Osteochondroma of 12th Thoracic Vertebra
- A Case Report-
Jin-Young Lee M.D., Kyung-Won Song M.D., Hyun-Jin Park M.D., Hyun-Tai Park M.D.

Originally published online June 30, 2011;
doi: 10.4184/jkss.2011.18.2.70

The online version of this article, along with updated information and services, is located on the World Wide Web at:
http://www.krspine.org/DOIx.php?id=10.4184/jkss.2011.18.2.70

This is an Open Access article distributed under the terms of the Creative Commons Attribution Non-Commercial License (http://creativecommons.org/licenses/by-nc/3.0) which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.
Osteochondroma of 12th Thoracic Vertebra - A Case Report-

Jin-Young Lee M.D., Kyung-Won Song M.D., Hyun-Jin Park M.D., Hyun-Tai Park M.D.
Department of Orthopedic Surgery, Kangdong Sacred Heart Hospital, Hallym University School of Medicine, Seoul, Korea

Study Design: Cases report
Objectives: We report 1 case of relatively rare osteochondroma that was in thoracic spine.
Summary of Literature Review: Osteochondroma is one of the most common benign tumor in bone, consist of 40%, but, rare in spine area occupying only 2%. We report a case of osteochondroma that was in the 12th vertebra of thoracic spine, that had severe right flank pain. We performed en bloc excisional biopsy of the bony mass.
Materials and Methods: A forty seven-year-old male complained right flank pain. He had mass of 12th thoracic costovertebral junction and underwent open excision and biopsy.
Results: The preoperative pain disappeared and any signs of recurrence were not found on the follow up performed at 1 year.
Conclusions: The painful osteochondroma of thoracic spine is treated successfully by surgical technique.

Key Words: Thoracic spine, Osteochondroma

Osteochondroma is the most common tumor among benign bone tumors, and it accounts for approximately 40% of benign bone tumors.\(^1\) It has been reported that it occurs in the metaphysis of long bones, in other words, it occurs preferentially in the distal femur, the proximal tibia, the proximal humerus, etc., and among flat bones, the pelvic bone and the scapula. The lesion in the spine is approximately 2%, it is not common, and it develops rarely in the age groups who completed bone growth.\(^2\) In clinics, it is difficult to diagnose only by plain radiography. It should be diagnosed by computed tomography or magnetic resonance imaging in association with physical symptoms that are presented by patients. It requires the differential diagnosis from the herniation of intervertebral disc, spinal stenosis, etc.

The authors experienced a 47 years old male patient case who presented with the right flank pain caused by osteochondroma developed in the 12\(^{th}\) thoracic vertebra, it was removed surgically, and good results were obtained. The case thus is reported together with a review of the literature.

CASE REPORT

A 47 years old male patient visited our clinic for the chief complaint of the right flank pain developed incidentally from 2 months ago. In physical examination that was performed at the time of visit, severe right flank pain was detected, nonetheless, tenderness was absent. In the right back area, pain that was restricted to the 12\(^{th}\) thoracic dermatome and the 1st lumbar dermatome was shown. In urine test, urologic and nephrologic examination, special findings were not observed. By plain radiography, in the costovertebral junction of the right 12\(^{th}\) thoracic vertebra, an oval bone tumor approximately 2.5 X 1.7 cm in size that was absent on the lumbar plain anteroposterior radiograph performed 4 years ago was detected (Fig. 1).
Computed tomography and magnetic resonance imaging were performed on the thoracic area. In computed tomography, high signal intensity that appears to be the enlargement, hypertrophy and sclerosis of the costovertebral junction of the 12th thoracic vertebra was shown. In magnetic resonance imaging, on T1 weighted axial view, similar to computed tomography, the finding of the hypertrophy of the 12th thoracic vertebra was shown, and relatively regular low signal intensity was shown. On T2 weighted axial images, a tumor that shows relatively even low signal intensity was observed, the border was relatively distinct, and the findings of the metastasis to adjacent soft tissues and bone tissues were not observed (Fig. 2).

In the collaborative test and diagnosis with the department of nephrology, the department of urology, and the department of dermatology, special findings and diseases were not detected. The pain showed a pattern that was restricted to the 12th thoracic dermatome. By radiological test, a tumor in the costovertebral junction of the 12th thoracic vertebra was observed, the pain was diagnosed as symptoms of the consequent nerve compression, and open excision was performed.

By the open excision that was performed by posterior approach to the thoracic vertebra, a mass 3 X 2 X 2 cm in size with a distinct border was detected, and the 12th thoracic spinal nerve was observed to be compressed. While protecting the spinal nerves from injury, using a bone cutter, the tumor was removed from the apex area of thoracic vertebra body including a portion of the 12th rib was removed. After the removal of tumor, free movements of the 12th thoracic spinal nerve were confirmed, and soft tissues were sutured (Fig. 3).

Excision and biopsy was performed on osteochondroma that was developed in the 12th costovertebral junction. In pathological findings, the excised specimen was thick bone tissues containing cartilages of which surface was irregular and uneven. The results of the microscopic examination at 40 times magnification of the resected surface showed the findings of osteochondroma that it was mature normal bone tissues,
surrounded by the cartilaginous cap, endochondral ossification was shown in some areas of the cartilages, and cancellous bones were formed beneath cartilaginous cap and atypical cells were not observed (Fig. 4).

Immediately after surgery, infection and other complication findings were not shown. Walking was allowed from 2 days after surgery, and suture was removed 2 weeks after surgery. The pain that was presented with prior to surgery was completely resolved 3 days after surgery, and during one year follow-up observation period, it did not recur.

DISCUSSION

Osteochondroma is a common tumor that accounts for 40% of the entire benign bone tumors. Nonetheless, only 2% of them occur in the vertebra. Osteochondroma is broadly classified to solitary osteochondroma and multiple osteochondroma. It has been reported that approximately 14% osteochondromas are multiple, and approximately 75% of them are inherited in an autosomal dominant manner. The etiology of osteochondroma is not clear, nevertheless, it is thought to be originated from the separation of epiphyseal growth plate cells through the periosteum surrounding the growth plate. In regard to the predilection site osteochondroma, approximately 30% occur in the long bones, particularly the knee joint and the upper humerus, and approximately 12% occur in the pelvis, the scapula, and the costa. It rarely occurs in the vertebra. Osteochondroma has a tendency to grow slightly away from the articular surface. The onset age is the teens or the infant period preferentially, and it is rare after the completion of bone growth. The cause has not been elucidated, nevertheless, it has been hypothesized that pathologically accelerated bone turnover in
psoriatic arthritis, etc. may act as a mechanism. The difference of the incidence between the male and the female has not been elucidated. Nevertheless, it has been shown that it occurs approximately 1.5 times more in the male than the female. The mean age of 60% patients who developed osteochondroma in the vertebra was younger than 20 years, and it occurs more frequently in the male. Typically, in the vertebra, it occurs in the posterior factors particularly, the tip of spinous process, and it invades more than 2 spinal bodies. According to the study reported by Albercht et al., 49% osteochondroma developed in the vertebra occur in the cervical vertebra, 26% in the thoracic vertebra, and 23% in the lumbar vertebra.

Concerning clinical symptoms of osteochondroma, although it may be found incidentally by radiological findings, the major symptom is the palpation of a painless lump, and occasionally, pain that is associated with mechanical compression, nerve compression, fracture of the stalk of tumor, malignant degeneration, osteomyelitis, pseudoaneurysm and bursitis may be present. The symptoms of osteochondroma that is developed in the vertebra are proportional to the size of tumor, and the major symptoms are caused by nerve compression and the compression of other adjacent organs. Nevertheless, cases associated with neurological symptoms are very rare because most lesions do not invade the spinal canal. However, in our case, although the lesion was present in the outside of the spinal canal, neurological symptoms similar to far lateral disc herniation were associated.

In plain radiological test, osteochondroma is detected as a bony contrast mass with the cortex continuous to the bone that it was originated. Computed tomography is the best elective test method for the diagnosis of osteochondroma. The findings are irregular, and a mass with a border distinct from the cortex and the bone marrow continuous to normal bones that is covered with cartilaginous cap could be observed. Pathologically, osteochondroma is shown as irregular bony masses with the gray white cartilaginous cap. Histologically, it has hyaline cartilages and mature bony spurs.

Considering that the probability of osteochondroma converting to malignancy is less than 1%, the principle of the treatment for osteochondroma is observation generally. Nonetheless, because of appearance, dysfunction of adjacent tissues, cases caused by the fracture of the stalk of tumor, symptoms of nerve compression, malignant degeneration is suspected, or diagnosis is vague, they become indication of surgical removal. Macgee has reported 1 case which occurred in the lamina of the vertebral arch of 2nd cervical vertebra and caused temporary quadriplagia, and if osteochondroma is benign histologically but with neurological symptoms due to nerve compression, by early diagnosis and surgical removal, good results could be obtained.

Fig. 4. On low magnitude power, section shows thickened bone and cartilage fragment. The mature bone is covered with well-differentiated osteocartilaginous cap. Also, there is endochondral ossification (H&E, x40).

Fig. 5. After operation, there is no more abnormal radiopaque findings of osteochondroma from the costovertebral junction of 12th thoracic vertebra.
Madigan et al.\textsuperscript{10} have reported in a review of the literature that for 12 cases of osteochondroma which compressed the nerve in the cervical vertebra and the thoracic vertebra and thus caused neurological symptoms, laminectomy and tumor resection were performed and neurological symptoms were recovered. In vertebral compression caused by osteochondroma, if the vertebra is decompressed by completely resecting the tumor, good recovery of neurological symptoms could be anticipated. For osteochondroma that was originated from the outside of the spinal canal as our case, nonetheless, it occurred in the distal lateral area and thus showing neurological symptoms similar to the herniated nucleus pulposus, the principle is surgical treatments. In our case, together with the improvement of symptoms after surgery, good results without recurrence of 1 year follow-up observation were obtained.

**CONCLUSIONS**

The authors treated a rare case of osteochondroma that was developed in the 12th thoracic vertebra by surgical removal and good results were obtained, and thus the case was reported together with a review of the literature.

**REFERENCES**