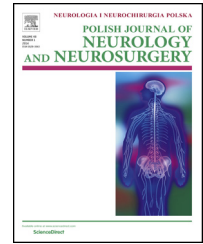


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## Case report

# A ganglion cyst derived from a synovial cyst: A case report



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## ABSTRACT

The synovial and ganglion cysts originating from the facet joint have been named under the name of the Juxtafacet cyst by the several researchers. They put forward that the synovial cyst originated from the synovial joint. But, they failed to clarify the pathophysiology of the formation of the ganglion cyst. In this case report, we reported a 67-year-old male patient was referred to the emergency from another center with the complaint of a left leg pain and weakness in the left foot and patient was treated with microchirurgical technique. His pathological examination was evaluated a ganglion cyst. We have discussed and explained the pathophysiology of the formation of a ganglion cyst derived from a synovial cyst. And separately, we have presented the spinal cysts by grouping them under a new classification called a cystic formation of the soft tissue attachments of the mobile spine as well as dividing them into sub-groups.

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## 1. Introduction

Lumbar disk herniation is known as the most common cause of sciatalgia in the lower lumbar region, and contrary to this, a

spinal extradural cyst rarely lead to radiculopathy [1,2]. Spinal extradural cysts are classified according to their locations, origins and pathological characteristics by the authors, the cysts within the lumbar canal are, in a broader classification, also referred to as lumbar juxtafacet cysts (JFCs), ligamentous

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Abbreviations: JFCs, juxtafaset cyst; PLL, posterior longitudinal ligament; LF, ligamentum flavum; CT, computed tomography; MRI, magnetic resonance imaging.

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structures (posterior longitudinal ligaments (PLL)), ligamentum flavum (LF) cysts or arachnoid cyst according to the tissues they are associated with [3,4]. The synovial and ganglion cysts originating from the facet joint are named under the JCFs by the several authors and even though they put forward the synovial cyst originated from the synovial joint, they failed to clarify the pathophysiology of the formation of the ganglion cyst.

With this case report, we have explained the pathophysiology of the formation of a ganglion cyst. Separately, we presented the spinal cysts by grouping them under a new classification.

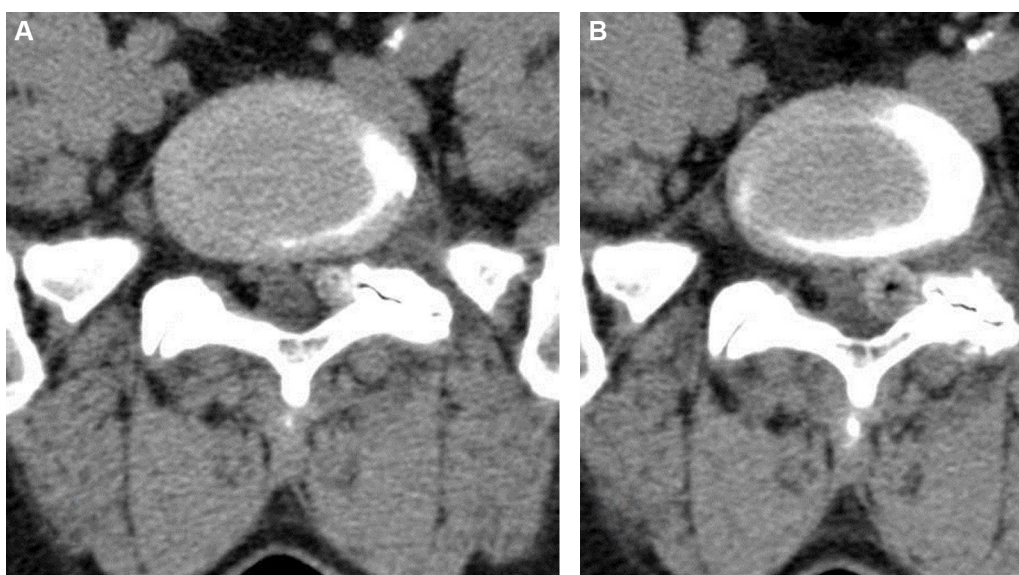
## 2. Case report

A 67-year-old male patient was referred to the emergency from another center with weakness in the left foot. From the patient's medical record, it was learnt that his complaints had first started 6 months ago in the form of a low back pain during his daily activities. When the patient had a low back pain, lumbar computed tomography (CT) was performed (Fig. 1A) and after that, he was administered with a medical treatment and physical therapy. But, the patient could not benefit from the medical and physiotherapy. Severe left leg pain started after five months later his lumbar pain and a lumbar CT was performed again at the hospital (Fig. 1B) and a operation was offered the patient but he did not accept the operation. A weakness developed in his left leg one month later his left leg pain. Contrast-enhanced and unenhanced lumbar magnetic resonance imaging (MRI) were performed in another health center. On the left L5-S1 level in the patient's unenhanced lumbar MRI was a cystic mass lesion adjacent to the left facet joint seen, which comprised within a heterogenous isointensity on T1 weighted sagittal and heterogenous hyperintense

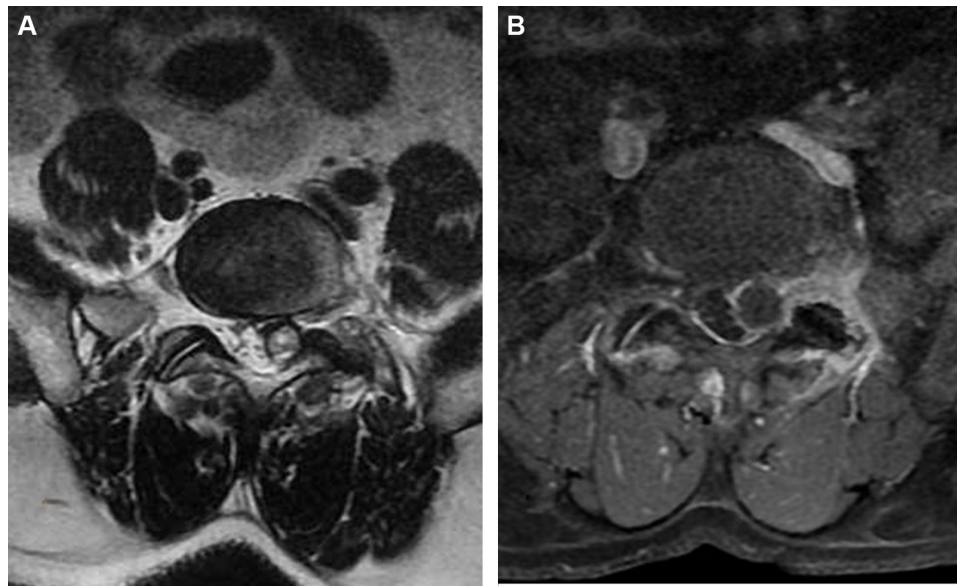
on T2 weighted axial imaging (Fig. 2A). In the contrast-enhanced lumbar MRI, there was a cystic mass that separated from the facet joint and the periphery of which maintained contrast (Fig. 2B). The patient's examination, the left plantar flexion was 4/5, there was also hypoesthesia on the left S1 dermatoma, and the left achilles tendon reflex could not be received. Therefore, we chose the micro surgery option. In the course of the subperiosteal dissection, the left L5-S1 LF was observed to have lost integrity in the middle area, from which a cystic lesion with a dark red colored wall was seen to emerge toward the posterior region (Fig. 3). LF was removed from its torn regions with the help of a hook, and the cyst was totally exposed by performing flavectomy via Kerrison Rongeurs. It was seen that there were fibrotic tissues on the facet joint surface of the cyst; however, there was no adherence on the dural, root and PLL sides that formed the medial part, and a cystic mass with an oyster-white ventral part and a dark red posterior part. We removed the cyst totally through the microchirurgical technique. The patient's postop left leg pain recovered. The pathological examination of the operation material showed that cystic wall-like structure had fibromyxoid tissue, inflammatory cells, vascular proliferation, multinucleated giant cells and myxoid degeneration (Fig. 4A). There was no lining epithelium in inner surface of the cystic lesion. The lumen of the cyst lesion had red blood cells (Fig. 4B). Immunohistochemical stains for smooth muscle actin, CD34, S100 protein, and cytokeratin were negative. It was decided that the histopathologic results had indicated a ganglion cyst.

## 3. Discussion

The synovial and ganglion cysts of similar characteristics in terms of their clinic features, indications for treatment and prognosis are histopathologically distinguished from each

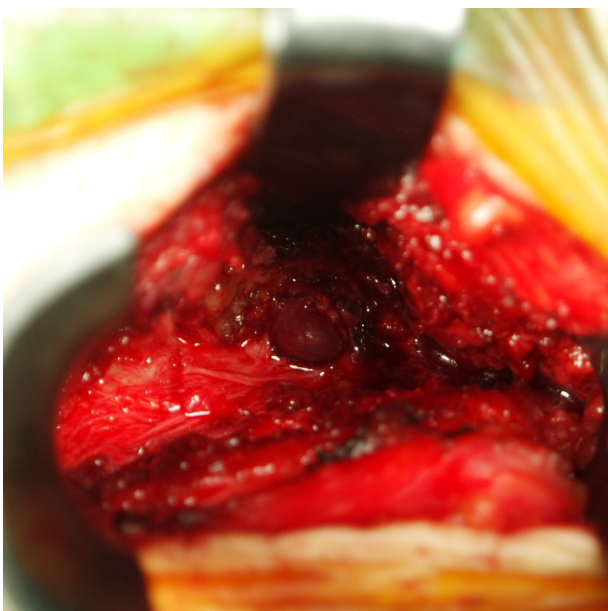


**Fig. 1 – (A, B) The first axial CT (A) obtained 4 months after starting the symptoms of the patients. The first CT exam (A) shows a hyperdens noduler lesion adjacent to facet joints which has degenerative joint disease. The second CT (B) exam obtained one month after to the first exam shows the enlarged noduler structure contains vacume phenomenia similar to intraarticular air of left facet joint space.**



**Fig. 2 – (A) (Axial T2) and (B) (postcontrast T1 weighted images with fat saturation) shows a heterogenous cystic structure adjacent to left facet joint of L4-5 level. Please note the heterogeneity of of the leison on T2 weighted image that indicates haemorrhagic or complicated fluid material of the cystic structure.**

other [5–8]. Synovial cysts arising directly from the synovium, commonly have a thick wall containing granulation tissue, histiocytes and giant cells and are always shown to have a synovial lining. Ganglion cysts are mucin filled and are composed of myxoid material but do not have synovial lining or a direct connection to the joint [4]. In addition to these, these cysts have also been reported to likely contain blood, hemosiderin and air [3,8,9]. Considering the formation mechanism of juxtafacet cysts, they were put forward that

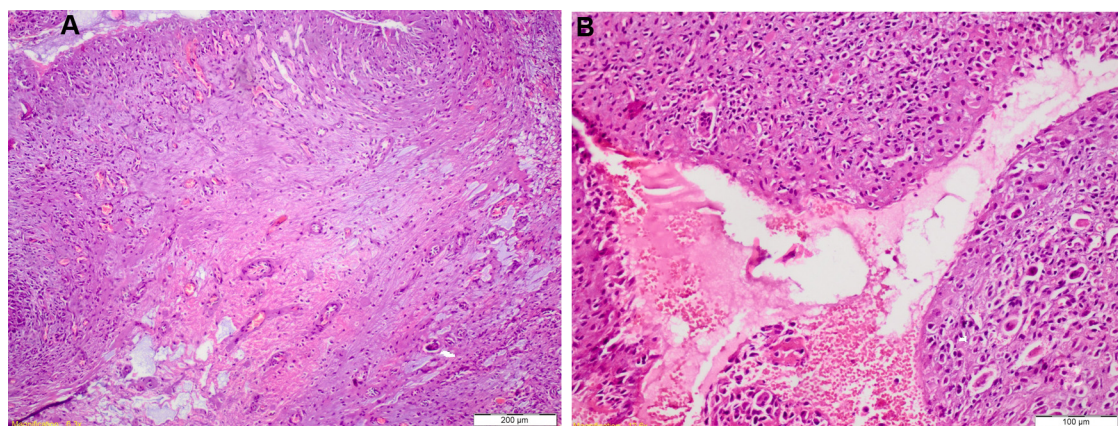


**Fig. 3 – The cystic lesion with a dark red colored wall was seen to emerge toward the posterior region.**

they could occur as the result of facet joint arthrosis, spondylolisthesis, recurring trauma, mixoid degeneration, an increase in the hyaluronidase activity and mesenchymal cell proliferation [2,3]. The ganglion cyst formation was also seen mostly on the L4-5, L5-S1 and L3-4 level in order and that both cysts were commonly observed in the elderly patients [9].

When the patient's medical record is correlated together with his radiological and pathological images, the patient's first lumbar CT was performed when the patient had a low back pain and it suggested that the cyst had first started to develop in the periphery of the facet joint; on the other hand, the lumbar CT was performed once again after the lumbar pain was followed by the left leg pain, it was seen that the size of the cyst developing in time could lead to a vacuum phenomenon associated with the facet joint. Even though MRI is not as sensitive to air as CT, it is seen in the contrast-enhanced and uncontrasted lumbar MRI which was shot one month after the secondary lumbar CT that there was no air within the cyst and that it was separated from the the facet joint in the form of being covered with a capsule. These findings suggest that the relationship between cyst and facet joint is lost in time. Starting from this fact, we consider that the facet joint ganglion cyst primarily develops like a synovial cyst, and afterwards, along with the progressive inflammatory process, it gives rise to the formation of a ganglion cyst as the relationship between cyst-facet joint is lost in time. In addition to these, normally giant cells commonly appear in the synovial cyst but it was appeared in our ganglion cyst pathological images too. For these reasons, we have called our case report a ganglion cyst derived from a synovial cyst. This case report promotes the opinion of Christophis et al. [10], that the ganglion cysts may occur due to synovial epithelium loss after the degeneration and destruction in the synovial cysts has progressed further.





**Fig. 4 – (A, B) The tissue shows cystic wall-like structure composed of fibromyxoid tissue, inflammatory cells, vascular proliferation, multinucleated giant cells and myxoid degeneration (H&E stain,  $\times 100$ , A). The lining epithelium is not present. There are red blood cells in the lumen of the cystic structure (H&E stain,  $\times 200$ , B).**

Generally, the hemorrhage is secondary to trauma or anticoagulation therapy [11]. In addition to these, microtrauma associated with daily activity as the cause of the hemorrhage [12]. Our patient had a degenerated facet joint and LF but had not a trauma story and an anticoagulation therapy. Therefore, degenerated facet joint and degenerated LF may be a factor lead to hemorrhage into the cyst with due to microtrauma during the daily activity as our case.

Considering the literature, another difference in opinion is seen in terming. The cysts located in the posterolateral region were named under the JFCs by several authors, whereas some authors classified these cysts on an anatomic basis as a LF or PLL cyst [3–5]. Christophis et al. [10] termed these cysts under the cystic formation of the mobile spine. In our opinion, these two classifications are insufficient. Because, these cystic structures originate from the soft tissues in the around of the mobile spine via degeneration or trauma and the definitive differential diagnosis of these cysts from the other pathologies as benign or malign spine tumors is made by pathologic examination. Therefore, our suggestion is to bring the terms of the cysts together under the name of 'the cystic formation of the soft tissue attachments of the mobile spine'. In addition, these cyst can be divided into the subgroups basis on their origin. Thanks to this classification, the formerly identified cysts, such as the disk cyst, annulus fibrosis cyst or anterior longitudinal ligament ganglion cyst can also be classified under this classification.

The treatment options include bed rest, anti-inflammatory agents, physical therapy, CT-guided aspiration, percutaneous injection of hyaluronidase and surgery [3,11,13]. If the ganglion cysts that bring about neurological findings, the treatment strategy should be surgery, and the postoperative outcome is generally very good [10,13,14]. While, in the treatment of the cyst, a total removal of the cyst via the microchirurgical technique is advised by some of the authors, some others suggest that fusion be added after the cyst has totally been removed [9,11–13]. Because, some authors think the screw instrumentation and fusion that juxtafacet cysts related with segmental instability. In our case, we removed the cyst totally through the microchirurgical technique and we did not add

insturmentation and fusion, since there was no instability in his preop functional lumbar X-ray.

In conclusion, the ganglion cysts originating from the facet joint may occur in the wake of the synovial cyst degeneration. The microchirurgical technique may prevent both the neural structures and the facet joint capsule from getting injured. The cysts of the spine that originate from the soft tissue may occur both within the canal and outside it. All these cysts can be gathered under the term, 'the cystic formation of the soft tissue attachments of the mobile spine' and can be divided into the subgroups basis on their origin.

### Conflict of interest

None declared.

### Ethics

The work described in this article has been carried out in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments involving humans; Uniform Requirements for manuscripts submitted to Biomedical journals.

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We have no financial interest. This case report has not been published or presented in a meeting.

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Zahir Kizilay designed the study, carried out the literature search, and was responsible for the acceptance of the final manuscript version. Ali Yilmaz and Sevilay Gürcan interpreted

the data. Osman Berber, Yelda Ozsunar, and Nuket Eliyatkin collected the data.

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