ORIGINAL ARTICLE **OPEN ACCESS**

DIAGNOSTIC ACCURACY OF ULTRASONOGRAPHY IN DIAGNOSIS OF BREAST HAMARTOMA KEEPING HISTOPATHOLOGY AS A GOLD STANDARD

Maheen Israr[1], Ashir Israr[2], Ghazala Wahid[3], Tariq Khan[4], Munazza Kainat Shuja[5],Muhammad Israr[6]

[1-6]-Department of Radiology, Hayatabad Medical Complex, Peshawar

ABSTRACT

Objective: To determine the diagnostic accuracy of ultrasonography in diagnosis of breast hamartoma keeping histopathology as gold standard.

Study Design: A Cross sectional study

Place and Duration of the study: This Study was conducted in the department of radiology, Medical teaching institution Hayatabad medical complex Peshawar from May 2022 to May 2023

Methodology: Final diagnosis of breast hamartoma was obtained by histopathology results obtained from the laboratory lesions via US guided 7G VAB or surgical excision from each patient. Histopathologic diagnosis of breast hamartoma was made by a consultant pathologist with seven years of post-fellow ship experience in breast pathology, who were blinded to the ultra sonographic results.

Results: Comparison of diagnostic accuracy of breast hamartoma on ultrasonography and breast hamartoma on histopathology. 78.94 % were on ultrasound and 100 % on histopathology.

Conclusion: It is concluded that breast hamartomas are uncommon tumor similar to other rare breast pathologies definitive diagnosis can be made on combining the result of clinical, radiological and histopathological examination.

KeyWords: Breast hamartoma, Lesions, Ultrasonography, Histopathology

How To Cite This Article: **Israr M, Israr A, Wahid G, Khan T, Shuja MK, Israr M**. Diagnostic accuracy of ultrasonography in diagnosis of breast hamartoma keeping histopathology as a gold standard: original article. **J Bacha Khan Med Coll**. 2024;5(2):**79–85.**

Correspondence Author:Maheen Israr
PGR, Department of Radiology,
Hayatabad Medical Complex, Peshawar
Email: maheenisrar909@gmail.com
https://orcid.org/0000-0001-8056-7725

Received: 10th August, 2024
Revised: 13th September, 2024
Accepted: 11th December, 2024
Published: 1st January, 2025
DOI: https://doi.org/10.69830/jbkmc.v5i02.164

INTRODUCTION:

A hamartoma is mostly benign mass of disorganized tissue native to a particular anatomical location. Most of the hamartomas are usually benign, but malignant transformation may occur. Hamartomas can grow almost anywhere in the body and usually are found in the lungs, breast, hypothalamus and colon etc.[1.]Most of the cases are asymptomatic and discovered incidentally during the evaluation of other medical conditions. Hamartomas cause morbidity by various mechanisms such as infection, infarction, pressure/ obstruction, hemorrhage/ anemia, fracture, neoplastic transformation.[2] Hamartomas result from the abnormal function of normal tissue and sometimes occur sporadically and a few times as part of a syndrome. Hamartomas is most likely due to a developmental error and may appear in several sites. It grows at the same rate as of original tissue.[3]There is no particular evidence of radical predilection. The incidence of most of the hamartomas remains unknown except pulmonary hamartoma, in which the incidence rate is approximately 0.25% . Pulmonary hamartomas are 8% of all lung tumors; most of them are diagnosed incidentally. The most common patient age range is 40- 70 years.[4] Hamartomas are fundamentally composed of disordered replications of normal tissue cells. The underlying mechanism of anomalous replications are not fully recognized. The distinct property is a clearly demarcated mass mainly containing fat and cartilage, but other tissue cells may also be present depending on the anatomic location. The size of most of the hamartomas is between 1 to 3cm,. Hamartomas are usually not encapsulated and have multiple lobes by septations. [5] On microscopic examination hamartomas have characteristics similar to any benign tumor, such as haphazard growth of the normal tissue and architectural pattern of cytologically normal cells native to the local site. There is usually no sign of metastasis or local invasion. Usually adipocytes and single chondrocytes appear in lacunae with the abundant neighboring matrix, and some other cell types may also be found depending on the site of origin.[6] One study yielded 89.78% accuracy for ultrasonography in the diagnosis of breast hamartoma taking histopathology as gold standard with an observed prevalence of malignant breast mass to be 25.55% .[7] The aim of this study is to determine the diagnostic accuracy of ultrasonography in diagnosis of breast hamartoma keeping histopathology as gold standard. Rare literature exits which has prompted me to carry out this study in order to get robust local evidence and share it with local clinicians in the shape of a guideline for future studyes and benefit of patients in our local population.

MATERIALS AND METHODS:

This Cross sectional study was conducted in the department of radiology, Medical teaching institution Hayatabad medical complex Peshawar from May 2022 to May 2023. A total of 905 patients were included in this study. Patients referred to radiology department of our hospital for screening of breast lump and patients having age between 20 to 70 years were included. All the patient presented for females. Patient already diagnosed for breast hamartoma and patients unwilling to participate in this study study were excluded from this study. Approval was obtained from hospitals ethical committee and CPSP Karachi REU department after which informed consent was taken from all the patients referred to radiology department of our hospital for screening of breast lump. However, prior to the conduct of study, the purpose of study was explained to all the patients. Once all formalities were completed clinical history was taken in each case. Patients were asked to lie in supine or lateral position. The location, largest diameter, border, echogenicity and the coexistence of calcifications in the breast lesions was examined by ultrasonography. Patients were diagnosed for breast hamartoma as per operational definition i.e on ultra sonography it is an oval shape with circumscribed margins showing heterogeneous echogenicity without changed posterior echogenicity .Final diagnosis of breast hamartoma was obtained by histopathology results obtained from the laboratory lesions via US guided 7G VAB or surgical excision from each patient. Histopathologic diagnosis of breast hamartoma was made by a consultant pathologist with seven years of post-fellow ship experience in breast pathology, who was blinded to the ultra sonographic results. All the information such as age, gender, size of lesion, and findings of breast hamartoma on ultrasonography and histopathology was recorded on a pre designed proforma. The data was analyzed statistically with the help of SPSS, version 23.0. Mean and SDs were calculated for numerical variables such age, size of lesion. Frequencies and percentages were calculated for categorical variables such as gender,ultrasonographyfindings, istopathological findings and diagnostic accuracy. Diagnostic accuracy was stratified with age, gender, site and size of lesion.

Study Design and Setting

The study took place during May 2022 up until May 2023 in the Radiology Department at Medical Teaching Institution, Hayatabad Medical Complex, Peshawar.

Study Population

The Study included a total participant count of 905 patients.

Ethical Approval Statement .

Approval for the study came from the Hospital's Ethical Committee combined with CPSP Study and Ethical Unit under Approval **No: CPSP/REU/RAD/-2021-182-6244**. Every participant granted their permission through written informed consent prior to study entry. The study goal was conveyed to all subjects during their pre-collection information session.

Inclusion Criteria

The study examined female patients between the ages of 20 to 70 who received breast lump screening in the radiology department.

Patients presented with both clinical and radiological indications of breast hamartoma.

Exclusion Criteria

Healthcare providers should not include patients who already carry a breast hamartoma diagnosis in their study. The study excluded patients who refused to take part as participants.

Study Procedure

Each participant provided informed consent before the studyer proceeded to obtain their clinical history. Patients needed to maintain either supine or lateral positions when undergoing ultrasound examinations. A professional analyzed the following key features of the breast lesions during ultrasonography examination:

- Location
- Largest diameter
- Border characteristics
- Echogenicity
- Presence of calcifications

Breast hamartoma received its diagnosis from operational criteria showing an oval-shaped solid mass through ultrasonography together with circumscribed margins alongside heterogeneous echogenicity yet no echogenic changes in the posterior section.Breast hamartoma received its final diagnosis through histopathological testing which made use of ultrasound-guided 7G vacuum-assisted biopsy (VAB) or surgical removal techniques. A consultant pathologist examined the specimens who owned seven years of post-fellowship experience and was unaware of the ultrasound results.

Data Collection and Statically Analysis

The proforma featured all needed data points about patients' demographic information and diagnostic characteristics along with measurement results and biopsy outcomes. The SPSS version 23.0 software performed the statistical assessments.A statistical evaluation was performed for numeric variables using mean values and standard deviation measurement (SD).documented categorical variables including gender and diagnostic accuracy together with ultrasonographic findings and histopathological findings as frequencies and percentages. The diagnostic accuracy assessment used specific age, gender, location, and size criteria for patient classification.

RESULTS:

This study was conducted on 905 patients presented at the department of radiology MTI Hayatabad medical complex hospital, Peshawar. Mean and SDs (standard deviation) for age was 35.63 years and standard deviation was 3.5 and mean and SDs for size of lesion was 4.827±.5269 cm. (Table no 1). All the patients were female. Out of 19 patients age wise 12 (63.15%) were less than 45 years and 7 (36.84%) were more than 45 years. (Table no 2). In 10 patients (52.63%) the lump was in the right breast and in 9 (47.36%) the lump was in the left breast. (Table no 3).All the patients i.e 905 were subjected to ultrasonography and all these patients were female. In 15 patients (1.7%) hamartoma was diagnosed on ultrasonography. (Table no 4). Clinical presentation of these patients waspainless mass in 15 (78.94%) and in 4 (21.05%) patients the findings were incidental. (table no 5). Preoperatively 9 patients (47.3%) were diagnosed on core biopsy. , 15 on ultrasonography (78.94%) and 4 (21.05) patients on mammography. As mammography is not indicated in patients less than 35 years and in our study patients less than 35 years were more . (Table no 6).All these patients were referred from surgical OPD , ward so they were referred back to their respective OPDs. Of 905 patients 875 patients underwent surgical removal of the lump and 30 patients were not willing for surgery. These patients were followed for 30 months. No recurrence or malignancies was seen in follow up. Out of these 875 patients 19 (2.17%) patient were diagnosed as breast hamartoma on histopathology. (Table no7. Of these 19 patients 15 (1.7%) patients were those who were diagnosed prior to surgery on ultrasonography and later on confirmed by histopathology.The study participants had a mean age of 35.63 ± 3.54 years, indicating a relatively young adult population with a small standard deviation, suggesting that most individuals were concentrated around this mean age. The mean size of the lesion was 4.827 ± 0.5269 cm, which shows that the lesions varied slightly in size but were generally similar in dimension across the study group. The relatively low standard deviation for lesion size indicates a fairly consistent size of lesions among the participants.

Table No 1 : Descriptive statistics of study: (N=905)

Numerical Variables	Mean	Std. Deviation
Age (Years)	35.63	3.54
Size Of Lesion (Cm)	4.827	0.5269

The study population consisted entirely of females (100%), with an age distribution as follows: 63.15% (12) were under 45 years of age, and 36.84% (7) were over 45 years of age. This indicates a higher proportion of younger females in the study, with a smaller but significant group of older females.

Table no 2: Age wise distribution

Gender/ Age	Frequency	Percent
Female	19	100%
< 45 years	12	63.15%
>45 years	7	36.84%

The distribution of lesion sites among the study participants revealed that 52.63% (10) were on the right side, while 47.36% (9) were on the left side. This shows a nearly balanced occurrence of lesions on both sides, with a slight predominance on the right side.

Table no 3: Site wise distribution

Site of lesion	Frequency	Percent
Right	10	52.63 %
Left	9	47.36 %

The ultrasonographic findings for breast hamartoma revealed that 1.7% (15) of cases were positive for hamartoma, while 98.3% (890) showed no evidence of hamartoma. Out of a total of 905 cases, the overwhelming majority did not exhibit breast hamartoma, indicating that it is a rare finding in this population.

Table no 4: Frequencies and Percentages for breast Hamartoma on Ultrasonography

Breast hamartoma on ultrasonography	Frequency	Percent
Yes	15	1.7 %
No	890	98.3 %
Total	905	100.0%

Among the study participants, 78.94% (15) presented with a painless mass, while 21.05% (4) had their condition identified incidentally. This indicates that the majority of cases were symptomatic with a painless mass being the predominant clinical feature, while a smaller proportion were asymptomatic and discovered incidentally.

Table no 5: Presenting symptoms

Painless mass	15	78.94 %
Incidental	4	21.05 %
Total	19	100 %

The diagnostic methods used in the study revealed that 47.3% (9) of patients underwent a core biopsy for evaluation. Radiological diagnosis was predominantly performed using ultrasonography in 78.94% (15) of cases, while mammography was used in 21.05% (4) of cases. These findings highlight the reliance on ultrasonography as the primary imaging modality for diagnosis, with core biopsy serving as an important confirmatory tool in nearly half of the cases.

Table no 6 : Pre operative diagnosis

Core biopsy	**9**	**47.3 %**
Radiological diagnosis		
Ultrasonography	15	78.94 %
Mammography	4	21.05 %

Among the total of 875 cases analyzed, breast hamartoma was confirmed on histopathology in 2.17% (19 cases), while 97.82% (856 cases) did not have a diagnosis of breast hamartoma. This indicates that breast hamartoma is a relatively rare finding in histopathological evaluations of breast lesions.

Table No:7 Frequencies and percentages for breast hamartoma on histopathology

Breast hamartoma on histopathology	Frequency	Percent
Yes	19	2.17 %
No	856	97.82%
Total	875	100.0%

DISCUSSION:

Breast hamartoma is an uncommon benign lesion of the breast comprising 4.85% of all benign breast masses [1,2,10] ·This term was first introduced by Arrigino, etall in 1971.[14] Breast hamartoma contains glandular epithelium, adipose tissue, and fibrous connective tissue in variable proportion[13] .They are characterized by slow growth and vary in size from tiny masses to tumor like formations measuring 10-12cm in diameter, which may occupy almost all the breast. Hamartoma represents 4-6 % of the benign breast lesion diagnosed in women. They are extremely rare in male[15,9] and in our study all the patients were female and the most common patient age is 40-70 years,[4] but in our study the common age range was from 20-70 years.They can develop at any age after puberty up to 60 % of hamartomas are subclinical i.e they cannot be detected by palpation. Clinically evident form present on physical examination as soft, round / oval nodular mass . That are smooth surfaced. They are generally not associated with any symptom and usually present as a painless mass the increasing use of screening mammography has led to increase in the diagnosis of breast hamartoma [14] . In our study only 4 patients were diagnosed on mammography because most of the patients were less than 35 years of age so screening mammography was performed on few cases. In contrast to mammography ultrasonography can provide detailed information about the extent, nature,content,mobility and homogeneity of the breast lesion. Hamartoma contains normal breast tissue cytological and histologically and have a heterogeneous tissue distribution. The presentation of hematoma on ultrasound differ widely owing to the marked variability in the adipose tissue and fibrous connective tissue content. In most cases, they appear as solid well defined oval formation lying parallel to the skin plane. The echo structure is inhomogeneous with hypoechoic areas intermixed with hyperechoic band like or nodular areas reflecting the presence of the adipose tissue epithelium and fibrous connective tissue. Some lesion have a bulls eyes in a multilayered appearance on mammography which is pathognomonic.Hyper vascularization is absent on color doppler imaging. The diagnosis can be difficult when the mass is small with low fat content and the pseudo capsule is incomplete [14,15] . Breast hamartoma is frequently surrounded by narrow zone of radiolucency which is usually referred to as its false capsule or pseudo capsule [16]

,and it is because of pushing and reinforcement of the lump on surrounding breast parenchymal tissue.[17] Data on the literature are limited on the specific electrographic characteristics of hamartoma but their consistency and compressibility are known to depend on the amount of adipose tissue they contain which is highly variable [18] . The presence of the amount of fibrous tissue in hamartoma have distinct electrographic features, with fibrous and glandular tissue displaying greater stiffness than fat tissue [19,20] . The use of electrographic software can be helpful for defining the margins of the mass[21] . The clinical diagnosis of breast hamartoma depends on combining ultra sonography, mammography and histopathologic examination of the breast lump and these modalities of breast lump examination are useful to reduce the risk of misdiagnosis [22] Combining the diagnostic methods will be much better than using a single tool which may lead to misdiagnosis.[23]Surgical excision of the breast hamartomatous lesion is believed to be curative and they have an excellent prognosis.

CONCLUSION:

In summary it is concluded that breast hamartomas are rare tumors similar to other uncommon breast pathologies, definitive diagnosis can be made on combining the result of clinical, radiological and histopathological examination.

Disclaimer: Nil

Conflict of Interest:Nil

Funding Disclosure: Nil

Authors Contributions

Concept & Design of Study: Maheen Israr[1], Ashir Israr[2]

Drafting: , Ghazala Wahid[3], Tariq Khan[4]

Data Analysis: Munazza Kainat Shuja[5],Muhammad Israr[6]

Critical Review: Munazza Kainat Shuja[5],Muhammad Israr[6]

Final Approval of version: All Mentioned Authors Approved The Final Version.

REFERENCES:

1. Alran L, Chamming's F, Auriol-Leizagoyen S, Velasco V, Deleau F, Brouste V, et al. Breast hamartoma: reassessment of an under-recognised breast lesion. Histopathology. 2022;80(2):304-13.

2. Brodie A, Eltatawy A, Lambert K. Pseudoangiomatous stromal hyperplasia causing massive unilateral breast enlargement-a case report. Translational breast cancer research : a journal focusing on translational research in breast cancer. 2022;3:19.

3. Chitty C, Dessauvagie B, Taylor D. Giant breast masses: A pictorial essay. Journal of medical imaging and radiation oncology. 2019;63(4):467-72.

4. Filippo G, Gaudino R, Calcaterra V, Villani A, Bozzola E, Bozzola M. Incidental pineal gland cyst in girls with early onset of puberty. Italian journal of pediatrics. 2022;48(1):44.

5. Fox G, Devanathan R. Breast hamartoma in an adolescent female. Australian journal of general practice. 2019;48(5):275-6.

6. Gültekin I, Şendur HN, Gültekin S, Arslan Kahraman D. Sonoelastographic findings of myoid hamartoma. The breast journal. 2020;26(2):291-2.

7. Guo Y, Lu L. Breast myoid hamartoma: A rare case report. Asian journal of surgery. 2022;45(12):2886-7.

8. He P, Chen W, Cui LG, Zhang H. Can Short-term Follow-up with Ultrasound be Offered as an Acceptable Alternative to Immediate Biopsy or Surgery for Patients with First Ultrasound Diagnosis of BI-RADS 4A Lesions? World journal of surgery. 2023;47(9):2161-8.

9. Hedjoudje A, Peng X, Gautam A, Pardo CA, Sciubba D, Gailloud P. Case of Cowden Syndrome with 15 Spinal Arteriovenous Fistulas. World neurosurgery. 2020;139:567-76.

10. Hoxhaj A, Drissen M, Vos JR, Bult P, Mann RM, Hoogerbrugge N. The yield and effectiveness of breast cancer surveillance in women with PTEN Hamartoma Tumor Syndrome. Cancer. 2022;128(15):2883-91.

11. Karki S, Shrestha A, Shrestha B. Adenolipoma of the Breast: A Case Report. JNMA; journal of the Nepal Medical Association. 2021;59(243):1189-91.

12. Kesim S, Ozguven S, Oksuzoglu K, Erdil TY. Lhermitte-Duclos Disease Related With Cowden Syndrome Mimicking Metastatic Lung Cancer on FDG PET/CT. Clinical nuclear medicine. 2023;48(2):e99-e100.

13. Kim SJ, Kim WG. Sonographic Features of a Myeloid Sarcoma of the Breast as a Relapse of Acute Myeloid Leukemia After Stem-Cell Transplantation: A Case Report. The American journal of case reports. 2019;20:612-9.

14. Kocakusak A, Ferlengez E. Hamartoma in breast is a sheep in wolves' clothes instead of a wolf in sheep' clothes with a breast within a breast sign as a growing health problem. The breast journal. 2020;26(3):520-1.

15. Komaki K, Funagayama M, Saitoh T, Maeda Y, Hayashi T, Kanematsu M, et al. Ductal carcinoma in situ of the breast arising in encapsulated mammary hamartoma ; A case report. The journal of medical investigation : JMI. 2020;67(3.4):368-71.

16. Li M, Lin G, You W, Zhen W, Xu C, Hong J, et al. Hamartoma of the breast in a man: A rare case report. Medicine. 2019;98(50):e18372.

17. Liu G, Wang ZL, Zhang MK, He Y, Liu Y. Breast hamartoma: Ultrasound, elastosonographic, and contrast-enhanced ultrasound features. Journal of cancer research and therapeutics. 2019;15(4):864-70.

18. Molière S, Mathelin C. The Cowden Syndrome. The New England journal of medicine. 2020;382(15):e29.

19. Ramkumar RR, Murthy PB, Nguyen JK, McKenney J, Eng C, Campbell SC. PTEN Hamartoma Tumor Syndrome: A Case of Renal Cell Carcinoma in a Young Female. Urology. 2021;148:113-7.

20. Tazeoğlu D, Dağ A, Arslan B, Berkeşoğlu M. Breast Hamartoma: Clinical, Radiological, and Histopathological Evaluation. European journal of breast health. 2021;17(4):328-32.

21. Türkyılmaz Z, Aydın T, Yılmaz R, Önder S, Özkurt E, Tükenmez M, et al. Our 20-Year Institutional Experience with Surgical Approach for Breast Hamartomas. European journal of breast health. 2019;15(3):171-5.

22. Yeung C, Wanzel KR. What you see is not always what you get: Radiographic-pathologic discordance among benign breast masses. Breast disease. 2019;38(3-4):117-23.

23. Yoshimoto N, Yanagi A, Takayama S, Sakamoto M, Tomoda K, Ishikawa K, et al. Axillary Lymph Node Swelling After COVID-19 Booster Vaccination: Japanese Case Report and Literature Review. In vivo (Athens, Greece). 2022;36(4):1977-81.