Case Report

Contralateral necrotizing fascitis after left nephrectomy for emphysematous pyelonephritis

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Introduction: Emphysematous pyelonephritis is an acute necrotizing infection of the renal parenchyma. The management is variable, extending to total nephrectomy in severe or refractory cases. Post-nephrectomy complications are numerous and common, necrotizing fasciitis, and sepsis being among them.

Case presentation: We present a case of a 37-year-old woman with obesity and a previous left emphysematous pyelonephritis episode managed conservatively. The patient presented with a second left emphysematous pyelonephritis and underwent a left total nephrectomy. Two weeks later, the patient presented with a contralateral necrotizing fasciitis of the abdominal wall. Subsequently, the patient required several surgical debridement procedures and a vacuum-assisted closure system treatment.

Conclusion: Emphysematous pyelonephritis is an aggressive infectious disease that requires high suspicion in patients at risk.

Key words: fasciitis, necrotizing, negative-pressure wound therapy, pyelonephritis.

Keynote message

EP is a serious disease that requires aggressive treatment. Among the post-nephrectomy complications of an infected kidney, NF is serious, with a risk of mortality and the need for extensive drainage.

Introduction

EP is an acute necrotizing infection of the renal parenchyma, characterized by the production of gas within the collecting system, renal parenchyma, and/or perirenal tissue.1,3 EP is a disease with a high mortality rate (21%),1,4 due to its unpredictable evolution, with associated sepsis and kidney failure.1,2

EP management consists mainly of draining the urinary tract,1 in order to avoid common complications like kidney abscesses or kidney loss. Fifteen to 20% of patients need nephrectomy.2,3 After nephrectomy, patients evolving with an infected wound are common,3–7 nevertheless NF is an unusual complication.8–11

NF is an aggressive and rapidly progressive bacterial infection of the wall’s soft tissues.12 Patients evolve with local signs of erythema, edema, and fever, and 20–32% of patients have sepsis.12–17 NF is an aggressive infection with a mortality rate of 20%.12 Management of NF requires aggressive and early surgical debridement of the compromised tissue together with broad-spectrum antibiotics.

We present the clinical case of a female patient with EP on the left kidney which evolved with a NF of the contralateral abdominal wall.
Case presentation

This is the case of a 37-year-old woman with a medical history of obesity (body mass index >30) and bilateral nephrolithiasis (right staghorn) with the previous hospitalization for left EP with renal and perirenal abscesses (urine culture showed *Escherichia coli*) treated with ureteral stent and drainage in 2018 without subsequent nephrolithotomy.

She presented at the emergency service with a history of 2 days of fever (38°C) and lumbar pain. The laboratory tests showed creatinine of 0.7 mg/dL, C-reactive protein 200 mg/L, WBC count 9 × 10^9/L, and urine sediment compatible with urinary infection and polymicrobial urine culture. CT scan (Fig. 1) reported a left kidney with a ureteral stent in situ and a new EP episode. Antibiotic treatment with ceftriaxone was started. Considering the previous medical history and clinical evolution, we decided on an open left nephrectomy.

The patient evolved afebrile, but after 1 week, laboratory tests showed higher C-reactive protein (400 mg/L), WBC above 20 000, and normal creatinine (0.5–0.7 mg/dL), for which antibiotics were changed to piperacillin-tazobactam.

On the 6th postoperative day, she presented signs of infection at the wound. Glycemic status was 105–200 mg/dL and wound culture showed *Staphylococcus epidermidis* and *Streptococcus* spp. Control CT scan showing extensive left retroperitoneal necrotizing process. The patient was evaluated by the infectology team who decided to start ampicillin/subactam and operative wound healing.

In the 2nd postoperative week, the patient evolved with persistently high C-reactive protein and WBC. CT scan showed a significant increase in extraperitoneal gas in the pelvic excavation that extended to the right upper quadrant, associated with air-fluid collections in the thickness of the subcutaneous cellular tissue of the right abdominal wall, suggestive of contralateral NF (Fig. 2a,b). On physical examination, the patient presented edema of the right wall but no crackles (Fig. 3a).

We did an extensive right incision from rib 12 to the pubis. Complete muscular necrosis of the entire abdominal wall and the right flank was observed with at least 1500 mL of pus (Fig. 3b). Moreover, we drained 500 mL of pus in the Retzius space. We washed with abundant physiological serum (9L). In the operation room, the patient evolved with septic shock. We decided to leave the wound open with drainage in the Retzius space. Intraoperative cultures showed a *Klebsiella pneumoniae* extended-spectrum β-lactamase and *Staphylococcus epidermidis*. We started Vancomycin and Imipenem.

The patient was intervened at least eight times, with the installation of a VAC system. During the last interventions, the spaces between the muscles of the abdominal wall and the peritoneum decreased, allowing to gradually close the two ends of the wound. However, 30% of the wall’s aponeurosis was lost. In the final surgical intervention, it was possible to make a wall closure by inserting a Vicryl mesh, covering the peritoneum, and fixing the mesh with sublay technique on the rest of the aponeurosis border (Fig. 3c,d).

The patient was discharged on the 55th day of admission. At the first medical checkup, the patient was asymptomatic with a healthy wound and a normal CT scan (Fig. 4a,b).

### Discussion

EP management is assorted: ureteral sent or a nephrostomy, surgical or percutaneous drainage, or in several cases total nephrectomy. Huang and Tseng classify EP in four types to predict the prognosis and need for aggressive treatment. The study includes risk factors such as thrombocytopения, renal failure, and septic shock. According to the CT scan and risk factors, the authors propose a mortality risk, to establish the best management (conservative or not).

Nephrectomy is currently preferred for more severe and aggressive cases or when conservative treatment fails, associated with complications such as post-operative septic shock, infection of the wound, or collections in the surgical bed. In this case, she presented a EP with a septic state with regular glucose status but without alterations of renal function or thrombocytopения, so an aggressive surgical treatment was decided with low risk of initial mortality, but with a high risk of complications.

Regarding NF, the main goal of surgery is the complete resection of all necrotic tissue, until the identification of healthy and vascularized tissue. Depending on the extension of the resected tissue, many patients need multiple surgeries to achieve adequate local control. The use of VAC is widely accepted in medical practice. VAC is a therapy to help wounds heal. Lacovelli et al. in a recent retrospective study, observed a higher probability of wound healing (OR 6.5) with VAC compared to standard therapies.
Fig. 2 Enhanced CT scan. (a) Extensive extraperitoneal gas through the preperitoneal space from the right hypochondrium to the right iliac fossa, associated with an air fluid collection in the thickness of the subcutaneous cellular tissue. (b) Slight thickening of the parietal peritoneum in the pelvic excavation, with characteristics of pelvic-peritonitis (arrow).

Fig. 3 (a) Preoperative image of the edematous right abdominal wall. (b) Surgical debridement of NF. (c) VAC System on the surgical wound. (d) Final abdominal wall closure.

Fig. 4 (a) New CT 8-week post-hospital discharge with the resolution of extraperitoneal gas. (b) Final surgical wound.
We believe that the extension of the infection to the contralateral subcutaneous tissue was caused by the combination of a severe septic state associated with regular metabolic control, producing the extension of the infectious process for the upper and lower lumbar triangles to the contralateral abdominal wall though the Retzius space. In this case, performing a more initial aggressive surgical treatment, greater flushing with abundant saline solution in the surgery site, taking intraoperative cultures for subsequent antibiotic adjustment, and thick drainage in the surgical bed could have decreased the local bacterial load and could have prevented the severity of NF. According to our knowledge, this is the first case of an NF in the contralateral abdominal wall. Previously, Khaladkar et al. reported EP of the left kidney with NF of the ipsilateral abdominal and thoracic wall, which was managed conservatively. Moreover, cases of association of PE with NF of the scrotum and perineum or the lower extremities have been reported with the need for aggressive treatment and good results.

In conclusion, EP is an aggressive infectious disease that requires high suspicion in patients at risk. Faced with the need for nephrectomy, a low threshold for local complications is imperative. NF requires aggressive treatment with extensive resection of the compromised tissues. The use of VAC is key for accelerating and improving the healing of contaminated post-operative wounds.

Conflict of interest
The authors declare no conflict of interest.

Approval of the research protocol by an Institutional Reviewer Board
Not applicable.

Informed consent
Obtained from the patient.

Registry and the Registration No. of the study/trial
Not applicable.

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