

Emphysematous cellulitis of the left thigh caused by sigmoid diverticulum perforation



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Necrotizing fasciitis and gas gangrene of the lower extremities are two life-threatening emergencies and are the most common causes of gas presence in the lower extremity. Rarely the gas presence is secondary to a perforated viscus and especially the colon. Large bowel diverticula are a quiet common disease in western countries and their prevalence increases with age. Also, the possibility of complications is greater in older patients. However, perforated colonic diverticulum seldom presents only with the presence of gas in the lower extremity. We report a case of emphysematous cellulitis of the left thigh caused by a sigmoid diverticulum perforation in a patient with peritoneal carcinomatosis.

KEY WORDS: Diverticulitis, Emphysema, Gas gangrene, Necrotizing fasciitis.

Introduction

The presence of gas in a lower extremity, which is revealed either clinically by crepitance or radiographically by the presence of gas shadows, accompanied by the presence of inflammation of the ipsilateral extremity consists a surgical emergency. It usually is the outcome of a severe infection of the extremity by gas forming microorganisms and most commonly is either a case of gas gangrene, with presence of gas usually within the muscles, or necrotizing fasciitis, where the gas usually extends in the subcutaneous tissue and the fascia¹. Rarely, the presence of gas in the lower extremity is a result of perforation of the gastrointestinal tract. We report a case of emphysematous cellulitis of the left thigh caused by a sigmoid diverticulum perforation in a patient with peritoneal carcinomatosis.

Case report

A 47-year old foreign woman was transferred to our hospital from a rural hospital with the possible diagnosis of gas gangrene of the left thigh. The patient was afebrile, conscious, alert and orientated. Her left thigh has been painful, swollen and with decreased range of motion for two days. Low molecular heparin had been administered subcutaneously in the patient five days ago in order to protect her from deep vein thrombosis during a flight. Her medical history included ovarian cancer, for which she has been treated 4 years ago by radical hysterectomy and bilateral salpingo-oophorectomy and received chemotherapy. Eighteen months after the first operation she was diagnosed with regional cancer recurrence and underwent an exploratory laparotomy which revealed peritoneal carcinomatosis. She received chemotherapy for 20 months.

Clinical examination revealed a left thigh that was swollen, tender, erythematous, warm and with crepitus extending to the groin. The abdomen was soft with no tenderness. The laboratory data on admission was the following: haemoglobin 10 g/dL, white cell count 7.2 K/uL, PLT count 229 K/uL, CPK 212 IU/L, SGOT 68 IU/L and SGPT 49 IU/L. All other blood chemistry was

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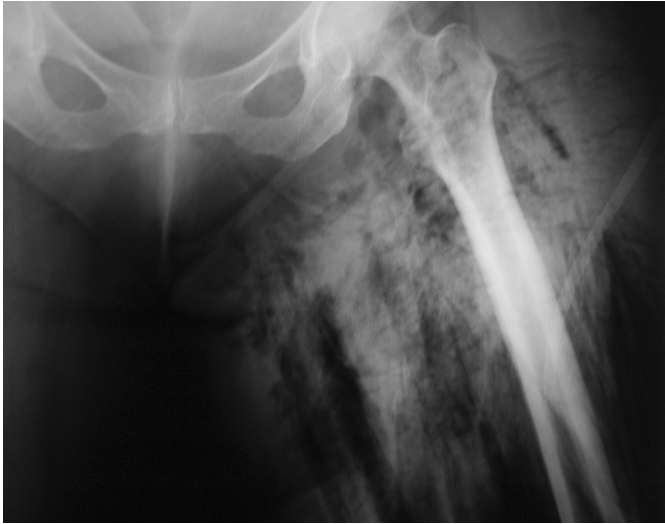


Fig. 1: Presence of massive subcutaneous emphysema of the left thigh.

within the normal range. The x-ray showed gross gaseous infiltration of the soft tissues of the thigh (Fig. 1) and the diagnosis was confirmed by the CT scan which showed the presence of gas both between the muscles and in the subcutaneous tissue (Fig. 2) and extensive adhesions and peritoneal carcinomatosis of the lower abdominal cavity extending into the pelvis (Fig. 3). Both the x-rays and the CT scan were done before admission to our hospital. The patient was started on intravenous ceftazidime 2g four times a day, metronidazole 500 mg three times a day and clindamycin 600 mg four times a day.

The patient was transferred to the operating room for surgical debridement with the preoperative diagnosis of gas gangrene. An incision in the anterior surface of the left thigh extending from the groin to the mid thigh was made. Much gas escaped but the muscles seemed intact and there was no evident myonecrosis. A culture was taken. Microbial culture revealed *Enterococcus faecium* sensitive to daptomycin and the patient was given daptomycin 350 mg per day. About 24 hours post-

operatively a brown, foul smelling fluid started draining from the wound. The chemistry of the fluid revealed amylase 41100 IU/L, LDH 4480 IU/L and bilirubin 7,28 mg/dl. A possible intestinal origin of the fluid was considered and a colonoscopy was performed which revealed a perforated diverticulum at the middle of the sigmoid colon. A surgery was decided but the patient, who agreed in the need of surgery preferred to be operated in her country and was air-transferred abroad with a medical flight accompanied by the doctor.

Discussion

Perforated diverticulitis can appear either as peritonitis in 5% of the patients caused by free perforation of the diverticulum in the peritoneal cavity, or as localized abscess in 39%². However, perforated diverticulitis can present without any abdominal manifestation and only with extraabdominal symptoms³. This clinical presentation seems to be more often in elderly patients and in women^{4,5}. In this case the diverticulum perforation may present with soft tissue emphysema with or without abscess formation⁶.

Gas in the soft tissues of the lower extremity can develop by movement of gas along the path of the least resistance into the thigh rather than free perforation into the peritoneal cavity and secondarily by the presence of gas forming organisms^{7,8}. Free air can travel from the abdomen to the thigh in various pathways: 1) following a route deep to the inguinal ligament along the psoas sheath, femoral sheath and femoral canal, 2) through fibro-osseous canals along the sacro-sciatic notch and the obturator foramen, 3) from the abdominal wall following a subcutaneous route, 4) directly by penetration of the pelvic floor and 5) cause of generalized cellulitis because of septicaemia⁹. In cases of perforation of intraperitoneal structures, as the sigmoid colon, like it happened in our case, gas seems to enter the thigh through the iliacus and psoas muscles⁵. In

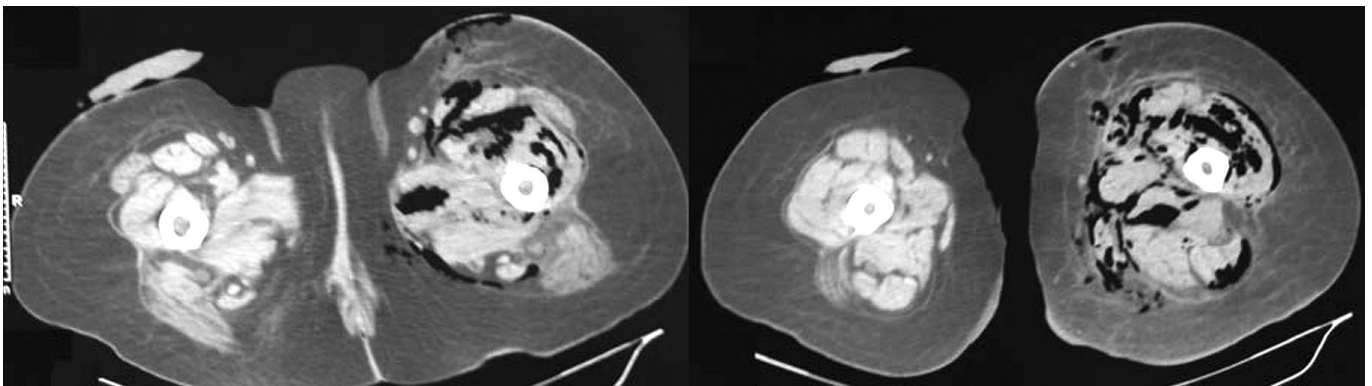


Fig. 2: CT scan demonstrating increased diameter of the left thigh compared to the right and presence of gas both in the subcutaneous tissue and also between the muscles.



Fig. 3: CT scan of the lower abdominal cavity demonstrating peritoneal carcinomatosis and extensive adhesions.

our case due to extensive adhesions from previous operations and due to the peritoneal carcinomatosis, the gas traveled from the right iliac fossa towards the left thigh.

Emphysema of the lower extremity caused by gastrointestinal perforation is rare and is characterized by crepitance, edema, discoloration and intense pain⁷. The diagnosis is supported by the presence of faeces upon drainage⁷. However in our case it was not only until 24 hours later that faeces drained through the surgical wound. Subcutaneous and intramuscular emphysema of the upper part of the lower extremity accompanied by the presence of cellulitis is a surgical emergency. Differential diagnosis includes two life-threatening and limb-threatening infections: necrotizing fasciitis and gas gangrene⁸, that are caused by different microorganisms, group A streptococci or polymicrobial flora and anaerobic bacteria respectively⁸. Necrotizing fasciitis and gas gangrene are two most common causes of gas presence in the lower extremity. The mortality rate of emphysema of the hip and thigh complicating a gastrointestinal tract perforation is 34 - 93%^{9,10}. In patients treated only with local drainage the mortality rate raises to 93%, while in patients treated also for the perforation the mortality decrease to 34%¹⁰. So it becomes obvious that both the local process and the intrabdominal lesion should be treated.

Conclusion

Subcutaneous and intramuscular emphysema of the upper part of the lower extremity accompanied by the presence of cellulitis is a surgical emergency. Necrotizing fasciitis and gas gangrene are two most common causes of gas presence in the lower extremity, but rarely the

gas presence is secondary to a perforated viscus and especially the colon. Colonic diverticulum perforation usually presents with intra-abdominal symptoms and presence of free air in the abdominal cavity. However, it is possible that the free air may in cases of extensive adhesions and peritoneal carcinomatosis cannot diffuse in the peritoneal cavity and follows the path of least resistance. In our case due to extensive peritoneal carcinomatosis, the gas moved inferiorly towards the thigh causing a clinical entity resembling gas gangrene and necrotizing fasciitis. In these cases surgical treatment, including both the local process and the intrabdominal perforation is necessary.

Riassunto

La fascite necrotizzante e la gangrena dell'arto inferiore sono due condizioni di emergenza perchè mettono a rischio la sopravvivenza, e le cause più frequenti della presenza di gas nei tessuti dell'estremità inferiore. Raramente la presenza di gas è secondaria alla perforazione di un viscere, in particolare il colon.

I diverticoli del colon sono una patologia abbastanza frequente nei paesi occidentali e la sua incidenza si accresce con l'età. Inoltre la possibilità di complicazioni è maggiore nei pazienti più anziani.

Comunque la perforazione di un diverticolo del colon raramente si manifesta con soltanto la presenza di gas nei tessuti dell'arto inferiore. Qui si riferisce un caso di cellulite enfisematosa della coscia sinistra causata dalla perforazione di un diverticolo del sigma in un paziente affetto da carcinosi peritoneale.

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