



Schmorl's Node as Cause of a Back Pain: Case Report

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Abstract

Background: Schmorl's node is a vertical herniation of the nucleus pulposus of the intervertebral disc into the vertebral endplates. Several theories have been proposed to explain the pathophysiology of Schmorl's node. It can be asymptomatic or it can result in a back pain. It can be isolated findings, or it can be associated with horizontal intervertebral disc herniation.

Case Report: We present a case of symptomatic SN associated with horizontal intervertebral disc herniation in a 41 years male presented with complaints of low back pain radiating to the right buttock.

Conclusion: Most cases of symptomatic Schmorl's nodes respond to conservative treatment, however, several surgical intervention options can be used for refractory cases.

Keywords: Schmorl's node; Symptomatic; Back pain

Introduction

Schmorl Nodes (SNs) are a type of vertebral end-plate lesion, in which the nucleus pulposus of the intervertebral disc herniates through the vertebral endplate into the body of the adjacent vertebra [1].

The Intervertebral disc consists of three parts [2]: First; the central part or the nucleus pulposus, which is the gelatinous layer of a hydrated collagen-proteoglycan gel, mainly type II collagen, acts as a shock absorber. Second; the outer part or the annulus fibrous consists of several laminated layers of fibrocartilage made up of both type I and type II collagen [2-4]. The annulus fibrous contains the nucleus pulposus and it helps to distribute pressure evenly across the disc which prevents damage to the underlying vertebral endplates. Third; Vertebral end-plate, which is the upper and the lower surface of the vertebral body, consisted of hyaline cartilage, mostly type II cartilage, it anchors the intervertebral disc and it help to distribute the pressure across the vertebral body [5].

SNs mainly seen in the thoracolumbar spine, this is because of increased rotational motion and low disc to vertebral ratio in this region [6,7]. To differentiate, spinal disc herniation is either vertical as in SNs (intervertebral protrusion of the nucleus pulposus), or horizontal as in intervertebral herniation through a weakened annulus fibrosus [8].

SNs can be an isolated finding, or it can be associated with intervertebral disc herniation. We reported a case of a middle-aged man who presented with a back pain, imaging studies showed both SNs and intervertebral disc herniation.

Case Presentation

A 41 years old, Middle Eastern, male, presents to our clinic with chronic back pain. The pain is progressively worsening, located at the right and left lower back, having a sharp quality, radiated to both legs (above the knees), having a severity rated as +7/10 (10= worst), being intermittently present and associated with marked limitation of physical activities, sleep disturbance, myalgia, paresthesia, lower extremities numbness and weakness. The pain worsens with prolonged work, rising in the morning, and walking upstairs. The pain decreases with rest, exercise, massage, and pain killer medications. The patient used NSAIDs and acetaminophen to improve the pain.

On examination, the patient is obese, BMI=31.24. On the lumbar spine, there was a decrease in strength and pain on deep palpation and on movement. Spinal flexion, extension, and rotation were intact. Neurological exams are normal.

Spinal X-ray showed nodular lucent lesion within L4. Abdominal/pelvic CT with contrast

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reveals 2.1 cm lytic lesion within the L4 vertebral body appears to demonstrate sclerotic margin within the L4 vertebra, representing a Schmorl's node. MRI without contrast showed the following: At L3/L4 level, there is fluid collection in the facet joints, a left subarticular annular tear and a circumferential disc bulge measuring 4 mm producing moderate stenosis of the bilateral lateral recesses touching the bilateral L4 nerve roots and moderate bilateral neural foramen stenosis touching the bilateral L3 nerve roots. At L4/L5 level, there is fluid in the facet joints. At L5/S1, there is a mild disc space narrowing and asymmetric circumferential disc bulge, to the left measuring 4.5 mm producing moderate stenosis touching the bilateral S1 nerve roots and moderate left neural foramen stenosis touching the bilateral left L5 nerve root. There is also abnormal strengthening of the normal lumbar spine curvature suggesting muscle spasm.

The patient was started on pain controlling medications (acetaminophen and ibuprofen), heat pack, massage, and follow up. In addition, the patient instructed to maintain regular exercise and diet for weight loss.

Discussion

SNs developed as a result of the weakening of the vertebral endplates which can be due to acute, chronic, or embryogenic processes [9]. Acute processes include traumatic events, resulting in the occurrence of SNs because of the axial pressure, as in motorcyclists' accidents and gymnasts [10,11].

Chronic processes include a degenerative process, and the autoimmune process. Chronic degeneration of the vertebral endplate, such as in osteoporosis, Paget's disease, hyperparathyroidism, infections, tumors, and Scheuermann's disease, leads to weakening vertebral endplate and disc herniation into the vertebral body and development of SNs [6,9,12]. The intervertebral disc (avascular tissue) exposure to the vertebral body (well-vascularized tissue) triggers an immune response. Therefore, the autoimmune process is not direct but results from other degenerative processes [13].

SNs can also be developed because of an error during embryogenesis. The interruption in the movement of the notochord, under the influence of the *Sonic Hedgehog* (SHH) gene, from the vertebral body to the intervertebral disc and formation the nucleus pulposus, can leave a space in the vertebral body resulting in herniation of the nucleus pulposus and formations of SNs [14].

SNs are more common in males than in females [14]. It can be asymptomatic and found as an incidental finding, or it can be presented as a lower back pain [15]. The gold standard modality to diagnose SNs is the MRI. According to the analysis of MRI imaging by Takahashi and et al. [15] in symptomatic cases, the cause of the pain in SNs is because of the herniation of the nucleus pulposus into the bone marrow of the vertebral body, which leads to inflammation and edema. However, the inflammatory radiological signs were not found in asymptomatic cases. Also, the MRI helps to rule out malignant bone lesions [16]. On Computed Tomography (CT scan), SNs appears as a lytic bone lesion. The role of Plain radiograph in the diagnosis of SNs is limited; it cannot detect the inflammatory radiological signs; however, it can detect the calcification around the SNs [17].

Conservative treatment, including pain medications, exercise, weight loss, bed rest, heat pack, massage and physical therapy is the first-line treatment for disc herniation [18]. Several modalities

of intervention can be used in cases unresponsive to conservative treatment [9], such as Lumbar spine fusion surgery of vertebral endplate [19], rami communications nerve block by injecting 2 mL of 1% mepivacaine and 10 mg of triamcinolone at gray ramus communications on each side [12,20], Tumor Necrosis Factor-Alpha (TNF- α) blockade infusion [21], and Percutaneous fluoroscopy assisted vertebroplasty [22].

In rare cases, SNs can precipitate infection. Kim et al. [23] reported a case of symptomatic SNs refractory to conservative treatment, and subsequent imaging showed enlargement of the cystic lesion. After surgical intervention, the histopathological report revealed osteomyelitis.

Meralgia paresthetica, a condition causing numbness and pain on the anterolateral thigh because of compression of the lateral femoral cutaneous nerve [24], can be misdiagnosed as spinal disc herniation (horizontal or vertical), as both pathologies can be presented simultaneously, especially in obese patients, and careful physical exam can help to differential both cases.

Conclusion

SNs can be presented as an incidental and asymptomatic finding or it can be presented as chronic back pain, it can be presented as a solitary lesion of the vertebral end-plate at the thoracolumbar region, or it can be associated with horizontal disc herniation. First line treatment is conservative treatment, including physical therapy, weight loss, and pharmacological treatment; however, several surgical intervention options can be used in refractory cases.

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