Aviation Radiology Quiz

Dear Reader

From this issue we introduce a new feature in the journal. From the archives of the radiologist we will be giving a radiology / MRI / CT Scan clip, to tickle your brain. All you have to do is to take a good look, identify what is being shown and then think up of its relevance in context of aviation radiology. To aid you in your rumination, a brief description will follow on another page.

Description is given on page 67
A MRI scan of the Dorso-lumbar region in which an anterior compression fracture of dorsal vertebrae 11 and 12 is shown. Also seen are Schmorl’s nodes in D-11, 12 & L1.

Schmorl’s nodes are defined as herniation of the intervertebral disc through the vertebral end plate. A German pathologist, Christian G. Schmorl in 1927, first described them. These lesions are believed to be associated with trauma, especially in the thoracic and lumbar vertebrae. They may or may not be symptomatic, and their etiological significance for back pain is controversial.

It is generally agreed that trauma likely precipitates the actual formation of the Schmorl’s node, but a possible congenital origin of a vertebral end-plate defect has also been suggested. In the maturing spine the epiphyseal plate may represent a weak spot of annular attachment, allowing for some discal material to extrude, causing an interbody nuclear herniation. It is now generally accepted that these nodes could predispose the disc to degenerative changes at an earlier onset, especially when observed in the earlier age groups.

Patients with symptomatic Schmorl’s nodes have pain on percussion; axial loading and extreme lumbar ROM exacerbate back pain. On MRI, in symptomatic cases, the vertebral body bone marrow surrounding the node is seen as low-intensity on T1-weighted images, and high signal intensity on T2-weighted images. These changes are local to the area of the Schmorl’s node. The signal changes on MRI are reflective of bone marrow edema and inflammation often seen in cases of fracture.

Symptomatic Schmorl’s nodes represent a fresh fracture of the vertebral endplate, which allows vertical disc herniation and nuclear migration. This may cause diffuse lower back pain without associated radicular findings often seen in transverse type herniations. It must be emphasized that for a Schmorl’s node to be considered symptomatic or active subsequent to trauma, an MRI should demonstrate the T1 and T2 signal changes described above.

Although Schmorl’s nodes in the past have been considered clinically insignificant, clearly they may be an active symptomatic process and etiology of pain in some patients. Schmorl’s nodes may be caused by numerous factors: trauma; hyperparathyroidism; osteoporosis; Scheuermann’s disease; osteomalacia; infections and neoplasm. Trauma in adolescent athletes may be responsible for symptomatic Schmorl’s nodes.

Recent studies have demonstrated that nucleus pulposus activates the release of inflammatory hormones and enzymes, such as leukotrenes, cytokines, PLA2, substance P, etc., and as such may be responsible for C-nociception or diffuse vertebrogenic pain seen in these types of cases.

Many cases of Scheuermann’s disease present with back pain. The back pain is generally located at or near the thoracolumbar junction; most of the patients are adolescents between the ages of 14 and 18. Usually the patient cannot recall the specific motion that caused the onset of pain. Clinically, the pain is relieved with rest and spinal manipulation. Usually the pain is sufficient to prevent the patient from performing their routine aviation tasks.

A dorso-lumbar kyphosis is a distinct clinical entity and may be associated with a Schmorl’s node and should be considered as a possible etiology for low back pain in the active adolescent. The symptoms are relatively mild; however, in the initial
stages, participation in competitive sports is significantly impaired. The diagnosis is confirmed by characteristic radiographic findings that can be correlated with the clinical findings.

The disease is self-limiting and usually does not require extensive treatment. A careful rehabilitation program consisting of an initial rest period followed by a gradual return to full activity is usually successful.

In ICD-9-CM, the three-digit diagnosis code 722 is termed “Intervertebral disc disorders.” A fourth digit, following the decimal is used variously to specify site or type of pathology. The fourth subcategorization, 722.3, is designated “Schmorl’s nodes.”

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**Answers to Quiz on Page 65**

1 - (a)  
2 - (b)  
3 - (c)  
4 - (a)  
5 - (b)  
6 - (b)  
7 - (b)  
8 - (a)  
9 - (a)  
10 - (a) 
11 - (d) 
12 - (d) 
13 - (c) 
14 - (a) 
15 - (b) 
16 - (a) 
17 - (a) 
18 - (d) 
19 - (a) 
20 - (b)