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Osteocartilaginous Exostosis: Types and Symptoms

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Abstract

A subungual exostosis (SE) is a bony overgrowth that is permanently attached to the tip of the distal phalanx. Its pathology differs from osteocartilaginous exostoses in that it mainly involves the overgrowth of normal bone, which may present beneath the toenail or on the sides of the toe. This retrospective study aimed to report the results of surgical treatment when the diagnosis of SE was delayed; the condition was initially considered to be another pathology affecting a different nail or the terminal toe. Subungual exostosis is a relatively common benign bone tumor that occurs in the distal phalanges of the toes and can be a source of pain and nail deformity. There is controversy about the treatment of these lesions and there are few studies that have synthesized what is known and provided meaningful information on treatment.

Two authors independently searched multiple databases (Medline, 1950–May 2013; Cochrane EBM database, and EMBASE, 1980–May 2013 provided by OVID; ACP Journal Club, 2003–May 2013; CINAHL by EBSCO, 1937–May 2013; and PubMed by NLM, 1940–May 2013), and key words were chosen to achieve a broad search strategy. We included studies on the management of toe exostoses with > 10 cases and we excluded studies that reported on upper extremity exostoses or osteochondromas. Demographic and treatment data were collected from each article by two independent authors and collated. A total of 124 abstracts were screened, and 116 articles were reviewed in full, of which 13 met the inclusion criteria.

Introduction

An exostosis is an extra growth of bone that extends outward from an existing bone. Common types of exostoses include bone spurs, which are bony growths also known as osteophytes. An exostosis can occur on any bone, but is often found in the feet, hip region, or ear canal. Exostoses develop over time, usually in people with joint damage from arthritis. They are most common in people over 60, but young people can get them, too, especially athletes. Most people with an exostosis don't have symptoms, but it can cause pain in certain situations [1].

A subungual exostosis (SE) is a bony overgrowth that is permanently attached to the tip of the distal phalanx. It was first described by Dupuytren, who observed SE on Hutchinson later reported SE on fingertips. The pathology of SE differs from that of osteocartilaginous exostoses. SE usually involves the overgrowth of normal bone, which may occur beneath the toenail or on the side of the toe, and can obstruct nail growth. While chronic irritation is thought to be the cause of metaplasia in fibrocartilage, the pathogenesis remains unknown. According to the literature, trauma, chronic infection, tumour, hereditary anomalies and the activation of a cartilaginous cyst are all possible causes. Some studies have reported that trauma is the main contributing factor in the development of SE, with subsequent acute and chronic inflammation causing cartilaginous metaplasia [2]. An alternative view is that chronic infection is the result and not the cause of SE. SE is most commonly diagnosed in children and young adults; most of these lesions are located in the big toe, although they can occur (albeit infrequently) in other toes. Only a small percentage of these lesions occur in the Regarding its pathology, SE commonly presents as swelling beneath the nail, causing separation between the nail and toe. It is frequently misdiagnosed and incorrectly treated.

Microscopic findings include trabecular bone formation at the basement layer and a proliferating fibro cartilaginous cap. Immature SE usually involves a thick cartilaginous layer, while mature lesions have a thin cartilaginous layer. Mature lesions consist mainly of trabecular bone tissue [3]. The cartilaginous cap includes mitotic hyper cellularity and dense nuclei. Although these findings suggest malignancy, the lack of an aplasia indicates that the lesions are benign. The differential diagnosis includes a wide range of benign and malignant tumours, skin lesions, chronic infections, soft tissue and nail pathologies. Radiological findings generally provide sufficient information for diagnosis. Magnetic resonance imaging (MRI) is helpful in the diagnosis of SE due to its ability to detect the different signal formations of tumours.

Types of (Osteocartilaginous) exostoses

There are some types of exostoses

Under the heel, Big toe, Back of the heel, Hip, Osteochondroma and Hereditary multiple exostoses,

Genetic mutations, Heredity, Injuries, Trauma such as from a car accident, Disc and joint degeneration, Aging, Nutrition, Arthritis, Osteoarthritis, Poor posture, Spinal stenosis [4].

Under the heel: This type of bone spur can be caused by plantar fasciitis. When your plantar ligament (located in the sole of the foot) pulls on your heel, it can cause a buildup of extra tissue [5].

Big toe: The base of the big toe is the most common place to develop arthritis in the foot. When a bone spur develops on the top of the big toe, it can keep you from moving it as much as you need to when you walk. This is called hallux rigidus or stiff big toe [6].

Back of the heel: Also called a "pump bump," Haglund's deformity refers to a bone spur on the back of the heel. This type of exostosis can occur when pump-style shoes rub against the back of the heel. Though

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it's called a pump bump, any type of shoe with a rigid back can cause this irritation [7].

Hip: Osteoarthritis wears away the cartilage in the hip and causes the bones to start rubbing together. This friction leads to the growth of bone spurs.

Osteochondroma: This is a growth of bone and cartilage that happens near the bone's growth plates. It usually affects the long bones in the leg, shoulder, or pelvis.

Symptoms of Exostosis

Many people with exostosis don't have any symptoms. The bone growths themselves don't cause pain, but they can cause problems when they put pressure on nearby nerves, limit your movement, or cause friction by rubbing against other bones or tissues [8].

Hereditary multiple osteochondromas is a rare disorder that affects bone growth. Bony tumors (exostoses or osteochondromas), covered with cartilage, typically appear in the growth zones (metaphyses) of the long bones adjacent to the areas where tendon and muscles attach to the bone. These growths vary in size and number among affected individuals, even within the same family. Some individuals will present with a few large "lumps" while others will show several small growths. The median age of diagnosis is three years and almost all affected individuals are diagnosed by 12 years of age [9].

In many cases, no treatment is required. If the exostoses are small, they may have little or no effect on the patient. However, in more severe cases, the growths may cause deformities of the forearm, knees, ankles, spine and/or pelvis. They may impose upon nerves, tendons and/or blood vessels, and interfere with movement or circulation, causing substantial pain as a result of pinched nerves or compressed tendons [10].

1. Pain near the joint, Stiffness, Limited movement
2. Bumps, especially in the hands or feet, Swelling
3. Weakness, Numbness, One leg or arm longer than the other
4. Painless, palpable mass near a joint - knee and shoulder most commonly
5. Numbness and tingling, Snapping of tendon over tumor
6. Restricted range of motion, Period changes in blood flow
7. Loss of pulse in affected limb due to vascular compression, Colour change in limb due to vascular compression

Discussion

The macroscopic, radiographic, and microscopic findings of the present study are consistent with a diagnosis of multiple osteochondromas affecting predominantly the antlers but also the left zygomatic bone of the white-tailed buck. The overall morphology of the exostoses closely resembles that of osteochondromas reported from humans and other mammals. In addition, the normal bone structure in the stalk regions of the exostoses and the gradual increase in the degree of bone mineralization towards the basal portions of the masses is more compatible with a benign than a malignant tumor. A further feature supporting the diagnosis as osteochondromas is the continuity of the cancellous and the compact cortical bone of the exostoses with the respective components of their parent bones that was demonstrated both by CT imaging and microscopic analysis.

In the present case, the cap of unmineralized hyaline cartilage characteristic of osteochondromas was lost in the process of decomposition, leaving only the mineralized portions of the exostoses. The presence/thickness of the cartilage caps could therefore not be assessed. The rather irregular orientation of the chondrocyte lacunae in the mineralized cartilage, in combination with the huge size of some of the exostoses, might be taken as an indication of malignancy, suggesting transformation of the osteochondroma into a secondary chondrosarcoma late during growth. However, considering that antler growth is the most rapid bone formative process known in mammals, the large size of some of the antler exostoses is not regarded a sufficient feature for diagnosing malignancy.

Conclusion

Osteochondroma is a benign cartilage tumor projecting from the external surface of the bone. It is the most common benign bone tumor and usually occurs in the metaphyseal region of the long bones. In the vast majority of cases, it appears as a solitary lesion, while in 15% of cases it presents as multiple lesions due to HME, caused by heterozygous loss-of-function mutations in EXT-1 and EXT-2 genes. Although most lesions are asymptomatic, symptoms may result from nerve or vein compression, fractures, bursa formation, osseous deformities, or even malignant transformation. It is estimated that the latter occurs in approximately 1% of solitary osteochondromas and 10% of HME. New onset of pain, growth of tumor after skeletal maturity, irregular margins, irregular or scattered calcifications, internal lytic areas, erosion of adjacent bones, cartilage cap thickness >2 cm in adults or >3 cm in children are signs of cancerous degeneration. Even though plain radiography is usually sufficient for the diagnosis of osteochondromas, cross-sectional imaging modalities are useful in the assessment of lesions situated at complex areas, complications, and cartilage cap thickness. Asymptomatic lesions require no treatment, whereas surgical indications encompass symptoms, complications, cosmetic reasons, malignant transformation, or uncertain diagnosis.

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Conflict of Interest

None

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