[17] but much longer than that reported by Dahm *et al*.[19]

The two patient in our series who died (mortality rate 5%) was a diabetic who presented with severe septicaemia and multiple organ failure. Mortality rates ranging from 3% to 45% have been reported,[6] and causes include severe sepsis, coagulopathy, acute renal failure and diabetic ketoacidosis.

Regarding predictors of outcome, alkaline phosphatase, lactate dehydrogenase and serum albumin were not routinely requested, although the single patient who died had renal failure and severe leucocytosis.

CONCLUSION

Fournier's gangrene remains a challenging problem for the surgeon and has a significant association with diabetes mellitus. The man-aging physician is required to deal with fluid and electrolyte management, antibiotic use, wound care and sepsis to achieve overall treatment of this condition.We emphasise that the diagnosis is a clinical one, and that the purpose of investigations is to assess patients' baseline values, determine the degree of physiological imbalance, and identify predisposing and aetiological factors.In a developing country , there is a paucity of resources, and laboratory results are often delayed owing to power failures, lack of reagents, etc. Prudent and selective use of these investigations may hasten decision making and reduce cost. Awareness of diabetes mellitus needs to be increased via public education programmes, as this was found to be a significant risk factor for Fournier's gangrene and appeared to increase the risk of death.The maintenance of good scrotal hygiene may possibly reduce the incidence of the condition, although there is no real evidence that this is so.Improved access to qualified doctors and hospitals, with health-care subsidies for poor patients, will be of great value. Thorough assessment, correction of fluid/electrolyte deficits, debridement and regular wound inspection, combination antibiotic therapy, tetanus prophylaxis, wound dressing and well timed closure remain the bedrock of the management of Fournier's gangrene.

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