



Case Report

Case report: treatment of Fournier's gangrene of the shoulder girdle[☆]



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ABSTRACT

Fournier's gangrene is a rare, high-mortality infection that affects the subcutaneous tissue with rapidly progressive necrosis. The objective is to report a case of Fournier's gangrene involving the region of the shoulder girdle after closed fracture of the clavicle, and to discuss this unusual evolution. The patient underwent a series of surgical procedures and was followed up on an outpatient basis for 12 months, at which point she was discharged. Fournier's gangrene is an aggressive lesion and requires early diagnosis (clinical-laboratory correlation) with the appropriate adequate surgical approach and clinical stabilization.

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Relato de caso: tratamento da gangrena de Fournier na cintura escapular

RESUMO

A gangrena de Fournier é uma infecção rara e com alta mortalidade que acomete o tecido subcutâneo, com necrose rapidamente progressiva. O objetivo é relatar um caso de gangrena de Fournier que envolveu a região da cintura escapular após fratura fechada da clavícula e discutir essa incomum evolução. A paciente foi submetida a procedimentos cirúrgicos seriados e acompanhada ambulatorialmente por 12 meses, quando obteve alta. A gangrena de Fournier é uma lesão agressiva e necessita de diagnóstico precoce (correlação clínico-laboratorial) com adequada abordagem cirúrgica e estabilização clínica.

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Fig. 1 – Radiograph after trauma.

Introduction

Necrotizing fasciitis (NF) or Fournier's gangrene is a rare and life-threatening infection caused by aerobic and/or anaerobic microorganisms that synergistically affect subcutaneous tissue and fascia with microcirculation thrombosis, and consequently, rapidly progressive necrosis of the skin in the affected region; the rate of evolution reaches 2–3 cm/h.¹⁻⁴

Reports on cases involving the shoulder girdle are uncommon; most of those appear due to contiguity of lesions in the arms or chest. The present case report is of particular importance, as it describes a case of Fournier's gangrene after a closed fracture of the clavicle. The patient was informed of and consented to the publication of this report.

Case report

A 42-year-old female patient who had previously been a victim of a motorcycle accident was attended to at a hospital unit in the interior of the state, diagnosed with a fracture of the middle third of the right clavicle, Allman's group I (AO 15-B1), with deviation >2 cm (Fig. 1).

The physical examination showed no apparent deformity, neurovascular deficit, or imminence of bone exposure at the fracture site; she presented only right shoulder abrasions. She was prescribed analgesics to be taken at home but received no orientation regarding the use of a sling or need for therapeutic follow-up with a specialist.

Two weeks after the trauma, still in her city of origin, she presented with pain, fever, and local hyperemia, requiring hospitalization. She evolved with maintenance of febrile peaks and local edema, in addition to skin fluctuation on the right clavicle region, followed by drainage of a purulent secretion through a small orifice. On the 17th day after the trauma, the patient underwent abscess drainage of the purulent secretion and cleansing with 0.9% saline solution, performed in the ward. No material for culture was collected (Fig. 2). The leukogram presented a WBC of 12,000/mm³ (3% rods), ESR: 25 mm/h, and CRP: 11 mm/dl. Intravenous antibiotic therapy was initiated with ceftriaxone 1 g 12/12 h, metronidazole 500 mg 8/8 h, and clindamycin 600 mg 8/8 h (Table 1).

At this stage, the patient was admitted to this medical service in Salvador, Bahia State, 25 days after the trauma, with an extensive lesion of the right hemithorax, toxemia, with sepsis (HR: 110 bpm, RF: 26 rpm, Temp: 38.5 °C), clavicle bone exposure, and extensive necrosis of the skin surrounding the base of the neck and the left hemithorax. No neurovascular alterations were observed (Fig. 3).

Admission exams: leukogram presented with 21,000 WBC/mm³ (5% rods), ESR: 44 mm/h, PCR: 20 mm/dl, creatinine: 1.3 mg/dl, urea: 48 mg/dl, and CPK: 900 u/l (Table 1). Magnetic resonance imaging (MRI) of the thorax evidenced an extensive inflammatory process in the anterior region of the thorax not involving deep tissue layers; the neck MRI showed no alterations. The patient was admitted to the intensive care unit (ICU) for clinical stabilization and begin a multidisciplinary team attendance.

The infectious diseases team requested surgical debridement to collect culture material (bone tissue) and modified the antibiotic therapy in use, introducing meropenem 1 g 8/8 h, vancomycin 1 g 12/12 h, and anti-tetanus prophylaxis. The plastic surgery team would approach the lesion after improvement of the thoracic bed and infection control at a second surgical time.

On the second day of ICU admission, still in sepsis, the patient presented signs of osteolysis in the clavicle exposure area and an increase in the necrotic area. The authors decided to perform a right clavicle resection, as well as an aggressive debridement of the devitalized tissue in the thorax (Figs. 4 and 5). Soft tissue and bone cultures were collected. The patient presented an important clinical improvement after the surgical approach, being discharged from the ICU three days after the procedure. She evolved with a reduction of the WBC and inflammatory markers (Table 1), and the purulent secretion diminished too.

After the initial debridement, a special dressing was done in an operating room every other day. The borders of the lesion ceased to evolve with necrosis; the raw area was without purulent secretion and forming granulation tissue (Fig. 6). The final bone and soft tissue culture results were negative. On the 20th day after the clavicle resection, when the patient presented normal laboratory tests, a skin graft was performed by the plastic surgery team. The patient evolved without new signs of infection and was discharged from the hospital. The wound presented complete healing 60 days after the grafting (Fig. 7). At the last outpatient visit (after six months of trauma), the patient presented a healed wound and excellent upper limb functional score: 33 points on the UCLA⁵ Score and 93 points on the Constant Score⁶ (Fig. 8). Both are functional shoulder scales: the Constant score has a maximum of 100 points and assesses eight variables (if greater >81, the result is considered to be good/excellent), while the UCLA score has a maximum of 35 points and assesses five variables (if greater >27, the result is considered to be good/excellent).

Discussion

NF is known by a variety of other names, such as Fournier's gangrene, hospital gangrene, and hemolytic streptococcal gangrene, among others.⁷ It a rare infection;



Fig. 2 – Evolution of the lesion while in an upcountry hospital in the State of Bahia.

Table 1 – Laboratory tests during hospitalization.

	Leukogram	ERS	CRP	Urea	Creatinine	CPK
Exam 1	12,000	25	11	–	–	–
Exam 2	21,000	44	20	44	1.3	900
Exam 3	13,000	32	15	38	1.1	700
Exam 4	7600	18	10	38	1.1	300

Exam 1, hospital admission in an upcountry town in the State of Bahia (two weeks after trauma); Exam 2, hospital admission in Salvador/Bahia (25 days after trauma); Exam 3, after debridement and clinical improvement (27 days after trauma); Exam 4, before grafting (47 days after trauma).

500–1500 cases/year are reported in the United States.⁸ The authors did not retrieve studies that demonstrated the incidence in Brazil. It has an estimated worldwide incidence of 0.4/100,000 people, with a greater involvement of males (3:1) at a mean age of 50 years. It can affect any region of the body, but there is predominance in the perineal area. The mean mortality rate is 32.2%; if untreated, it can reach 100%.⁹

Initially described as a disease of unknown cause, it is now known that an underlying pathological process can be found in most cases of Fournier's gangrene; nonetheless, in a significant number of patients, the cause cannot be determined.^{10–12} Therefore, a careful investigation can indicate the point of entry, which is located primarily in the urogenital tract, in the digestive tract, or in cutaneous affections.⁹ In a series of 1726 cases published by Eke¹¹ in 2000, cutaneous conditions accounted for 24% of the cases.

The most commonly observed comorbidity is diabetes mellitus, with a prevalence of 40–60%. Other common comorbidities include immunodeficiencies, hepatic cirrhosis, heart failure, obesity, alcoholism, systemic lupus erythematosus, Addison's disease, hypertension, and peripheral vascular disease.¹³

There are two classifications for NF. The United States Food and Drug Administration (FDA) classifies NF according to its microbiological characteristics: Type I- the most common (accounting for over 80% of cases), with aerobic/anaerobic polymicrobial pattern (streptococci, staphylococci, enterococci, bacteroides); type II- monomicrobial (*S. aureus* or more commonly group A beta-hemolytic *Streptococcus*), with less aggressive lesions, accounting for 10–15% of the cases; and type III- necrotizing fasciitis and gastric myonecrosis caused



Fig. 3 – Skin lesion on admission at the tertiary unit in Salvador, Bahia.

by *Clostridium perfringens*, accounting for less than 5% of the cases.¹⁴ Féres et al.¹⁵ proposed an anatomic classification according to the extension of the necrosis area and correlated it with mortality; these authors defined four groups with increasing severity, in which group I presented a 12.5% mortality rate, while the mortality rate in group IV was 68.75% (Table 2).

Due to its severity and speed of evolution, Fournier's gangrene is a medical emergency where clinical diagnosis must be suspected as soon as possible so that early treatment can be

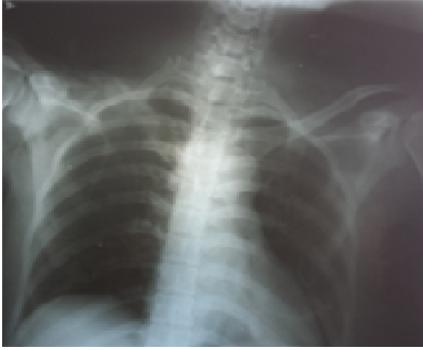


Fig. 4 – Chest radiograph after surgical resection of the clavicle.



Fig. 5 – Lesion after initial debridement.

initiated. The classic triad is pain, edema, and local erythema; fever and tachycardia are the most frequent vital signs.¹³ This clinical picture can evolve rapidly with necrotic tissues and hemorrhagic blisters.¹³ Patients may present laboratory



Fig. 6 – Lesion after the last debridement, before grafting.



Fig. 7 – Shoulder and chest lesion, three months after grafting.



Fig. 8 – Six months after the procedure, in an outpatient clinic, the patient presented excellent functional results and a completely healed wound.

abnormalities such as leukocytosis ($>20,000$ WBC/mm³), urea >18 mg/dl, serum creatinine >1.2 mg/dl, CRP >16 mg/dl, and CPK >600 u/l.¹⁶ Furthermore, imaging exams may also be used, such as radiographs (gas formation; however, this exam has low sensitivity and specificity), ultrasonography, computed tomography (lesion extension and gas formation), and MRI (more accurate, but more costly).¹⁷ Culturing the debrided tissue is important in order to guide antibiotic therapy.¹³

As described by Mallikarjuna et al.,¹⁸ the treatment of Fournier gangrene consists of radical debridement of the necrotic tissues, drainage, antibiotic therapy for approximately four to six weeks (initially empirically with ampicillin or ampicillin/sulbactam combined with metronidazole or clindamycin; de-escalation guided by culture results), plus good hemodynamic stabilization of the patient. Recent studies confirm the importance of hyperbaric oxygen therapy as an additional treatment for the debridement of necrotic tissue, as it inhibits the proliferation of anaerobic bacteria, accelerating infection control and tissue regeneration.^{18,19} The use of a vacuum drain dressing has shown to be beneficial in the follow-up after debridement; this dressing should be changed every 24–72 h.²⁰ Tetanus prophylaxis should be performed; however, randomized controlled trials are still required to prove the efficacy of the use of immunoglobulins as a neutralizer of *Streptococcus* toxins.²¹ After clinical stabilization and absence of infectious signs at the wound site, reconstructive

surgery should be performed with grafting and flaps by a plastic surgery team.²²

This case report, which presented a case of NF after a closed fracture of the clavicle (with only right shoulder abrasions) is of great relevance because it is an injury in an area of low incidence (shoulder), but with high mortality (trunk involvement). After searching the SciELO, Bireme, and PubMed databases from 1940 to 2015, no similar cases were retrieved.

Patients with clavicle fractures with a relative indication for surgical treatment should be followed-up periodically by an orthopedist. Basic care, such as the use of a sling, assessment of soft tissue/skin and neurovascular conditions, as well as radiographic follow-up of the fracture, is paramount in the treatment, minimizing possible complications of this fracture. As it is an aggressive pathology with a rapid evolution and risk of death (classified as F eres type IV), Fournier's gangrene should always be suspected when presenting the clinical-laboratory characteristics described in this case report. It is important to note that lesions in the upper limbs, neck, and trunk demand even greater care due to the higher mortality risk reported in the literature. The surgical and drug approaches should be conducted as early as possible. Vacuum drainage and oxygen therapy were not used, as they are not available at this medical service.

The infection was caused by bone exposure after a few days of conservative treatment. Early diagnosis, due to clinical

Table 2 – Anatomical classification of the necrosis area and correlation with mortality in Fournier gangrene (Féres et al.¹⁵).

Groups	Description	Mortality (%)
Group I	Necrosis of the anterior perineum, scrotum, and penis or vulva	12.5
Group II	Group I + posterior perineum, perianal region up to 7 cm in diameter, rectum, and perirectal fat	34
Group III	Group II + sacral region, gluteal, inguinal region, and necrosis of the penis	37
Group IV	Group III + abdominal wall, suprapubic region, flank, thoracic wall, axillary region, and retroperitoneum	68.75

suspicion of Fournier's gangrene and clinical-laboratory confirmation, allowed the appropriate treatment for this rare condition.

Conflicts of interest

The authors declare no conflicts of interest.

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