Cervical Myelopathy and Lumbar Spondylolisthesis in Elderly Patients with Diffuse Idiopathic Skeletal Hyperostosis (DISH) – A Case Series

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Learning Point of the Article:

Early surgical intervention in DISH patients helps in getting better outcome with no residual neurodeficit.

Abstract

Introduction: Diffuse idiopathic skeletal hyperostosis (DISH) is a non-inflammatory disease, which causes the ossification of spinal longitudinal ligaments and enthesis leads to stiffness in the affected segment of the spine and neurological deficit due to compression of spinal cord or nerve roots by osteophytes.

Case Presentation: We present three cases of DISH, presented with cervical myelopathy, lumbar spondylolisthesis, and dysphagia. All three patients had neurodeficit and radiological examination showed cord compression, canal stenosis, listhesis, and contiguous ossification in the spine with normal sacroiliac joints. The first patient had cervical myelopathy because of compression of cord by ossified posterior longitudinal ligament, which was managed with posterior laminectomy, decompression, and stabilization. The second patient had L4–L5 listhesis with canal stenosis, which was managed with decompression, instrumentation and fusion (TLIF). The third patient had cervical myelopathy due to C6–C7 listhesis and also had dysphagia because of compression of esophagus by anterior osteophytes, which was managed with removal of anterior osteophytes and anterior discectomy and fusion (ACDF). Postoperatively, all three patients recovered completely with no residual neurodeficit.

Conclusion: DISH can present in various ways, which depends on the site of involvement in the spine. Early surgical intervention helps in getting a better outcome in patients with neurodeficit and prevents further complications.

Keywords: Cervical myelopathy, diffuse idiopathic skeletal hyperostosis, lumbar spondylolisthesis, surgical decompression.

Introduction

Diffuse idiopathic skeletal hyperostosis (DISH) is a non-inflammatory disease. It affects the spinal longitudinal ligaments and enthesis, which become ossified over time and causes a decrease in mobility at the affected segment of spine [1]. The prevalence of DISH is estimated between 2.9% and 27.3% and is predominantly seen in males over the age of 50 years [2]. The criteria for diagnosing DISH include four continuous levels of ossification, relative preservation of disc spaces, and absence of apophyseal joint degeneration [3]. Ankylosing spondylitis (AS) and DISH are similar on imaging, but AS can be excluded after a negative radiograph of the sacroiliac joint and seen at a younger age. DISH causes restricted spine movements in the affected part. Compression of the trachea and esophagus is common complaints in patients with cervical DISH [4]. Neurological symptoms are seen in around 04% of the patients [5]; it can be associated with spinal cord compression, nerve root compression, and vertebral artery insufficiency [6, 7]. Isolated complaints such as back pain can be managed with activity modification, physical therapy, bracing, NSAIDs, and bisphosphonates [1]. The conditions such as fracture, cervical myelopathy, lumbar stenosis, neurological deficit, and painful deformities require surgical decompression and stabilization.

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Author's Photo Gallery


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Figure 1: Cervical spine X-ray (lateral view) showing the osteophyte formation with loss of cervical lordosis.

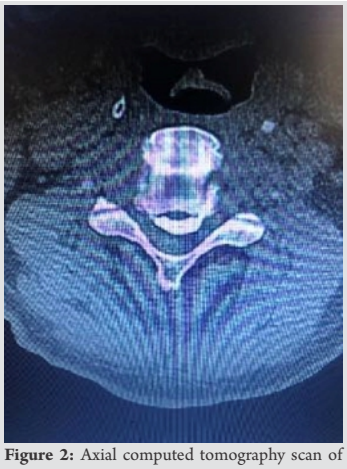

Figure 2: Axial computed tomography scan of the cervical spine showing the ossification of the anterior longitudinal ligament, posterior longitudinal ligament with canal stenosis.

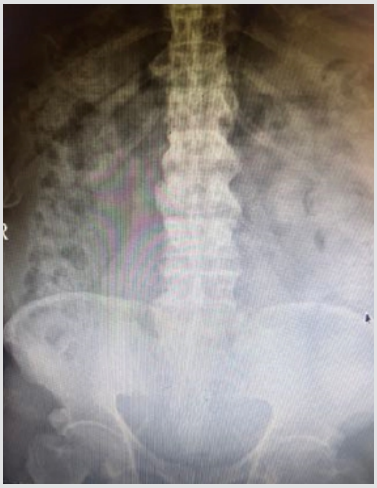

Figure 3: The osteophyte formation in the lumbar spine with normal sacroiliac joints.

Figure 4: Postoperative X-ray cervical spine (lateral view), showing posterior instrumentation with rod and screws.

The thorough radiological evaluation by X-ray, computed tomography (CT), and magnetic resonance imaging (MRI) would help preoperatively to plan the complete decompression of the stenosed levels. It will also help to guide the selection of approaches based on the pathological changes in the vertebral levels and spinal canal as well. The screening of the entire spine reveals the involvement in other regions. Following are case series of experience in treating elderly patients with DISH.

Case Series

Case 1

A 69-year-old male patient presented with bilateral upper and lower limb weakness, inability to walk for 4 months and which was gradually progressive. The patient was apparently healthy 4 months back; there was no history of trauma, fever, weight loss, and loss of appetite. On examination, muscle power in both upper limb and lower limbs was 3/5, bilateral Hoffman's sign was positive, all reflexes were exaggerated, difficulty in tandem gait and clonus was absent. However, bowel and bladder were spared.

Figure 5: Lumbar spine X-ray (AP view) showing the osteophyte formation at lumbar and thoracic spine levels with normal sacroiliac joints.

Radiological examination showed multiple contiguous ossifications of the anterior longitudinal ligament, posterior longitudinal ligament from C2 to T1 (Fig. 1-3) and also in the thoracic, lumbar spine with normal sacroiliac joints, we diagnosed as DISH with cervical myelopathy. As the patient was having multiple level cord compression at the cervical spine, ossification of posterior longitudinal ligament (OPLL) and had no dysphagia and difficulty in breathing, we planned for posterior decompression surgery with fixation.

Figure 6: Lumbar spine X-ray (lateral view) showing L4–L5 spondylolisthesis.

The patient was operated under general anesthesia, in the prone position with the head fixed in a three-point head fixation device. A posterior midline incision was made, dissection was kept within the white median raphe to avoid cutting the vascular muscle tissue. Ligaments were detached from the spinous process and posterior elements were exposed subperiosteally till the lateral edge of the facet joints. Posterior laminectomy, decompression, and fixation were done from C2 to T1 using lateral mass screws, pedicle screws, and titanium connecting rod. Hemostasis was achieved and the wound was closed in layers.

Postoperatively, a soft cervical collar was given to relieve immediate post-operative pain. Post-operative X-rays (Fig. 4) showed proper alignment; physiotherapy for all four limbs was started from the 2nd day of surgery. At present, 2 years follow-up, the patient has got complete recovery of

Figure 7: Postoperative LS spine X-ray showing posterior instrumentation with L4–L5 fusion (TLIF).

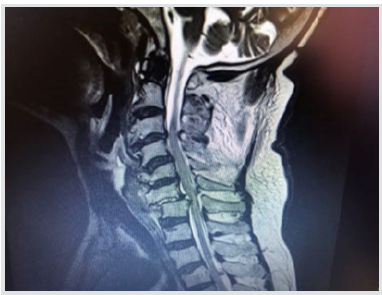

Figure 8: Magnetic resonance imaging of cervical spine T2 sagittal view showing the C6–C7 listhesis and cord compression with myelomalacic changes.

Figure 9: Axial computed tomography scan of the cervical spine showing the ossification of the anterior longitudinal ligament.

Figure 10: X-ray thoracic spine showing the contiguous ossification in DISH.

Figure 11: Postoperative X-ray cervical spine showing anterior cervical discectomy and fusion at C6–C7 level.

power, no difficulty in walking and all the reflexes are normal.

Case 2

A 69-year-old female patient presented with lower backache and left lower limb radiculopathy along L5 dermatome for 5 months with neurologic claudication distance of about 100 m. She was a known case of hypertension on treatment. There was no history of trauma, tuberculosis, surgery, bowel bladder involvement, and weight loss. On examination, tenderness was present over the lower back with motor weakness of extensor hallucis longus (EHL), extensor digitorum longus (EDL), and gluteus medius. Hypoesthesia was present over the L5 dermatome (anterolateral leg, dorsum of the foot, and great toe).

Radiological examinations showed grade1 spondylolisthesis of L4–L5 with lumbar canal stenosis (Fig. 5, 6). Listhesis was mobile and unstable, which was confirmed by flexion and extension X rays. Contiguous ossification in the thoracic and lumbar spine region was seen with normal sacroiliac joints and we diagnosed as DISH. As the patient had backache, which did not reduce by conservative measures, had mobile listhesis and neurodeficit, we planned for surgical management.

The patient was operated in a prone position under general anesthesia. A midline skin incision was made, which was carried down in the midline through the subcutaneous tissue to the tip of the spinous process. Posterior elements were exposed subperiosteally using an elevator. Posterior decompression, instrumentation using pedicle screws and fusion was done at L4–L5 level using a titanium cage with bone graft. Hemostasis was achieved and the wound was closed in layers. The intraoperative blood loss was 400 ml and the operative time was 1 h and 50 min. Post-operative X-ray (Fig. 7) showed good alignment of the lumbar spine with correction of listhesis, radiculopathy was relieved immediately after surgery and she was mobilized from the 2nd post-operative day. At present (1.5 years follow-up), she does not have a motor weakness, hypoesthesia, back pain, and claudication.

Case 3

A 61-year-old male patient presented to us with complaints of neck pain and bilateral upper limb radiculopathy, difficulty in walking and weakness of all four limbs for 6 months and dysphagia for 3 months. He had a history of fall 6 months back and had no history of tuberculosis, fever, or weight loss. On examination, he had mild midline neck tenderness, motor weakness at triceps, wrist flexors and finger extensors and hypoesthesia over C7 dermatome (middle finger). All the reflexes were exaggerated with positive bilateral Hoffman's sign with difficulty in tandem gait with absent clonus.

Radiological examination revealed, listhesis at C6–C7 level and cord compression with myelomalacic changes (Fig. 8, 9). Contiguous ossification of the anterior longitudinal ligament was seen in the cervical, thoracic, and lumbar spine with normal sacroiliac joints (Fig. 10) and the anterior cervical spine hyperostosis was compressing the esophagus. We diagnosed as DISH with cervical myelopathy. We planned for anterior decompression and fixation as the patient was having dysphagia and no posterior longitudinal ligament ossification.

The patient was operated in a supine position under general anesthesia, using anterior transverse incision. After the dissection, the trachea and esophagus were retracted medially and the carotid artery laterally. Anterior osteophytes compressing the esophagus were removed. Anterior cervical discectomy and fusion were done using a plate, titanium cage, and bone graft. The post-operative X-ray showed the correction of cervical alignment and listhesis (Fig. 11). The post-operative period was uneventful.

At present, 1.5 years follow-up; he has complete recovery of power, no difficulty in walking, normal reflexes, and no dysphagia.

Discussion

DISH is a disorder of unknown etiology and characterized by osteophyte formation seen in ligaments, tendons, and joint

capsule insertions and causes pain and stiffness in spine [8]. This case series describes the various presentations of the patients with DISH such as dysphagia, cervical myelopathy, and spondylolisthesis. Dysphagia is seen in 30% of the DISH patients with cervical osteophytes [8]. Elderly patients with metabolic syndromes, obesity, and diabetes mellitus are common association with DISH; growth hormones and insulin-like growth factors are said to promote bone growth [9]. In our series, no one had diabetes and one patient had hypertension on regular medication and all patients aged more than 60 years. Apart from diabetes, biliary stones, atherosclerotic vascular disorders, abnormalities of lipid, purine metabolism, and systemic hypertension are seen with DISH patients [10].

Resnick et al. [11] described the three criteria for diagnosing DISH, (a) calcification and ossification along the anterolateral paravertebral ligaments at least four vertebral bodies; (b) relative preservation of the intervertebral disk height in the contiguous bodies; and (c) absence of apophyseal ankylosis. Our patients met the above criteria and diagnosed as DISH.

The thoracic spine is the most commonly involved region causing backache and stiffness; the symptoms depend on the location of the spine involvement [8]. Most of the patients are asymptomatic initially and symptomatic in the late stages as osteophytes compressing on the adjacent structures and OPLL, ossified ligamentum flavum (OLF) causing narrowing of the spinal canal. In this series, all our patients had osteophyte formation at the thoracic spine level seen on radiographs and no significant symptoms were observed.

Out of three patients in our series, two patients had listhesis with neurodeficit and canal stenosis. DISH causes the fusion of several spinal segments, which leads to more load on the unaffected segment, causing hypermobility of the spinal segment leading to ligamentum flavum hypertrophy and canal stenosis [12]. Cervical myelopathy in DISH can occur due to compression of the cord by OPLL, ossified or hypertrophied ligamentum flavum, which leads to narrowing of spinal canal [13]. We observed two patients of cervical myelopathy in our series, one was associated with OPLL and the other was with listhesis. Formation of large anterior osteophytes causes dysphagia by compressing the esophagus, surgical removal of the osteophytes helps in the resolution of the symptom [8], which is observed in our case with dysphagia. Degenerative or post-traumatic listhesis with associated neurodeficit is best managed with surgical decompression and fusion, which helps in getting better outcome as observed in our series. Cervical myelopathy, canal stenosis are managed with surgical decompression and stabilization. Spondylolisthesis is managed with surgical decompression, instrumentation, and fusion of affected level using a cage with bone graft.

The anterior cervical decompression and fusion (ACDF) surgery itself poses a different set of challenges such as excessive intraoperative bleeding, difficulty in achieving hemostasis, prolonged operative time, tracheal problems due to compression by hypertrophied syndesmophytes, placement of implants on the irregular surface, and associated morbidities of elderly and bedridden state.

Posterior decompression and fusion surgery in the cervical spine are considered safe in a DISH patient; the recovery is directly proportional to the degree of decompression caused intraoperatively with bulginess of the cord. However, this surgery alone cannot be helpful in cases of dysphagia caused due to hypertrophied syndesmophytes at lower cervical levels.

Conclusion

DISH can present in various ways, which depends on the site of involvement in the spine. Early surgical intervention helps in getting a better outcome in patients with neurodeficit and prevents further complications.

Clinical Message

Patients with DISH presents with various symptoms and signs, which depends on the part of spine and neural structures involved. Early diagnosis and treatment help in getting better outcome without any residual neurodeficit.

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