

# Cervical spine control; bending the rules

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Cervical spine fractures associated with diffuse idiopathic hyperostosis (DISH) are less common than those associated with ankylosing spondylitis and can occur after minor trauma in patients asymptomatic of the disease process. This case report describes a hyperextension injury of the neck in a patient unknown to have DISH, which resulted in an angulated C3/C4 fracture. The position of the fracture was improved by placing the neck in flexion with immediate improvement in the patient's neurological deficit.

**A**TLS guidelines<sup>1</sup> for the management of a suspected cervical spine injury state that the neck should be immobilised at all times until a fracture or spinal cord injury has been excluded. Usually this entails immobilisation with a hard cervical collar, sand bags or bolsters, and tapes. Here we describe a situation where an exception was made for unusual reasons.

## CASE REPORT

A 77 year old man was transferred to the emergency department (ED) after a fall on a dry ski slope. He was complaining of neck pain and an inability to feel or move his arms and legs from the time of the fall. He was transferred immobilised in a hard cervical collar on a spinal board. The board was removed on arrival in the ED, cervical spine control being maintained with triple immobilisation as per ATLS guidelines. On assessment he was found to have left sided facial abrasions with no evidence of significant head injury. Peripherally neurological examination revealed a sensory level at C5 and slight movement in the left arm only grade 1–2 power, as well as diaphragmatic breathing and some anal tone. A trauma series of radiographs were performed that showed an angulated fracture at C3/C4 (see fig 1) with bony bridging of the cervical vertebra anteriorly suggestive of diffuse idiopathic skeletal hyperostosis (DISH). After review of the radiograph the hard cervical collar was immediately removed and the head placed on a pillow to flex the neck. Further radiographs showed reduction of the fracture (see fig 2). Subjectively an immediate improvement in his neurology was noted and on further assessment he was found to have regained bilateral



**Figure 1** Lateral C spine radiograph showing an angulated fracture at C3/C4 with bony bridging anterior to C4–C6.



**Figure 2** Lateral C spine radiograph showing reduction of C3/C4 fracture.

hip flexion grade 4 and some knee flexion and ankle plantar and dorsiflexion. His sensory level was unchanged. His neck was maintained in flexion and he was transferred to the spinal treatment centre where two days later he was noted to have almost normal power in his right lower leg, grade 2–4 in the left leg, grade 1–3 in his left arm, but grade 0 in his right arm. A diagnosis of an incomplete spinal cord injury was made with features of a central and posterior cord syndrome as well as a Brown-Sequard syndrome.

## DISCUSSION

DISH is a common condition affecting between 2.5% to 10% of people over the age of 70 years and is more common in men than women.<sup>2</sup> It is a non-inflammatory condition with flowing calcification and ossification along the anterolateral borders of varying numbers of contiguous vertebral bodies with preservation of the disc spaces. It is similar but not identical in pathology to the disease processes ankylosing spondylitis (AS) and ossification of the posterior longitudinal ligament, and all three can lead to unexpected and grossly unstable fractures of the spine with similar management problems.<sup>3,4</sup>

Quite often DISH is asymptomatic but may cause stiffness and loss of motion of the spine that is usually mild to moderate. Whereas in AS loss of movement and kyphosis of the cervical spine can be pronounced it is generally less of a feature in DISH, and indeed in this patient there was no history of such a problem. A degree of spinal osteopenia is also associated with DISH though to a lesser extent than with AS.

In all three processes the combination of osteopenia, loss of elasticity, and ossified ligaments produces a rigid brittle structure, which is prone to fracture, and which is recognised to act more like a long bone in fracture with the fulcrum of movement centred around the fracture site.<sup>5</sup> This rod-like nature also tends to produce transverse fractures that pass all the way across the vertebral level, as compared with the compressive fractures normally seen in flexible spines.<sup>6</sup> These features generally make the fractures markedly unstable.

**Abbreviations:** DISH, diffuse idiopathic skeletal hyperostosis; AS, ankylosing spondylitis; ED, emergency department

While fractures of the cervical spine associated with DISH have been described in the past, this is the first report in which the neurological injury associated with the fracture has been shown to improve by immobilising the neck in the line of the kyphosis. There have been reports of neurological deterioration after placement in a cervical collar in patients with a combination of cervical spine fracture and AS,<sup>7,8</sup> but in both these cases the patients complained of increasing pain and neurological dysfunction as the collar was applied and there was little improvement on subsequent removal of the hard collar. There was no such history in this case and this could be because the degree of kyphotic deformity and spinal rigidity tends to be not so marked in DISH patients. A learning point to be gained from this case is that in some exceptional circumstances one must not be afraid to remove all conventional cervical spine protection and immobilise the neck in the line of the pre-existing kyphosis. Normally triple immobilisation of the neck places the cervical spine in a neutral position—that is, in neither flexion nor extension. In this patient's case neutrality could only be achieved by flexing the neck to bring the upper cervical vertebra in alignment with the rigid fused lower vertebra. Also in all these disease processes significant fractures and spinal cord injuries can occur after minor trauma and a common cause of secondary neurological deterioration is delayed diagnosis.<sup>5,9</sup> As symptoms associated with DISH may well be at most minor and overlooked by the patient, ED physicians must have a strong index of suspicion in elderly patients presenting with neck pain even if the degree of trauma appears to be insignificant.

### Contributors

NM performed the literature search, reviewed the articles, and wrote the case report. NB initiated the study idea and reviewed the final report. Nick Maskery is guarantor for the paper,

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