

CASE REPORT

PEARLS AROUND THE KNEE – ANATOMICO- PATHOLOGICAL CONSIDERATIONS. (POLEMICS)

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ABSTRACT: In 1883 Reidel described heterotrophic ossification (HO) for the first time. A large number of predisposing factor are described in the literature, although the precise pathogenetic mechanism is still unknown. But, it is thought to be due to over expression of Bone morphogenetic protein (BMP) in peri-articular soft tissues.

HO can limit the range of motion of a joint. These may be solitary or multiple painless periarticular masses which are lobular and densely calcified, diagnosed by USG, X-ray, CT and MRI. During routine dissection of right knee in a male cadaver aged between 60 to 65 years, while exposing the interior of knee by a transverse supra patellar incision the articular surface of patella and infra patellar pad of fat were exposed. A rounded projection about 2cm in size was visualized in the midline deep to synovial membrane of the infra patellar pad of fat. After incising the synovial membrane a large bony ossicle which looked like a pearl, was removed.

In yet another case in a male cadaver aged between 60 to 65 years a hard, mass was felt in the infrapatellar part of right knee in its lateral part which was exposed by incising lateral patellar retinaculum & to our surprise, small pearl like object of the size smaller than 1cm, oval in shape and bony hard in consistency could be removed. Measurements and weights were recorded. Radiographs were taken. When the literature was searched it has been variously described as peri articular calcinosis, heterotrophic ossification (HO), tumoral calcinosis. Controversy still exists regarding its etiology, pathogenesis and nomenclature.

KEY WORDS: Heterotrophic ossification, Tumoral calcinosis, Polemics

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INTRODUCTION: Heterotopic ossification (HO) is the formation of bone in soft tissues where it is neither needed nor desired. HO was first described in 1883 by Reidel, and later, in 1918, Dejerne and Ceilliar reported the development of HO among paraplegic patients injured in World War I.^{1, 2, 3} HO is defined as the process by which trabecular bone forms outside of the skeletal structure, occupying a space in soft tissue where it does not normally exist.⁴ HO has been associated with paralysis and prolonged immobilization, head and spinal cord injury, acute respiratory distress syndrome (ARDS), burns, and pancreatitis. Common predisposing conditions for HO are direct muscular trauma, total hip and knee arthroplasty, prolonged sedation, mechanical ventilation, and ankylosing spondylitis.^{1, 5, 6}

During routine dissection of knee joints, we came across a very unique feature in the anterior part of knee. There were bony hard nodular masses. One of them could be felt projecting backwards from the deeper part of infra patellar pad of fat another one was felt as a firm nodule in the anterolateral part of knee. Further dissection led to exposing these beautiful pearl like bodies – which aroused our curiosity.

OBSERVATIONS:

Case 1:

In a male (age 60-65 years) while exposing the interior of knee by a transverse supra patellar incision, the articular surface of patella and infra patellar pad of fat were exposed. A rounded bony ossicle like a pearl was visualized deep to synovial membrane in the midline: size - 2cm, bony hard in consistency (Fig.1, 2 Table 1)

Case 2:

During routine dissection of a male cadaver (age 60-65 years): A hard, mass felt in the infrapatellar part of right knee in its lateral part. Mass was exposed by incising lateral patellar retinaculum. Small pearl like object was removed: size < 1cm, shape – oval, consistency - bony hard (Fig.1, 2 Table 1).

DISCUSSION: In an interesting article by Olsen KM. and Chew FS (2006) have described that Massive periarticular calcinosis of the soft tissues is a unique but not rare radiographic finding. The soft-tissue lesions of tumoral calcinosis are typically lobulated, well-demarcated calcifications that are most often distributed along the extensor surfaces of large joints. Tumoral calcinosis is a familial condition characterized by solitary or multiple painless, periarticular masses. Teutschlaender studied this disease process from 1930 to 1950, at which time it became known as Teutschlaender disease.⁷

Inclan et al (1943) described that the classic tumoral calcinosis lesions were characterized as lobular, densely calcified masses confined to the soft tissue, generally at the extensor surface of the joint in the anatomic distribution of a bursa. Tumoral calcinosis has a typical appearance on radiographs: amorphous, cystic, and multilobulated calcification located in a periarticular distribution.⁷

HO the abnormal development of bone in areas of the body other than skeletal tissue, commonly occurs in association with traumatic brain injury and spinal cord injury.^{1, 5, 6, 8} Ectopic bone can develop from immature osteoid in a matter of weeks.⁸ This clinical entity is still an enigma among scientists and clinicians, and current preclinical work has made slow but steady progress in our understanding of the etiology and pathophysiology behind heterotopic bone formation.¹

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HO can limit the range of motion of a number of different joints, most commonly the hip, knee, shoulder, and elbow.^{2,3} Limitations in joint range of motion can lead to further complications such as disuse osteoporosis and eventual fractures during transfers or falls. Surgical excision can often provide symptomatic relief and improved mobility, but optimal timing of surgery can be difficult to establish.³ The 'lacy pattern' in the affected muscles on MRI is the earliest radiological finding associated with HO.² The precise pathogenetic mechanism of HO is unknown. But it is thought to be due to over expression of Bone morphogenetic protein in peri-articular soft tissues.^{1,2} The new bone can be contiguous with the skeleton but generally does not involve the periosteum.³ Complications of HO: peripheral nerve entrapment, pressure ulcers, functional impairment of joint.^{1,3}

Surgical excision can often provide symptomatic relief and improved mobility. Numerous risk factors are associated with the formation of HO, but the mechanisms behind these changes are poorly understood.²

Prophylaxis against HO traditionally has involved radiation therapy or use of nonsteroidal anti-inflammatory drugs. Once formed, heterotopic bone can be managed only with surgical excision.^{6,8}

In our study radiological finding of lobulated calcific mass of these pearls (Fig. 3) shows a distinct pattern confirming the diagnosis of HO. Current findings may help us to understand this puzzling clinical entity, and lead to new preventive and therapeutic measures in the management of this debilitating problem.

CONCLUSION: During routine dissection we do come across such intriguing and fascinating objects (like – Fabella, Stones in the gall bladder, Foreign body in the nose or Piriform fossa; Syndactyly, Polydactyly, etc.) and the impressionable mind of students seeks an answer to such curious findings. This may be an appetizer to their unquenchable quest for learning.

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Table 1

Parameters	Deep/ Large	Superficial/ small
Length	15.98 mm	8.95 mm
Breadth	14.82 mm	7.37 mm
Thickness	8.87 mm	4.7mm
Weight	1.55 gm	0.225 gm
Consistency	Hard	Hard
Shape	Circular	Oval
Surface	Uneven	Uneven

FIGURE 1



CASE 1

CASE 2

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FIGURE 2



CASE 1

CASE 2

FIGURE 3: RADIOLOGICAL FINDINGS



Case 1: Rounded bony ossicle showed multilobulated Calcification

Case 2: Oval pearl like object showed showed lobular and dense calcification