

## Morbidity and Mortality Case Report

# Massive air in tissues mimicking necrotizing fasciitis of thighs, pelvis and acute abdomen after high pressure lavage of infected pelvic wound. A case report

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## ABSTRACT

A rare cause of air in tissues due to high-pressure lavage treatment of infected surgical wound is described along with discussion of the safety and effectiveness of that method.

## Case description

23 years old patient was admitted to our hospital Emergency Room after motorcycle accident with following injuries: open pelvic fracture, urological injury, closed fracture of right tibial diaphysis and open fracture of right ankle (Figs. 1, 2).

In operating room, he was treated by the team of general surgeons, urologists and orthopedic surgeons. All the wounds were evaluated and debrided. Urologic injury consisted of the cut of right ductus deferens and the tear of left testicular artery, leaving reproductive function questionable. Orthopedic injuries were the displaced bilateral fractures of superior and inferior pubic rami (straddle fracture) and the right anterior sacroiliac joint tear, closed fracture of the right tibial diaphysis and open fracture of the right ankle. All fractures were fixed with external fixation, including the pelvic fracture (with iliac crest frame) (Fig. 3). After healing of traumatic pelvic wounds, he had undergone open reduction with internal fixation of pubic fractures using Stoppa approach, including the part of healed traumatic wound in the incision (Fig. 4). The tibial and ankle fractures were also treated by internal fixation in the same session.

A week after operation he started to suffer from repeated skin abscesses in the pelvic region which were treated with bedside incision and drainage and finally the decision was made to debride the wounds in the operation room. In OR all the wounds were opened, debrided and washed with high-pressure lavage. Part of wounds were left open.

The next day after surgery, he started to complain on severe abdominal pain. On examination, there was clear impression of acute abdomen, the crepitations were palpable on the thighs, pelvis, abdomen and lower chest region. The CT scan showed diffuse gas in the tissues of thighs, pelvis, retroperitoneum and peritoneal cavity, giving impression of necrotizing fasciitis and/or perforation of the hollow viscera (Figs. 5, 6, 7, and 8). Laboratory findings did not show any serious abnormality.

Due to clinical picture of acute abdomen he was taken to operating room, the laparoscopic laparotomy was made without any significant findings. The cultures taken from peritoneal cavity were later positive for *Bacteroides fragilis* and *Pseudomonas aeruginosa* - the same microorganisms which caused the wound infection. The pelvic wounds were explored again with the finding of little amount of pus from previously closed wound.

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Fig. 1. Presentation in ER.

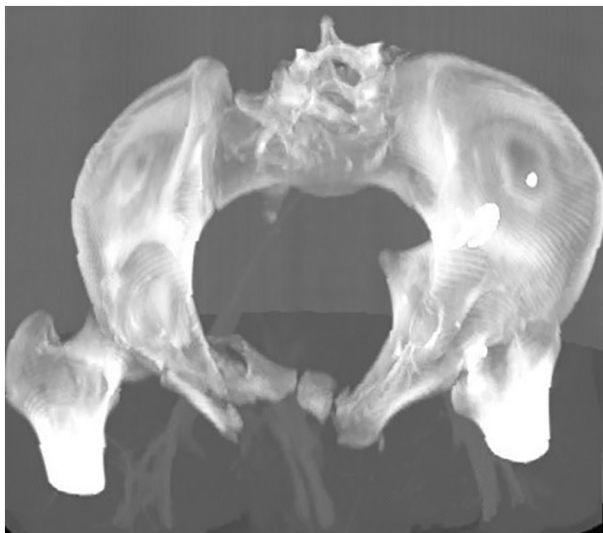


Fig. 2. 3D reconstruction of fracture.

Postoperative period was uneventful with gradual relieve of all the symptoms during 3 days. Pelvic wound was closed by secondary intention with the use of negative pressure therapy. Total hospital stay was 5 months.

### Discussion

Air in tissues is the condition that can be sign of serious infection and always considers the special attention.

We did not find any report on gas in tissues following the high-pressure lavage and it is not mentioned as frequent complication or serious problem in spite of the fact that it seems to be the logical consequence of the high-pressure lavage. We did not find it as one of



Fig. 3. Provisionally fixed pelvis.



Fig. 4. X- ray after ORIF.

possible causes in differential diagnosis of air in tissues in the reviewed by us literature.

There are obviously many fascial planes in the human body that let the gas spread far away from its source [1–3]. It seems that tissues after serious trauma can be more vulnerable to it. That fact has to be considered when treating infections with high-pressure lavage. There is also the concern (also not enough proven) of spreading infection to remote sites by its use [5,7]. High-pressure lavage is also proven to cause damage to tissues and have negative effect on bone regeneration [4,6]. In spite of effective removing the contamination (6,) its real value in preventing and treating the infection is uncertain [6,8]. For example, the “FLOW Study” [9] did not show any superiority of high-pressure lavage versus low-pressure lavage in terms of reoperation rate.

In our case, we observed very wide air spread that partially could be attributed to existent fascial layers and partially to previously damaged tissues. The spread of air was so extensive that lead to condition that was suspected to be the life- threatened infection and lead to additional anesthesia and surgery because of clinical picture of the acute abdomen. Interestingly those cultures from abdominal cavity obtained by laparoscopy were positive to the same microorganism that caused perineal wound infection, supporting the fact that the high-pressure lavage can cause the spread of infection.

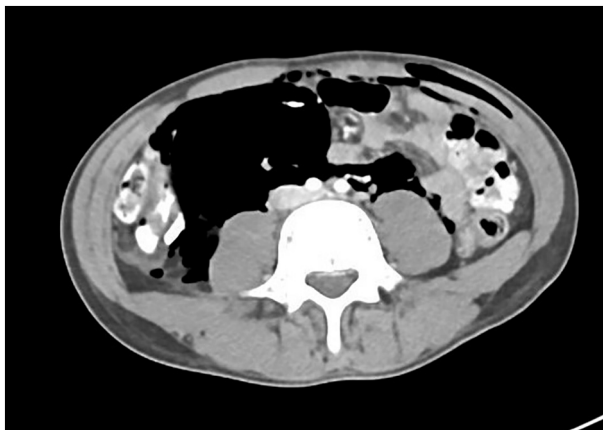


Fig. 5. Axial cut of abdomen showing free gas in peritoneum.

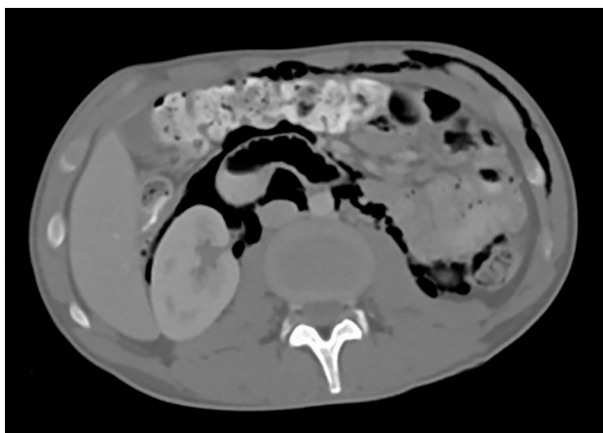


Fig. 6. Axial CT cut, showing gas in peritoneum, retroperitoneum, and subcutaneous tissue.

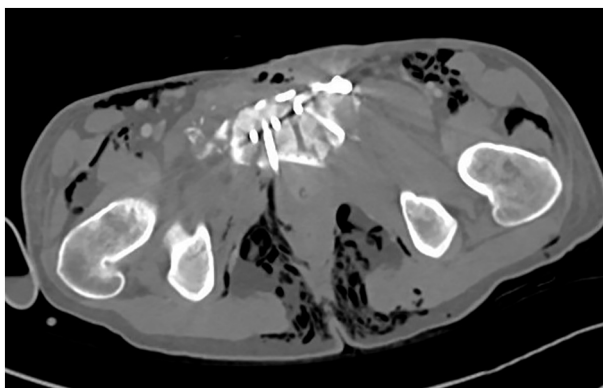


Fig. 7. Axial CT cut, showing subcutaneous gas in pelvic region.

### Conclusion

High-pressure lavage may have the positive features of achieving good cleaning of wound (not supported universally in all studies) but should be used cautiously in the presence of severe tissue damage. The main drawbacks of its use are air spread that can be mistaken for necrotizing fasciitis (especially in context of local infection), additional damage to tissues and the possible spread of infection.

There is no known data if there is some difference exists in its influence in extremities or in torso but our case shows clearly its

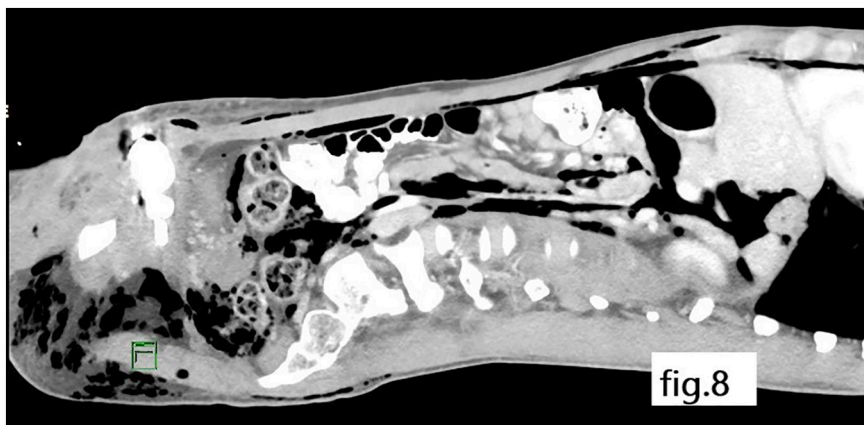


Fig. 8. Saggital CT cut, showing gas in pelvis, peritoneum, retroperitoneum.

negative and even dangerous effects in perineal and pelvic trauma. In our opinion, its use should be avoided in case of severe perineal and pelvic trauma or infection, for example the surgical or traumatic wounds.

#### Declaration of competing interest

Any of authors do not receive any financial support from other people or organizations that could inappropriately influence their work.

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