Images in Spine Surgery: Diffuse Idiopathic Skeletal Hyperostosis (DISH)

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A 65 year old man presented to the emergency room with a history of fall and back pain. The same morning he was standing in his boat which was getting loaded on a trailer when the rope loading the boat broke. He fell backwards with an extended spine and felt severe pain in lower thoracic region and the left side of his chest. No respiratory or neurologic complaints were noted at that time. Emergency room examination did not reveal any neurologic injury either. Chest X-rays did not show any abnormality except rib fractures on left side. X-rays of cervical, thoracic and lumbar spine showed wide spread signs of osteophytes with DISH (Diffuse Idiopathic Skeletal Hyperostosis) like features. X-rays also showed that he had sustained an extension-distraction injury at the level of T8-T9 disc and the injury extended all the way to the posterior elements. This extension-distraction injury was highly unstable because of the involvement of all three columns.

This unstable spinal injury was stabilized with instrumentation from T7 to T10 and fusion was performed using local bone graft. He developed bilateral haemopneumothorax during the later part of surgery while being prone and at the end of surgery was turned supine and bilateral chest tubes were placed. He gradually recovered from surgery and is now restored to activities of daily living.

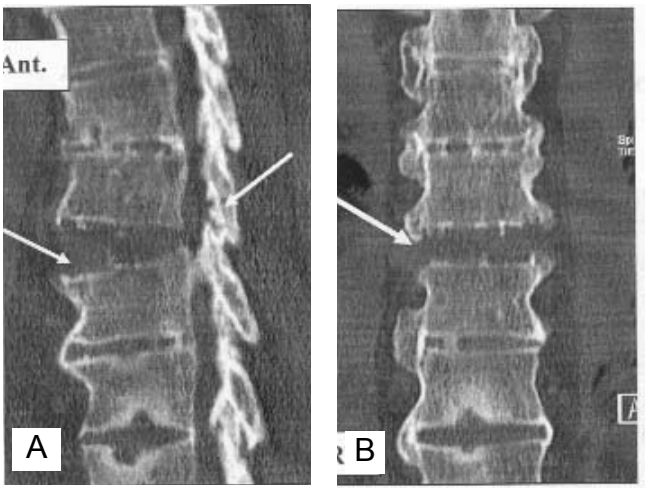

Figure 1. Sagittal (A) and coronal CT reconstruction (B) of the thoracic spine, showing the extension-distraction injury at T8-9 (arrow) which is extending all the way to the posterior column (arrow). Note the increased osteophytes on the right side of thoracic spine compared with the left side, a characteristic feature of DISH.

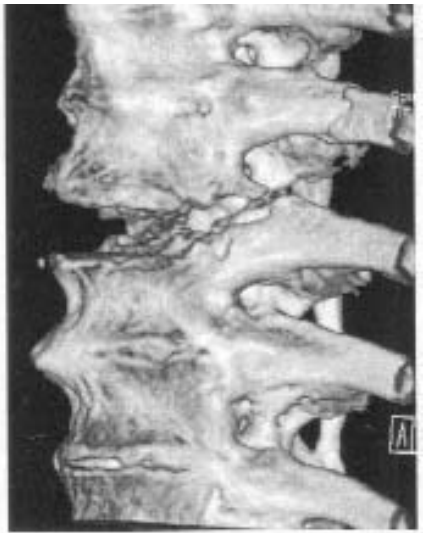

Figure 2. 3-D computed tomographic reconstruction of the thoracic spine, lateral projection, showing the three column injury.

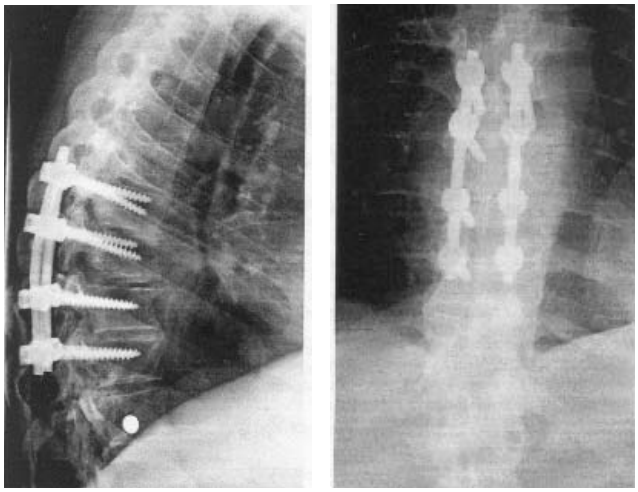

Figure 3.: Postoperative X-rays showing stabilization with pedicle screws and rods two level above and below injury. Note the flowing osteophytes in the lower thoracic spine predominantly on the right side.

Commentary

Diffuse idiopathic skeletal hyperostosis (DISH) or Forestier's disease is a disorder characterized by spinal stiffness, generalized osteophytosis and presence of flowing ossification in the thoracic spine region. Its cause remains unknown. No association with ankylosing spondylitis is documented. It is not an uncommon disorder and some studies document a prevalence rate of upto 25% in a population over 50 years of age.[1] DISH usually presents in a middle aged or older patient with chronic back pain and spinal stiffness in the lower thoracic spine with or without extra spinal manifestations. In the cervical spine osteophytes can impinge on the esophagus leading to dysphagia. Symptoms may be referable to any spinal region due to myelopathy, stenosis or pain. Clinical findings are comparatively mild as compared to the dramatic radiographic features due to the stability incurred by the spinal ankylosis.[2] Three radiographic criteria are described for the

diagnosis of DISH which are, the presence of flowing osteophytes (Melting candle-wax appearance) over the anterolateral aspect of at least 4 contiguous vertebrae, relative preservation of the disc spaces, lack of ankylosis of the spinal facets and sacroiliac joints.[3] Characteristically the flowing osteophytes are present over the right side and in the lower thoracic spine. The pulsations of the aorta are postulated to prevent the formation of osteophytes on the left side. Therefore patients with suspicion of DISH may require X-rays of the lower thoracic spine for diagnosis, even if no symptoms can be referred to the thoracic spine.

Patients with DISH are at high risk of fracture through the disc space or vertebral body. Usually these fractures are extension-distraction injuries. These injuries are highly unstable since most of them are three column injuries and there is a large lever arm of the ankylosed proximal and distal segments. The diagnosis of these fractures is difficult due to the already abnormal anatomy. A very high index of suspicion should be maintained during spinal examination in trauma patients with DISH. Any clinical suspicion of injury should be thoroughly evaluated by relevant imaging including X-rays, CT scan or MRI. The instability in DISH is usually underestimated on X-rays since lack of ligament integrity and presence of long lever arms can lead to displacement and neurological injuries. For the same reasons cervical traction should be used with great caution in such injuries as it can lead to over distraction. Fractures in DISH should be managed by instrumentation and fusion over a sufficient length of the spine since proximal and distal segments are already fused leading to increased forces at the fracture site. In case an anterior decompression is required it should be supplemented with posterior fixation.

References

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2. Belanger TA, Rowe DE. Diffuse idiopathic skeletal hyperostosis: musculoskeletal manifestations. J Am Acad Orthop Surg 2001; 9:258-67.
3. Resnick D, Niwayama G: Diffuse idiopathic skeletal hyperostosis (DISH): Ankylosing hyperostosis of Forestier and Rotes-Querol, in Resnick D (ed):Diagnosis of Bone and Joint Disorders, 3rd ed. Philadelphia: WB Saunders, 1995; pp 1463-95.