Fournier’s gangrene is a necrotizing fasciitis-like infection of the penis, scrotum and perineum that is seen around the world especially in immunocompromised patients. With or without urologists the general surgeon is involved in the acute care of these patients and without plastic surgeons the general surgeon must do the necessary reconstruction. This is the reason the treatment of Fournier’s is included in this publication.

Fournier’s is a polymicrobial infection that is often seen in patients with underlying diabetes, HIV/AIDS or other immunodeficiency states. The etiology of the infection is most often due to urethral strictures with periurethral infection and abscesses and also perianal disease. The infection may spread proximally into the abdominal wall and must be contained and controlled by radical and repeated “second look” débridements, broad spectrum antibiotics and delayed closure by a number of methods discussed below. Septic shock is always a potential complication in these patients.

The infection is usually in the superficial planes and above the muscles. It involves the subcutaneous tissue and Dartos fascia in the penis and Scarpa’s fascia in the abdomen and scrotum. Culture and sensitivity with or without biopsies may be done but treatment with wide débridement must be carried out as soon as the patient is seen, not waiting for cultures even if available. Blood work must be done to rule out diabetes and HIV. Usually it is obvious if the patient has urinary obstruction. If there is a urethral stricture, catherization may be attempted; however, if a periurethral abscess is present,
it should be opened and suprapubic cystostomy should be done to divert the urine. Occasionally a colostomy may be necessary.

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Appropriate treatment includes: Radical and repeated débridements, broad spectrum antibiotics, fluid resuscitation, treatment of underlying illnesses, protection of testicles, daily wound care, and reconstruction once the wound is ready.

Débridement: Urgent and extensive débridement must be done on admission with careful inspection to ensure the infection has not spread proximally into the abdominal wall. Periurethral abscesses must be opened and drained well. A “second look” procedure should be planned for the following day. The testicles are very vascular and usually are not involved though covered with exudate. Every attempt must be made to save the testicles and not debride until one is absolutely certain they are necrotic.

Antibiotics and Fluid Resuscitation: Since this is a poly microbial infection with aerobic and anaerobic gram positive and gram negative organisms. Ideally newer antibiotics as ciprofloxacin and clindamycin are used but most
must rely on the older but still effective triple antibiotic therapy with metronidazole (Flagyl), ampicillin or penicillin/cloxacillin, and gentamycin. Rarely chloramphenicol may be used when other antibiotics are not available to cover gram negative infections. In compromised patients with diabetes, systemic spread of the infection is common and often with septic shock. Fluid resuscitation must be started immediately even if the patient is not in shock.

Treatment of Underlying Illness: History and blood tests should give immediate information regarding diabetes, HIV or other underlying problem. Urethral stricture with periurethral disease should be easily diagnosed by history, physical and catherization. A Foley/SP catheter is a must to monitor urine output.

Wound Care and protection of testicles: This gangrenous infection will require repeated débridements for several days to several weeks. Occasionally the abdominal wall must be opened and the subcutaneous tissue with the involved Scarpa’s fascia excised. It is rare for the deeper muscle fascia to be involved but it must be evaluated. Wounds should be kept moist between débridements with wet dressings, silver sulfadiazine as a topical antimicrobial, and a VAC if available (see chapter on chronic wound management). The testicles must not be allowed to desiccate. Once they are free from overlying infection, they can be placed temporarily in the upper thigh. Pockets just below the subcutaneous tissue can be developed on each side and the testicles loosely placed in these pockets that are not closed in order to allow for drainage. In some cases, the testicles are left in these pockets permanently.

Reconstruction: After adequate débridement, the testicles are often left “hanging” free and independent. If they have been placed temporarily in thigh pockets, they can be released for scrotal reconstruction. A VAC, if available, may help fill in dead spaces and prepare the wound for scrotal reconstruction. The easiest method of scrotal reconstruction is with local tissues if available and if not excised during débridement. Remaining scrotal, perineal and inner thigh tissues have considerable elasticity and often can be undermined and advanced to cover much of the residual defect. Every case is different and the amount of available tissue remaining for reconstruction varies. Where local flaps are not adequate or when one is unsure how to use these, meshed skin grafts can be used to cover the testicles and perineum. Meshed grafts contour well to the irregular surfaces and these mature over time and give an adequate “scrotum,” though sensitive and prone to mechanical trauma. Grafts can be used in conjunction with local flaps for coverage. Testicles can be gently sutured together in a vertical direction to close the midline defect and provide a
smaller and smoother surface for skin graft coverage. Flaps that are available for coverage are the medial thigh flap, the Singapore flap—pudendal thigh flap, anterolateral thigh perforator flap and even large superficial inferior epigastric flaps turned down from the abdomen, though this area may be involved in the infection. All these flaps are fasciocutaneous and give a good cosmetic reconstruction. The medial thigh flaps can be based proximally in the anteromedial groin and advance easily into the defect. These are fasciocutaneous flaps based mainly on perforators and are very vascular and safe to use. The length of the flap can be 2-3 times the width. The Singapore (vulvoperineal) flap is based in the posterior perineum and extends up along the crease between the thigh and scrotum (See Flaps for Wound Coverage chapter). It is likely this skin and superficial fascia have been involved in the disease process. The anterolateral thigh flap may be a large flap based off perforators from the lateral circumflex femoral artery. These will be out of the zone of infection. When the defect is deep and large and includes the abdominal wall this flap provides excellent coverage. Gracilis--muscle-only--flaps may be used and skin grafted. When the muscle is raised and turned to cover the defect from one side to the other, only one muscle may be necessary. If there is still considerable swelling in the local tissues and testicles, then the gracilis from both sides may be necessary. Adjacent open areas around the muscle flaps may be grafted. The gracilis is an easy muscle to elevate through a longitudinal anterior medial thigh incision from the pubis to the medial femoral condyle. The point of rotation is at 10 cm distal to the inguinal ligament. All flap procedures must be well drained on each side. Suction drains are ideal if available.

The author's choice of closure is:

1. First, local tissue from scrotum and medial thigh that is freed and advanced over the defect
2. Second are unilateral or bilateral medial thigh flap
3. Third is unilateral or bilateral gracilis muscle transfers with STSG.
4. Anterolateral thigh flap

Meshed but not spread out skin grafts are used for penile reconstruction. Meshed skin is ideal for coverage of the penis. If the entire penis requires grafting, then the penis must be stented in the following manner:

1. Foley catheter if it is possible and the catheter taped or sutured to the abdominal wall out of the zone of infection
2. A suture is placed from the glans to the catheter to hold the penis extended.
3. A non-adherent dressing should be used to cover the skin graft
4. Then a bulky gauze dressing
5. Followed by a layer of foam rubber that wraps around the penis and underlying dressing to create a chimney-like dressing to hold the penis extended.
6. Sutures, 4-6 long sutures, are placed at the corona and at the penile base and these are used to tie-over the foam rubber as a stent dressing. (Foam rubber may be obtained from rubber in the local market that is used in chair cushions and sterilized—see chapter on VAC creation)
7. If available, a small VAC can be placed over the penile graft.
8. Antibiotics are used during the grafting procedure and for several days postop if extensive flaps have been used.

Postop care: With meshing of the graft there is no urgency to inspect the graft. The author changes the penile dressing in 10-14 days. Keeping the penis extended and stabilized allows for complete healing. Drains under flaps should be left in place until drainage has ceased, often 5-7 days. It is important that the patient be carefully followed and treated for any underlying medical condition.
Same case, after serial débridements: Urethral fistula was reconstructed with a dartos island prepuce flap from the penis. The black arrow points to flap prior to closure of the fistula. The flap was used as an onlay patch to reconstruct the urethral mucosa.

Shows repair of urethral defect and elevation and rotation of medial thigh flaps to cover testicles. Donor site skin grafted.

(Figures 4-9: Courtesy of Dr. Bill Rhodes)

Fournier’s Gangrene after multiple débridements and wound care for several weeks: Testicles were covered with island medial thigh flaps that were tunneled to reach the testicles. Remaining wound closed by undermining. This wound could have been closed with a skin graft but without the good “cosmetic and a near normal” result.
Fig 12
Young boy with a diagnosis of Fournier’s gangrene: TFL flap used to cover defect and prevent recurrent hip contracture

Fig 14
Final result

Summary:

Fournier’s gangrene is a life threatening infection that requires urgent and repeated débridements to save the patient’s life.