

## The Gracilis Muscle Flap Technique is an Aesthetic and Functional Option in Fournier's Gangrene: Clinical Case

Sergio Heinar Rodríguez-Sosa<sup>1</sup>, Gerardo Salvador Rea-Martínez<sup>2</sup>, Edgar Efraín Hernández-Luna<sup>3</sup>, Eduardo Navarro-Becerra<sup>4</sup>, Ana Fernanda Espinoza de los Monteros-Kelley<sup>5</sup>, Alexis Emir Noguera-Echeverría<sup>1</sup>, Fernanda Ramírez-Amado<sup>5</sup>, Héctor Armando Rubio-Zapata<sup>6</sup>, Guillermo Padrón-Arredondo<sup>7</sup>

<sup>1</sup>General Surgery Resident. General Surgery Resident, Clínica-Hospital Mérida APP del ISSSTE, Mexico

<sup>2</sup>Plastic and Reconstructive Surgery Resident. Hospital Regional "Dr. Valentín Gómez Farías", ISSSTE.

<sup>3</sup>General Surgery Resident. General Surgery Resident. Hospital General de Cancún Jesús Kumate Rodríguez., Servicios Estatales de Salud en Quintana Roo.

<sup>4</sup>Plastic and Reconstructive Surgeon. Santa Maria Chapalita Hospital.

<sup>5</sup>Traumatologist and Orthopedic Surgeon. Santa Maria Chapalita Hospital.

<sup>6</sup>MSc. Associate Professor. Facultad de Medicina, Universidad Autónoma de Yucatán.

<sup>7</sup>General Surgeon. Hospital General Playa del Carmen, Servicios Estatales de Salud en Quintana Roo.

### ABSTRACT

**Introduction:** The scrotum is a covering of skin that covers and protects the testicles. Although it is not common, some bacterial infections of this skin can extend to deep tissues and produce a severe entity known as Fournier's gangrene.

**Clinical case:** A 62-year-old male patient arrives at the Emergency Department due to increased scrotal volume with extension to the perineal region associated with purulent discharge and fever for one week. The patient has type 2 diabetes mellitus of 10 years duration, with poor control despite consuming oral hypoglycemic agents. He has also had high blood pressure for two years, managed with Losartan 50 mg/day. They observed secretion from perianal fistula drainage and uncomplicated external hemorrhoids. Laboratories: Glucose 260 mg/dL, BUN 23 mg/dL, Urea 49.5 mg/dL, Cr 1.50 mg/dL, Leukocytosis 33.39 x 10<sup>9</sup>/L, Hb 9.9 g/dL, Hct. 30.3%.

**Discussion:** The management of Fournier's gangrene includes both pharmacological measures, such as the use of antibiotic therapy and surgical management. Autologous partial skin graft is one of the most used techniques due to its safety and versatility and the extensive availability of donor areas. The process consists of obtaining a portion of skin taken from a donor area, preferably the thighs, which is obtained with a dermatome, after which the graft is meshed, increasing its extension and increasing the surface to be covered. As for negative aspects, there is possibly an unaesthetic result and possible retractions. Despite this, most authors point to a good result with this technique.

**KEYWORDS:** Fournier's gangrene; Surgery; genitoperineal reconstruction; flaps; debridement; skin graft.

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### INTRODUCTION

The scrotum is a covering of skin that covers and protects the testicles. Although it is not common, some bacterial infections of this skin can extend to deep tissues and produce a severe entity known as Fournier's gangrene [1].

Fournier's gangrene is a progressive, necrotizing fasciitis that can be located in the testicular, perineal, and perianal regions. Necrotic lesions of the epidermis and the overlying connective tissue are usually disabling and difficult to resolve. The bacterial etiology of this pathology is usually

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mixed and includes mainly *Streptococcus*, *Staphylococcus*, and *Escherichia* [2, 3].

The initial treatment should be antibiotics and timely surgical debridement, followed by surgical reconstruction of the skin lesion. Scrotal reconstruction, while preserving its characteristics and functions, usually represents a challenge for the plastic surgeon. In addition to protecting the scrotal region, functional and aesthetic recovery is the primary goals for surgical reconstruction. Currently, there is no consensus on a standard reconstruction method, and surgical decisions are according to the individual experience of the surgeon [4]. The decision to use a pedicled flap of the gracilis muscle with a partial skin graft because, if necessary, the right and left muscles can be used; over time, the muscle atrophies, producing characteristics similar to the Dartos muscle of the scrotum, which can produce better aesthetic and functional effects [5].

### CLINICAL CASE

A 62-year-old male patient arrives at the Emergency Department due to increased scrotal volume with extension to the perineal region associated with purulent discharge and fever for one week. The patient has type 2 diabetes mellitus of 10 years duration, with poor control despite consuming

oral hypoglycemic agents. He has also had high blood pressure for two years, managed with Losartan 50 mg/day, without previous surgeries or allergies to medications.

The condition began ten days before with an increase in volume in the perineal region and scrotum; subsequently, pain, fever, and spontaneous purulent discharge appeared, so he went to the hospital. Management started with Ciprofloxacin, and a CT scan was performed that showed only an uncomplicated inguinal hernia, so he was discharged from the emergency room. Because the signs and symptoms did not improve, he returned to the hospital.

Physical Examination: Conscious, cooperative, restless, with adequate coloration of the integuments, cardiopulmonary without alterations. Globulous abdomen at the expense of adipose panniculus with erythema from the hypogastrium, passing through the pubis and reaching the perineum. Increased volume in the scrotum, which extends to the perineum, is painful on palpation and with a necrotic patch two cm at the level of the raphe (Fig. 1). There is a secretion from perianal fistula drainage and uncomplicated external hemorrhoids. Laboratories: Glucose 260 mg/dL, BUN 23 mg/dL, Urea 49.5 mg/dL, Cr 1.50 mg/dL, Leukocytosis 33.39 x 10<sup>9</sup>/L, Hb 9.9 g/dL, Hct. 30.3%.



**Figure 1. Genital region upon patient admission.**

Subsequently, an ultrasound showed an increase in the volume of the subcutaneous cellular tissue at the expense of diffuse edema that involved all the fascia of the scrotum without affecting the tunica vaginalis. The testicle and epididymis preserved morphology and echogenicity. The inflammatory process extended to the base of the scrotum. Delicate echoes are observed inside, probably due to gases and mobile hypoechoic content (liquid)—the bilateral scrotal abscess. The diagnosis of Fournier's gangrene was established testicle and epididymis without sonographic

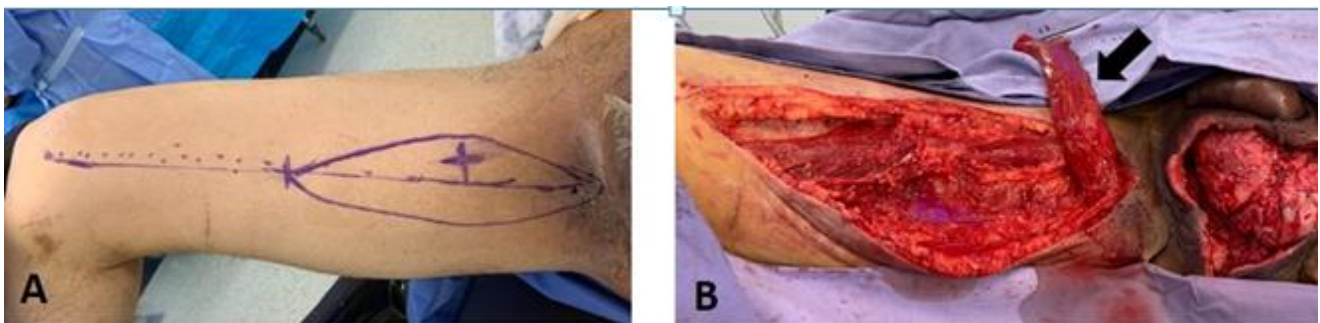
alterations and emergency surgical management. Under general anesthesia, mechanical lavage and debridement of the necrotic and devitalized scrotal tissue are performed. A scrotal bed was found with abundant fibrin mats and coagulation of subcutaneous cellular tissue. However, there was no vascular compromise of the testes and spermatic tracts (Fig. 2A). After several mechanical washings and debridement of three-quarters of the scrotal skin, the release of the testicles and their respective cords continues, with mobilization of the penis (Figs. 2B and 2C).

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The reconstruction begins with a vertical incision on the medial aspect of the thigh; the different tissue planes until the Gracilis muscle is identified (Figs. 3 A and B). The central vascular pedicle, which is located approximately 8 or 10 centimeters below the inguinal groove, is identified. Hemostasis is reviewed and corrected. The tibial insertion of the muscle is sectioned at the level of the goosefoot using a

counter-cutaneous incision above the knee and allows complete dissection of the muscle. The central pedicle is dissected while the muscular release of its pubic insertion is carried out to allow mobilization towards and coverage of the scrotal area. It is necessary to section the branch of the obturator nerve in order to inhibit muscle contractions [6].

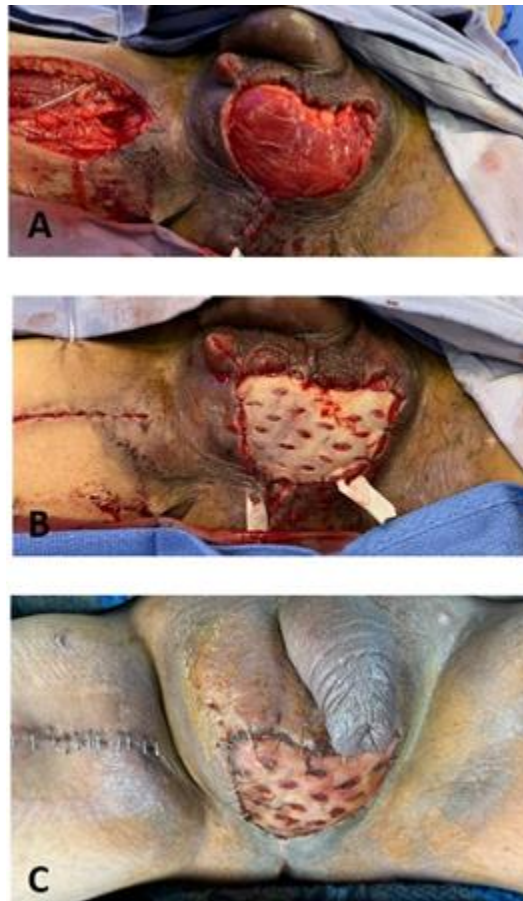


**Figure 3. Gracilis muscle and graft harvest**

El músculo es tunelizado por debajo de la piel inguinal para alcanzar la zona receptora. El colgajo es colocado a través de un túnel subcutáneo y se inserta en la herida para cubrir los testículos expuestos (Fig. 4 A). En este caso, se cubrieron ambos testículos, se requiere la disección del colgajo muscular tanto en el lado derecho como en el lado izquierdo. Luego se aplicó un injerto de piel fenestrado de espesor parcial extraído de la parte anterior del muslo derecho sobre

la zona reconstruida. El sitio donante fue reparado por planos, mientras que los colgajos cutáneos fueron suturados en zona receptora e injertados superficialmente y se deja drenar (Fig. 4B). El paciente presentó una evolución postoperatoria favorable. A los dos meses postoperatorios se constató un resultado satisfactorio, tanto en el aspecto funcional como estético (Fig. 4C) [6, 8, 9].

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**Figure 4. A. Gracilis muscle is in place, B. Donor site repair plus fenestrated skin graft is in place, C. Final functional and aesthetic recovery.**

### DISCUSSION

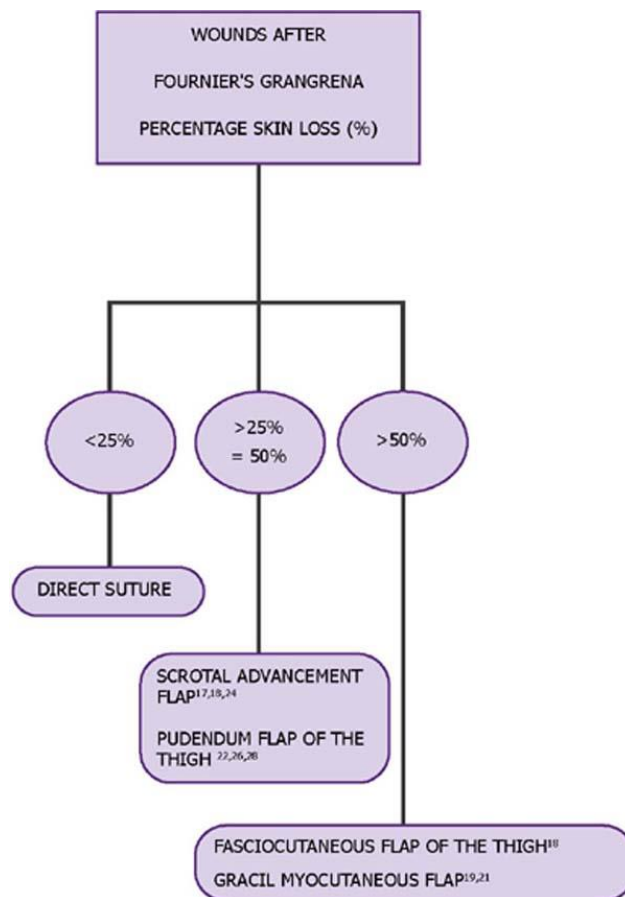
The scrotum plays an essential role in sexual function and life. Therefore, any disruption in its continuity can put at risk not only the sexual image and function but even the life of the patient, as it is a region that is very susceptible to infections that can lead to septicemia. In its therapeutic management, function must be assessed, and an adequate cosmetic result must provide patients with a quality of life [5].

Fournier's gangrene is a severe infectious entity that affects the scrotal region, which has several risk factors, such as the patient's immune status; in our case, it is an older man with a history of obesity and long-standing uncontrolled diabetes mellitus. We do not know if there is a history of alcoholism, hygiene habits, and others due to which the patient develops gangrene. Reconstruction of the scrotum is often a complicated task due to poor blood supply to the scrotal wall and adjacent tissue after gangrene. The perineal bacterial

flora, the difficult immobilization of the repaired site, and the contour of the testicles generally make correct tissue healing difficult [6, 8].

The management of Fournier's gangrene includes both pharmacological measures, such as the use of antibiotic therapy, and surgical management [7]. Autologous partial skin graft is one of the most used techniques due to its safety and versatility and the extensive availability of donor areas. The process consists of obtaining a portion of skin taken from a donor area, preferably the thighs, which is obtained with a dermatome, after which the graft is meshed, increasing its extension and increasing the surface to be covered. As for negative aspects, there is possibly an unaesthetic result and possible retractions. Despite this, most authors point to a good result with this technique [2]. There are other reconstructive techniques for this type of defect. According to the reconstructive algorithm proposed by Karian et al. (Fig. 5).

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Scrotal defects with a total thickness of less than 50% are subsidiary to direct closure or with flap advancement, reserving coverage through skin grafts or flaps for more significant defects. In this patient's case, the area of scrotal damage was greater than 50%, so coverage was carried out using a myocutaneous flap of the Gracilis muscle. Although the use of flaps may present some risks, such as necrosis, dehiscence, and hematoma, dehiscence is related to tension in the suture planes, necrosis to poor blood supply to the vascular pedicle of the flap, and hematoma to inadequate hemostasis [5].

The Gracilis muscle flap is a type II flap that primarily relies on the blood supply to the ascending branch of the medial circumflex femoral artery for wound healing [3, 4]. Another limitation of Gracilis muscle flaps includes the loss of muscle function in the donor area and the presence of an additional scar on the thigh. In this case report, healing at the donor site was limited and acceptable to the patient, and there was no functional deficit in gait. After scrotal reconstruction, wound infection can be a risk; therefore, adequate management of healing measures, a sepsis, antiseptics, and antibiotics is essential. It is important to rest in bed after surgery to ensure good healing. The donor site of this flap can also be primarily closed with little or no morbidity [9]. Although this technique is associated with a shorter hospital stay, it requires constant healing, performed on an outpatient basis [1, 3].

The present work demonstrates that using this technique, the aesthetic and functional results were satisfactory for the patient, which impacted their quality of life and sexual

satisfaction. Indeed, in addition to the need for surgical reconstruction of the scrotum, the final result can blend in with the scrotal tissue. For the success of this and other surgical procedures, postoperative care is essential, especially in hygiene and wound management, avoiding pressure on the area to reduce the risk of suture dehiscence or tissue suffering. It would be essential to evaluate the long-term effect that this technique has on sexual function, including spermiogenesis, erection, and perception of body image, and compare it with other techniques [7, 8].

### Tips

1. Fournier gangrene is a rapidly progressive and potentially lethal form of necrotizing fasciitis of the perineal, genital, or perianal regions.
2. Early recognition, extensive resection of necrotic tissue, antimicrobial treatment, and aggressive colonization is the cornerstone of managing Fournier's gangrene.
3. The choice of reconstruction technique is based on the characteristics of the defect: size, location, and depth, as well as the availability of local tissue.
4. The most used techniques are primary closure, IPP, flaps, a combination of the above, and closure by secondary intention.
6. More than 95% of patients have at least one comorbidity, and of this, the most common is type 2 diabetes mellitus.
7. The description of the defect of the subunits involved is more appropriate than the recording of the size of the area.

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### CONCLUSION

The surgical reconstruction technique for Fournier gangrene, using Gracilis muscle flaps followed by a split-thickness skin graft, produced an excellent functional and aesthetic result, constituting an attractive option to cover tissue losses in the scrotal region.

### Conflicts of interests

There was no conflict of interest during the study, and no organization did not fund it.

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