

Clinicopathological analysis of seven breast hamartomas and review of the literature

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Abstract

Aim: Breast hamartomas are uncommon benign lesions that constitute 4.8% of benign breast tumors; they consist of mammary ducts and lobules, fatty tissue, and fibrous tissue. The aim of this study was to determine the clinical and pathological characteristics of breast hamartomas diagnosed by surgical resection and to examine the accompanying lesions.

Material and Methods: Patients who underwent breast surgery between January 2013 and January 2018 at Konya Education and Research Hospital and who were diagnosed as having breast hamartomas were reviewed retrospectively.

Results: Seven breast hamartomas were identified. All of them were female. The mean age was 45 years. The mean tumor size was 3.9 cm. Most of the lesions were located in the right breast (57.1%). All the hamartomas appeared in the upper part of the breast. Five of the seven cases were admitted with a painless palpable mass in the breast (71.4%). Three of the seven cases were myoid hamartomas. The type of lesion most commonly associated with breast hamartomas is cyst formation. Pseudoangiomatous stromal hyperplasia, columnar cell hyperplasia, and ductal epithelial hyperplasia are also common. Ductal epithelial hyperplasia and columnar cell hyperplasia were observed in all the myoid hamartomas. Ductal carcinoma in situ was detected in one case; it was also a myoid hamartoma.

Conclusions: Breast hamartomas are accompanied by many types of lesions such as fibrocystic changes, adenosis, ductal epithelial hyperplasia, and pseudoangiomatous stromal hyperplasia. In addition to these lesions, columnar cell hyperplasia was also identified. Malignancies are rarely detected in breast hamartomas; however, one case of ductal carcinoma in situ in a myoid hamartoma was detected.

Keywords: Hamartoma; breast hamartoma; breast; myoid hamartoma; fibroadenolipoma; adenolipoma

INTRODUCTION

Breast hamartomas (BH) are benign fibroepithelial lesions composed entirely of breast tissue components (1). They consist of haphazardly distributed mammary ducts, lobules, fibrous stroma, and adipose tissue—these lesions are also referred as fibroadenolipomas or adenolipomas (2,3). They were initially described as mastomas in 1928 by Prym. In 1971, Arrigoni coined the term “hamartoma” (4).

Breast hamartomas constitute 4.8% of benign breast tumors (5). They may present as a clinically apparent mass, but more often, they are asymptomatic and detected radiologically. In recent years, with the increased

use of numerous breast diagnostic procedures such as ultrasound, mammography, and magnetic resonance imaging (MRI), successful diagnosis of BH has also increased.

Breast hamartomas are well-demarcated and usually encapsulated, round, or oval masses (1). Fibrocystic changes, ductal epithelial hyperplasia (DEH), pseudoangiomatous stromal hyperplasia (PASH), and calcifications can be observed in BH (6,7). If a BH contains smooth muscle fibres in the stroma, then it is considered to be a myoid hamartoma (2). This study presents the clinicopathological findings of seven BH from a retrospective review.

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MATERIAL and METHODS

Ethical approval was obtained from the Ethics Committee of Selcuk University, Faculty of Medicine (2019/42) for the study. As the study was a retrospective study, the ethics committee decided that an informed consent form was not required.

All of the patients who underwent breast surgery at Konya Education and Research Hospital between January 2013 and January 2018 were retrospectively reviewed, and the cases that were diagnosed as BH were included in the study. The patients' clinical and follow-up information was obtained from their patient files. The pathology preparations and previous radiological images of the cases were reanalyzed by a pathologist and a radiologist, respectively.

RESULTS

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All of the patients who underwent breast surgery at Konya

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An ultrasound of the breast was administered to all of the patients before excision. One patient was evaluated with ultrasound and mammography, two patients were evaluated with ultrasound and MRI, and three patients were evaluated with ultrasound, mammography, and MRI. One patient was examined by ultrasound only.

Four cases were radiologically considered to be fibroadenoma or fibroadenolipoma and evaluated as BIRADS 3. The typical pseudocapsulated "breast within the breast" appearance was demonstrated via mammography (Figure 1). In two cases, microcalcification was detected on mammography. One of these was reported as BIRADS 4A, and the other as BIRADS 4c. One patient was thought to have a phyllodes tumor (radiologically examined); it was then evaluated to be BIRADS 4A.

Table 1. Demographic and clinicopathological features of seven breast hamartomas

Age	Gender	Site	Localisation	Tumour Size(cm)	Clinical Presentation	Pathological	Diagnosis
1	43	Female	Right	UEQ	3.5	palpable, painless breast mass	Hamartoma
2	49	Female	Right	UMQ	2.8	palpable, painless breast mass	Myoid Hamartoma
3	48	Female	Right	UEQ	3	palpable, painless breast mass	Myoid Hamartoma
4	44	Female	Right	UEQ	2.2	asymptomatic	Myoid Hamartoma
5	49	Female	Left	UMQ	2.8	palpable, painless breast mass	Hamartoma
6	42	Female	Left	UEQ	9	palpable, painless breast mass	Hamartoma
7	43	Female	Left	UIQ	4.3	asymptomatic	Hamartoma

UEQ: Upper external quadrant
UMQ: Upper middle quadrant
UIQ: Upper internal quadrant

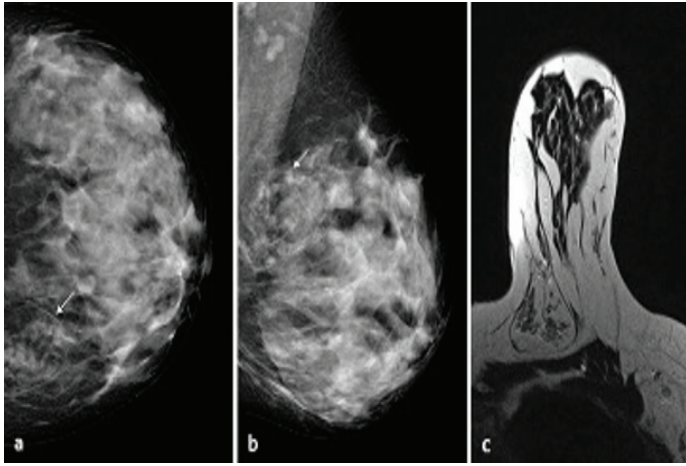


Figure 1. Radiological image of a breast hamartoma. Mammographically, the typical pseudocapsulated “breast within the breast” appearance is demonstrated on the (a) craniocaudal and (b) mediolateral-oblique images in the upper middle quadrant of the left breast. A pseudocapsulated hamartoma can be seen on the MRI T1W images in the upper medial quadrant of the left breast (c)

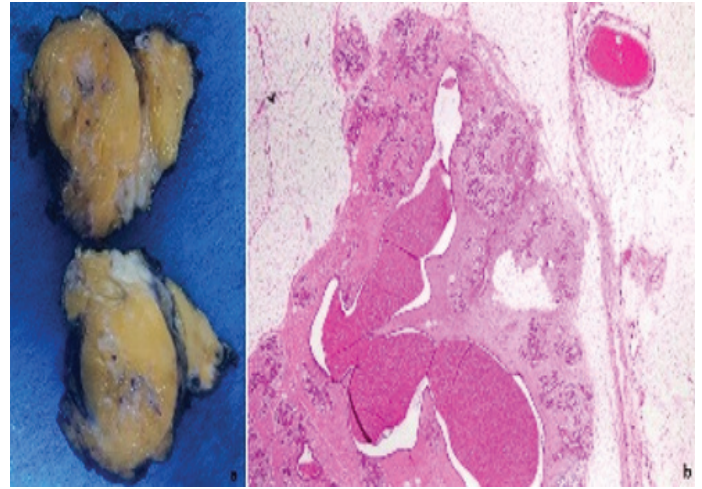


Figure 2. Macroscopic picture of a mammary hamartoma. (a) A properly delimited mass from breast tissue containing fatty tissue in most areas. (b) Microscopic appearance of aBH composed of fatty tissue, fibrous tissue, and mammary ducts and lobules surrounded by a fibrous capsule (HEX50)

Table 2. Macroscopical and histopathological findings of seven breast hamartomas

Diagnosis	Macroscopic description	Accompanying lesions
Hamartoma	well circumscribed, white colored, encapsulated, round, solid mass	Cyst Formation, Fibrosis
Myoid Hamartoma	well circumscribed round nodule with homogenous tan colored, rubbery, whorled cut surface	Adenosis, DEH, CCH, Calcification
Myoid Hamartoma	well circumscribed round nodule with yellow and white colored, heterogeneous cut surface	Cyst Formation, DEH, CCH, PASH, Calcification
Myoid Hamartoma	Oval nodule of well circumscribed, firm, grey and white colored cut surface	Apocrin metaplasia, DEH, CCH, PASH, DCIS
Hamartoma	well circumscribed round nodule with white colored, rubbery cut surface	Cyst Formation, Fibrosis
Hamartoma	Lobulated round mass with rubbery, grey and white colored cut surface and showing area of myxoid degeneration	Cyst Formation, Fibrosis, PASH
Hamartoma	well circumscribed, oval, fibrofatty, yellow and white colored, shiny soft nodule with thin capsule and foci of punctate hemorrhage	Cyst Formation, DEH, CCH, PASH, Calcification

DEH: Ductal epithelial hyperplasia
 CCH: Columnar cell hyperplasia
 PASH: Pseudoangiomatous stromal hyperplasia
 DCIS: Ductal carcinoma in situ

A Tru-cut biopsy was performed for four cases. The biopsies showed fibrosis, ductal epithelial hyperplasia, and columnar cell changes in two cases. One of the biopsies revealed fibrocystic changes and the other smooth muscle fibres, and this case was diagnosed as a myoid hamartoma from the excised material.

The macroscopical and histopathological findings of the seven BH are summarized in Table 2. When the resection

materials were macroscopically examined, well-defined masses that could be distinguished from the breast tissue were observed. The macroscopic appearance of the masses varied according to the proportion of fat tissue (Figure 2a). Myoid hamartomas contained less fat tissue; the cross-sections were of an elastic consistency and skin-pink in color. Microscopically, the BH were composed of fatty tissue, fibrous tissue, and mammary lobules surrounded by a fibrous pseudocapsule (Figure 2b).

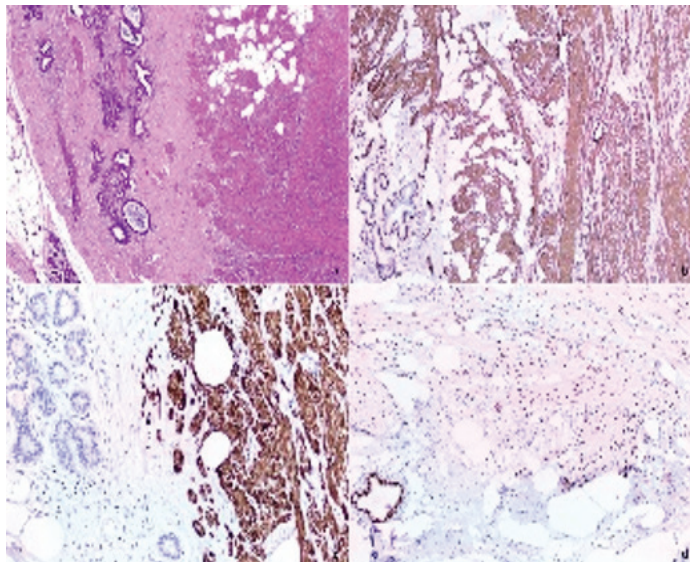


Figure 3. (a) Microscopic appearance of a myoid hamartoma involving smooth muscle fibers as well as fatty tissue, fibrous tissue, and mammary ducts and lobules (HEX100). (b) Positive staining of smooth muscle cells with immunohistochemical SMA (SMA X100). (c) Desmin (Desmin X200). (d) ER (ER X200)

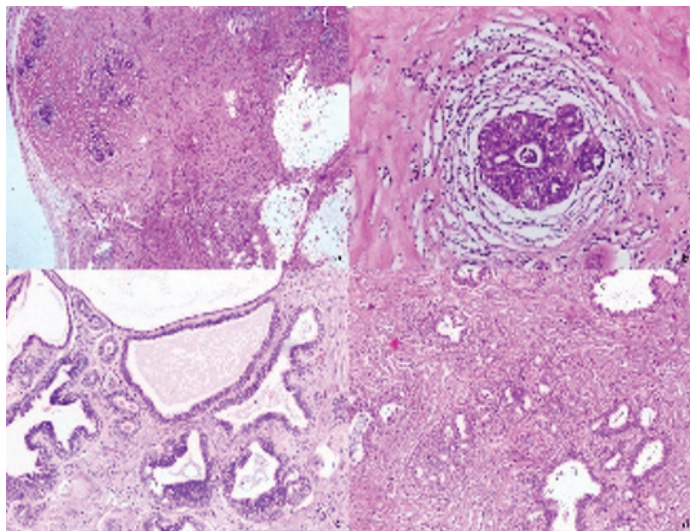


Figure 4. Accompanying lesions in breast hamartomas; (a) Pseudoangiomatous stromal hyperplasia (HEX50). (b) Ductal epithelial hyperplasia and calcification (HEX400). (c) Columnar cell hyperplasia and cystic changes (HEX200). (d) Ductal carcinoma in situ (HEX200).

Myoid hamartomas involved the smooth muscle cells to varying degrees in their stroma (Figure 3a). Immunohistochemical studies were performed on three of the myoid hamartomas. SMA, desmin and ER immunoreactivity were detected in the spindle stromal cells that comprised the fascicle formation (Figure 3b–3d). The lesion most commonly associated with hamartomas is cyst formation. PASH, DEH, and columnar cell hyperplasia (CCH) are other common lesions seen in hamartomas (Figure 4a–4c). DEH and CCH were observed in all the myoid hamartomas. Ductal carcinoma in situ (DCIS) was detected in one case; this case was also a

myoid hamartoma (Figure 4d).

A lumpectomy was performed for all patients. Radiotherapy was applied to the myoid hamartoma with DCIS. No additional treatment was performed in the other cases. None of the cases have shown recurrence in the follow-ups between 22 months and six years, and all of the patients are still alive.

DISCUSSION

Breast hamartomas are uncommon benign lesions. They consist of a disorganized collection of breast tissue including mammary ducts and lobules, fatty tissue, fibrous tissue, and smooth muscle. All these tissue components are admixed in varying amounts. If they contain cartilage tissue, then they are referred as a chondrolipoma (8). A myoid hamartoma is a rare variant of hamartoma containing a significant smooth muscle component. The term myoid hamartoma was first used in 1973 by Davies and Riddell (9).

Breast hamartomas predominantly occur in females, but they can also be seen in males (10-12). All of the cases in the present study were female. Breast hamartomas are usually seen in premenopausal women, mostly in their forties. The average age of the patients ranges from 33.5–66.5 (7). They are characteristically found on the outer quadrant of the breast (13), with a slight tendency to be localized in the right breast (11). In the present study, hamartomas were detected in the outer or middle quadrant of the breast in most of the patients—only one of them was located in the inner quadrant. All of the breast hamartomas were in the upper part of the breast. Breast hamartomas are clinically apparent, painless, mobile, soft-to-firm masses, or they are asymptomatic and are detected radiologically.

Diagnosis of BH is based on radiological and pathological findings. The combination of mammography, ultrasonography, and histological examination for diagnosis is useful and reduces the risk of misdiagnosis (14). Ultrasonographically, in most cases, BH appear as solid, well-defined, oval masses with an echogenic rim and internal heterogeneous echogenicity with hypoechoic areas intermixed with hyperechoic band-like or nodular areas, reflecting the presence of adipose, epithelial, and fibrous connective tissues (15). Mammographically, they are well-circumscribed masses containing fat and soft tissue surrounded by a thin radiopaque line (pseudocapsule), which can often be observed. The image is typically described as a “breast within a breast” (16,17). Conventional T1 and T2 weighted MRI illustrate that BH have masses of heterogeneous intensities with a thin capsule (18).

Breast hamartomas are macroscopically round to oval, well-defined, soft or elastic masses that are usually covered with a thin fibrous capsule; their cross-sections are white or yellowish in color, representing the presence of fibroadipous tissue. Their color and consistency depend on the proportion of fatty and fibrous tissue they contain.

Breast hamartomas are usually encapsulated—either a true capsule or a pseudocapsule of surrounding fibrous tissue. The amount of fatty tissue and fibrous tissue in BH is variable. In some cases, fatty tissue forms a large part of the hamartoma, whereas in others, it contains a very small amount of fatty tissue. The glandular component protects the lobular structure, but the lobules are larger and more disorganized than normal breast tissue (8).

Myoid hamartomas, a rare variant of BH, contain smooth muscle cells to varying degrees in their stroma. It is thought that the source of this smooth muscle may be the blood vessel wall, areolar muscles, myoepithelial cells, or undifferentiated breast stroma. However, CD34 positivity also suggests that these cells may be the metaplastic breast stromal cells. Smooth muscle fibres in myoid hamartomas are immunohistochemically positive for desmin, SMA, vimentin, ER, and PR.

Breast hamartomas are accompanied by many types of lesions such as fibrocystic changes, adenosis, and DEH. PASH is associated with BH (6,7). In the present cases, the most commonly associated lesion was cyst formation. DEH and PASH were also frequently associated lesions. CCH is also a component of BH, and all of the occurrences in the present study were myoid hamartomas. CCH within the breast has become more defined in recent years, with pathologists' awareness of these lesions increasing; thus, accurate diagnosis of CCH is also increasing. To the best of the present authors' knowledge, CCH in BH has been defined for the first time in this study. The presence of DEH and CCH in all myoid hamartomas is another interesting finding.

Breast hamartomas are usually benign tumors, but on rare occasions, DCIS, lobular carcinoma in situ, or invasive ductal carcinoma are detected in mammary hamartomas (6,19,20,21). DCIS was detected in one case that was also a myoid hamartoma. Some hamartomas displayed calcifications, causing the radiologist to suspect malignancy.

Some authors have suggested that BH confirmed by mammography can be follow-up (22). However, because malignancies associated with BH have been reported, surgical excision is generally recommended to treat BH, as it is considered to be curative. The prognosis for BH is excellent, whether it includes surgical excision or not. Recurrence is rare and is assumed to be multifocal lesions rather than real recurrences (11). Multiple BH are seen in Cowden syndrome, also known as multiple hamartoma syndrome; this is an autosomal dominant disorder mainly arising from the germline mutation of the PTEN gene. In addition to having multiple hamartomas in many organs, the risk of developing breast cancer also increases with Cowden syndrome (1).

CONCLUSION

In summary, BH are rare tumors; they can be easily recognized radiologically, and they are becoming more and more frequently described pathologically due to both increased awareness and increased rates of surgical

excision. They can be accompanied by fibrocystic changes, adenosis, DEH, CCH, and PASH. Myoid hamartoma is a rare variant of BH that exhibits a significant smooth muscle component. Breast hamartomas are often benign, and while rare, they can be accompanied by malignancies.

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