

Case Report

Principles of dressing and debridement in modern rural surgery: experience of a case of Fournier's gangrene

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ABSTRACT

Fournier's gangrene is a rare and rapidly progressive necrotising fasciitis of the external genitalia and perineum. It is characterised by obliterative endarteritis of the subcutaneous arteries resulting in gangrene of the subcutaneous tissue and the overlying skin. Rural surgery refers to the practice of surgery serving people in rural communities and geographically remote areas. Rural surgery faces multiple challenges like limitation of resources and manpower, poverty, multiple co-morbidities and superstitions. We present such a case of Fournier's gangrene treated in a secondary care centre of rural Assam. A 45 year old male presented with pain and discharge from the scrotum since two weeks. No other co-morbidities were present. Initially, wound debridement and dressing with hydrogen peroxide and povidone iodine is done. Necrosed tissue is sent for microbial culture and sensitivity. Initially, empirical antibiotics was started and was converted to fluoroquinolones as it showed sensitivity. Serial dressing and debridement were continued till healthy granulation tissue appeared. Then, the wound was closed by loose approximation method. Wound was successfully apposed and viability of both the testis was also found to be intact. Thus, the age-old principle of dressing and debridement still serves as the background of wound care in modern rural surgery.

Keywords: Necrotising, Fasciitis, Obliterative, Endarteritis, Dressing, Debridement

INTRODUCTION

Scrotum is an integral part of male reproductive system. It is derived from the labioscrotal folds. It swells and fuse to form twin scrotal sacs under the influence of testosterone. The point of fusion is the median raphe, which extends from the anus along the perineum to the ventral surface of the penis. The scrotal wall is composed of the following structures from the superficial to the deep-rugate skin, superficial fascia, dartos tunica, external spermatic fascia, cremasteric fascia, and internal spermatic fascia. It varies from 2 to 8 mm in thickness. Dartos acts to regulate the temperature of the testicles by expanding or contracting to wrinkle the scrotal skin. The system of different membranes inside the scrotum avoids

testes from injury. It also acts as a covering for protection to the testes. The scrotum contains a pair of testes and its coverings (Tunica vaginalis and albuginea), epididymis and part of the spermatic cord. Anterior scrotal artery (branch of deep external pudendal artery) supplies anterior scrotum and posterior scrotal artery (branch of internal pudendal artery) supplies posterior scrotum. Scrotum is drained by superficial network of veins (anterior into great saphenous vein and posterior into internal iliac vein). Lymph from the scrotum is drained into the superficial then into the deep inguinal lymph nodes. The skin and dartos of the scrotum are largely supplied posteriorly by the posterior scrotal nerves and branches of the pudendal nerve, laterally by perineal

branches of the posterior femoral cutaneous nerves and upper part by the ilioinguinal and genitofemoral nerves.¹

Fournier's gangrene is a rare and rapidly progressive necrotising fasciitis of the external genitalia and perineum. Morbidity and mortality rates range upto 20-30%. It is characterised by obliterative endarteritis of the subcutaneous arteries resulting in gangrene of the subcutaneous tissue and the overlying skin.² Common etiological factors are diabetes mellitus, poor personal hygiene, obesity, psychosis and decubitus ulcers.³ Fournier's gangrene severity index (FGSI), laboratory risk indicator for necrotizing fasciitis (LRINF) and neutrophile-lymphocyte ratio (NLR) are three scoring systems for evaluation of mortality and morbidity in patients with Fournier's gangrene.⁴

Treatment starts with extensive debridement and broad-spectrum antibiotics. In 2001, national institute for clinical excellence defined debridement as the removal of devitalised or infected tissue or foreign material from a wound. Debridement is of following types- surgical, mechanical, autolytic, enzymatic and biological.⁵

Along with debridement, effective dressing with various solution and ointments, grafting, healing by secondary intention, flap reconstruction along with newer treatment modalities like negative pressure wound therapy (NPWT) and hyperbaric oxygen therapy has been used for successful management in Fournier's gangrene. Dressing selection should be based on its ability to provide or maintain moist environment, enhance epidermal migration, promote angiogenesis and connective tissue synthesis, allow gas exchange between wounded tissue and environment, maintain appropriate tissue temperature to improve blood flow to wound bed and enhances epidermal migration, provide protection against bacterial infection, should be non-adherent to wound and easy to remove after healing, must provide debridement action to enhance leucocytes migration and support accumulation of enzyme, must be sterile, non-toxic and non-allergic.⁶

Rural surgery refers to the practice of surgery serving people in rural communities and geographically remote areas. Rural surgery faces multiple challenges like limitation of resources and manpower, poverty, multiple co-morbidities, superstitions etc. We present such a case of Fournier's gangrene treated in a secondary care centre of rural Assam.⁷

CASE REPORT

A 45 year old male presented with pain and discharge from the scrotum since two weeks at the surgery OPD of Titabor sub-divisional civil hospital, Jorhat, Assam. Patient had no previous history of injury to the scrotum or any other scrotal lesion. He had burning and increased frequency of micturition since previous 1 week. No other co-morbidities were present. On general examination, there was pallor and patient were poor in nutrition. No

other abnormalities noted. On local examination, there was discontinuation of the scrotal wall with presence of slough which is present over both the testis was seen. Surrounding groin region was healthy (LRINF score:6). It diagnosed to be case of Fournier's gangrene (Figure 1).



Figure 1: Fournier's gangrene on the initial day of presentation.

Treatment was started with initial wound debridement and dressing with hydrogen peroxide and povidone iodine on initial day. Necrosed tissue is sent for microbial culture and sensitivity. Initially, empirical antibiotics were started with third generation cephalosporins and metronidazole and were converted to fluoroquinolones as it showed sensitivity. Regular sitz bath followed by serial dressing and debridement were continued till healthy granulation tissue appeared. The patient's blood report showed moderate anaemia and hypoalbuminemia. Both these conditions were corrected with 2 units of packed RBC transfusion and high protein diet respectively.

Following optimization of the patient's general conditions, operative procedure was planned under local anaesthesia (Figure 2). The surrounding skin was mobilized and the edges were trimmed following which, the edges were approximated using non-absorbable sutures with placing of a corrugated rubber drain in the suture line. Drain was removed the next day and stitches removed after 12 days. Viability of the testis was checked by ultrasonography after stitch removal. Patient was advised to apply topical antibiotic ointment for 1 week following stitch removal and was followed-up once where no abnormalities were detected (Figure 3).



Figure 2: Pre-operative wound.



Figure 3: After completion of treatment and follow-up.

DISCUSSION

Study conducted by Shyam et al concludes that Fournier's gangrene is a surgical emergency and the treatment is based on a multimodal approach. However, early recognition with aggressive haemodynamic stabilisation, parenteral broad spectrum and urgent surgical debridement are the mainstay of treatment. Another study conducted by Auerbach et al opines the same.⁸

Another study conducted by Ozkam et al concluded that NPWT has promising results in the treatment of Fournier's gangrene.⁹

The study conducted by Altamore et al concluded that surgical debridement and broad-spectrum antibiotics remain the pillars of effective treatment and hyperbaric oxygen therapy could speed up the healing process. However, randomized controlled trials are necessary to support the effectiveness of NPWT.¹⁰

The study conducted by Agwu et al concluded that in resource-constraint setting, prompt and adequate resuscitation, aggressive debridement, use of hypertonic saline bath and appropriate broad-spectrum antibiotics give favourable outcome.¹¹

Another study concluded that treatment is started with fluid resuscitation, broad-spectrum antibiotics and aggressive surgical debridement. The best option for reconstruction should rely on the surgeon's expertise, patient preference, and available resources.¹²

CONCLUSION

Fournier's gangrene is a life-threatening disease of the scrotum and perineum. A lot of factors contribute to its occurrence and *E. coli* is the most common organism involved. Debridement and dressing following sitz bath

under broad-spectrum antibiotic cover is the mainstay of treatment, especially in resource-limited centres. In higher centres, hyperbaric oxygen therapy and reconstruction can be undertaken. NPWT has promising results but needs more evaluation.

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