Significance of pneumorrhachis detected by single-pass whole-body computed tomography in patients with trauma

Dear Editor,

Pneumorrhachis, which involves the entrapment of air or gas within the spinal canal, is a rare, typically incidental, imaging finding. Pneumorrhachis may be caused by several degenerative, traumatic, infectious, tumoral, decompressive sickness or iatrogenic etiologies.[1-3] Usually, pneumorrhachis is an asymptomatic epiphenomenon, but it can produce symptoms associated with its underlying pathology.[1] Patients with trauma induced by high energy accidents tend to undergo single-pass whole-body computed tomography (PAN-SCAN) to detect lethal injuries to organs. We experienced cases of pneumorrhachis detected by the PAN-SCAN image interpretation, and we herein report the results of a retrospective analysis performed to determine the significance of pneumorrhachis in traumatized patients.

A medical chart review was retrospectively performed in all patients with trauma who were treated by a physician in the Department of Emergency (ER) and were admitted to our hospital between April 2013 and October 2014. The exclusion criteria included patients who did not undergo the PAN-SCAN. The subjects were divided into two groups: The pneumorrhachis group, which included patients who had pneumorrhachis detected in the PAN-SCAN image, and the control group.

There were four patients included in the pneumorrhachis group and 130 patients in the control group. All four patients in the pneumorrhachis group were female, and their ages were 53 [Figure 1], 89 [Figure 2], 90, and 91-years-old. All four patients survived. The pneumorrhachis was located in the lumbosacral epidural space in all four cases. There were no neurological abnormalities at the level of the lumbar or sacral spinal cord in the pneumorrhachis group. Statistically, the average age (80.7 + 9.5 vs. 53.3 + 2.0, P < 0.05) and proportion of females (0/4 vs. 92/39, P = 0.01) in the pneumorrhachis group were significantly higher than those in the control group.

In previous reports, cases of pneumorrhachis induced by traumatic or degenerative etiologies were predominant. In the previous traumatized cases, a direct open injury into the spinal canal, air migration into the spinal canal due to pneumocephalus with an open skull fracture, pneumomediastinum with barotrauma or a pneumothorax were reported.[3] In this report, all of these mechanisms were ruled out by the results of the interpretations of the images. The vacuum phenomenon is produced by the liberation
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of gas, principally nitrogen, from surrounding tissues, and accumulation within the cracks, clefts or crevices, which form in the disc as it degenerates with aging, usually in the lumbar region.[4]

The discrepancy in the frequencies between the vacuum disc and pneumorrhachis may be because the vacuum disc was rigid, thus leading to the retention of gas.[4] The prevalence and severity of disc space narrowing, characterized by degenerative changes, are both higher in elderly females than elderly males.[5] Accordingly, our findings suggested that it may have been incidentally detected vacuum phenomenon by the traumatic PAN-SCAN.

In conclusion, pneumorrhachis detected by traumatic PAN-SCANS tends to be found in elderly females at the lumbosacral region. If the patient does not have a direct open wound into the spinal canal, pneumocephalus, pneumomediastinum, or pneumothorax, the diagnostic significance is minimized.

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Figure 2: An image of a traumatic PAN-SCAN taken of case 2 on arrival. An 89-nine-year-old female sustained head contusional wounds and cervical central spinal cord syndrome manifesting as bilateral dysesthesia of the hands after falling from a 3 m height. The PAN-SCAN revealed pneumorrhachis at the lumbosacral level (black arrow)