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Original Article

‘Abnormal’ cervical imaging?: Cervical pneumatocysts – A case report of a cervical spine pneumatocyst

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ABSTRACT

To our knowledge there are only 15 reported cases of pneumatocysts in the cervical spine, but awareness of their existence should help the clinician when diagnosing abnormalities in radiological images. When faced with intravertebral gas, in addition to considering more sinister causes, one should consider the differentials including pneumatocysts. Despite our relative lack of understanding of these benign lesions the knowledge that they can change over time should prevent unnecessary testing or treating.

We present a patient who fell down stairs and was found to have cervical intravertebral gas, on computed tomography imaging, with the typical appearance of a pneumatocyst.

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1. Introduction

Pneumatocysts are intraosseous gaseous lesions with a pathognomonic appearance on computer tomography (CT). They are often incidentally discovered on imaging obtained for other reasons. Most importantly they are benign and should be differentiated from more sinister causes of gas collections such as osteomyelitis, osteonecrosis or tumours. However, only scanty reports of pneumatocysts exist in the literature and their aetiology and natural progression are little understood. We present a case report of a pneumatocyst of the 4th cervical vertebra (C4) that was found in a trauma patient.

2. Case presentation

A 62-year-old woman presented to the emergency department following a fall down a flight of stairs. She denied neurological symptoms and neurological examination was normal. She reported neither pain nor spinal tenderness. Routine blood tests revealed no abnormalities.

She gave no history of recent surgery, was not diabetic and was on no regular medication. She had a 50 pack year smoking history.

CT of the cervical spine revealed a circular radiolucency in the right side of the C4 vertebral body, immediately adjacent to the end-plate and zygapophysial joint (Figs. 1 and 2). It

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Fig. 1 – Coronal view of a pneumatocyst in the 4th cervical vertebra adjacent to the end-plate and zygapophysial joint in a 62-year-old woman.

Fig. 2 – Sagittal view of a pneumatocyst in the 4th cervical vertebra adjacent to the end-plate and zygapophysial joint in a 62-year-old woman.

measured 4 mm with a radiodensity of –951 Hounsfield units. There was no surrounding cortical or medullary destruction and it was surrounded by a thin sclerotic rim. There was no extension into the intervertebral space nor spinal canal (Fig. 3) and there was no evidence of vacuum phenomenon in the adjacent intervertebral discs. There was however mild degenerative cervical bone changes with osteophyte formation.

She underwent open reduction internal fixation of a right ankle bimalleolar fracture and dislocation and was discharged two days later.

3. Discussion

Intravertebral gas can result from osteomyelitis, osteonecrosis, secondary to trauma, post-surgical intervention or tumours, both benign or malignant. Those predisposed to them are patients with osteoporosis, diabetes or those taking steroids.¹ Less common causes are pneumatocysts. These have pathognomonic CT findings – a radiolucency with attenuation that ranges from –950 to –580 Hounsfield units, indicating gas, surrounded by a sclerotic rim.

Several pneumatocysts have been documented in iliac and sacral bones, adjacent to the iliosacral joint, but those in other locations are rarer, or at least less well reported in the current literature.² There have been isolated reports of pneumatocysts in the humeral head, medial end of the clavicle and the spine.

As far as we are aware there have been only 15 reported cervical pneumatocysts in the literature to date (three in C4, six in C5, three in C6, two in C7 and one at an unknown level^{2–11}). There have been 3 reported in the thoracic spine,^{2,11,12} 13 in the lumbar spine^{1,2,9,11,13} and many in the sacrum.^{14–16}

Two population groups have been identified with pneumatocysts. An older patient cohort, ranging from 49 to 69 years old, with degenerative spines and larger pneumatocysts and a younger cohort with no obvious degenerative change and smaller intravertebral pneumatocysts (2–5 mm in diameter).⁷

Fig. 3 – Axial view of a pneumatocyst in the 4th cervical vertebra measuring 4 mm at its largest with –951 Hounsfield units in a 62-year-old woman.

There are several theories for the origin of the pneumatocyst, with or without associated vacuum phenomenon. It has been postulated that the gas develops spontaneously,¹⁷ that the gas accumulates within a pre-existing simple fluid-filled cyst or ganglion or that nitrogen relapses from adjacent joints.¹¹ In addition, it has been proposed that extension of intervertebral disc gas through a degenerate endplate may cause pneumatocysts, with trauma facilitating its passage.¹⁸

The natural progression of these gas-filled cavities are equally unclear. They have been reported to spontaneously progress to fluid-filled cysts⁹ and then either to fill with granulation tissue⁸ or re-accumulate gas. These gas-filled cavities may also gradually⁷ or rapidly enlarge.¹² Although there is certainly no indication for routine surgical management of pneumatocysts, enlarging cavities may need to be monitored if there is a risk of pathological fracture.

4. Conclusion

Pneumatocysts are little reported in the literature but awareness of their existence should help the clinician when diagnosing abnormalities in radiological images. When faced with intravertebral gas, in addition to considering more sinister causes, one should consider the differentials including pneumatocysts. Despite our relative lack of understanding of these lesions the knowledge that they can change over time should prevent unnecessary testing or treating of these benign lesions.

Conflicts of interest

All authors have none to declare.

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