Spontaneous Drainage of a Thoracic Empyema Through a Lumbar Median Skin Incision Used for Posterior Spinal Fixation: Case Report

Posterior Spinal Fiksasyon İçin Kullanılan Lomber Orta Hat İnsizyonundan Torasik Ampiyemin Spontan Drenajı

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ABSTRACT Empyema is defined as pus in the thoracic cavity due to a pleural space infection caused by bacterial infection following community or hospital- acquired pneumonia or, rarely, blunt or penetrating chest injuries or surgical procedures. Evidence-based guidelines indicated that surgical drainage is more likely to be effective in patients with empyema. The spontaneous drainage of pus through intercostal and paravertebral muscles to the outside is a rare event. In our case, thoracic empyema was drained spontaneously via a lumbar median skin incision for used posterior spinal fixation in an unusual way. Chest and spine injury are found together in the majority of trauma cases. To our knowledge, this case whose thoracic empyema was drained lumbar median skin incision will be first case in the current literature. The surgeons should consider thoracic empyema as a cause of postoperative wound infection or discharge after thoracolumbar fixation.

Key Words: Drainage; empyema; trauma, nervous system; surgical wound infection; lumbar vertebrae

ÖZET Ampiyem hastane ya da toplumsal kaynaklı bakteriyel pnömoniyi takiben ya da nadiren de olsa künt, penetran göğüs travmalarını, cerrahi prosedürleri takiben torasik boşlukta oluşan iltihap olarak tanımlanır. Kanıta dayalı kılavuzlar, ampiyemin tedavisinin cerrahi drenaj olduğunu göstermektedir. Ampiyemin interkostal ve paravertebral kaslar arasından spontan drenajı oldukça nadirdir. Olgumuzda; omurga kırığı için kullanılan posterior orta hat insizyonundan torasik ampiyem spontan olarak drene olmuştur. Omurga ve göğüs travması, travma olgularının büyük çoğunluğunda beraber gözlenir. Bilgilerimize göre, torasik ampiyemin lomber orta hat cilt insizyonundan drene olduğu bu olgu mevcut literatürde sunulan ilk olgu olacaktır. Cerrahlar torakolomber stabilizasyonu takiben gelişen yara yeri enfeksiyonu ya da akıntısında, spontan torasik ampiyem drenajını akıllarında mutlaka bulundurmalıdırlar.

Anahtar Kelimeler: Drenaj; ampiyem; travma, sinir sistemi; cerrahi yara enfeksiyonu; lumbar vertebra

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Empyema is defined as pus in the pleural space due to an infection caused by a bacterial infection following pneumonia or, rarely, blunt or penetrating chest injuries or surgical procedures.[1] Despite optimal management according to the current guidelines, empyema is still associated with significant morbidity and mortality (6%-24%).[2,3] Evidence-based guidelines indicate that surgical drainage is more likely to be effective in patients with chronic or acute empyemas.[2,3] The spontaneous drainage of pus through intercostal and paravertebral muscles to the outside is a rare

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event. In this report, we described a patient who had blunt chest and spinal trauma associated with pleural empyema. Empyema was noted on the thoracic computed tomography (CT). We performed posterior spinal instrumentation for the fracture of a Th12 vertebra along with an L4-L5 spondylolisthesis. After a while, the thoracic empyema drained spontaneously via a posterior median skin incision used for posterior fixation procedure. To the best of our knowledge, this case is the first one to be reported in the relevant literature.

CASE REPORT

A 55-year-old female was admitted to our emergency clinic after a traffic accident. She complained of sharp stinging pain while breathing and had a sensibility over paravertebral muscles of T12 level by palpation. The neurological examination was totally normal. The posteroanterior (PA) chest x-ray and thoracic CT revealed distal fractures of the 3rd, 4th, 5th, 6th, and 11th ribs and pleural effusion on the left side (Figure 1a,b). The thoracic surgeon advised follow-up. Lateral lumbar x-ray revealed a Th12 compression with 30% collapse on the anterior part of the corpus and degenerative L4-L5 spondylolisthesis (Figure 2a). We performed a posterior segmental fixation and fusion between Th10 and L5 level with titanium antibacterial silver-coated pedicle screws through a standard lumbar median approach (Figure 2b,c). Wound infection occured one week later after surgery. Wound culture revealed *Klebsiella pneumoniae* infection, and the antibiogram susceptible to cefoperazone and sulbactam. The laboratory findings were as follows: white blood cells: 13 500 cell/mm^3; erythrocyte sedimentation rate: 92 mm/hour; CRP: 175 mg/L (0-6). Debridement of the wound through the entire length of the previous incision was performed; and residual sutures, loose particles of bone graft and necrotic tissues were removed aggressively. We noted the existence of a tract between the intercostal muscles, paravertebral muscles toward our surgical incision. The pus was drained from the pleural space via this tract. A closed irrigation-suction apparatus was inserted as part of the treatment, and cefoperazone+sulbactam (Pfizer Inc., New York, NY 10017, USA) medication was administrated immediately (2x1 g, IV). We decided to obtain control thoracic CT, which revealed pulmonary atelectasis with marked pleural effusion (Figure 3). The thoracic surgeon again did not perform a tube thoracostomy and reported that the empyema had already been drained through lumbar median skin incision. The postoperative course was uneventful, and a follow-up thoracic CT on the 7th postoperative day revealed no empyema; the patient had recovered successfully (Figure 4).

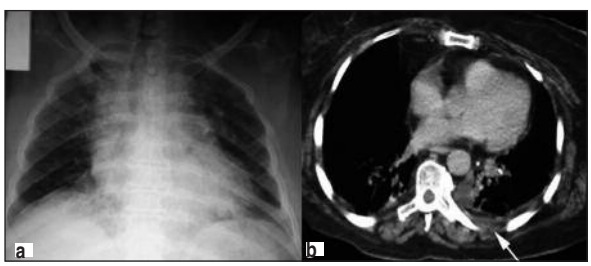

FIGURE 1: (a) The patient's chest x-ray on admisson revealed fractures of 3rd, 4th, 5th, 6th ribs and minimal pleural effusion on the left side and fracture of 4th rib on the right side **(b)** The patient's axial thoracic CT on admission revealed pleural effusion (white arrow).

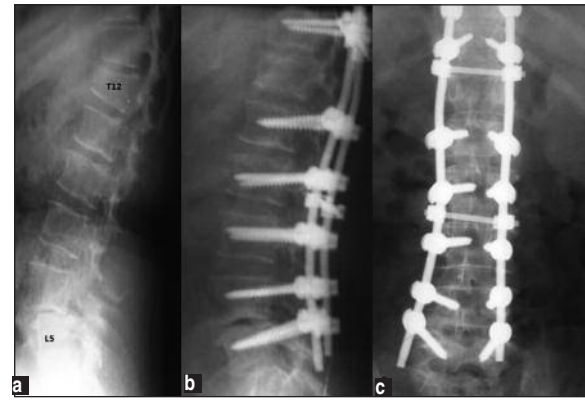

FIGURE 2: Lateral lumbar x-ray **(a)** is showing a compressed fracture in the 12th thoracal vertebra which is anteriorly narrowed in a wedge shape and L4-L5 degenerative spondylolisthesis. Postoperative sagittal **(b)** and posteroanterior **(c)** lumbar x-rays demonstrating good correction of spondylolisthesis and good placement of instrumentation.

DISCUSSION

Major advances in surgical instrumentation of the vertebral column have emerged for a number of spinal pathologies (including fractures, degenerative and neoplastic diseases) over the last two

FIGURE 3: Axial thoracic CT after posterior spinal instrumentation showing marked pleural effusion (white arrow) and left lung atelectasis.

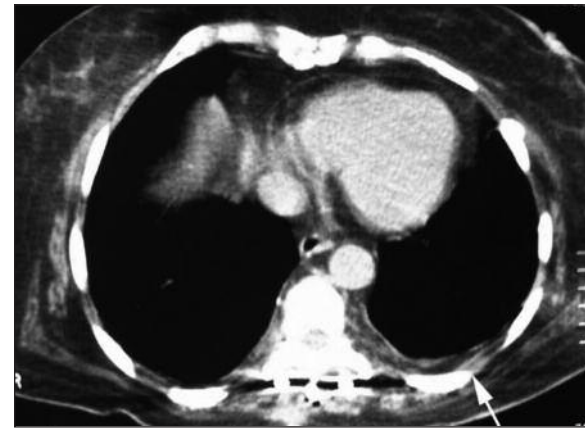

FIGURE 4: A repeated axial thoracic CT demonstrated drainage of pleural empyema (white arrow).

decades.[4] The advantages of instrumentation systems include immediate stabilization of the spine, the correction of deformities, reconstruction of the spine and rapid mobilization of the patient.[4] The use of spinal instrumentation clearly increases the incidence of postoperative infections, which is estimated to range from 2.1 to 8.5 %.[5]

It is well known that both spinal and chest injury frequently occur together in the majority of trauma cases. In the reported case, the patient had blunt chest trauma with multiple rib fractures associated with pleural effusion. She was considered as a potential candidate for thoracic empyema. The triphasic nature of the thoracic empyema is well-know. The visceral pleura remains elastic, and the dimensions of the thoracic cavity are maintained in the exudative phase (stage 1). The fibrin deposits create bridges that separate the effusions, which creates multiple loculations (stage 2). Granulation tissue was developed in stage 3.[3,5] The treatment of empyema can be summarized as appropriate antibiotic therapy combined with medical or surgical space drainage, including: tube or open-window thoracostomy, video-assisted surgery, decortication and thoracoplasty The optimally aggressive treatment modality should be tailored to the condition of each patient, the stage of the empyema and the healing potential of the persisting cavity. Drainage remains the first-line treatment modality in stage 1 and stage 2. A chronic, untreated empyema (stage 3) that has eroded through the thoracic cage and formed a subcutaneous abscess is rarely observed.[3,5] The spontaneous drainage of thoracic empyema through the lumbar midline skin incision for posterior lumbar fixation is very rare and has never been reported in the English-language literature. Possible mechanism in the presented case may be paravertebral muscle dissection during pedicle screw insertion and associated ribs fracture causing rupture of the fascia and muscle of the posterior thoracic wall weakened to wall of the empyema. While increased pressure in the empyema cavity was facilitating rupture of the weakened wall and pleura, spontaneous drainage of the empyema occurred between thoracic space and skin incision. Iatrogenic penetration of the empyema cavity during pedicle screw placement can be another possible mechanism. But, there was no screw malposition on the post-operative images.

In conclusion; the surgeons should keep thoracic empyema in their mind as a potential cause of postoperative wound infection or discharge after thoracolumbar spine fixation for spine fracture associated with chest trauma. Therefore, thoracic CT follow-up and cooperation with the chest surgeon are very important.

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