CASE REPORT

Thoracic Pneumorrhachis in Patient with Lumbar Fractures; a Case Report

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Abstract

Pneumorrhachis as a relatively rare condition may be an indication of substantial intra-spinal column injury. Here we report a 39-year-old man was admitted because of low back pain and dyspenea after locating between motor vehicle and wall three days before admission. On arrival, physical exams and vital signs were normal. Computed tomography (CT) scan showed bilateral pleural effusion, fracture of ribs number 8, 9 and 10 in lower left side of thorax, fracture of vertebra in L2-L4, and air bubbles in upper thoracic spinal canal.

Key words: Pneumorrhachis; spinal cord; Spinal Fractures; case reports

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Introduction:

Pneumorrhachis is defined as the presence of free intraspinal air. It is a relatively rare condition, typically benign and resolves with conservative therapies (1). This has been occasionally described in the surgical published work, usually in the context of thoracic surgery or as a complication of spinal instrumentation (2). It initially described by Gordon and Hardman in 1977 as intraspinal air (3). Since then, especially with the advent of computed tomography (CT), there has been an increasing number of case reports describing the presence of air within the spinal canal (4). In 1987, Newbold et al coined the term pneumorrhachis (5). Pneumorrhachis may be an indication of substantial vertebral column injury, especially when paraspinal hematoma, rib fractures, transverse process fractures, clavicle fractures, subcutaneous air, intramuscular air, pneumothorax, or hemothorax are also present (2, 6-8). Pneumorrhachis has also been reported with isolated head trauma and in the absence of an identifiable fracture within the skull or spine (9, 10). Nontraumatic causes of pneumorrhachis include infection (11). Despite known conditions that can result in pneumorrhachis the clinical significance and neurologic outcome for patients with pneumorrhachis remain poorly understood. Here, we report a case of pneumorrhachis with fracture in lumbar spine and history of ankylosing spondylitis.

Case report:

A 39-year-old man was admitted because of low back pain and dyspnea after locating between motor vehicle and wall 3 days before admission. He suffered from ankylosing spondylitis and was under corticosteroid therapy. On arrival, his Glasgow Coma Scale was 15/15 with normal neurological examination. He was able to move his lower extremity, but it was limited by pain. In addition, he had intact sensation to light touch in all extremities. Vital signs were stable and in radiographic examination, there was rib fracture in three ribs, hemothorax, subcutaneous emphysema, and lumbar vertebra fracture in L2-L4. There was no evidence of fracture or subluxation within the cervical spine. CT scan showed bilateral pleural effusion, fracture of ribs number 8, 9 and 10 in lower left side of thorax, fracture of vertebra in

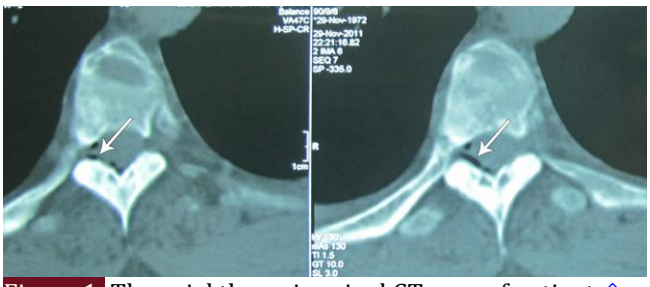

Figure 1: The axial thoracic spinal CT scan of patient

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L2-L4, and air bubbles in upper thoracic spinal canal (Figure 1). The patient underwent lumbar surgery (laminectomy and cord decompression) and fusion of L2-L4 by screw. In according to neurosurgery consult no action performed on air bubbles. There was no neurologic deficit after treatment.

Discussion:

Pneumorrhachis, as the presence of free intra-spinal air, is also called aerorachia or epidural emphysema. It usually occurs in the epidural space but may be spread within the subarachnoid space with the distraction of dura meter (1). A significant increase in intra alveolar pressure and its rupture is the most common mechanism of pneumorrhachis. Intra alveolar pressure was increased in several conditions such as acute asthma, recurrent vomiting and closed thoracic trauma. This led to alveolar rupture and air movement along the bronchovascular axis up to the mediastinum. The collected air then disassociates the pleura from the aorta and the parietal pleura from the spine, subsequently inflowing the extradural space via the intervertebral foramina (12). In addition, subarachnoid air may easily move cranially and caudally and may cause back and/or local pain and headache and/or nervous tissue compression (brain and spinal cord) by a valve mechanism. However, in the present case, there are not strong evidence of air diffusion between the pleura and the epidural space, it is the only pathophysiological mechanism stated in the literature (1).

Pneumorrhachis is most commonly identified on plain radiography or CT scan (13). Magnetic resonance imaging is the most accurate investigation for the assessment of the extent of the condition. The natural history of pneumorrhachis is one of spontaneous resolution by diffusion. The best explanation for the radiologic findings in our patient is that air, under pressure in the pleural space, entered the spinal canal and then the subarachnoid space directly through tears of the parietal pleura and the spinal meninges. Tension pneumothorax and thoracic spinal fracture should be considered in the differential diagnosis of both pneumorrhachis and pneumocephalus. Intraspinal air is usually asymptomatic, self-limiting and resolves with conservative therapies, but in a rare number of cases, pneumorrhachis can cause cord compression and may even require decompressive surgery. Therefore, quick assessment and diagnosis remain important (13). Appropriate antibiotic prophylaxis must be considered, however, due to increased risk of infection of the underlying breach in the dura in traumatic etiologies (2). In comparison with others, Sinha and Mantle has been described a case of pneumorrhachis with rapid deterioration to death (14). Lin et al reported a rare case of pneumorrhachis following lumbar puncture. The pneumorrhachis resolved spontaneously (15). In other study, they presented a case of tension pneumocephalus and pneumorrhachis secondary to a subarachnoid pleural fistula after thoracic spinal surgery (16). Valente et al reported a 21-year-old male with severe pneumocephalus and pneumorrhachis who was made a full recovery without any neurological complication (17).

The present report intends to increase awareness about pneumorrhachis among trauma patients. It is usually asymptomatic and self-limiting, but its presence should alert the attending trauma physician to carry out diagnostic workup for associated injury and treat the underlying cause (18). When seen in a trauma patient, pneumorrhachis may be pathognomonic of a serious unidentified spinal injury.

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