ORIGINAL RESEARCH PAPER

Orthopaedics

KEY WORDS:
Chondromatosis; Loose body; Lumbar spine; Stenosis; Synovium, osteochondromatosis

SYNOVIAL CHONDROMATOSIS OF LUMBAR SPINE

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ABSTRACT

Synovial osteochondromatosis is uncommon pathology where a metaplastic change of synovium leads to loose body formation in various large joints like the knee, hip, and shoulder. Rarely spine may be involved, the cervical area is most commonly reported, and unusually lumbar spine involvement is also seen. Preoperative imaging studies depend on the degree of mineralization of these lesions and may not show all the lesions on Magnetic Resonance Imaging (MRI) scanning. We report a histopathologically confirmed case of synovial osteochondromatosis of the lumbar spine presenting as canal stenosis, which was not evident onthe preoperative MRI scan. This study aimed to report the need for a preoperative Computerized Tomographic Scan (CTscan) along with MRI, which improves the diagnostic accuracy of identifying uncommon lesions in the spine, like synovial osteochondromatosis.

INTRODUCTION

Synovial osteochondromatosis involving the various joints in the musculoskeletal system is a well-known clinical condition.[1]The synovial lining of usually larger joints like the knee, hip, and shoulder undergoes a metaplastic change and forms nodules of cartilage and bone. These separate from the parent tissue and form loose bodies in the concerned joint. These loose bodies will eventually produce symptoms like pain, locking of joints, effusion into the joint, and premature degeneration of joints.[2,10]These lesions can be grouped into 3 phases. Phase1 is an active synovial disease without loose bodies;phase2 is the transitional phase with osteochondral bodies separated from parent tissue freely floating in the joint; phase 3 is multiple osteochondral fragments freely floating in the joint with active synovial proliferation.[9]

However, the involvement of the spine and facet joints in the lumbar area is rare. A literature review shows these may be found in the canal, neural foramen, or paraspinally abutting the facet articulations without being in the canal. Extension of these lesions into the canal has produced compressive myelopathy.[2,3,4]

Radiological evaluation of these lesions with preoperative Magnetic Resonance Imaging (MRI) and radiographs depends on the degree of mineralization of these lesions. Unmineralized cases account for 16% of the total reported cases and are difficult to differentiate from synovial lining and surrounding soft tissues.[5]

This study aimed to report the need for a preoperative Computerized Tomography Scan (CT scan) along with MRI and plain radiographs, to identify the degree of mineralization of these uncommon spinal pathologies, and improves the diagnostic accuracy.

Case Report

A 36-year-oldmale patient was admitted with low back pain for one year, suggestive of neurogenic claudication. Radiological evaluation showed degenerative disc and central canal stenosis with biforaminal occlusion at L4 and L5levels. Patient preoperative assessment with anterior-posterior and lateral views radiographs of the lumbosacral spine showed disc space narrowing, facet arthrosis at L4 and L5 levels, margins of the facet joint were sclerosed with minimal (R) scoliotic curve of the lumbosacral spine **(Figure 1 & 2)**.

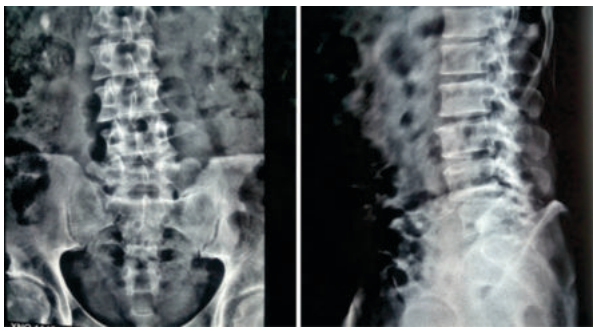

Figure 1 Showing APview of 'LS' spine Figure 2 Showing lateral view of 'LS' spine

MRI showed a large degenerative disc compressing the dura, with biforaminal occlusion at L4 and L5 levels, a complete block of the nerve roots; facet joint of the left side showed edema and effusion into the joint.This is unusual as the plain radiographs and MRI did not show any mass paraspinally or abutting the facets **(Figure 3 & 4)**.

As the patient did not respond to conservative line of management, he was planned for surgical decompression,

pedicle fixation with fusion of the concerned segment.

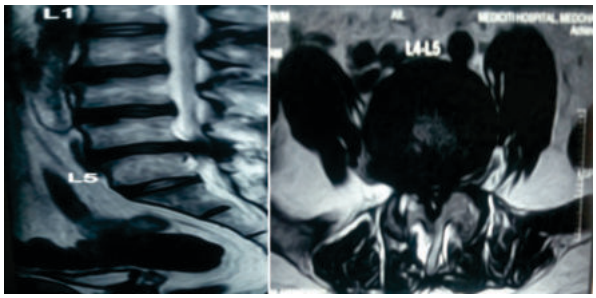

Figure 3 & 4 Preoperative MRI images of LS spine

Intraoperatively multiple loose bodies (a total of 3 loose bodies) were found abutting the facet articulation of the L4 and L5 joint on the left side and were removed, the largest measuring about 1.5 cm in diameter; 2the outer feel of the mass was unlike bone, being softer in nature **(Figure 5)**.

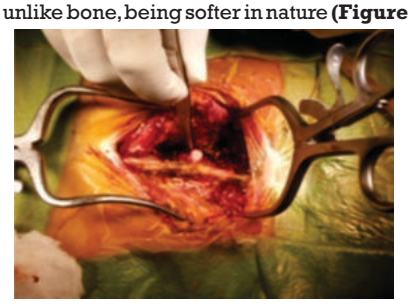

Figure 5 Intra Operative Picutre showing the loose body

All the synovium and part of the facet of L4 and L5 on the left were excised, and removed specimens were sent for histopathological examination; none were found in the canal or foramen. Decompression of the concerned levels with the removal of disc material and thickened flavum was performed along with fixation of pedicles of L4 and L5 with 6.5mm*40mm titanium screws connected to 60mm rods on both sides **(Figure 6 & 7)**.

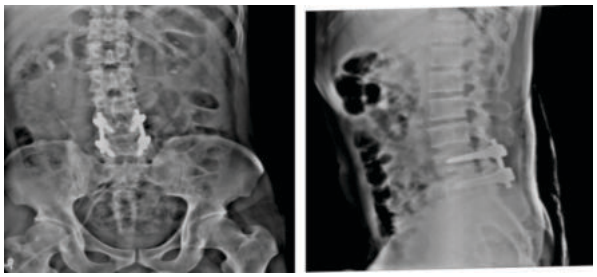

Figure 6 & 7 Intra Operative picture & Post-operative X-ray's (AP & Lateral views) showing the spinal fixation

Disc material and thickened flavum, which were removed also sent for histopathology. After due confirmation of the free canal and nerve roots, decortications of the transverse processes was done on both sides, and bone grafts harvested from removed spinous processes were placed postero-laterally. Histopathogically, the loose bodies showed hyaline cartilage with viable chondrocytes consistent with synovial osteochondromatosis **(Figure 8)**.

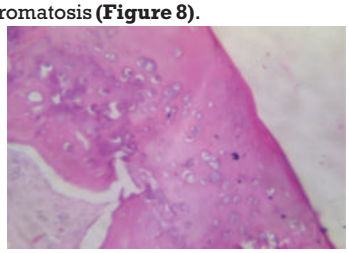

Figure 8 Histopathology section of the loose body showing hyaline cartilage with viable chondrocytes

Postoperatively, the patient improved from pre-operativesymptoms and was relieved of the leg pain. In addition, walking distance has improved to 4kilometers, and no signs of recurrence at the one-year follow-up after surgery.

DISCUSSION

Synovial osteochondromatosis, a well-known clinical entity involvement of various large joints like the knee (60 to70%), hip, and shoulder are common, males to the female ratio being 2:1; extra-articular involvement of soft tissues like bursa and tendon sheaths is also reported. Occasional multifocal involvement is seen with two or more joints showing the same pathology. Paravertebral or spinal involvement is rare. A total of fourteen cases have been reported with spinal involvement, and a review of the literature shows only 6 cases reported in the lumbosacral spine.[2]

Synovial osteochondromas can be grouped as primary and secondary. Primary is one with cellular atypia and irregular proliferation of cartilage cells, which form cartilage nodules. These tend to recur after removal and are seen without inciting joint pathology. Secondary synovial osteochondromatosis is one with preexisting joint pathologies such as osteoarthritis, osteonecrosis, neuropathic arthropathy, osteochondral fractures, and rheumatoid.[8,10]

These lesions can be grouped into 3 phases. Phase1 is an active synovial disease without loose bodies; phase 2 is the transitional phase with osteochondral bodies separated from parent tissue freely floating in the joint; phase 3 is multiple osteochondral fragments freely floating in the joint with active synovial proliferation.[9]

The synovial lining of usually larger joints like the knee, hip, and shoulder undergoes a metaplastic change and forms nodules of cartilage and bone. These separate from the parent tissue and form loose bodies in the concerned joint. These loose bodies will eventually produce symptoms like pain, locking of joints, effusion into the joint, and premature degeneration of joints.[10]Involvement of the spine and facet joints in the previously reported cases led to intra-spinal loose bodies, which were compressing the dura and nerve roots, leading to symptoms. On MRI, 80% showed intermediate or a combination of intermediate and dark signals. On T2-weighted images, 89% showed heterogeneous signals with discrete areas of the dark signal.[5]Non-visualization of these lesions may be due to (a)non-contrast study; (b) adequate calcification within the lesion, which hampers heterogeneous signal generation in T2 weighted sequencing of MRI.[5,11] Kramer*etal.*[11] described three subtypes of osteochondral lesions on MRI depending on the level, or density of mineralization. Subtype A(16%) has the same signal intensity as synovium in T1 &T2 imaging. Intravenous gadolinium contrast administration may be helpful in such cases. CT scanning in such cases may help identify the extrinsic erosions of the cortex of facet jointsand calcifications of the lesion, which may appear as a ring and arc, helping to differentiate from the synovial lining. One has to consider synovial osteochondromatosis from facet articulations if there is any lesion abutting the facet with a heterogenous signal in the MRI imaging.

In our patient, the MRI study showed (Kramer subtype A)no evidence of paraspinal mass, no evidence of external erosive changes of the facets, and joint effusion was present with a widening of the joint space. No heterogeneous mass within the canal. Foraminal compression was due to associated disc indentation and flaval hypertrophy.

CONCLUSIONS

Due to the rarity of this condition, much of the management has been inferred from extraspinal disease. The radiological

evaluation did not identify these lesions preoperatively. However, a preoperative CT scan was not done in our patient. However, in retrospect, any patient with facet joint edema would benefit from a CT scan also, as this increases the diagnostic accuracy of identifying these lesions. Intra-operatively, these loose bodies and synovium need to be completely excised to prevent a late recurrence, as done in our patient.[12]

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Authors' contributions: BVR was the chief surgeon who performed the surgery and was responsible for final proofreading. MTVP is responsible for composing and design of the manuscript. EVK, DBY, and SS were responsible for the literature review and data analysis. All authors have critically reviewed and approved the final draft and are responsible for the manuscript's content and similarity index.

Ethical requirements: A signed informed consent for surgery and study has been obtained from the patient. The patient is aware of the treatment plan, and informed consent was obtained beforehand. This study was approved by the hospital ethics committee.

Conflict of Interest:
There are no conflicting relationships or activities.

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