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Aneurysmal Bone Cyst in the Clavicle Resembling a Solitary Bone Cyst with Magnetic Resonance Appearance

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Abstract

Aneurysmal Bone Cyst (ABC) is a benign bone tumour characterized by expansile and lytic nature which located in the intramedullary field and first named in 1942. Although benign, the ABC can be locally aggressive. Its expansile nature can cause pain, swelling, deformity, disruption of growth plates or joint surfaces. It constitutes 1% of all bone tumors, most commonly seen in children and adolescents. Almost all bones can be involved, but long bone metaphyses and vertebrae are the most common sites of involvement. Among all flat bones, the clavicle is one of the rare sites where tumors or tumor-like lesions are seen, and it is one of the very rare settlements in terms of ABC. In this study, we present a rare case of an 8-year-old patient who was surgically treated with an aneurysmal bone cyst located in the right clavicle, resembling a solitary bone cyst with a Magnetic Resonance Image (MRI).

Keywords: Cyst; Bone; Clavicle; Tumour; Benign

Case Presentation

An 8-year-old girl with painless swelling on the right clavicle was found to have a mass of 2 cm × 2 cm in the right supraclavicular region on the physical examination. No skin disorder, localized increase in temperature or redness. In biochemical analyzes were normal. Anti HCV, HBSAG and anti HCV values were negative.

In the radiographs taken for the mass, in the right clavicle was found eccentrically located, septated, superior cortex thinned but undisturbed an expansile lytic lesion with slightly heterogenous internal structure (Figure 1). On Computed Tomography (CT), in the right clavicle, expansile, heterogeneous bone lesion in the right clavicle was obtained. It was noted that a portion of the lesion was surrounded by a sclerotic line and the cortical cortex was somewhat tapered in CT sections. A focal septation-like appearance was observed in the lesion (Figure 2). On Magnetic Resonance (MR) images, the lesion in the right clavicle was seen a thin septation in the central portion and expansile character low signal on T1 weighted images and high signal and in the T2 weighted images (Figure 3 A and B). In contrast enhanced images the lesion showed peripheral contrast enhancement, but not a significant fluid-fluid level (Figure 4). Despite the eccentric and septated appearance on x-ray examination, the presence of highly homogeneous of internal structure and absence of fluid-fluid levels on CT and MR, suspicious in terms of solitary bone cysts. The presence of focal, more contrasting areas within the lesion in MR images also suggests the differential diagnosis of telangiectatic osteosarcoma.

Aspiration biopsy was performed first for the differential diagnosis of the lesion, followed by biopsy of the lesion. Aspirated red liquid was prepared using a liquid based cytology method. Cytology was the result of blood elements (non-diagnostic cytology). There were no signs of infection. In the biopsy specimen, the material was mostly composed of reactive new bone tissue and a very small area of lesion support the ABC (Figure 5).

The case was operated with prediagnosis of ABC. Frozen study showed numerous myxoid and chondroid stromal cartilaginous tissue and loose stromal component and membranous fragments between them and no definitive diagnosis was made. In the resected curette material, fibrotic stroma surrounding blood-filled cavities, hemosiderin-loaded macrophages and osteoclastic giant cells were observed. The case was reported as ABC. Cellular atypia and other malignancy findings were not observed in the material. The lesion was curetted during surgery and the space in the clavicle was

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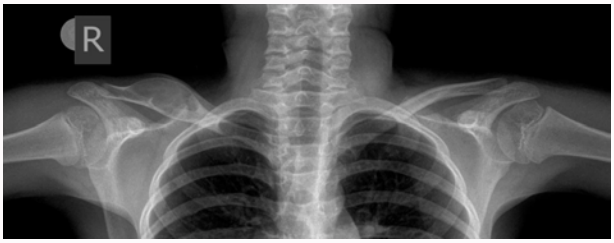

Figure 1: X-ray examination shows expansile lytic lesion in the right clavicle.

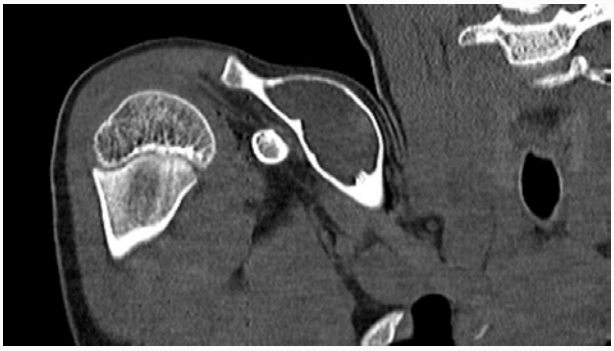

Figure 2: Image of a coronal planned reformats CT of the case.

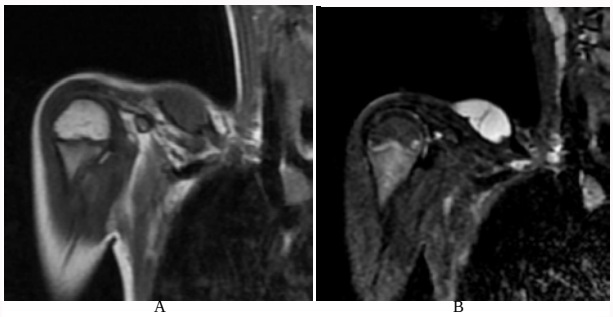

Figure 3: (A) On T1-weighted coronal MR image, the lesion is observed in homogeneous hypointense signal. (B) T2-weighted fat-suppressed coronal MR image shows a homogeneous hyperintense internal structure, except for a thin septation within the lesion.

filled with bone graft. The case was directed to follow.

Discussion

Aneurysmal Bone Cyst (ABC) is an expansile, osteolytic, locally destructive benign vascular lesion which is one of the pseudotumors of the bone; it is located intramedullary [1]. It was first described by Jaffe and Lichtenstein in 1942 [2]. It constitutes approximately 1% of all primary bone tumors [3-8]. ABC is common in the metaphyses of the extremity long bones and in the vertebrae and it is rare in short tubular bones, patella, calvarial bones, flat bones such as orbita and costas [7,9-13]. The clavicle is one of the places where the tumor and tumor-like lesions are very rare [14]. The incidence of tumors in the clavicle is less than 1%. ABC is the most common benign lesion of the clavicle [15]. 85% of cases with aneurysmal bone cyst are under 20 years-old and rarely seen less than 5 years-old [16]. Accordingly we present an 8-year-old girl. Patients usually have pain, swelling, and more rarely pathological fractures. Symptoms occur after trauma in one third of the cases [17]. Our patient presented with complaints of pain and swelling. Skin redness, temperature difference, trauma story was not available.

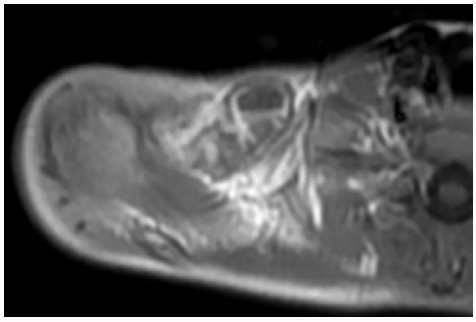

Figure 4: After IV Gd injections, enhancement is observed at the periphery of the lesion on T1-weighted axial image.

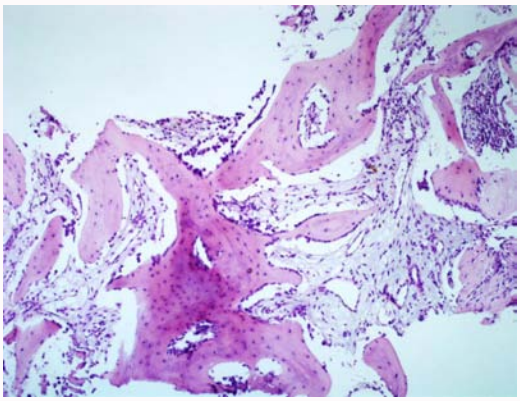

Figure 5: Microscopic view of the material taken after biopsy.

The prognosis of the disease varies. Sometimes the lesion grows slowly; sometimes it grows rapidly and reaches giant dimensions. The duration of symptoms is usually shorter than six months [1]. In our case, swelling was noticed about 1 month ago the etiology of ABC is not fully known. The primary lesion started as arteriovenous malformation from the bone or periosteal region and hemodynamic effects of blood flow play a role in etiology. Dabezies et al. [17] claim that ABC is seen in children after fracture and trauma can play a role in etiology.

Typical radiographic appearance of aneurysmal bone cyst is eccentrically located, expansile, occasionally osteolytic bone lesion [18]. Integrity of cortex is generally preserved. There is no periosteal reaction [6]. Pathologic fracture is very rare [1]. The transition zone between the normal bony and lesion is narrow and soft tissue component is not observed. However, if the cortex erodes, destroys, and contains a soft tissue component, it may suggest an aggressive form of ABC [1]. Appearance of soap bubbles in the lesion together with the thinned cortex is rarely detected. If the cortex and medullary together erode, it can mimic a centrally located tumor in the bone [1]. ABC is seen in as sub periosteal thickening on the x-ray. Centrally located lesions may mimic simple bone cysts but simple bone cyst is always seen at the center of metaphysis adjacent to epiphyseal area. In our case, an eccentrically located, expansile, well-defined osteolytic lesion was determined in X-ray. ABC is seen as cyst with septated, fluid-fluid level on CT. The lesion is usually seen low-signal, but there may also high signal areas depend on presence of hemorrhage on T1-weighted MR images. Heterogeneous high-signal areas can be observed due to cyst content on T2-weighted images [6]. ABC should be considered in the presence of septated cyst with fluid-fluid level, showing low signal on T1 and high-signal on T2 weighted images

[19]. Fluid-fluid level is specific for aneurysmal bone cyst [20,21]. In our case, this specific appearance was not determined on MRI and the homogeneous internal structure separated by fine septation was observed. Therefore, MRI appearance suggests solitary bone cyst. The ABC has primary types (about 70%) and secondary forms (about 30%) with concomitant benign and malignant tumors such as chondroblastoma, giant cell tumor, osteoblastoma, osteosarcoma, malignant fibrous histiocytoma [1,4,22-27].

The histological structure of the aneurysmal bone cyst is composed of reactive repair tissue with hemorrhage therefore microscopic images of some areas of giant cell tumor, fibrous dysplasia, chondroblastoma, osteoblastoma can resemble aneurysmal bone cyst [1]. Therefore, it should be debated whether aneurysmal bone cyst is secondary to another lesion or cystic hemorrhagic structural changes of the lesion [1]. These tumors, which are counted because of their coexistence and similarities in imaging methods, should be considered in differential diagnosis. Treatment planning should not be done without definitive diagnosis by biopsy [28].

Morphologically, there are cystic, cystic-solid (mixed) and solid forms of ABC [29]. The most striking feature of the cystic type is the cavernous spaces with fibrous tissue, osteoclastic giant cells and bone mixture. In the solid type, osteoblastic and fibrous proliferation and scattered osteoclastic giant cells and osteoid trabeculae are observed [29]. In the mixed type, characteristics of these two types coexist. Microscopically, cystic spaces filled with erythrocytes are observed, whose inner surfaces are not paved with endothelium [25]. There are capillary-rich fibroblastic proliferation, osteoclastic giant cells, hemosiderin-loaded macrophages, and reactive new bone tissue on the wall of cystic spaces that do not cascade to each other [1,23,30]. Histopathological differential diagnosis of ABC is giant cell tumor, brown tumor, fibrous dysplasia, chondroblastoma, osteoblastoma. In some areas of these tumors, the presence of cystic hemorrhagic areas and osteoclastic giant cells similar to ABC which may lead to misdiagnosis. The solid type of aneurysmal bone cyst with a soft tissue component may cause radiological diagnostic difficulties and necessitate differential diagnosis with telangiectatic osteosarcoma due to its high mitotic and cellular activity [28]. In our case, the lesion was expansile but does not show the typical fluid-fluid level lesion on the MR image, therefore simple bone cyst and telangiectatic osteosarcoma are considered in the differential diagnosis and biopsy was performed.

The main treatment of ABC is curettage and grafting [1]. Nearly all of the cases were seen improvement after curettage and grafting [1]. Gibbs et al. [31] suggest a "burr drill" method in addition to curettage and grafting. Embolization during surgery in some cases; it may be necessary to add phenol, liquid nitrogen and bone cement as local adjuvants [32,33]. Radiotherapy is also effective in giant size lesions. However, recurrence is reported in 10% to 15% of cases with ABC [34]. George et al. [35] reported when Ethibloc is injected into the cyst, the recurrence rate reduced to 6.5%. It has been reported there is no recurrence in the cases of treated with argon beam coagulation in addition to curettage and grafting [36]. Our case was treated with curettage and grafting. The patient's follow-up and recurrence has not been observed.

Conclusion

As a result, when an expansile lesion in the clavicle was detected in childhood, the MR appearance was similar to simple cyst but the aneurysmal bone cyst should be considered in the differential diagnosis and it should be thought contradictory results may occur between imaging methods and diagnosis should be made absolutely by biopsy.

References

1. Ozbarlas S. Basit ve anevrizmal kemik kistleri. TOTBİD Dergisi. 2013;12:539-46.
2. Jaffe HL, Lichtenstein L. Solitary unicameral bone cyst with emphasis on roentgen picture, the pathological appearance and the pathogenesis. Arch Surg. 1942;44(6):1004-5.
3. Randall RL, Nork SE, James PJ. Aggressive aneurysmal bone cyst of the proximal humerus. A case report. Clin Orthop Relat Res. 2000;370:212-8.
4. Cottalorda J, Bourelle S. Current treatments of primary aneurysmal bone cysts. J Pediatr Orthop B. 2006;15(3):155-67.
5. Kaila R, Ropars M, Briggs TW, Cannon SR. Aneurysmal bone cyst of the paediatric shoulder girdle: a case series and literature review. J Pediatr Orthop B. 2007;16(6):429-36.
6. Kervancıoğlu S, Kervancıoğlu R, Şirikçi Ş, Özkur A. Klavikulanın solid tipte anevrizmal kemik kisti: nadir bir çocuk olgu. Tanısal ve Giriflim-sel Radyoloji. 2002;8:299-301.
7. Biesecker JL, Marcove RC, Huvous AG, Mike V Aneurysmal bone cysts. A clinicopathologic study of 66 cases. Cancer. 1970;26(3):615-25.
8. Mankin HJ, Hornicek FJ, Ortiz-Cruz E, Villafuerte J, Gebhardt MC. Aneurysmal bone cyst: a review of 150 patients. J Clin Oncol. 2005;23:6756-62.
9. Greenspan A, Jundt G, Remagen W. Differential Diagnosis of Orthopaedic Oncology. 2nd ed. Philadelphia: Lippincott Williams & Wilkins; 2006.
10. Suneja R, Grimer RJ, Belthur M, Jeys L, Carter SR, Till-man RM, et al. Chondroblastoma of bone: long-term results and functional outcome after intralesional curettage. J Bone Joint Surg Br. 2005;87(7):974-8.
11. Atalar H, Başarır K, Yıldız Y, Erekul S, Sağlık Y. Management of chondroblastoma: retrospective review of 28 patients. J Orthop Sci. 2007;12:334-40.
12. Jee WH, Park YK, McCauley TR, Choi KH, Ryu KN, Suh JS, et al. Chondroblastoma: MR characteristics with pathologic correlation. J Comput Assist Tomogr. 1999;23(5):721-6.
13. Chadha M, Singh AP. Aneurysmal bone cyst of clavicula. Can J Surg. 2008;51(2):E32-3.
14. Pamecha C, Patel JG, Patel LN, Patel PR. Aneurysmal bone cyst of clavicule. Indian J Radiol Imaging. 2004;14(2):179-80.
15. Lichtenstein L. Aneurysmal bone cyst; further observations. Cancer. 1953;6(6):1228-37.
16. Mirra JM. Aneurysmal bone cyst. In: Mirra JM, Picci P, Gold RH, editors. Bone tumors: Clinical, radiologic, and pathologic correlations. 2nd ed. Philadelphia: Leaand Febiger; 1989. p. 1267-311.
17. Dabezies EJ, D'Ambriosia RD, Chuinard RG, Ferguson AB Jr. Aneurysmal bone cyst after fracture. A report of three cases. J Bone Joint Surg Am. 1982;64(4):617-21.
18. Bilgili F, Özkaya U, Kabukçuoğlu YS, Parmaksızoğlu A, May C. Agresif Seyirli Anevrizmal Kemik Kisti: İki Olgu Sunumu. JAREM. 2011;1:65-8.
19. Snieders MN, vanKemenade FJ, vanRoyen BJ. Monostatic fibrous dysplasia of a lumbar vertebral body with seconder aneurysmal bone cyst formation: a case report. J Med Case Rep. 2009;3:7227.
20. Doğan H. Anevrizmal kemik kisti. J Turkish Spinal Surg. 2006;17(3):11-6.
21. Kransdorf MJ, Sweet DE. Aneurysmal bone cyst: concept, controversy,

clinical presentation, and imaging. AJR Am J Roentgenol. 1995;164(3):573-80.

22. Brindley GW, Greene JF Jr, Frankel LS. Case reports: malignant transformation of aneurysmal bone cysts. Clin Orthop Relat Res. 2005;438:282-7.

23. Cottalorda J, Bourelle S. Modern concepts of primary aneurysmal bone cyst. Arch Orthop Trauma Surg. 2007;127(2):105-14.

24. Oliveria A, Perez-Atayde AR, Inwards CY, Medeiros F, Derr V, Hsi BL. USP6 and CDH11 oncogenes identify the neoplastic cell in primary aneurysmal bone cysts and are absent in so-called secondary aneurysmal bone cysts. Am J Pathol. 2004;165(5):1773-80.

25. Ozan F, Toker G. Patella yerleşimli sekonder anevrizmal kemik kisti. Acta Orthop Traumatol Turc. 2010;44(3):246-9.

26. Bertoni F, Bacchini P, Capanna R, Ruggieri P, Biagini R, Ferruzzi A, et al. Solid variant of aneurysmal bone cyst. Cancer. 1993;71(3):729-34.

27. Sullivan RJ, Meyer JS, Dormans JP, Davidson RS. Diagnosing aneurysmal and unicameral bone cysts with magnetic resonance imaging. Clin Orthop Relat Res. 1999;366:186-90.

28. Dahlin DC, Unni KK. Bone tumors: general aspects and data on 8542 cases. 4th ed. North Carolina, USA: Thomas Springfield; 1986.

29. Brastianos P, Gokaslan Z, McCarthy EF. Aneurysmal bone cysts of the sacrum: a report of ten cases and review of the literature. Iowa Orthop J. 2009;29:74-8.

30. Tillman BP, Dahlin DC, Lipscomb PR, Stewart JR. Aneurysmal bone cyst: An analysis of ninety five cases. Mayo Clin Proc. 1968;43(7):478-95.

31. Gibbs CP Jr, Hefele MC, Peabody TD, Montag AG, Aithal V, Simon MA. Aneurysmal bone cyst of the extremities. Factors related to local recurrence after curettage with high-speed burr. J Bone Joint Surg Am. 1999;81(12):1671-8.

32. Capanna R, Sudanese A, Baldini N, Campanacci M. Phenol as an adjuvant in the control of local recurrence of benign neoplasms of bone treated by curettage. Ital J Orthop Traumatol. 1985;11(3):381-8.

33. Peeters SP, Van der Geest IC, Rooy JW, Veth RP, Schreuder HW. Aneurysmal bone cyst: the role of cryosurgery as local adjuvant treatment. J Surg Oncol. 2009;100(8):719-24.

34. Van de Luijtgaarden AC, Veth RP, Slootweg PJ, Wijers-Koster PM, SchultzeKool LJ, Bovee JV, et al. Metastatic potential of an aneurysmal bone cyst. Virchows Arch. 2009;455(5):455-9.

35. George HL, Unnikrishnan PN, Gak NK, Sampath JS, Bass A, Bruce CE. Long-term follow-up Ethibloc injection in aneurysmal bone cysts. J Pediatr Orthop B. 2009;18(6):375-80.

36. Cummings JE, Smith RA, Heck RK Jr. Argon beam coagulation as adjuvant treatment after curettage of aneurysmal bone cysts: a preliminary study. Clin Orthop Relat Res. 2010;468(1):231-7.