Case Report

Case report: treatment of Fournier’s gangrene of the shoulder girdle

Nivaldo Cardozo Filho, Gyoguevara Patriota, Rodrigo Falcão, Roberto Maia, Gildásio Daltro, Daniel Alencar

Group do Ombro e Cotovelo, Hospital Manoel Victorino, Salvador, BA, Brazil
Hospital do Subúrbio, Salvador, BA, Brazil
Faculdade de Medicina, Universidade Federal da Bahia (UFBA), Salvador, BA, Brazil
Serviço de Ortopedia e Traumatologia, Grupo do Ombro e Cotovelo, Hospital Manoel Victorino, Salvador, BA, Brazil

Article info

Article history:
Received 7 January 2017
Accepted 28 March 2017
Available online 10 June 2018

Keywords:
Fournier’s gangrene
Shoulder
Necrotizing fasciitis

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.

© 2017 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).

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. O 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.

© 2017 Sociedade Brasileira de Ortopedia e Traumatologia. Publicado por Elsevier Editora Ltda. Este é um artigo Open Access sob uma licença CC BY-NC-ND (http://creativecommons.org/licenses/by-nc-nd/4.0/).

---

* Study conducted at the Hospital Manoel Victorino, Grupo do Ombro e Cotovelo, Salvador, BA, Brazil.
* Corresponding author.
E-mail: champatriota@hotmail.com (G. Patriota).

https://doi.org/10.1016/j.rboe.2018.05.008
2255-4971/© 2017 Sociedade Brasileira de Ortopedia e Traumatologia. Published by Elsevier Editora Ltda. This is an open access article under the CC BY-NC-ND license (http://creativecommons.org/licenses/by-nc-nd/4.0/).
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/mm^3 (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: 110bpm, RF: 26 ripm, 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/mm^3 (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 UCLA® Score and 93 points on the Constant Score® (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.5 It a rare infection;
500–1500 cases/year are reported in the United States.\textsuperscript{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%.\textsuperscript{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.\textsuperscript{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.\textsuperscript{9} In a series of 1726 cases published by Eke\textsuperscript{11} 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.\textsuperscript{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 by Clostridium perfringens, accounting for less than 5% of the cases.\textsuperscript{14} Fêres et al.\textsuperscript{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
initiated. The classic triad is pain, edema, and local erythema; fever and tachycardia are the most frequent vital signs. This clinical picture can evolve rapidly with necrotic tissues and hemorrhagic blisters. Patients may present laboratory
Furthermore, the after culturing the tetanus and every abnormalities has been confirmed. However, MRI (more accurate but more costly) is important in order to guide antibiotic therapy. As described by Mallikarjuna et al., 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/subactam 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. 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. 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. 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.

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 Féres 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

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

REFERENCES

1. Jones J. Investigation upon the nature, causes, and treatment of hospital gangrene as it prevailed in the Confederate armies. In: Surgical memories of the War of Rebellion. New York: United States Sanitary Commission; 1871. p. 1861–5.
2. Laucks SS 2nd. Fournier’s gangrene. Surg Clin North Am. 1994;74(6):1339–52.
3. Smith GL, Bunker CB, Dinneen MD. Fournier’s gangrene. Br J Urol. 1998;81(3):347–55.
4. Yaghan RJ, Al-Jaberi TM, Bani-Hani I. Fournier’s gangrene: changing face of the disease. Dis Colon Rectum. 2000;43(9):1300–8.
5. Amstutz HC, Sew Hoy AI, Clarke IC. UCLA anatomic total shoulder arthroplasty. Clin Orthop Relat Res. 1981;155(5):7–20.
6. Constant CR, Murley AH. A clinical method of functional assessment of the shoulder. Clin Orthop Relat Res. 1987;214:160–4.
7. Stephens BJ, Lathrop JC, Rice WT, Gruenberg JC. Fournier’s gangrene: historic (1764–1978) versus contemporary (1979–1988) differences in etiology and clinical importance. Am Surg. 1993;59(3):149–54.
8. Necrotizing fasciitis. Wkly Epidemiol Rec. 1994;69(22):165–6.
9. Tang WM, Ho PL, Fung KK, Yuen KY, Leong JC. Necrotising fasciitis of a limb. J Bone Joint Surg Br. 2001;83(5):709–14.
10. Sarani B, Strong M, Pascual J, Schwab CW. Necrotizing fasciitis: current concepts and review of the literature. J Am Coll Surg. 2009;208(2):279–88.
11. Eke N. Fournier’s gangrene: a review of 1726 cases. Br J Surg. 2000;87(6):718–28.
12. Quatan N, Kirby RS. Improving outcomes in Fournier’s gangrene. BJU Int. 2004;93(6):691–2.
13. Martinschek A, Evers B, Lampi L, Gerngroß H, Schmidt R, Sparwasser C. Prognostic aspects, survival rate, and predisposing risk factors in patients with Fournier’s gangrene and necrotizing soft tissue infections: evaluation of clinical outcome of 55 patients. Urol Int. 2012;89(2):173–9.
14. US Department of Health and Human Services, Food and Drug Administration, Center for Drug Evaluation and Research. Guidance for industry. Uncomplicated and complicated skin and skin structure infections: developing antimicrobial drugs treatment; 2010.
15. Feres O, Andrade JJ, Rocha JJC, Aprilli F. Fournier’s gangrene: a new anatomic classification. In: Reis Neto JA, editor. Proceedings of the 18th Biennial Congress of the international society of university colon and rectal surgeons, Sao Paulo, Brazil: Monduzzi Editore; 2000. p. 103–7.
16. Wong CH, Khin LW. Clinical relevance of the LRINEC (Laboratory Risk Indicator for Necrotizing Fasciitis) score for assessment of early necrotizing fasciitis. Crit Care Med. 2005;33(7):1677.
17. Ruiz-Tovar J, Córdoba L, Devesa JM. Prognostic factors in Fournier’s gangrene. Asian J Surg. 2012;35(1):37–41.
18. Mallikarjunu MN, Vijayakumar A, Patil VS, Shivswamy BS. Fournier’s gangrene: current practices. ISRN Surg. 2012;2012:942437.
19. Escobar SJ, Slade JB Jr, Hunt TK, Cianci P. Adjuvant hyperbaric oxygen therapy (HBO2) for treatment of necrotizing fasciitis reduces mortality and amputation rate. Undersea Hyperb Med. 2005;32(6):437–43.
20. Mouës CM, van den Bemd GJ, Heule F, Hovius SE. Comparing conventional gauzetherapy to vacuum-assisted closure wound therapy: a prospective randomised trial. J Plast Reconstr Aesthet Surg. 2007;60(6):672–81.
21. Norrby-Taglund A, Muller MP, Mcgeer A, Gan BS, Guru V, Bohnen J, et al. Successful management of severe group A streptococcal soft tissue infections using an aggressive medical regimen including intravenous polyspecificimmunoglobulin together with a conservative surgical approach. Scand J Infect Dis. 2005;37(3):166–72.
22. Butler CE. The role of bioprosthetics in abdominal wall reconstruction. Clin Plast Surg. 2006;33(2):199–211.