Pictorial CME

Dear Reader

From this issue we introduce a new feature in the journal. We will try to bring in a pictorial CME from the different disciplines of aerospace medicine. Readers are requested to give a feedback as well as suggestions to improve it. We also welcome similar write-ups from our specialists in the field.

Happy learning

- Editor -

Spondylolysis

Spondylolysis is a condition in which there is a defect in the pars inter-articularis of the neural arch, the defect passing between the superior articular process and remainder of the lamina (Fig 1).

Approximately 3-7% of the general population have Spondylolysis. The incidence is higher amongst athletes. It can occur in both children and adults and is 2-3 times more common in males.

Spondylolysis is believed to be caused by micro trauma, resulting in a stress fracture of pars interarticularis. The region of the spine most commonly affected is LV5. It may be unilateral or bilateral. Spondylolysis can lead to significant morbidity. The condition is generally asymptomatic, when symptomatic, patients complain of pain on extension and or rotation of lumbar spine. Intervertebral disc degeneration occurs frequently and patients with bilateral Spondylolysis can subsequently develop spondylolisthesis.

Diagnosis

The diagnosis is easily missed if the linear translucency seen on the lateral view is not specifically looked for. When visualized, it is adequate for the diagnosis in most cases. However definitive demonstration of the break in the pars interarticularis is possible only in the oblique views, often likened to the neck of the Scottish Dog (Fig-2). Due to the oblique nature of the defect, it is easily missed on CT and MRI.

Spondylolisthesis

Spondylolisthesis is the condition of forward slippage of one vertebra on the vertebra below. The word is derived from Greek: spondylo, defined as “spine” in Greek and listhesis- defined as “to slip or slide”. The most common spinal levels involved are either L5-S1 (in isthmic spondylolisthesis) or L4-L5 (in degenerative spondylolisthesis).

Types

1. **Congenital spondylolisthesis:** It occurs due to anomalies of the bones of the spine. About 14-21% of all spondylolisthesis as being caused by dysplasias, the patients usually present in their adolescence.

2. **Isthmic spondylolisthesis:** This defect is usually caused by stress fracture of the pars. The type of stress...
Degenerative spondylolisthesis: This condition is due to arthritis of the spine. Spinal canal stenosis is also associated with this condition. The most common region for degenerative spondylolisthesis is L4-5.

4. **Traumatic Spondylolisthesis**: Traumatic spondylolisthesis is a slippage caused by a fracture in the spine, usually at the facet joint.

5. **Pathological Spondylolisthesis**: This type is caused by destruction of the posterior aspect of the neural arch by either a tumor, infection or an inherent abnormality of the bone as in osteoporosis.

6. **Post-surgical**: Slippage occurs or is worsened after a laminectomy or other surgical procedures on the posterior aspect of the spine. This is seen, for instance, in patients with spinal canal stenosis who need to have a very wide decompression, leaving the spine unstable.

**Grades of Spondylolisthesis**

Grading is done on a lateral view of a plain radiograph taken in standing position to accentuate slippage.

- Grade-1 (occult) - Slip less than 25% of the vertebral body
- Grade-2 - 25-50% slip
- Grade-3 - 50-75% slip
- Grade-4 - More than 75% slip

**Aeromedical Concerns**

Both these disabilities have significant relevance to the aerospace community. The important aeromedical concerns are:

(a) Occasionally, spondylosis and spondylolisthesis are radiological diagnosis made after initial presentation of low backache. In aircrew it is usually detected in asymptomatic individuals on routine radiography.

(b) Various aviation stresses like abnormal cramped posture and vibrations specially in helicopter flying could aggravate the symptoms.

(c) In fighter aircrew high G forces may produce
symptoms in an individual with spondylolysis. In spondylolisthesis, the susceptibility of the spine to injury is also theoretically increased when subjected to the Gz force of ejection. However, in follow up study of 21 aircrew with varying degrees of spondylolisthesis, only 3 had increase of slippage and 4 had one episode each of back ache. One pilot with Gr 1 spondylolisthesis ejected, without further slippage or fracture.

(d) Spondylolisthesis is unlikely to cause incapacitation in flight but if symptomatic, will cause considerable distraction.

(e) Detected on initial entry these conditions are not compatible with Air Force service.

(f) For disposal of a trained aviator, a complete history, physical exam and functional evaluation of the spine is required. A MRI scan of the spine may be required for evaluating the intervertebral disc and associated ligaments in selected cases. Disposal is decided on a case-by-case basis. Aircrew with symptoms or on medication are not fit for aircrew duties. Asymptomatic individuals after a period of observation on the ground could be reflighted gradually. Periodic follow up is required to assess progression of displacement.

References


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