Hemophiliacs Bone Pseudotumors

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Abstract

Four cases of proved hemophiliac pseudotumors caused by intraosseous bleeding are reported. Five lesions were found at the uncommon locations involving the cranial vault, mandible, phalanx, distal femur and distal tibia. The conventional radiographic and computed tomographic findings are expansile osteolytic destruction, cortical thinning, partial breaking cortex or pathological fracture, and sometimes associated soft tissue mass. Ultrasonographic feature of one case at the phalanx shows cortical expansion and thinning contained mixed echogenicity in the medullary canal with soft tissue extension. $T^{99}m$ DTPA of one case at the distal femur shows increased vascular flow and uptake at right distal tibia and left distal femur.

Key word : Hemophiliacs Bone Pseudotumors - Cases Report

Hemophiliac pseudotumor is a rare manifestation complicated in hemophiliac patients with severe disease. The sites of involvement have been reported at the joint, muscle, cranium, orbit and bone. Most of the bony lesions are located in the long bones, pelvis, spine and mandible[1-8]. We reported four cases of hemophiliacs bone pseudotumors with unusual site including cranial vault, phalanx, mandible and long bones. The imaging modalities were performed by plain radiography, computed tomography, ultrasonography and radionuclide bone scan. All four cases showed similar imaging characteristics which helped to establish the diagnosis.

Case 1

A one year old boy presented with a mass at the left cheek. The mass was noticed as a small mass since three months old, and gradually increased in size, then grew rapidly for one month before admission. Physical examination revealed a good looking, well fed boy. A mass was found at the left cheek about 6 cm in size, with hard consistency. There was no sign of inflammation or tenderness on palpation.

Plain film showed a multiloculated expansile osteolytic lesion at the left mandible. (Fig. 1)

CT showed an expansile multiloculated cyst at the left side of the body and angle of

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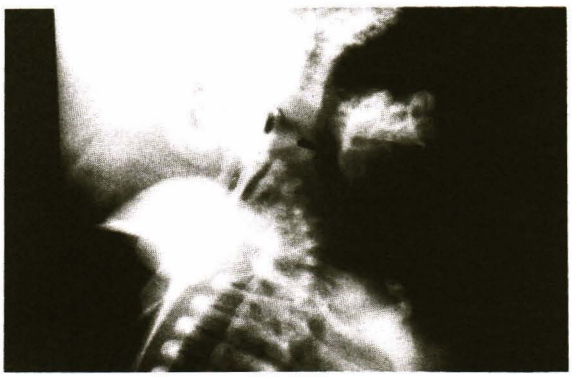

Fig. 1. (case 1)
Plain radiograph of lateral mandible showing multiloculated expansile osteolytic lesion at left side of mandible with well defined sclerotic border. (arrow)

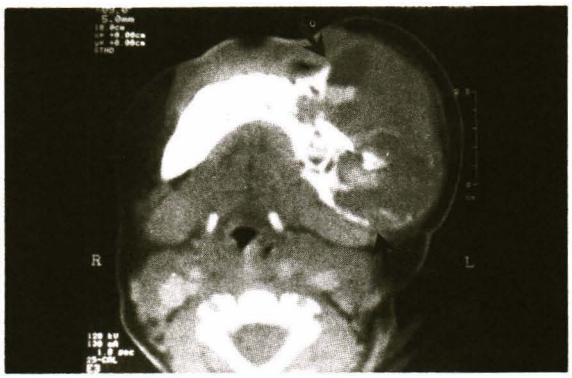

Fig. 2. (case 1)
Axial CT scan showing multiloculated expansile cystic lesion with content and fluid level at left side of mandible. (arrows)

mandible. Fluid content and fluid level were seen in the lesion. (Fig. 2)

Fine needle aspiration of the mass was performed in which no essential tissue fragment was obtained. During admission, he developed prolonged bleeding and easy bruising at the needle puncture sites.

Laboratory findings showed factor 8 activity = 0 per cent, PT=10.9/12, PTT=65.3/37.5. The child was diagnosed as hemophilia A, factor 8 inhibitor. He was treated by incisional drainage with blood clot evacuation of the mass, as well as intravenous cryoprecipitate infusion.

Case 2

An eighteen year old man presented with a soft tissue mass and pain at the left frontal head. The mass had been excised and drained before by a doctor from another hospital. The mass was found to be a hematoma with evidence of prolonged bleeding, then the patient was referred to Chulalongkorn Hospital for further treatment.

Physical examination revealed a pale sick patient with a big mass at left frontal head. The mass was fluctuated with continuous blood oozing from the cut wound.

Plain skull series showed multiple expansile osteolytic lesions at the left frontoparietal area, with well defined outlines. (Fig. 3 A, B)

CT showed multiple expansile osteolytic lesions at the left frontal and parietal bones. The densities measured 80-90 HU compatible with blood densities. Multiple air bubbles were seen at the scalp overlying the lesion at the left frontoparietal area. (Fig. 4)

Laboratory findings showed factor 8 assay = 2.15 per cent, PT=15.4/14.4, PTT 51.3/34.1.

Hemophilia A (moderately severe) was diagnosed. He was treated with intravenous cryoprecipitate infusion including debridement of the infected wound. Biopsy was performed in order to exclude malignancy. The pathological result of the tissue turned out to be necrotic tissue with chronic inflammation. Later he developed factor 8 antibody and sepsis, and expired finally.

Case 3

An eighteen year old man complained of left knee swelling for six months, which increased in size and pain on motion. He was referred to Chulalongkorn Hospital for suspicious osteogenic sarcoma. He had a history of prolonged bleeding since childhood. Physical examination revealed swelling of the left knee and right ankle with firm consistency, and having pain during movement. Plain film of the left knee showed expansile osteolytic destruction of lower metaphysis of the femur

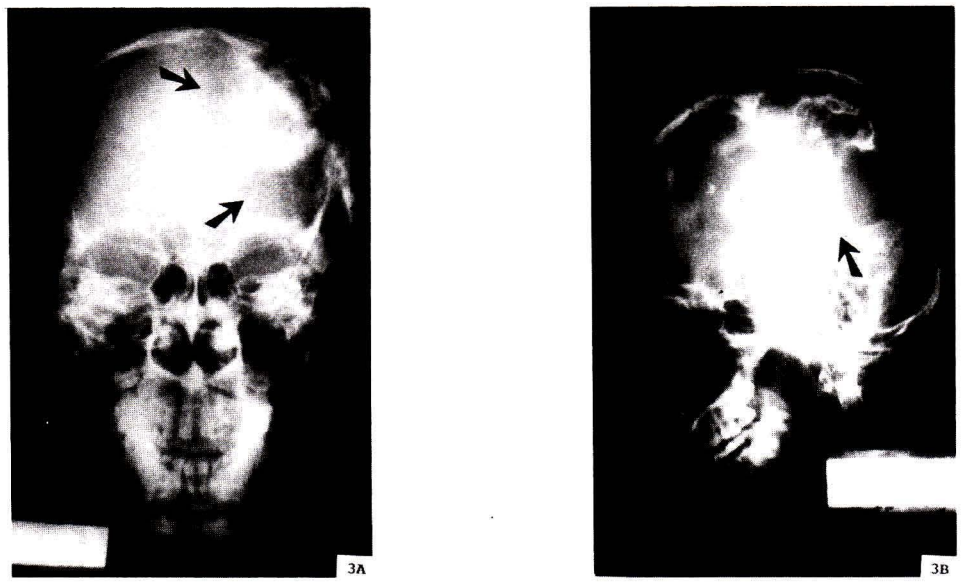

Fig. 3. A (AP), B (lateral)
Plain radiograph AP and lateral views of skull showing multiple expansile osteolytic lesions with well defined sclerotic borders at left frontoparietal bone. (arrows)

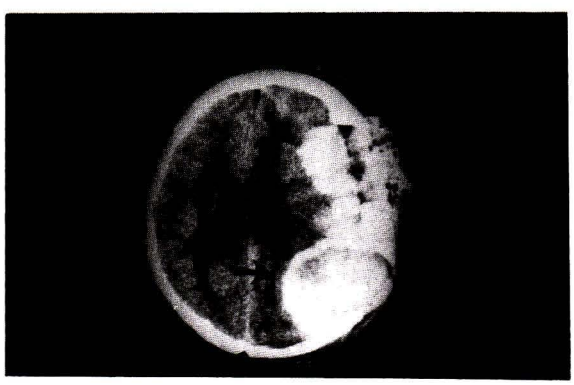

Fig. 4. (case 2)
Axial CT scan of brain showing multiple expansile osteolytic lesions with well defined outlines at left fronto parietal bone, contained bloody density content, and air bubbles in the scalp overlying the lesion. (arrows)

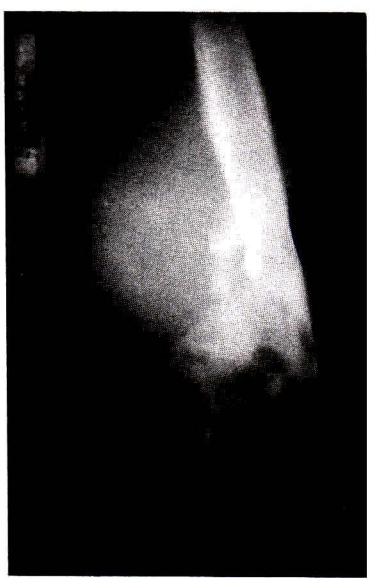

Fig. 5. (case 3)
Plain radiograph of lateral view of left knee showing osteolytic destruction, cortical thinning with pathological fracture and surrounded soft tissue mass at lower metaphysis of femur. (arrow)

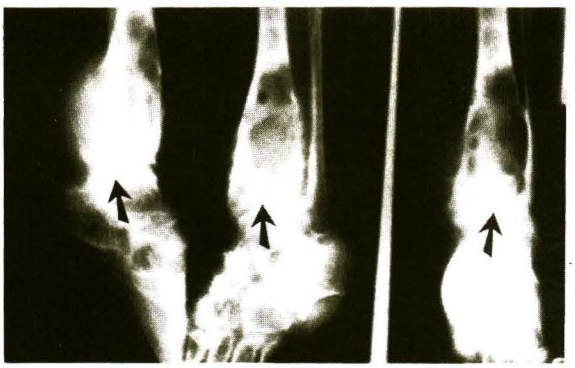

Fig. 6. (case 3)
Plain radiograph AP, lateral and oblique views of right ankle showing multiloculated expansile osteolytic lesion at distal metaphysis of tibia with well defined border, cortical thinning with partial breaking and associated soft tissue mass. (arrows)

Fig. 7. (case 4)
Plain radiograph oblique view of left hand showing multiloculated expansile osteolytic destruction involving entired proximal phalanx of index finger, with cortical breaking and soft tissue extension. (arrows)

with pathological fracture. Surrounding soft tissue edema or mass was seen. (Fig. 5) Plain film of the right ankle showed multi-loculated expansile osteolytic lesion at distal metaphysis of tibia. Partial break through the cortex was seen with associated soft tissue mass. (Fig. 6) Radionuclide bone scan showed increased uptake and flow at the lesions.

Laboratory findings showed factor 8 = 1 per cent. He was diagnosed as hemophilia A presenting with intraosseous bleeding or pseudotumor. He was treated with intravenous cryoprecipitate infusion and left above knee amputation.

Case 4

A fourteen year old boy, a known case of hemophilia A diagnosed when he was 2 years old, presented with a soft tissue mass at the left index finger for one year. The mass had progressively increased in size.

Physical examination revealed swelling of the index finger with soft consistency. There was no sign of inflammation, but tenderness on palpation.

Plain film showed multiloculated expansile osteolytic destruction of the whole proximal phalanx of the index finger. There was partial breaking through of the cortex with soft tissue extension. (Fig. 7)

CT scan showed expansile cortex of proximal phalanx with internal inhomogenous densities. (Fig. 8)

Ultrasound showed enlarged proximal phalanx with cortical expansion and thinning containing mixed echogenic contents in the medullary canal. Soft tissue extension was associated. (Fig. 9)

Laboratory findings showed PT=12.6/12, PTT = 61.2/23.9. He was treated with excision and allograft replacement of the poximal phalanx of the index finger, as well as intravenous cryoprecipitate infusion.

DISCUSSION

Hemophilia is a term applied to a group of disorders characterized by an anomaly of blood coagulation due to a deficiency of a specific plasma clotting factor. Intraosseous and intra-articular bleeding are the two most common associations. There are two types of hemophilia; classic hemophilia A and Christmas disease (hemophilia B). Both are X-linked recessive disorders, clinically manifested in men and carried by women. The

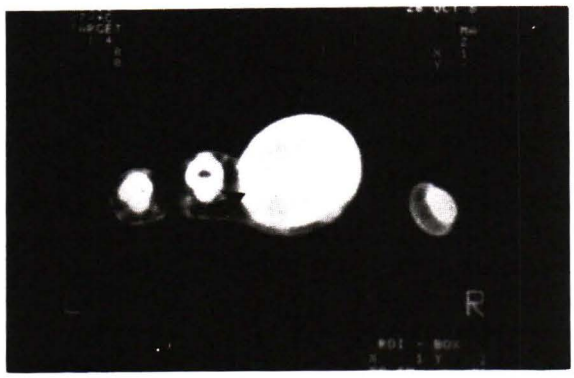

Fig. 8. (case 4)
Axial CT scan of left hand showing expansile osteolytic lesion of proximal phalanx of index finger. (arrow)

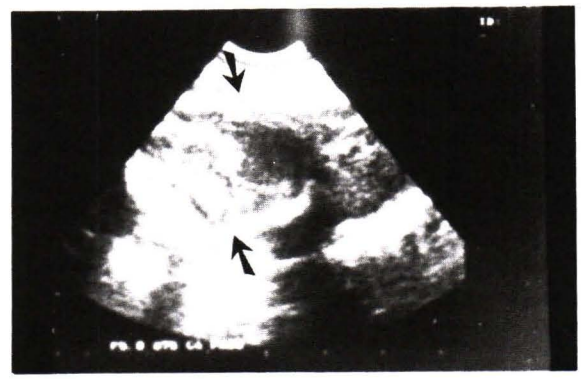

Fig. 9. (case 4)
Ultrasonography of proximal phalanx of left index finger showing cortical expansion, widening of medullary canal contained mixed echogenicity, and cortical breaking with surrounding soft tissue thickening. (arrows)

severity of the clinical manifestations of either forms of hemophilia varies. The diagnosis is established by performing appropriate laboratory tests to detect defects in blood coagulation.

Hemophilic pseudotumor of bone and soft tissue was first described by Starker in 1918 in a patient with extensive destruction of the femur. It still remains a relatively uncommon manifestation of the disease, probably occurring in fewer than 2 per cent of cases. The bones that are most frequently implicated, in descending order of frequency are the femur, the components of the osseous pelvis, the tibia and the small bones of the hands. Hemophiliac bone pseudotumor is a status of massive periosteal or intraosseous hemorrhage creating neoplastic like lesions. In subperiosteal locations, the periosteal membrane is lifted from the parent bone and hemorrhage may extend into the adjacent soft tissue. Periosteal bone formation follows creating expanded and irregular osseous contours. In intraosseous locations, large defects with geographic (relatively well-defined) bone destruction may be associated with distortion of traversing trabeculae. Noninvasive imaging modalities by plain radiographs, CT, MRI and sonography have proved useful in diagnosis and planning treatment. The radiographic appearance of a hemophilic pseudotumor is variable. Medullary bone destruction may produce small or large central or eccentric radiolucent lesions that are fairly well demarcated. Trabeculae can extend across the lesions, and the surrounding bone is frequently sclerotic border. Cortical violation and periosteal bone formation may reach considerable proportions. A large soft tissue mass may be encountered. The size and extent of destruction may simulate a neoplasm but sclerotic margins with both extrinsic and intrinsic scalloping suggest the correct diagnosis[1,9]. CT has proved to be the most efficient method in the detection of bone destruction and soft tissue lesion. The major application to the evaluation of patients with hemophilia is assessing the extent of pseudotumors, soft tissue hemorrhage, or neovascular compromise. CT is effective in establishing the diagnosis of extraosseous hemorrhage and in evaluating its extension and response to the treatment. Soft tissue ossification is also well shown. CT makes it easier for the clinician to choose the proper management either conservative or surgical treatment and to determine the duration of the treatment during regression of the hematoma[3,10]. MRI provides great benefit in examination of hemophilic arthropathy for better demonstration of anatomic details of joint cartilage, menisci, cruciate ligaments and synovial tissue. MRI helps to define the intra or extra articular

involvement, and the presence of hematoma. The age of hematoma can be assesed specifically according to varying MR features[11,12]. No specific sonographic features play a role in the diagnosis of hemophiliac bone pseudotumor. Ultrasound is helpful to evaluate the involvement of the joint including degree of synovial hypertrophy, status of bone and cartilage erosion, and presence of joint effusion. In addition, ultrasound is usually preferable in visualized soft tissue masses, in sequential studies, to evaluate progression and recurence of the lesions[5,10]. The radionuclide bone scan showing increased uptake in hemophilic pseudotumor may simulate tumors. Increased sensitivity of the isotope examination over clinical and radiologic evaluation is expected but lacks specificity[11].

Although the roentgenographic characteristics of pseudotumors obviously depend on the initial site of hemorrhage (intramedullary, subperiosteal, soft tissue), eventually large and disorganized lesions may appear, which can lead to pathologic fracture. Without treatment, the lesions progress slowly and eventually require radical surgery, often causing the patient's demise[5,6]. With better recognition of this complication and its pathogenesis, definite therapy (surgery, irradiation) can be instituted at an earlier stage.

The differential diagnosis of hemophilic pseudotumors includes several other disorders. Initially, a subperiosteal hematoma in hemophilia produces periostitis that can simulate malignancy (Ewing's sarcoma, skelatal metastases) or infection. An intraosseous hematoma leading to osteolytic lesions of varying size simulate primary and secondary neoplasm, tumor-likes and infection. In many patients, accurate diagnosis relies on knowledge of the patient's underlying disease. On rare occasions, diagnosis is not adequately established by the clinical and roentgenographic features. In these cases, a biopsy followed by surgery may be necessary.

SUMMARY

The skelatal abnormalities associated with hemophilia are characteristic. They result from hemorrhage in soft tissue, muscle, subperiosteal, intraosseous and intra-articular locations. Tumor-like lesions may occasionally be encountered owing to massive subperiosteal, osseous or soft tissue hemorrhage with erosion and distortion of adjacent bone. The differential diagnosis is generally not difficult when clinical and radiologic features are suggested[9]. With better recognition of this complication and its pathogenesis, definitive therapy (surgery and irradiation) can instituted at an earlier stage[5,7].

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ภาวะเลือดออกในกระดูกของโรคฮีโมฟีเลีย

ดรุณี บุญยืนเวทวัฒน์, พ.บ., นารีรัตน์ ไทยอาจ, พ.บ.**

รายงานผู้ป่วยโรคฮีโมฟีเลีย จำนวน 4 ราย มีเลือดออกในกระดูกที่เกิดในตำแหน่งต่าง ๆ ได้แก่ กระโหลกศีรษะ 1 ราย, กระดูกขากรรไกร 1 ราย, กระดูกข้อนิ้วมือ 1 ราย และกระดูกขา 1 ราย ภาวะเลือดออกในกระดูกมีผลทำให้เกิดการทำลายของกระดูก อาจทำให้กระดูกแตกหักและเลือดออกกระจายเข้าไปในส่วนของเนื้อเยื่อ พยาธิสภาพนี้จะตรวจพบได้โดยการถ่ายภาพ ได้แก่ เอกซเรย์ธรรมดา, เอกซเรย์คอมพิวเตอร์, อัลตราซาวด์ และนิวเคลียร์สแกน จะพบมีการเปลี่ยนโดยให้ลักษณะภาพที่คล้ายกับการทำลายของกระดูกที่เกิดจากเนื้องอก เรียกภาวะนี้ว่า "Hemophiliac bone pseudotumot"

คำสำคัญ : โรคฮีโมฟีเลีย – ภาวะเลือดออกในกระดูก

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