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Solitary Osteochondroma of Posterior Elements of the Spine: A Rare Case Report

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Learning Point of the Article:

Osteochondroma of dorsal spine is a rare entity in paediatric age group but still it should be considered a differential diagnosis and once diagnosed treatment for such patients is en bloc resection.

Abstract

Introduction: Osteochondromas are the most common benign tumors of the bone accounting for 35% to 40% of all benign bone tumors. They present in two distinct clinical forms – solitary osteochondroma and multiple osteochondromas. Solitary osteochondroma accounts for 85% of all osteochondroma and is commonly seen in childhood and adolescence. They more frequently affect the appendicular skeleton and are rarely found in spine. Biopsy and imaging help in diagnosis and en bloc resection is the treatment of choice in symptomatic patients.

Case Report: We present a case of a 6-year-old girl who presented with swelling over back for 4 years. Radiological evaluation and biopsy were done and the patient was diagnosed with osteochondroma of the left lamina and spinous process of dorsal 12th vertebral body which was managed with extraperiosteal en bloc excision.

Conclusion: Osteochondroma of the lamina and spinous process of vertebrae is rare and can be effectively treated by extraperiosteal en bloc resection and has a good post-operative outcome.

Keywords: Osteochondroma, en bloc resection, posterior element, spine.

Introduction

Osteochondromas are the most common benign tumors of the bone accounting for 35–40% of all benign bone tumors [1]. Also known as an osteochondromatous exostosis, osteocartilaginous exostosis, or simply exostosis, these are bone projections enveloped by a cartilage cover that arises on the external surface of the bone. These lesions are thought to arise due to a congenital defect in perichondrium [1]. They present in two distinct clinical forms – solitary osteochondroma and multiple osteochondromas. Solitary osteochondroma accounts for 85% of all osteochondroma and is commonly seen in childhood and adolescence. They more frequently affect the appendicular skeleton. It most frequently occurs in the distal femur, proximal tibia, and proximal humerus [2]. Rarely, osteochondroma can present in soft tissues [3]. We describe a rare case of osteochondroma of the posterior elements of the spine in a young girl.

Case Presentation

A 6-year-old girl presented with complains of swelling over mid-back for 4 years. The swelling was insidious in onset and had gradually increased in size. The swelling was not associated with pain. The patient had a normal birth and developmental history with no other medical ailment.

Swelling measured 5x5 cm over the back. The swelling was hard, irregular, and fixed to the underlying bone. The skin over the swelling was free. There were no dilated veins or pulsations over the swelling. There were no scars, sinuses, and redness over and around the swelling.

Anteroposterior and lateral plain radiographs of the dorsolumbar spine and computed tomography of the spine

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Author's Photo Gallery

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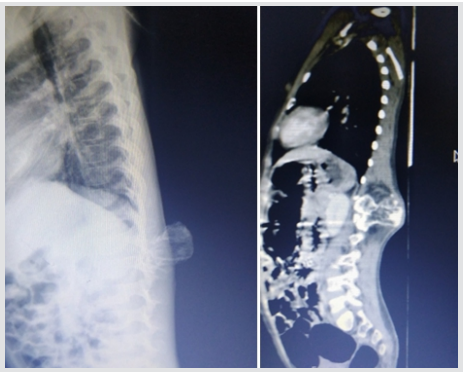

Figure 1: Lateral radiograph and computed tomography images of the thoracolumbar spine showing outgrowth in the 12th thoracic vertebra.

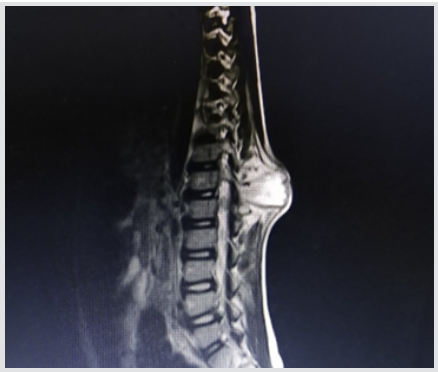

Figure 2: Sagittal section of magnetic resonance imaging of the dorsolumbar spine showing a well-defined lobulated lesion from the spinous process of the 12th thoracic vertebra.

were suggestive of osteochondroma of posterior elements of dorsal 12th vertebrae (Fig. 1). Magnetic resonance imaging of the thoracic spine revealed heterogeneous lobulated lesion measuring 4.8x4x4.3 cm arising from the left lamina and spinous process of the 12th thoracic vertebra (Fig. 2). Core needle biopsy was done and histopathological examination was suggestive of osteochondroma.

The patient was planned for extraperiosteal en bloc removal of the tumor. A midline incision was taken over the tumor and complete excision including the perichondrium was done. Histopathology examination confirmed osteochondroma (Fig. 3).

Postoperatively, the patient was started with bedside mobilization and walking with the support of a walker from the 4th post-operative day. The patient had no pain and was able to walk freely without any support. At subsequent follow-up at 3 months, 6 months, and 12 months, no signs of recurrence were seen (Fig. 4).

Discussion

First described by Sir Astley Cooper in 1818, osteochondroma is the largest group of benign bone tumors, which are composed of spongy bone covered by a cartilaginous cap [4]. Many theories have been proposed to explain the etiology of osteochondroma, all of them relating to alterations to the growth plate [5]. Germ line mutations in EXT1 and EXT2 genes located on chromosomes 8 and 11 have been associated with the cause of the disease. Although it is most common benign tumors of the bone accounting for 35% to 40% of all benign bone tumors, it usually occurs in long bones and rarely involves the spine [1]. Only 3% to 4% of solitary osteochondromas arise in spine and occur in approximately 9% of patients who are affected by hereditary multiple exostosis. The tumors are thought to arise through a process of progressive endochondral ossification of aberrant cartilage of a growth plate [1, 5]. It affects mainly the cervical and dorsal spine, probably related to different durations of the ossification processes that occur in the secondary centers of ossification. It can be speculated that the more rapidly the ossification process of these centers develops, the greater the probability that aberrant cartilage will form is. In adolescence, secondary ossification centers, which lie in the spinous process, transverse process, articular process, and the endplate of vertebral body, complete the growth of the vertebral column. The tumor can be asymptomatic or symptomatic, either causing pain by pressure on adjacent soft-tissue structures when it grows posteriorly, or, more rarely, causing radicular or spinal compression symptoms, when it grows into the spinal canal [2, 5, 6, 7, 8]. On gross appearance, the lesion appears as firm, lobulated, pedunculated, or sessile mass varying in size, covered by fibrous tissue/perichondrium which is in continuity with the periosteum of underlying bone. Marrow and cortical continuity with the underlying parent bone defines the lesion and this feature is better visualized on computed tomography scan [5]. Magnetic resonance imaging is useful to determine the extent of neurologic structures compromise and it identifies lesions that look suspicious of malignant transformation [5]. Chang et al. performed an en bloc resection of the osteochondroma of transverse process of the left 5th cervical vertebrae of a 63-year-old male with symptoms getting relieved post resection [9]. Raswan et al. reported a case of vertebral osteochondroma arising from the lamina of 3rd cervical vertebra, presenting with features of compressive myelopathy in a 15-year-old boy. Total excision of the tumor was carried out along with lamina of C3 vertebra, the patient recovered significantly [10]. Ganesh et al. reported a case of a 9-year-old boy with osteochondroma of facet joint and the pedicle of 4th

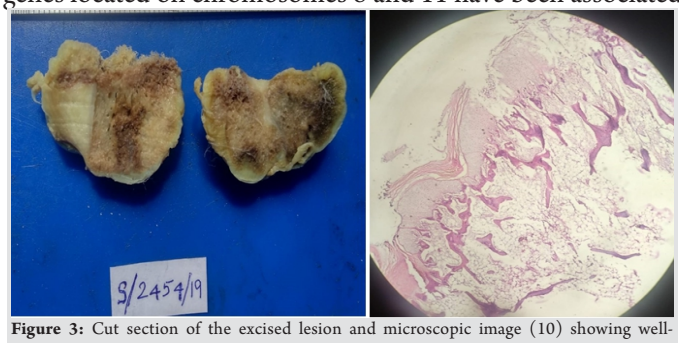

Figure 3: Cut section of the excised lesion and microscopic image (10) showing well-encapsulated tumor covered by hyaline cartilage cap.

Figure 4: Post-operative lateral radiograph of the thoracolumbar spine showing spine devoid of tumor.

Author and Year	Number of patients	Age(year) / sex	Diagnosis	Presentation	Outcome post resection
Zaijun L et al (2013)[17]	14	43 /male	L4 Spinous process	Pain and hyposthesia	Good
		26 /male	C1-C2 lateral mass	Swelling,pain and quadriplegia	Good
		11 /male	T1-7 laminar	Swelling ,pain and paraparesis	Good
		60 /female	C1 lateral mass	Pain,dysphagia and hyposthesia	Restricted range of motion and dizziness post resection
		34 /female	C1-C2 lateral mass	Swelling,pain and quadriplegia	Good
		17 /female	C1 processus transverse	Swelling,pain and hyposthesia	Good
		63 /female	C5-C7 Lamina	Swelling,dizziness and hyposthesia	Good
		17 /female	T6 vertebrae	Paraparesis and hyposthesia	Good
		49 /female	C2-C3 Vertebral body	Quadriplegia and hyposthesia	Worse
		68 /female	L2 processus transverse and lamina	Pain,hyposthesia and quadriplegia	Good
		56 /female	T5 vertebral body	Backpain,hypostheisa and paraparesis	Only Partial function recovery
		57 /female	C5 vertebrae	Dizziness and paraparesis	Good
		16 /male	T5-6 processus spinous and processus transverse	Paraparesis and hyposthesia	Good
		15 /male	C2-C3 lamina	Quadriplegia	Good
Kuraishi K et al (2014)[18]	5	57 /male	Right inferior articular process of L4 vertebrae	Right leg pain over L5 dermatome	No symptoms at 6 years follow up
		63 / female	Superior articular process of right S1 vertebrae	Motor weakness at right lower extremity	Motor weakness gradually improved and no complaints at 7 years follow up
		48 /female	Right L4 inferior articular process	Low back and left leg pain over L5 dermatome	Leg pain relieved but mild low back pain still present at 3 years follow up
		32 /male	Inferior articular process of right L4 vertebrae	Pain in right buttock and lateral surface of thigh	Symptom free immediately after resection
		62 /male	Inferior articular process of right L4 vertebrae	Pain involving bilateral buttocks and legs	Pain relieved and post-operative course uneventful
García-Ramos CL et al (2015)[13]	2	20 /female	Right lateral side of C1, extending to C2 and spinous process of C5, and C7	Pain in the cervical region, accompanied by paresthesias in the right upper limb	Asymptomatic
		21 /male	Spinous process of L2,L3,L4	Low back pain	Asymptomatic
Bárbara Rosa et al (2016)[12]	1	70 /male	Spinous process of 5th lumbar vertebrae	Pain	Completely relieved from pain
Pham MH et al (2016)[19]	1	17 /male	Posterior vertebral body of T9 vertebrae	Bilateral feet numbness and gait difficulty	Complete neurologic recovery
Raswan US et al 2017 [10]	1	15 /male	Lamina of C3 vertebra	Compressive myelopathy	Normal power in all 4 limbs by 10th post operative day
Lotfinia, I. et al (2017) [14]	1	48 /female	posterior arch of C1	Numbness, paresthesia and difficulty in walking	Symptoms improved immediately after surgery and No residual deficit
Yakkanti R et al (2017)[20]	4	6 /female	Left C6 lamina	Neck pain	Good
		35 /male	Posterior elements of T12	Mid back pain	Good
		11 /male	C6 vertebrae	Right posterior neck swelling	Good
		36 /female	Right C3 lamina	Neck pain and progressive myelopathy	Good

thoracic vertebrae extending into the spinal canal superiorly up to 3rd thoracic vertebral level on the left side with severe spasticity of both lower limbs with features of myelopathy. He underwent a 3rd and 4th thoracic vertebrae laminectomy and total excision. There was a significant improvement in the lower limb spasticity and was independent for activities of daily living at 6 months follow-up [11]. Rosa et al. reported a case of spinous process osteochondroma of 5th lumbar vertebrae, and after marginal resection, the patient was relieved of pain [12]. García-Ramos et al. reported two cases of spinal osteochondroma, one of spinous process of 2nd, 3rd, and 4th lumbar vertebra and other of the right lateral side of 1st cervical vertebrae, extending to 2nd cervical vertebrae, and spinous process of 5th and 7th cervical vertebrae, in both the patients, resection was done with excellent post-operative outcome [13]. Lotfinia et al. reported a case of solitary osteochondroma arising from the posterior arch of 1st cervical vertebrae, causing left-sided ascending numbness and paresthesia and difficulty walking which were relieved after excision through posterior approach [14]. An extensive review was done in PubMed, SCOPUS, and Ovid Medline with keywords being spinal osteochondroma, lumbar spine osteochondroma, and cervical spine osteochondroma. Out of the 34 cases, 31 had good post-operative outcome and only 3 had residual symptoms post-resection of tumor (Table 1). Hence, when symptomatic, the treatment of choice of osteochondromas should be surgical resection. The resection can be achieved in the majority of cases without spinal instrumentation because it rarely compromises the spinal stability, as osteochondromas show focal growth in the posterior elements. The most concerning complication of osteochondromas is malignant transformation, fortunately a rare complication [15, 16].

Conclusion

Osteochondroma is a relatively common bone tumor, accounting for 35–40% of all benign bone tumors, but occurs infrequently in the spine accounting for <3% of all osteochondromas. The best approach to treatment in almost all symptomatic cases is marginal excision of the tumor. Meticulous surgical excision, with complete resection of the cartilaginous cap of the tumor, is important in preventing recurrence. When tumor excision is performed adequately, the outcomes are excellent with very low recurrence rates.

Clinical Message

Osteochondroma is less common in spine and can be treated effectively by extraperiosteal en bloc resection.

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