Poster Surgical Approach for Cervical Fracture in a Patient with Diffuse Idiopathic Skeletal Hyperostosis: A Case Report

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Abstract
Background: To explain posterior approach for a case with vertebral fracture caused by trauma in a patient with diffuse idiopathic skeletal hyperostosis (DISH) and evaluation its outcome and effects.

Case Presentation: A 57 years-old man came to emergency room due to falling and severe cervical pain. The patient was neurologically intact and radiological surveys revealed fractures in C6 cervical vertebrae in addition to hyperostosis in the lumbar and thoracic spine. We fixed fractured vertebra by lateral mass screws through a posterior approach with bony fusion (without laminectomy).

Results: The patient was mobilized the day after operation and discharged from hospital 3 days later. One year follow up showed acceptable bony fusion and no complication was reported.

Conclusions: Posterior approach is an effective and simple procedure in comparison to other approaches and can be used safely with minimal side effects in selected patients with DISH.


Keywords: Hyperostosis, Diffuse Idiopathic, Neck Injuries, Cervical Fracture, Spinal Fusion, Posterior approach.

Introduction

Diffuse idiopathic skeletal hyperostosis (DISH) was first described in 1950 (1). It is a common but rarely diagnosed abnormality that occurs due to ossification of spinal ligaments. It even may cause compressive effects on esophagus and trachea and rarely leads to dysphagia or airway obstruction (2).

In human, symptoms are variable, from mild back pain to severe neurological deficits due to spine fractures and spinal cord compression (3,4,5,6). Factors necessary to diagnose DISH are as follows (7):

- Continuous calcifications and ossifications along the anterolateral side of at least four adjacent vertebral bodies, with or without osteophyte formation.
- Normal height disk in the involved levels without any other disk disease
- Absence of bony ankylosis in facet joints and absence of erosion, sclerosis, or bony fusion in sacroiliac joints (8).

Reported prevalence of this disease is 25% in men and 15% in women. Patients with DISH are often asymptomatic, and need no specific medical attention (9,10). In symptomatic cases surgery may be essential if sufficient relief cannot be reached with conservative treatment or if neurological disorders or vertebral fractures exist (3,11).

Four percent of patients with DISH show some neurological symptoms such as: paresthesia, motor disturbances or myelopathy. Posterior osteophytes or calcification of posterior ligaments impinging on the cord are usually the cause. Anterior osteophytes on the cervical vertebrae with stenosis in subglottic region leads to airway deformity and resultant difficult intubation (12,13,14).

Case report

A 57 year-old man presented with severe neck pain following falling down. There was a tenderness in C5-C6 region and neurological examination was normal. The patient was a known case of diabetes type 2 and hypertension who had undergone coronary arterial bypass surgery 7 years ago.

Images including x-ray, computed tomography (CT) and magnetic resonance imaging (MRI) revealed fracture of C6 cervical vertebra (Figure 1). Signs of diffuse idiopathic hyperostosis of cervical (C3-C7), thoracic (T5-T9) and lumbar vertebrae were also observed.

Posterior approach was chosen for posterolateral fusion and fixation of C5 through C7 by screws and rod system with patient in prone position and under general anesthesia. No specific complication reported. Follow up
Figure 1. Lateral MRI of cervical vertebrae revealing diffuse idiopathic skeletal hyperostosis in C3-C7 vertebrae and C6 fracture.

Figure 2. Anteroposterior X-ray of fused vertebrae (C5-C7) with lateral mass screws and without laminectomy.

Figure 3. Lateral X-ray of fused C5-C7 vertebrae with screws and without laminectomy. Images showed acceptable immobilization after one year (Figures 2 and 3).

Discussion

Diffuse idiopathic skeletal hyperostosis occurs due to ossification of spinal ligaments. It can be diagnosed by simple radiography, CT, MRI or on histology. It can be differentiated from spondylitis by the location (ventral longitudinal ligament) and extent of new bone formation (3).

CT scan is not a routine way for diagnosing diffuse idiopathic skeletal hyperostosis (DISH), except for evaluating some situations, such as fracture, spinal canal stenosis due to associated ossification of the posterior longitudinal ligament (OPLL), and compressive impacts on the esophagus or inferior vena cava (10). When ossification of the posterior longitudinal ligament (OPLL) causes neurologic symptoms, MRI is an appropriate diagnostic tool for clarifying mass effect of the ossification, impression on the thecal sac, and the presence of cord compression. Ossification occurs outside the spinal canal and so patients are generally asymptomatic.

Sometimes an extensive calcified cervical mass may cause dysphagia or thoracic outlet syndrome and surgical resection is needed. Rothschild and Hutton both suggested that DISH can be a protective mechanism in the spine secondary to other spinal conditions and should not be considered as a result of back pain at the first step (17,18).

There are reports that explain different operative approaches in order to treat DISH patients. Cases with dysphasia and airway obstruction in which operative treatment was selected have been reported. The approaches consisted of the following: resection of...
cervical ossifications using an anterolateral approach, lateral approach, or transpharyngeal approach (2).

A patient with continuous low back pain in a DISH patient with none fused lumbar spine has been described in which decompression and posterior lumbar interbody fusion (PLIF) alleviated the pain (19).

Thoracic laminectomy with excision of the bony mass and a full decompression of the canal has been reported in a 72-year-old man with DISH who presented with sudden numbness of lower extremities and progressive difficulty with walking. Post-operatively the patient had a period of complete paraplegia, which rapidly improved (10). Another case with pseudoarthrosis between T11/12 who was successfully treated through a combined anteroposterior approach with fusion has also been reported (20).

Anterior approaches are more demanding due to proximity to vital anatomical structures. These approaches should be performed in association with abdominal or thoracic surgeons. Neurosurgeons are usually more familiar with posterior approach, but it may necessitate including more vertebrae in fusion segment that causes more restriction in spinal motility.

If fracture of a vertebra occurs, there is no neurological deficit, signs of instability are not present and pain becomes the main symptom, treatments like weight loss or traction and caudal epidural block begins. If total symptomatic relief cannot be gained or there are neurological deficits and conservative treatments do not help, operation may be required (1).

Our patient was a 57-year-old man presented with severe neck pain following falling down. There was tenderness in C5-C6 region and neurological examination was normal. Images revealed unstable C6 fracture in addition to signs of diffuse idiopathic hyperostosis in cervical (C3-C7), thoracic (T5-T9) and lumbar vertebrae. Posterior approach was chosen. Screws and rods were fixed in 5th through 7th cervical vertebrae and posterolateral bony fusion was also made at these levels with patient in the prone position and under general anesthesia. No specific complication observed. Follow up images reveal stable spine with bony fusion after one year.

According to the unstable nature of these patients (due to the long lever arm above and below fracture site that can lead to displacement) non-operative treatments for DISH are not recommended. Long level fixations (more than 4 points) and/or anterior approaches are suggested by some specialists but good results and acceptable fusion were gained in this case with 4 point fixation.

Although more comprehensive studies are needed to prove this statement, posterior approach should be considered an appropriate condition and short level posterior fixation and fusion can be effectively used with minimal side effects for fractured cervical spine in selected patients with less instability.

References