



Letters to the Editor

Spinal cord injury without radiographic abnormality in adults. SK Gupta *et al.*, *Spinal Cord* 1999; 37: 726–729.

Gupta *et al* describe 15 patients with MRI findings with spinal cord injury. On initial examination, plain X-rays of the cervical spine including flexion/extension films failed to detect any bony abnormality.

They do not describe the size of the spinal canal or the presence or absence of spondylosis. This is important since, as they point out, Crooks and Birkett¹ documented spinal cord injury without demonstrable skeletal injury in patients of late middle and old age who had narrowing of the cervical canal with spondylotic changes.

This finding is well documented since Alexander *et al.*,² Payne and Spillane³ and Burke⁴ suggested that when the canal is narrow those patients are particularly liable to injury of the cervical cord. This has been shown in patients with chronic myelopathy,³ and patients with achondroplasia and the Klippel-Feil syndrome are particularly liable to injury of the cord.

McMillan and Silver⁵ endeavoured to see if this was present in patients with acute hyperextension injuries resulting in tetraplegia, a similar group of patients to those described by Gupta *et al.*

We investigated this problem in detail in 1987 describing 75 consecutive patients between 1948 and 1967 from Liverpool Regional Paraplegic Centre with particular reference to the incidence, presence of spondylosis, diameter of the canal, congenital abnormalities, mechanism of injury of the neck and neurological features in the group of patients with extension injuries.

We found that 'tetraplegia without bony injury' was misleading because evidence of bony injury was found in 33 of 47 patients whose initial X-rays were available. In 14 of these cases it had been missed on the initial films. The bony damage shown at the time of the initial examination included avulsion of anterior osteophytes, fractured spinous process, fractured spinous process extending into neural arch, compression fracture posterior body, fractured pedicle, fractured neural arch, fractured arch of atlas, and loss of one disc space with marked angulation and loss of cervical lordosis.

We compared the diameter of the canal with patients with fractures and fracture dislocations which served as a control and also a group of normal controls and found that the canal was narrowed by direct measurement and by the indirect method of Chrispin and Lees⁶.

Spondylosis was frequently but not invariably present. The majority of the subjects were elderly but of the 75 patients, they were not invariably elderly, the age range being between 11 and 77, with an average age of 53, but 12 were in the 10 to 40 year old age group, so it is not as Gupta *et al* stated 'exceedingly rare'.

We believe that spondylosis contributed to the damage to the cord by making the spine rigid. The cervical canal was narrower in these patients than in patients with fracture-dislocations and in the control group of normals. This narrowing is more likely to be due to a congenital cause since the narrowing found in cervical spondylosis would be of a lesser order.

We believe the mechanism of injury to be a transverse tear through a degenerate disc affected by spondylosis. The vertebral hypermobility so produced damages the cord by direct contusion, which injures the cord, and when the alignment is restored by muscle spasm the spine X-ray film appears to be normal.

JR Silver, MB, BS, FRCP, Ed & Lond,
Fellow of Institute of Sports Medicine
Consultant in Spinal Injuries

References

1. Crooks F, Birkett AN. Fractures and dislocations of the cervical spine. *Br J Surg* 1944; **31**: 252–265.
2. Alexander E, Davis CH, Field CH. Hyperextension injuries of the cervical spine. *Arch Neurol Psychiatr* 1958; **79**: 146.
3. Payne EE, Spillane JD. The cervical spine. An anatomicopathological study of 70 specimens (using a special technique) with particular reference to the problem of cervical spondylosis. *Brain* 1957; **80**: 571.
4. Burke DC. Hyperextension injuries of the spine. *J Bone Joint Surg* 1971; **53B**: 3.
5. McMillan BS, Silver JR. Extension injuries of the cervical spine resulting in tetraplegia. *Injury* 1987; **18**: 224–233.
6. Chrispin AR, Lees F. The spinal canal in cervical spondylosis. *J Neurol. Neurosurg. Psychiatr.* 1963; **26**: 166–170.

In reply to Dr JR Silver

By definition, the term 'SCIWORA' includes patients without demonstrable radiographic abnormality. Patients with cervical spondylitic changes were therefore excluded from the study, because the mechanism of injury in these patients is probably different, as mentioned by Dr Silver. The patients who had a cervical disc had soft discs without associated osteophytes and all of them showed remarkable and rapid improvement. This is in contrast to the findings of hard discs with osteophytes in patients with cervical spondylitis who may have associated cord changes as well. We, therefore, are of the opinion that patients with significant cervical spondylotic changes and narrow spinal canals should be excluded from the term 'SCIWORA'.

SK Gupta