

# Complications of a Pressure Sore of the Chest Wall: Case Report

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## Summary

*A female tetraplegic patient developed a pressure sore of the chest wall leading to an empyema of the lung and respiratory failure. The pressure sore resulted from the commonly practised habit of grasping the upright of the wheel chair with the upper arm in order to gain stability.*

**Key words:** Tetraplegia; Pressure sore; Empyema; Respiratory failure.

The chest wall is an unusual site for a pressure sore to develop in either the acute or chronic phase of spinal injury as it is not normally subjected to prolonged or intense pressure, factors normally associated with pressure sore formation (Richardson and Myer, 1981; Constantin, 1980). Among the complications that result from pressure sores are the development of abnormal communications to other structures, sinus formation and severe infections. Frequently the communications are to a joint space or bone leading to pyarthrosis or osteomyelitis but other communications have been documented between a pressure sore and the urethra, small or large bowel and dural sac. The communication of a pressure sore through the chest wall to the pleural cavity with the formation of an empyema of the lung has not been previously documented.

## Case report

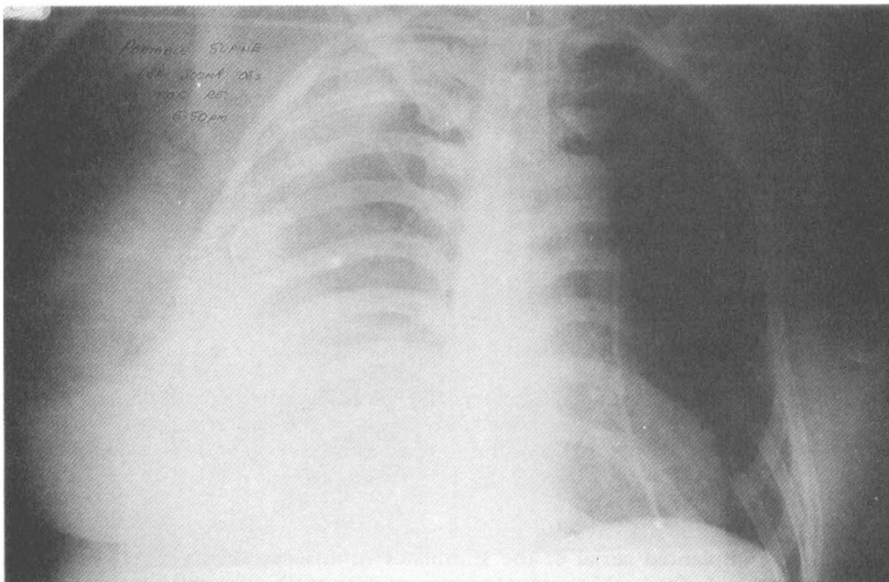
A 29-year-old female sustained a complete tetraplegia below C5 in a road accident in 1974. Four years later a dorsal column stimulator was implanted in an attempt to improve her bladder capacity and leg circulation, and to reduce muscle spasms and sweating attacks. She had gained weight since her injury and was obese, reaching 108 kg, her height being 1.57 metres.

In November 1984 a red swelling appeared in the skin on the right side of her back adjacent to the implanted aerial of the stimulator in an anaesthetic area of skin. The superficial lesion failed to heal in spite of treatment with antibiotics and became necrotic. An aspiration of the lesion was undertaken but the area failed to heal and the skin later

became ulcerated; a diagnosis of a pressure sore was then made. She was admitted to The Duke of Cornwall Spinal Treatment Centre as an emergency 4 months after the initial swelling had appeared, with increasing exhaustion and shortness of breath.

On admission she had an 8 centimetre diameter ulcerated lesion on the right chest wall in the posterior axillary line and was pyrexial, dehydrated, cyanosed, dyspnoeic, tachycardic and hypotensive. A chest X-ray suggested a right pleural effusion (Fig. 1) but subsequent negative aspiration with a 50 mm needle led to an alternative diagnosis of middle and lower lobe pneumonia being made. Intravenous fluids, flucloxacillin, amoxicillin, gentamicin were commenced as treatment for the presumed chest infection; the sputum culture eventually only indicated an *E. coli* infection. During the following 36 hours she became increasingly exhausted and unable to expectorate, her respiratory function deteriorated requiring 60% oxygen to maintain an arterial PaO<sub>2</sub> of 8.0 kPa and eventually she became hypotensive and oliguric. After transfer to theatre for bronchoscopy and intubation, controlled ventilation and inotropic cardiovascular support was required in the intensive care unit. Although some sputum had been obtained at bronchoscopy, which failed to culture any organism, a pleural chest aspiration was attempted again using a 125 mm needle to penetrate the chest wall, and 2 litres of turbid fluid was collected from which *Proteus* and *E. coli* were isolated. Her condition improved dramatically and the antibiotic regimen was changed to gentamicin and ampicillin. The pressure sore was debrided leaving a cavity 10 cm deep over the 6th, 7th and 8th ribs in the posterior axillary line (Fig. 2). The 7th rib was found to be fractured and was partially excised to allow the insertion of a drain into the empyema cavity releasing a further 1.6 litres of fluid. Respiratory support continued for 4 weeks with a tracheostomy being performed after 10 days. Intravenous antibiotic therapy was continued but changed after 2 weeks to include piperacillin and later tobramycin to treat a resistant pseudomonas infection isolated from the chest. Gradual healing of the empyema cavity and wound allowed the patient to return home 14 weeks after admission.

Prior to admission the cause of the pressure sore was thought to be a rivet on the back of the patient's powered wheel chair although additional padding had not resolved the initial sore. After admission it was feared that the implanted aerial in her chest wall might be a contributory source of infection, but it was not found at the base of the lesion and was never removed. However the cause was found after a weekend visit home prior to her final



**Figure 1** Chest X-ray on admission.



**Figure 2** Debrided pressure sore of the right chest wall. A deep cavity with ribs at the base is seen.

discharge in her manual wheel chair, when a red pressure area appeared in a similar position on the opposite side of her chest. It was then realised that her habit of grasping behind the back of this manual chair with her upper arm for stability was forcing the upright of the chair into her chest wall. This action, in combination with a too narrow chair for her size, was sufficient to produce enough pressure to cause ischaemia of the skin and subcutaneous tissues and possibly fracture of the rib. It was noted that this manual wheel chair had been used continuously during a foreign holiday a few weeks prior to the development of the initial sore.

### **Discussion**

Pressure sores commonly occur in the weight bearing areas where the skin and subcutaneous tissues are compressed against underlying bone, the danger being greater when there is no subcutaneous fat to cushion the direct effect of pressure. In this case there was adequate subcutaneous fat (Fig. 2) and the site involved was not weight bearing, these factors making the initial diagnosis of a pressure sore less likely. The presence of the aerial may have been a complicating factor as a means of transmitting pressure to the chest wall, a factor that should be considered when these aerals are positioned, but was unlikely to have been a source of infection, as the pressure sore healed without its removal. The sore was probably due to acute repetitive compression of the tissues against the upright of the wheel chair, combined with a constant low level force from sitting in a poorly fitting wheel chair. Repetitive actions producing moderate pressures have been suggested as a cause of pressure sores when insufficient rest periods are allowed for tissue recovery to take place (Brand, 1976) and would have occurred in this patient. The possibility that the infection spread outward

from a primary chronic undiagnosed empyema as a case of Empyema Necessitatis (Bailey and Love 1980) is unlikely as the clinical evidence does not support this. It is presumed that infection began in the damaged subcutaneous tissues and spread inward to involve the chest wall leading to a secondary formation of an empyema, as a clear history exists of a superficial skin lesion in an exact site where excess pressure was generated, which pre-dated any serious illness.

### References

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