Osteochondroma of The Spine : A Rare Case Report

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Abstract

Introduction: Osteochondroma is the most common benign bone tumor, accounting for 36% of benign bone tumors. Most commonly found in long bones, reports show that spinal osteochondroma is relatively rare, accounting for only 4% to 7% of primary benign spinal tumors.

Case Report: A 29-year-old man came to the outpatient polyclinic of Haji Adam Malik General Hospital Medan with complaints of weakness in the lower limbs since 2013. The patient had a history of trauma in which he was hit by a pedicab in September 2012, Physical examination of the local status of the rear area shows that on inspection abnormal bony prominence was found, on palpation a palpable mass was found on the lumbar area sized 2 x 2 cm, and limited range of motion of the thoracolumbar area due to weakness. Whole Spine MRI without contrast showed straight thoracolumbar and degenerative marrow disease with bulging of L4-5 and L5-S1 discs pressing against the spinal canal. Mass on the right side of Th 11 to L1 involving the right multifidus lumborum muscle and right longissimus thoracis muscle, attached to the arch up to the spinous process compresses the spinal canal and the right side of the neural foramen.

TREATMENT: The treatment of this patient is an open biopsy, tumor excision, Th10-12 laminectomy, and Th9-Th10-L1 posterior stabilization.

Discussion: Total tumor resection is recommended for neurological repair and to reduce the risk of malignant transformation, although the risk of malignant transformation remains low. Spinal fusion and posterior instrumentation may be required to prevent spinal instability after extensive laminectomy in surgical procedures. In this case, the fusion procedure is performed and showed excellent clinical outcome after total resection of spinal osteochondromas. In this patient, there was no significant motor improvement, but sensory improvement was found at right and left L3 levels compared to the preoperative baseline.

Conclusion: Patients with spinal osteochondroma are rare cases. MRI and biopsy are tests that can be used to confirm the diagnosis. The best approach to this treatment is excision of the tumor. Careful surgical excision with complete resection is important to prevent recurrence.

Keywords: Surgical excision, osteochondroma, spinal tumor

INTRODUCTION

Osteochondroma is a proliferation of hamartomatous bone and cartilage that arises from cartilage growth and develops through endochondral ossification below the periosteum. This process of osteochondroma development may explain its tendency to involve long bones, such as the distal femur, proximal tibia, and proximal humerus. Generally, osteochondromas appear in the first three decades of life and affect children and adolescents. The majority of osteochondromas are asymptomatic and discovered incidentally. [1]

Osteochondroma is the most common benign bone tumor, accounting for 36% of benign bone tumors. Most commonly found in the long bones, reports show spinal osteochondroma to be relatively rare, accounting for only 4% to 7% of primary benign spinal tumors. And less than 3% of all osteochondromas. Osteochondromas can appear as a solitary and non-hereditary lesion or as part of an inherited condition known as hereditary multiple osteochondromas (HMOs). Several studies have reported that solitary osteochondromas are more common in the spine compared to osteochondromas associated with HMOs.[18]

Approximately 15% of osteochondromas occur in the context of hereditary multiple osteochondromas is an autosomal dominant inherited disorder. Solitary osteochondromas tend to occur in the metaphysis of the long bones, especially the femur, humerus, tibia, spine, and hips, even though any part of the skeleton can be affected.[2]

Osteochondromas are usually asymptomatic and are discovered incidentally. Malignant transformation of solitary osteochondroma may occur in 1-2% of patients, whereas for osteochondromas in the context of HMO syndrome the incidence is between 1% and 25%. Diagnosis of osteochondroma requires radiological imaging and, in some cases, especially if malignancy is suspected, histological examination is also required.[3]

Numerous studies using cell biology, molecular biology, and immunohistochemical methods analyzed the mechanisms involved in the pathogenesis of osteochondroma. It has been proven that HMOs are caused by mutations in one of two genes: exostosis (multiple)-1 (EXT1), located on chromosome 8q24.11 – q24.13 or exostosis (multiple)-2 (EXT2), located on chromosome 11p11-12 (75-81). Recently, biallelic inactivation of the EXT1 locus was described in nonhereditary osteochondromas.[18]

Epidemiologically, osteochondromas are usually found in adolescents or children, rarely in infants or newborns.[4] There is no gender predilection for solitary osteochondromas. HMO syndrome affects males more frequently than females and is usually found in Caucasians compared to other races, affecting 0.9-2 individuals per 100,000 population. Approximately 65% of patients have a family member with autosomal dominant HMO gene transmission. The HMO syndrome is a clinical concern during the first decade of life in more than 80% of patients.[5-6] Solitary osteochondroma shows a predilection for the metaphysis of the tubular long bones, especially the femur (30%), humerus (26%), and tibia (43%). Lesions are rare on the carpal and tarsal bones, patella, sternum, skull, and spine.[7]

Clinical manifestation of osteochondroma varies, the main symptom is pain. Neurologic manifestations are rare because the lesions usually grow outside the medullary canal. Radiculopathy may present acutely, secondary to trauma, or may present with paresthesias due to the slow growth pattern of the tumor.[18]

Osteochondromas can occur around the nerves or blood vessels, the most common being the popliteal nerve and artery. Although rare, periodic changes in blood flow can also occur. Vascular compression, arterial thrombosis, aneurysm, pseudoaneurysm formation, and venous thrombosis are common complications resulting in claudication, pain, acute ischemia, and signs of phlebitis, while nerve compression occurs in about 20% of patients.[8,9] Tumors can be found under the tendons, resulting in pain during relevant movements and thus causing restriction of joint movement. Pain also occurs as a result of inflammation or swelling of the bursal, or even from a fracture of the base of the tumor.[10,11] Generally, normal function and movement may be restricted and asymmetry may also be seen in slowly-growing and inward-growing osteochondromas. If there is a tumor in the spine, there may be kyphosis or spondylolisthesis if it is close to the intervertebral space.[12] Clinical signs of malignant transformation are pain, swelling, and enlargement of the mass. Normal function and movement may be restricted and asymmetry may also be found in slowly-growing and inward-growing osteochondromas. If there is a tumor in the spine, there may be kyphosis, or spondylolisthesis if it is closely located to the intervertebral spaces.[13,14]

The most common location of spinal osteochondroma is on the cervical level, attributing to 50% of cases, mostly on C2 28%, followed by C3 and C6.[18]

MRI is useful for diagnosing, but a biopsy is needed to confirm a definite diagnosis. Surgical management is indicated for patients with neurological disorders or pain.

This study aims to report a case of osteochondroma of the spine, conduct a review, and present the experience with 1 case, including the surgical treatment and subsequent outcomes.

CASE REPORT

A 29-year-old man presented to the Orthopedic and Traumatology Polyclinic at H Adam Malik General Hospital Medan with complaints of weakness in the lower limbs. This has been experienced by the patient since 2013. History The patient experienced trauma in September 2012, the patient was hit by a pedicab from behind and dragged. After the incident, the patient was able to carry on with his normal activities. Two months after the trauma, the patient felt numbness in the legs, and six months after the trauma, there was a weakness in the lower limbs. The patient was previously admitted to Martha Friska Hospital and was referred to H Adam Malik General Hospital, Medan. Currently, the patient is mobilized using a wheelchair. The patient also had difficulty controlling urination for the past 2 months and defecation for the past 1 month.

On physical examination localized status on the back.

L: found abnormal bony prominence.

F: Mass in the lumbar region with a size of 2 x 2 cm, normal skin color (+).

M: Thoracolumbar motion limited d/t weakness.

Motoric Examination:

C5/C6/C7/C8/T1

5/5/5/5/5 // 5/5/5/5/5

L2/L3/L4/L5/S1

2/2/2/2/2 // 2/2/2/2/2

Sensory examination: +2 on level L2 , +1 / +1 on level L3 , 0/0 on level L4, and bellows.

Physiological Reflexes: Biceps/Triceps : +/+ , KPR/APR ++/++

Pathological Reflexes: Babinski +/+ , Chaddock +/+, Oppenheim +/+. Clonus +/+

Digital Rectal Examination: TSA tight, BCR (+), Perianal sensation (+)

A whole Spine MRI without contrast revealed a straight thoracolumbar with degenerative marrow disease with L4-5 and L5-S1 disc bulging pressing on the spinal canal. Right-sided Th11 to L1-high mass involving the right thoracic multi-diffuse lumborum and longissimus muscles attach to the arch to the spinous processes compressing the spinal canal and right-sided neural foramen.

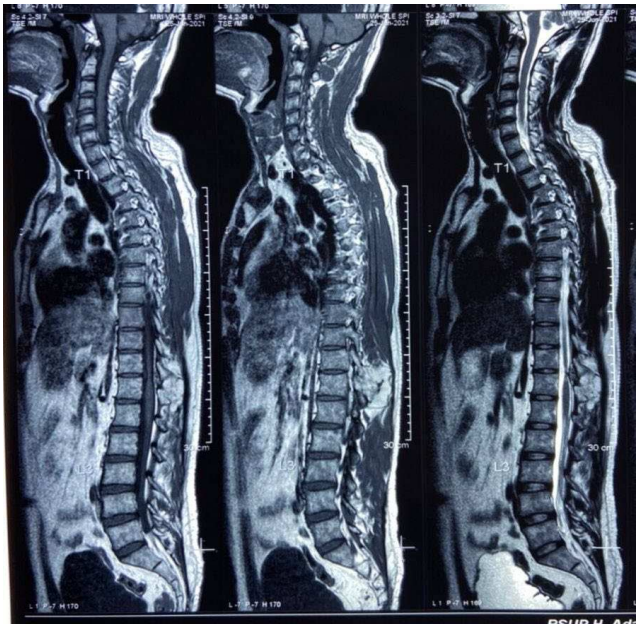


Figure 1: Cervical-thoracal-lumbar intestinal signal marrow heterogeneity is seen at T1 and T2-weighted

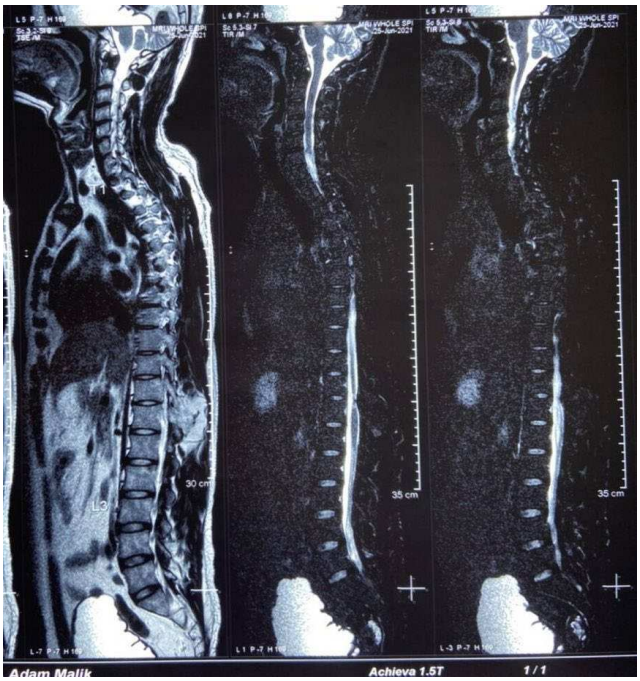


Figure 2: The cervical vertebral disc intensity is partially decreased with a posterior protrusion at the level of C3-4 and C4-5.

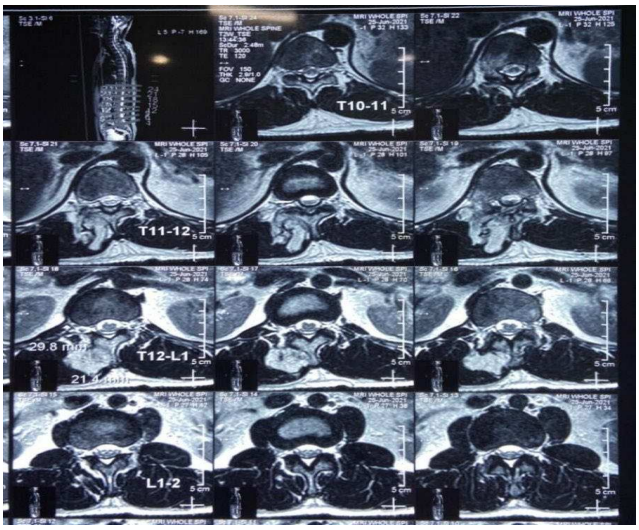


Figure 3: Heterogeneous hyperintense mass seen on T1 and T2-weighted and heterogeneous slight hyperintense on STIR at the level of Th11 to L1 on the right side, partially circumscribed and attached to the arch to the spinous process of the right side of the Th11 vertebra and compressing the canal at Th11 level A mass was seen involving the right multi-diffuse lumborus and longissimus thoracic muscles and suspiciously pressing on the neural foramen at Th12 level. The conus medullaris is at the level of Th12-L1.

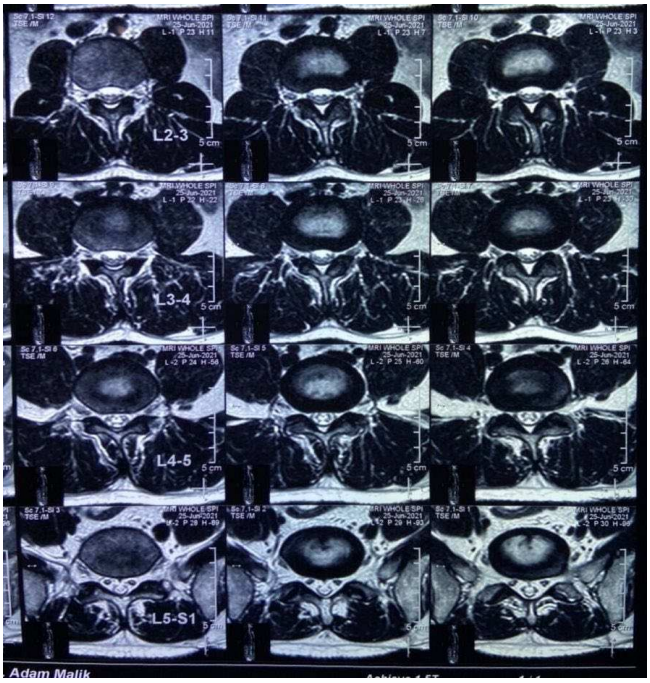


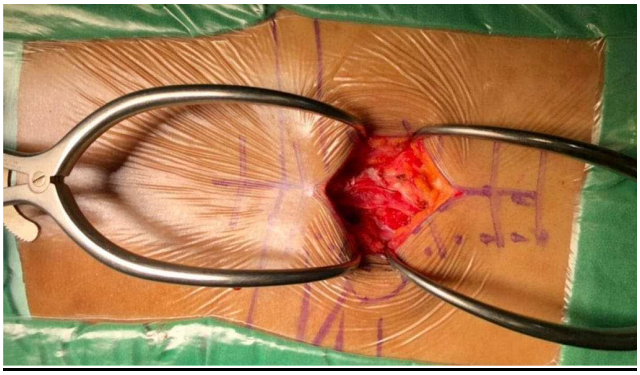
Figure 4: Protrusion of the L4-5 and L5-S1 discs can be seen posteriorly compressing the canal. In the axial section, the L4-5 and L5-S1 disc bulging discs compress the spinal canal.

TREATMENT

TREATMENT for this patient is open biopsy and excision of the tumor and laminectomy on Th10-12 and Posterior Stabilization on Th9-Th10-L1.

Open incision biopsy was performed in the midline parallel to the spinous process -/+ 10 cm, the incision was deepened to reveal a tumor mass. Sampling was done for histopathology, the wound was washed clean, the wound was sutured layer by layer, and the wound was covered with tulle and gauze. [Figure 5]

The Open Biopsy showed bone tissue preparations showing cap cartilage with perichondrium and adjacent saturation bone, cells with round and oval shapes, fine chromatin, eosinophilic cytoplasm, saturated fat cells with normal border cells, dilated and congested blood vessels. The conclusion from this open biopsy is osteochondroma. **[Figure 6]**



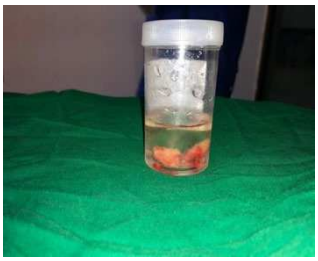


Figure 5: Right Paraspinal T11-T12 Tumor and Th11-Th12 Spinal Canal Tumor.

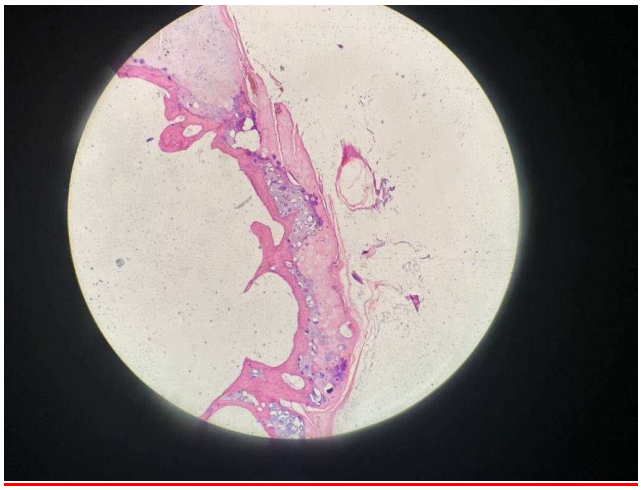


Figure 6: Microscopic Pathology Anatomy shows the cartilage cap with perichondrium and adjacent saturation bone, cells with round and oval shapes, fine chromatin, eosinophilic cytoplasm, found saturated fat cells with normal border cells, blood vessels are dilated and congested. The conclusion from this open biopsy is osteochondroma.

Tumor excision and laminectomy at Th10-12 and Posterior Stabilization at Th9-Th10-L1 showed tumor mass to the right of the spinous process to L1 and Th11-Th12, and tumor tissue was removed. Laminectomy was performed on Th10-Th12 until the dura was visible, the mass was removed from the dura, compression was performed and a pedicle screw was placed on Th9-Th10 and right and left L1, fitted with 2 rods and 6 nuts.

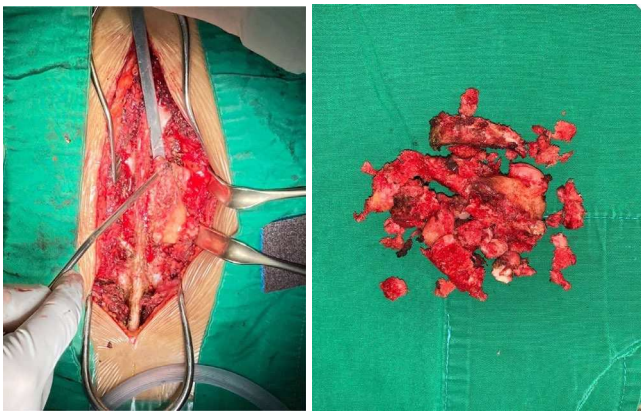


Figure 7: A solitary mass is seen on the right side, tumor resection was performed to relieve extradural compression.

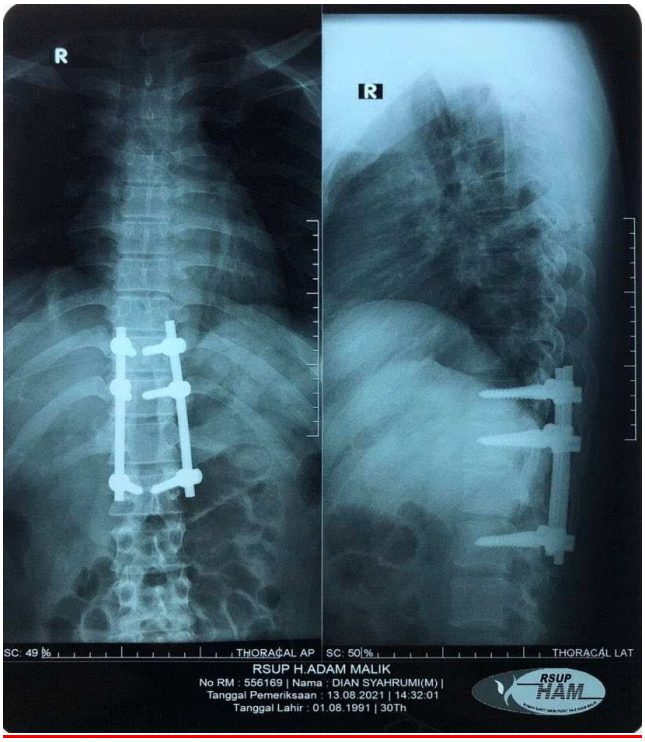


Figure 8: 2 rods, 6 pedicle screws, and 6 nuts are attached to Th10-Th11-L1.

DISCUSSION

In a literature review of spinal osteochondroma, Yakantiet al.3) identified 132 cases of solitary osteochondroma and 17 cases associated with multiple hereditary exostoses. NS The median age of patients with spinal osteochondroma is 35 years. The age range for the symptomatic presentation of solitary osteochondroma is generally accepted to be 10-30 years for peripheral lesions. Osteochondroma, on the other hand, appears later in life and develops symptoms at a median age of 32 years.[14]

In this case, the patient is 29 years old. These patients were diagnosed with osteochondroma of the spine only after they became symptomatic as a result of nerve compression, which manifested as numbness and weakness in the lower limbs.

There are several reports of spinal "osteochondroma". Spinal osteochondromas are a relatively rare phenomenon, accounting for only 1-4% of all osteochondromas. A feature of osteochondroma is a cartilage-covered lump of bone that is continuous with the parent bone.[10]

Treatment may not be necessary for asymptomatic solitary osteochondromas. Carefully observe the tumor for any changes over time. However, it is intraspinal osteochondroma that causes symptoms. Total tumor resection is recommended for neurologic improvement and to reduce the risk of malignant transformation — although the risk of malignant transformation remains low. Spinal fusion and posterior instrumentation may be required to prevent spinal instability following extensive laminectomy in the surgical procedure.17 In this case, a fusion procedure was performed.

Surgical treatment frequently results in an excellent prognosis. After total resection of spinal osteochondromas, this patient had an excellent clinical outcome.

This patient had no immediate side effects, was discharged after 5 days of postoperative care, and presented clinical improvement with sensory change from +1 to +2 at right and left L3 levels compared to the pre-operative baseline. This increase remained stable at 1 month of follow-up.

One month after treatment there were no significant motor changes, but there were changes in sensory at the L3 level.

A long-term study of outcomes in 27 patients with surgically resected spinal osteochondromas found a recurrence rate of 8% (N = 2) within 5 years postoperatively.17 Therefore, postoperative management and follow-up are recommended in this patient population.

CONCLUSION

Osteochondroma is a relatively common bone tumor, accounting for 36% of all benign bone tumors, but rarely found in the spine, accounting for less than 3% of all osteochondromas. Reported in this case, a patient with osteochondroma of the spine is a rare case. MRI and open biopsy are tests that can be used to confirm the diagnosis. The best approach to this treatment is the excision of the tumor. Careful surgical excision with complete resection is important in preventing recurrence. And early diagnosis prevents the severity of motor and sensory impairment in patients. When tumor excision is done appropriately, the results are excellent with a very low recurrence rate.

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