Case Report

An Unusual Case of Breast Cholesterol Granuloma

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Abstract

Cholesterol granuloma (CG) is a rare and benign inflammatory tissue reaction caused by the accumulation of lipid and cholesterol crystals in the tissue, resulting from such incidents as localized trauma and hemorrhage. It has been suggested that the reaction starts with the lysis of blood cells in the tissue and the cellular components, leading to a foreign body reaction in the tissue. As a result of this process, a nodular mass forms in the tissue, and the pressure of this mass on the surrounding tissues can cause pain and the loss of various functions. CG commonly occurs in such anatomic areas as the mastoid bone, petrous apex, tympanic cavity and sinus maxillaris, and more rarely in the breast. CGs of the breast mimic breast cancer both clinically and radiologically, which makes such masses important. Incisional or excisional biopsy is recommended for radiographically suspected cases. The presence of multinucleated giant cells, cholesterol clefts, foamy macrophages, and hemosiderin in surrounding damaged cells and tissues in the specimen, as histopathological findings, can steer diagnosis. It should be noted that CGs may occur in atypical localizations besides their usual anatomic localizations, and the case in the present study is particularly interesting due to its rare atypical presentation.

Keywords: Breast, cholesterol, granuloma

Introduction

Cholesterol granuloma (CG) is a rare, slowly growing benign lesion surrounded by fibrous capsular tissue. In such clinical entities, the blood cell components degrade and cholesterol crystals accumulate in the tissue as a result of a trauma or hemorrhage.[1,2]

CG commonly occurs in the middle ear or tympanic cavity, petrous apex, paranasal sinuses, mastoid process, kidneys, testes, peritoneum, and in the lymph nodes but only rarely in the breast.[3] Here, we present a CG case with a rare localization that was radiologically very similar to breast cancer.

Case Report

Our clinic evaluated a 58-year-old female case who presented with a painless nodular mass in the right breast. It was ascertained from the medical history that the mass had been present for about 5 months. There was no additional predisposing factor, family history of breast cancer, trauma, history of any intervention, or medication.

A physical examination revealed a solitary, 1 cm × 1-cm, soft, irregular, palpable solid mass in the upper outer quadrant of the right breast.

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The laboratory examination revealed normal levels of hemogram, serum glucose, cholesterol, and triglyceride.

On ultrasonography (USG), a hypoechoic nodular lesion without vascularization was observed [Figure 1]. A mammographic examination revealed a nodule at the 10 o'clock position in the upper outer quadrant of the right breast, which was heterogeneous, intense, hypoechogenic, and irregular, with angular margins and sporadically microcalcified and lobulated contours [Figure 2].

The histopathological examination of the biopsy specimen revealed fibrotic granulomatous lesions, cholesterol clefts and surrounding edema, irregular eosinophilic material, lymphocytes, foreign body giant cells and hemosiderin-laden

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foamy macrophages, erythrocyte extravasation, hemorrhagic changes, fibrin, calcification, and fat necrosis [Figures 3 and 4]. On the cytological examination of the biopsy specimen, the case was diagnosed with CG.

With no postoperative problems, the case was followed up with semi-annual USG and annual mammography controls. During the 5-year follow-up, the case experienced no additional symptom or any signs of recurrence.

Discussion

CG is a rare, benign condition characterized by the nodule formation of cholesterol crystals in the tissue. The total incidence has been reported to be 0.6 per million. The peak age of the condition is the second and third decades.[4]

CG may have various clinical manifestations. It is not specific to an organ or a tissue and is often observed in the paranasal sinuses, mastoid process, zygoma, maxilla, middle ear cavity, petrous apex, tympanic cavity, kidneys, testes, and peritoneum. It is rarely observed in the breast and thymus.[5] Manasse first identified CG in the ear,[6] while Gacek[7] recorded the first CG in the petrous apex in 1975, interpreting it initially as cholesteatoma. Later, similar cases were reported in saccus endolymphaticus, pterygoid process, and sinus sphenoidalis.[8] Bezić and Piljić-Burazer, in turn, reported two cases of CG in the breast and demonstrated periductal rupture and macrocyst formation.[9] Our case is of significance among previous studies in having a very rare localization.

The pathogenesis of CG and the mechanism underlying the accumulation of cholesterol crystals have not been fully explained, although some theories have been put forward.[1] Yamazaki *et al*. suggest that the degradation and disintegration of basement membrane-like heparin also contribute to the formation of granuloma.[10] This process often progresses slowly.[2] In the case presented here, however, a notable developmental phase was observed over a 5-month period,

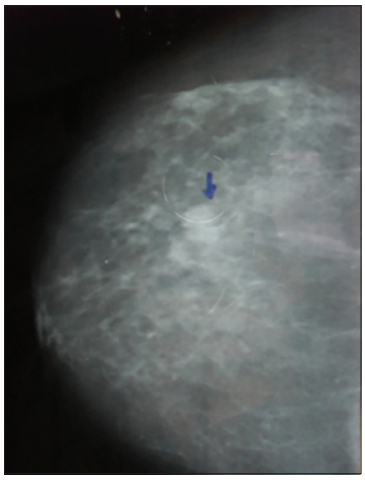

Figure 1: View of a 1 cm × 1-cm hypoechoic nodular lesion (arrow) with slightly lobulated contours and without vascularization, as detected on ultrasonography

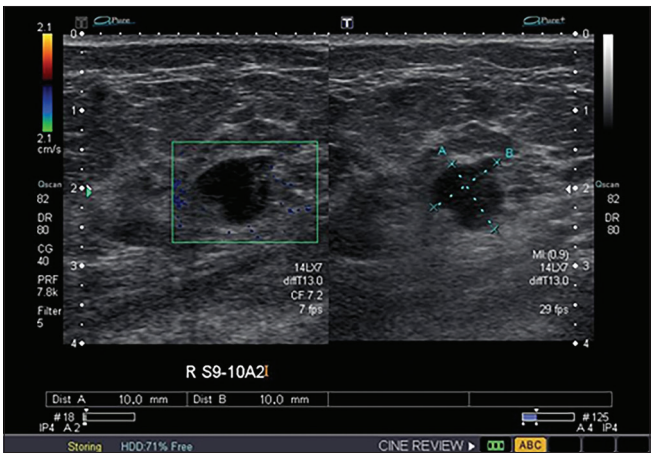

Figure 2: View of nodular opacity areas 1 cm in diameter and with regular contours, as detected on mammography

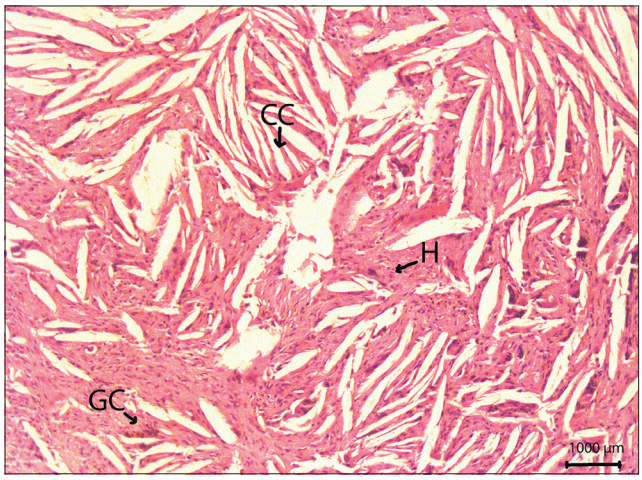

Figure 3: View of cholesterol clefts, histiocytes, and foreign body giant cells, as detected microscopically (CC: Cholesterol cleft, H: Histiocyte, GC: Giant cell) (H and E ×100)

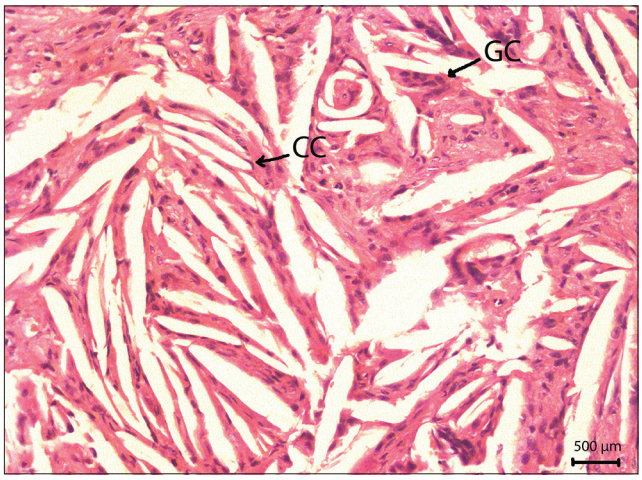

Figure 4: View of multinucleated foreign body giant cells in cholesterol clefts at high magnification (CC: Cholesterol cleft, GC: Giant cell) (H and E ×200)

and so the potential for variations in the clinical course should be kept in mind.

There is a different theory for the pathogenesis of breast CG, with the etiological factor here being ductus ectasia as the primary disease. The mechanism involves periductal inflammation as a result of the ductal wall injury of the fat-rich intraluminal material due to ductal ectasia.[2,11] As with our case, ductal ectasia may not always be involved in the etiology, and the etiology may remain unknown.

It has been reported in the literature that CG may appear with nonspecific findings on mammography that may include fat necrosis and microcalcification.[3] Garofalo *et al*. demonstrated that CG might display ossification, and a mammography may reveal annular calcification.[12] Likewise, Wilhelmus *et al*. reported a case of CG with suspected areas of calcification on mammography.[13] Our case also had radiologically nonspecific findings, and therefore, a histopathological confirmation was required to rule out breast cancer.

The clinical conditions to be considered in a differential diagnosis of CG include lipoma, xanthoma, lipoid granulomatosis, cholesterol embolization, necrobiosis lipoidica diabeticorum, necrobiotic xanthogranuloma, trichilemmal cyst, pilomatricoma, cancer, and metastasis. It is highly important to differentiate CG, especially from malignancy, and so radiologists should be very careful in differentiating this clinical entity.[14]

CG may also co-exist with breast cancer. Furuhira *et al*. reported a case with breast CG, who was simultaneously diagnosed with invasive ductal breast cancer.[15] While very rare, it should be kept in mind that this pathology may co-occur with other clinical conditions included in a differential diagnosis.

There are no previous studies reporting infection or malignant transformation in such cases.[1] Likewise, our case also had no sign of infection or malignancy during follow-up. We believe, however, that periodic controls are very important and should not be neglected during the follow-up of all kinds of masses in the breast.

CG treatments include options such as follow-up, curettage, or complete resection, although there is a lack of consensus on the optimal approach.[4] For our case, a complete resection of the palpable and progressive lesion was performed to eliminate the possibility of diagnostic confusion in breast screenings during the follow-up. We suggest that an early complete resection of the breast CG may be an advantageous and preferable approach.

Conclusion

We presented here a case of breast CG, which is a clinical condition with scarce reports. As with our case, there may be no ductal ectasia or any potential etiological factor in the breast, and so it should not be forgotten that these lesions may follow an atypical course, both in etiological and clinical terms. We believe that these rare etiological parameters in such cases should be investigated also demographically in further studies.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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