

# Surgical Management and Morphology of Synovial Chondromatosis of the Spine: Case Report

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### Abstract

Primary synovial chondromatosis is well known in large joints, the knee, followed by hip mainly in male adults are the most commonly involved sites. Primary process represents benign neoplastic formation of hyaline cartilage nodules in the subsynovial tissue of a joint, tendon sheath, or bursa. Interesting developmental progress may be seen; the nodules may detach from the synovium and form loose bodies. The differential list of the synovial chondromatosis includes benign and malignant conditions. The pathologic appearance may simulate chondrosarcoma because of significant histologic atypia. Radiologic correlation is vital for correct diagnosis. There are only limited publications about synovial chondromatosis of the spine, published in English literature and absolutely no published data in Russian literature. Treatment of primary disease is surgical synovectomy with removal of chondral fragments. The recurrence rates range significantly. This is the first case of the primary synovial chondromatosis of the spine in our practice.

**Keywords:** Synovial chondromatosis; Facet joint; Metaplastic cartilage; Cartilaginous loose bodies

## **Case Report**

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#### Surgical data, imaging studies, histology

**Clinical case of patient C, 61 years old:** Over several years patient complained of pain in the lower back with irradiation to the lower limb. Patient noted the pain worsening in the last 2-3 months [1-9]. MRI revealed a tumor at the L5-S1 level of the vertebrae on the left with compression of the left L5 spine and stenosis of the spinal canal. The biopsy suggests chondrosarcoma [10].

Upon admission, the status is relatively satisfactory [11].

**Status localis:** Patient is mobile but uses a cane. Examination revealed no deformation of the spine and long tubular bones. Movement in the joints is complete. Palpation does not reveal soreness in the region of spinous processes of L5, S1 vertebrae.

Paravertebral muscular ridges are not deformed. External and internal sensitivity are preserved; paresis up to 2b in the left lower limb. Patient controls the physiological administrations.

There are no signs of compression of the spinal cord and horse tail. Score on the scales ECOG-1, Karnofski-90, Watkins-1, and VAS-2. Frankel-D. Removal of tumor of L5-S1 vertebrae with replacement of defect with bone cement.

In the patient's position on the abdomen with rollers under the chest and pelvis, under the ETN, the operating field was treated twice with iodine-alcohol solution and covered with sterile underwear.

A linear section of the skin and subcutaneous fat was produced in the projection of spinous sprouts from L3 to S2 vertebrae, up to 14 cm long. With the help of a raspberator and an electro-knife, the skeletal arches and joint vertebraes from both sides of the spinous processes.

With the help of Kerrison's nippers, hemilaminectomy is performed at the level of L5-S1 vertebrae. At revision a tumor is detected in the field of the left departments on level L5-S1 of vertebrae with a compression of a nervous root.

The tumor was removed with the help of high-frequency boron and Volkmann spoons. The resulting defect is filled with bone cement.

Silicone drainage, deduced through the contracture, was positioned in the place of the removed tumor. Hemostasis during the operation. Layering suture to the lesion. Iodine. Aseptic gauze. Complications during surgical treatment: none.

Radiography of pelvic bones in the region of the posterior-left parts of the L5 body of the vertebra and adjacent parts of the vertebral body S1.

A postoperative defect with clear sclerotized contours measuring 3.1 x 2.2 cm is measured, which is 2/3 filled with bone cement spreading posteriorly paravertebrally to the left.

The left parts of the L5 body of the vertebra are flattened (Figures 1 and 2).

In the left lateral mass S1 of the vertebra, the site of the osseous structure is defined, with clear sclerotized contours measuring up to 2.3 cm in diameter.

Common degenerative-dystrophic changes are detected in the visible parts of the lumbosacral spine with the presence of marginal bone osteophytes of vertebral bodies and intervertebral articulations and zones of subchondral osteosclerosis of adjacent surfaces of L3-S1 vertebral bodies.

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**Figure 1:** Axial CT (a) and coronal and sagittal reconstructions (b, c) showing the soft tissue mass around the left L5-S1 facet joint containing characteristic calcifications and causing smooth erosion of left posterior cortex of the L5 vertebral body, left L5 pedicle, anterior and posterior surface of left L5-S1 facet joint.



**Figure 2:** Axial T2 (a) and sagittal T2 (b), T1 (c), T2 FS (d) MRI demonstrate a mass centered around the left L5-S1 facet joint eroding the left posterior surface of the L5 vertebral body, left L5 pedicle, anterior and posterior surface of left L5-S1 facet joint. The mass consists of a tissue with predominantly hypointense signal on T2, T1 and T2 FS with little foci of contrast enhancement on T1 postcontrast images (f).

**Histologic findings of the surgical specimen:** Grossly, the pathology specimen consisted of nodular fragments of grey-white irregular structures that ranged from 3-14 m in largest dimension. The tissue

looked mostly fleshy with some evidence of cartilage and granularity. Synovium was not obviously seen in the specimen. Microscopic sections revealed some isolated foci of dystrophic calcifications [2]. No surrounding reactive synovium was obviously seen. Discrete clusters of hyaline cartilage without evident cytologic atypia of chondrocytes were very characteristic for synovial chondromatosis. At high magnification, chondrocytes within cartilaginous myxoid matrix showed some occasional plump morphology and pleomorphism. All those features were more consistent with late phase of the development of synovial chondromatosis [3] (Figures 3-5).



**Figure 3:** Localized synovial chondromatosis, especially in the late stage of its development, presents as conglomerate of individual cartilage nodules. At low power photomicrograph of the cross section through the lesion, most nodules are composed of hyaline cartilage. Some are calcified, some features of early enchondral ossification might be present. Degenerative changes of the matrix with local calcifications might be seen throughout the lesion. Hematoxylin-eosin X 200.



**Figure 4:** Well-developed isles of chartilage tissue are very characteristic for the late, developed stage of synovial chondromatosis. The nodules may enlarge and detach from the synovium. Enchondral ossification of cartilage nodules is a frequent feature of well-developed synovial chondromatosis, even well-developed peripheral rings or eggshells of lamellar bone might be seen. Hematoxylin-eosin X 100.



**Figure 5:** Medium power photomicrorraph of chondroid nodules, chondrocytes are clustered in lacune shape spaces, some myxoid areas are present, slight nuclear atypia and hyperchromasia might be seen. All those features are common for the well-developed stage of synovial chondromatosis. Dystrophic features, myxoid and chondroid matrix of the well-developed nodules with some ischemic changes. Calcifications are throughout the lesion. Hematoxylin-eosin X 100.

## Discussion

As it is seen in this case report, diagnosing synovial chondromatosis on frozen section or core biopsy can be difficult given the nondiagnostic findings of fibrous and synovial tissue, foci of dystrophic calcifications and reactive changes. When viewed in combination with proper clinical and radiographic information, synovial chondromatosis is likely to be diagnosed correctly. However, synovial chondromatosis should be differentiated with various benign and malignant entities [5,6]. The differential list should include first of all chondrosarcoma. Chondroblastic cells in early stages of the development of synovial chondromatosis might mimic several primary bone tumors and create some difficulties for the pathologist. Features of the metaplastic nodules with clear cell features might mimic clear cell chondrosarcoma. Extensive cartilage metaplasia is always a diagnostic dilemma, and is often worrisome, especially if the biopsy is small. Tumoral calcinosis, degenerative joint disease, extra skeletal chondroma and hamartoma should always be considered in the differential. Prominent multifocal calcifications in the cartilages of joints and intervertebral disks are characteristic feature for tophaceous pseudogout (tumoral calcium pyrophosphate dehydrate crystal deposition disease). Making the correct diagnosis might be extremely difficult. Tumors that present as a single cartilaginous nodule within the joint capsule are sometimes referred to as synovial chondromas [7-11].

Being a rare entity, synovial chondromatosis is demonstrating unusual and unexpected imaging findings in comparison with the well-known imaging features of synovial chondromatosis of the major joints of the appendicular skeleton [4]. The atypical features of presentation in the spine include extra-osseous mass, little involvement of the adjacent facet joint. Chondromatosis masses usually did not centre upon the facet joint, presence and pattern of chronic bony erosion is also characteristic.

## Conclusion

The most important differential for primary synovial chondromatosis is chondrosarcoma. The pathologic appearance may simulate malignant process because of the prominent cytological atypia of the chondrocytes, especially if the biopsy is small and radiologic features are not obvious. Surgical synovectomy and removal of chondral fragments including loose bodies is the most common procedure. Primary synovial chondromatosis is a benign formation of islands of chondrocytes within the synovial lining of joints resulting in thickened synovium and forming sub synovial chondroid nodules. Synovial chondromatosis was initially classified as metaplasia, but more recent data prove the neoplastic nature of the process. Cartilage nodules may extrude through the synovium, detach, calcify and form so called loose bodies.

Numerous papers have been written about synovial chondromatosis in large joints, but limited reports of synovial chondromatosis of the spine reported in the literature. The purpose of our study was to review the radiographic and pathologic findings that can help to distinguish synovial chondromatosis of the spine from several benign and some malignant entities: tumoral calcinosis, degenerative joint disease, extra skeletal chondroma and hamartoma, tophaceous pseudo gout, primary and secondary chondrosarcoma. Synovial chondromatosis of the spine is rare, radiographic imaging has certain characteristic features. Only analysis of numerous cases can give the complete picture of the changes in the spine joints. Therefore, it is essential to get a combination of data from clinician, radiologist and pathologist.

## References

- 1. Bertoni F, Unni KK, Beabout JW, Sim FH (1991) Chondrosarcoma of the synovium. Cancer 67: 155-162.
- 2. Inwards CY, Unni KK (2004) Bone tumors. Sternberg's diagnostic surgical pathology. Philadelphia, PA: Lippincott Williams and Wilkins.
- Fandburg-Smith J. (2003) Cartilage and bone forming tumors and tumorlike lesions. Diagnostic soft tissue pathology. New York: Churchill Livingstone.
- 4. Murphey MD, Vidal JA, Fanburg-Smith JC, Gajewski DA (2007) Imaging of synovial chondromatosis with radiologic-pathologic correlation. Radiographics 27: 1465-1488.
- Kyriakos M, Totty WG, Riew KD (2000) Synovial chondromatosis in a facet joint of a cervical vertebra. Spine (Phila Pa 1976) 25: 635-640.
- Greenlee JD, Ghodsi A, Baumbach GL, VanGilder JC (2002) Synovial chondromatosis of the cervical spine case illustration. J Neurosurg 97: 150.
- 7. Gallia GL, Weiss N, Campbell JN, McCarthy EF, Tufaro AP, et al. (2004) Vertebral synovial chondromatosis. Report of two cases and review of the literature. J Neurosurg Spine 1: 211-218.
- Littrell L, Inwards C, Sim F, Wenger D (2016) Imaging features of synovial chondromatosis of the spine: a review of 28 cases. Skeletal Radiol 45: 63-71.
- Moody P, Bui MM, Vrionis F, Setzer M, Rojiani AM (2010) Synovial chondromatosis of spine: case report and review of the literature. Ann Clin Lab Sci 40: 71-74.
- 10. Unni KK, Inwards CY, Bridge JA, Kindblom LG, Wold LE (2005) Synovial tumors. Tumors of the bone and joints. Silver Spring, MD: ARP Press.
- 11. Shives TC, McLeod RA, Unni KK, Schray M F (1989) Chondrosarcoma of the spine. J Bone Joint Surg Am 71: 1158-1165.