

Morphological Description and Clinico-Radiological application of the Bony Exostosis (Osteochondroma or Diaphysial Aclasia) of Scapula.-A Case Report

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Abstract

Anatomy is a subject where complex information regarding the human body has to be assimilated by the students. Osteology forms an integral part of the study of human skeletal anatomy. During routine osteology classes, an **abnormal bony exostosis of adult Right Scapula** was observed, when collected to explain to the students of I M.B.B.S. An **exostosis (plural: exostoses)** is formation of new bone on the surface of a bone. Exostoses or Osteochondromas are benign tumors that contain both bone and cartilage. Exostoses typically are formed at the end of long bones and rarely seen on flat bones such as the ilium, ribs and shoulder blade (scapula). The Exostoses are not present at birth, but 96% of affected people develop multiple exostoses by the time they are 12 years old. Exostoses / Osteochondromas are themselves a hard painless masses becomes painful when they press on tendons, muscles or nerves. These may remain asymptomatic or present as chronic complications and life threatening emergencies. This condition of exostoses has a genetic, orthopedic and clinical importance. The purpose of present study is to highlight the I M.B.B.S. students about abnormal scapula and their clinical applications. General Morphological details, Genetic factors and Clinico-radiological evaluation of the study were carried out in detail.

Key words: Exostoses, Osteochondroma, Orthopedic, Radiological and Morphological details.

Introduction:

Exostosis or Osteochondroma is the most common type of non-cancerous bone tumor. It is benign cartilaginous neoplasm that consists of a pedicle of normal bone protruding from the cortex covered with a rim of proliferating cartilage cells. It may originate from any bone that is preformed in cartilage and generally appears near the growth plate. The majority of children with an Osteochondroma only have a single tumor. Less commonly, Osteochondromas will occur as multiple tumors. Osteochondroma do not spread beyond the

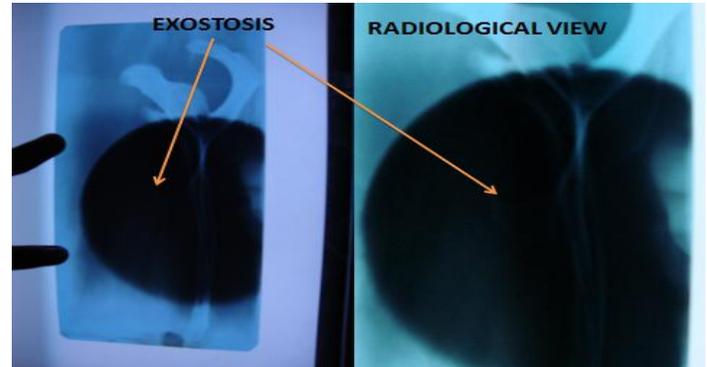
affected bone, they may grow in size as your child grows. An Osteochondroma ordinarily stops growing when a child reaches full height (around age 14 in girls and 16 in boys). In most cases, Osteochondroma rarely create problems and treatment is not needed. The lesion is noticed unless it is traumatized or of large size. Surgery is only necessary if the tumor is causing significant pain, putting pressure on blood vessels or nerves, or very large in size.

We are presenting the details of one **abnormal bony exostosis of adult Right Scapula** with regards to its morphological description, genetic

factors and clinico-radiological application in this text.

Observations and results:

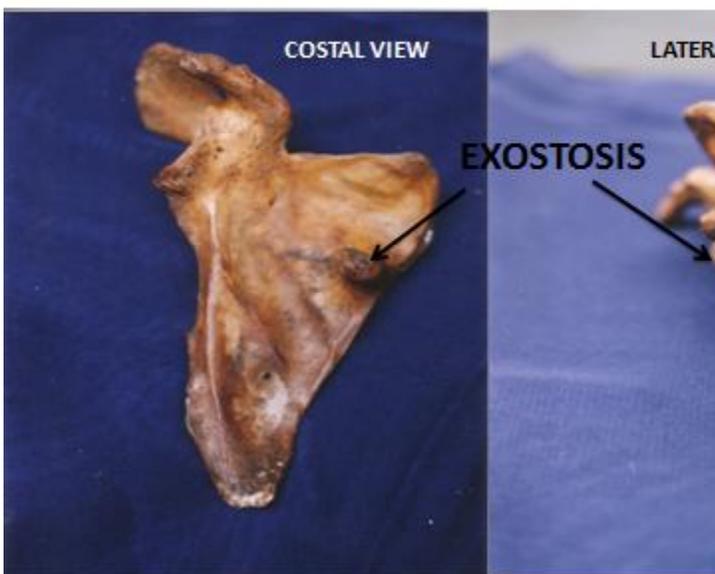
We are presenting the details of **abnormal Right Scapula** procured from the osteology laboratory of the Department of Anatomy. This right scapula had bony projection along the vertebral border or medial border on the costal surface. This scapular projection was confirmed as **Exostosis of the scapula (Osteochondroma** a benign tumor) which was confirmed by the discussions with the orthopedic surgeon. Exostosis is growth disorder due to Endochondral ossification which results in failure of remodeling of the bone and it is localized at the growing end of the long bones. It is rarely seen in scapula. The specimen was photographed in two different aspects (Costal and Lateral view). The radiograph of the bony specimen was also taken.



Discussion

Exostosis or Osteochondroma is a cartilaginous benign tumor of the bone. It is due to developmental dysplasia of a growth plate which ceases growth at skeletal maturation. These exostoses are not present at birth. About 96% of affected people develop multiple exostoses by the time they are 12 years old. Exostoses are typically seen at the end of long bones and also rarely seen in flat bones such as hip and scapula. Approximately 50 % of Osteochondromas occur around the knee. They also occur in the spine. Involvement of the vertebral column has been estimated from 1.3-4%. But however Spinal cord compression is rare. Exostoses or Osteochondroma are painless masses and becomes painful when they press on tendons, muscles, nerves or blood vessels.^{1,2} Hereditary multiple exostoses (**HME**) stop growing, when the individual reaches adult height. (Around age 14 in girls and 16 in boys). The incidence of HME is estimated to be 1 in 50,000 individuals. The patients may present with solitary or multiple exostoses. Exostoses are typically benign. In some instances these tumors become cancerous. Multiple exostoses can disrupt bone growth and can cause growth disturbances of the arms, hands, and legs, leading to short stature. Exostoses can cause chronic pain ranging from mild to severe, depending on the shape, size, and location of the lesion. Malignant transformation risk is about 1-6% usually involving flat bones. Osteochondroma of the scapula are not rare, especially in HME. A scapular exostosis produces symptoms of shoulder pain and sometimes winging of scapula. Scapular exostosis

Exostosis of Right Scapula Bony projection along the Medial



was demonstrated to be the structural cause of scapular winging.³

The snapping of the scapula is described in the literature as being due to an exostosis on the undersurface of the vertebral angle of the scapula, which rides across the rib cage and results in the winging of scapula due to compression of the nerve to the Serratus Anterior.⁴

Spinal exostoses are uncommon. Solitary spinal exostoses were more common than those associated with multiple hereditary exostoses (MHE or HME). Lesions were most common in the upper cervical spine. Evaluation should include both computed tomography and magnetic resonance imaging to define the origin of the exostosis and the presence of neural structure compression. Surgical excision should be preformed en bloc⁵

Osteochondroma rarely involves the sacrum. Radiologic studies showed a lesion occurring from the lamina of the sacrum, compressing the S2 nerve root. Histologic studies showed the tumor to be an Osteochondroma. The tumor was excised en bloc.⁶

Radiographic Distribution of Lesions is Anatomical location of the Exostoses:^{7&}

| | | | |
|-----|---------------------------|----------|-------------------------|
| 1. | Distal | femur: | 70% |
| 2. | Proximal | tibia | 70% |
| 3. | Proximal | humerus: | 50% |
| 4. | Scapula: | | 40% |
| 5. | Ribs: | | 40% |
| 6. | Distal | radius: | 30% |
| 7. | Distal | ulna: | 30% |
| 8. | Hands: | | 20-30% |
| 9. | Mid Femur | 30% | 10. Proximal fibula 30% |
| 11. | Distal Tibial and fibula: | | 20-25% |
| 12. | Feet: | 15% | 13. Ilium: 15% |

In our specimen the abnormal exostosis of the right scapula identified from the osteology laboratory when teaching the I MBBS students, may be with Genetic factors and Clinical features, in that particular individual which we do not know.

Genetics:^{9&10}HME is an autosomal dominant hereditary disorder. HME has a 50% chance of transmitting this disorder to his or her children. However, approximately 10% -20% of individuals with HME are due to spontaneous mutation. HME has been linked with mutations in three genes. EXT1 which maps to chromosome 8q24.1 EXT2 which maps to 11p13 EXT3 which maps to the short arm of Chromosome 19 . Mutations in these genes are thought that, normal chondrocyte proliferation and differentiation may be affected, leading to abnormal bone growth. In case of mutation identified, prenatal testing and preimplantation Genetic Diagnosis can be offered by a genetic counselor.

Diagnosis is mostly clinical and radiological. Technetium skeletal scintigrams are occasionally used to determine number of exostoses.

Treatment and conclusion:

Simple radiograph and MR images may be helping in assessing exostoses of the bone. It is said that genetic factors play a role in the pathogenesis of exostoses. Surgical excision is performed when exostoses lead to growth disturbances or lead to disability. In our specimen the abnormal exostosis of the right scapula is a work of its own type and has been rarely reported in the literature. We as teachers in anatomy, in routine annual survey of the bone room in department of anatomy can find number of abnormal bones. **The same we would like to emphasize the first M.B.B.S students about its morphological importance and its clinico-radiological significance in their future experiences.**

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