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Imaging Features of Mucinous Carcinoma of the Breast

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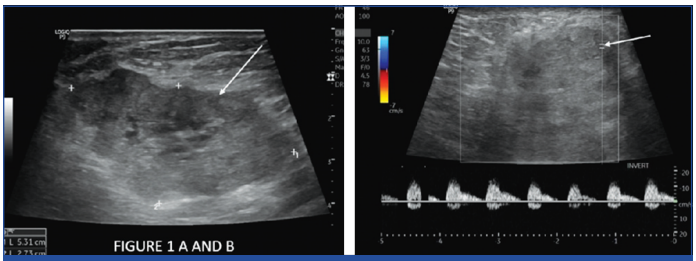
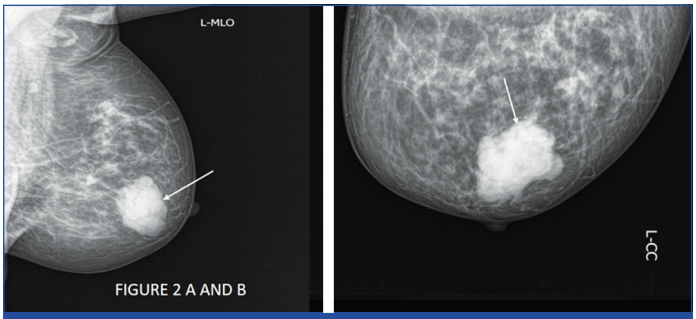
A 57-year-old female, a housewife, presented with complaints of a gradually increasing lump in the left breast for two months. There was no history of nipple discharge, weight loss, or loss of appetite. Additionally, there was no family history of breast carcinoma. On local examination and palpation of the left breast, a palpable lump measuring 6x6 cm was found. The lump involved the retroareolar and lower outer quadrant, and it had a firm consistency and was mobile. The overlying skin was pinchable. The nipple-areolar complex and left axilla were normal. The lump was non tender. The patient was then referred for mammography and ultrasound of the breast. The ultrasound revealed a hypo to isoechoic lesion measuring 5.3x2.7 cm with microlobulations and minimal peripheral vascularity in the lower outer quadrant of the left breast [Table/Fig-1a,b]. No significant left axillary lymph nodes were detected. The mammography showed a relatively high-density lobulated well-defined mass in the retroareolar and lower outer quadrant of the left breast. No microcalcifications or surrounding architectural distortion were detected [Table/Fig-2a,b]. Radiologically, a Breast-imaging Reporting and Data System (BI-RADS) 3 or 4a lesion was considered since the lesion had well-defined lobulated margins. Magnetic Resonance Imaging (MRI) was performed, which showed a well-defined lobulated mass without diffusion restriction, mimicking a benign lesion [Table/Fig-3a,b]. The patient then underwent fine needle aspiration cytology, which revealed Mucinous Carcinoma (MC) of the breast. Subsequently, the patient underwent a modified radical mastectomy after a metastatic work-up. There was no evidence of distant metastasis on chest X-ray, abdominal ultrasound, and bone scan. The patient was not able to afford Positron Emission Tomography-computed Tomography (PET-CT). The resected specimen showed features

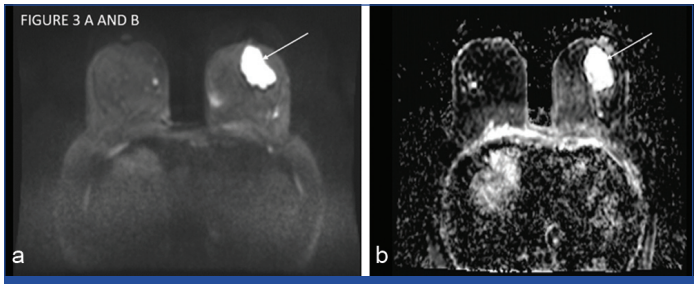


[Table/Fig-1a,b]: Ultrasound showing the lobulated iso to hypoechoic mass with peripheral vascularity (white arrows).



[Table/Fig-2a,b]: Mammography image showing lobulated high density mass (white arrows).

of MC of the breast with pathological staging of pT1bN0Mx. Two axillary lymph nodes were resected, and they were free of tumour. The tumour was unifocal with a histological grade of 2. The cancer was both Estrogen Receptor (ER) and Progesterone Receptor (PR) positive, Human Epidermal Growth Factor Receptor (HER2) 2 negative. The mucin content was over 90%, suggesting the pure mucinous variety rather than the mixed variety. The patient was then referred to a medical oncologist for chemotherapy. The patient is presently doing well after six months of follow-up.



[Table/Fig-3a,b]: MRI diffusion and apparent diffusion coefficient image showing left breast mass without diffusion restriction (white arrows).

Mucinous Carcinoma (MC), also known as colloid carcinoma of the breast, is a rare and well-differentiated type of invasive adenocarcinoma. It represents about 4% of all invasive breast cancers and has a better prognosis. It is more common in perimenopausal and postmenopausal women [1,2]. Mucinous breast carcinoma is characterised by the production of a large amount of extracellular mucin and can be divided into two main subtypes: Pure Mucinous Carcinoma (PMC) and Mixed Mucinous Carcinoma (MMC). The pure variety of MC consists of atleast 90% mucin, either intracellular or extracellular, and is more common than the mixed variety [1]. The pure variety of MC generally has a better prognosis than the mixed variety and is usually both ER- and PR-positive, HER2 negative, as observed in the present case [1,2]. If the tumour is positive for HER2, trastuzumab is the first-line treatment [3]. Pure MCs show less frequent metastasis to axillary lymph nodes compared to mixed tumours, as seen in the present case. On imaging, the pure variety of MC mimics a benign lesion with a well-defined borders on both mammography and ultrasound [4]. Lobulations often indicate a high mucin content, as observed in the present case. On ultrasound, the lesion may appear isoechoic, similar to the surrounding fat in its pure form. However, in the present case, the mass was iso to hypoechoic and clearly showed lobulated borders [4]. The mixed form typically appears hypoechoic on ultrasound [4]. On MRI, pure MCs exhibit very high T2 signal intensity due to abundant mucin and may not show diffusion restriction or a low apparent diffusion coefficient value, as observed in invasive ductal carcinoma, similar to the present case [5]. A pure variety of MC can have a smooth or irregular margin, as in the present case, while all mixed tumours have irregular margins. The very high signal intensity of MC on T2-weighted images, resulting from the abundant accumulation of mucin, is a common MRI feature in both pure and mixed forms

[5]. Since the imaging features of the pure variety of MC mimic those of a benign lesion, histopathology is crucial for diagnosis. The increased production of mucin has been associated with a better prognosis because it acts as a barrier to limit the spread of these tumours [6,7]. Except for HER2 overexpressing MCs, surgery is the main treatment strategy supported by adjuvant chemotherapy and radiotherapy [1,8].

REFERENCES

[1] Marrazzo E, Frusone F, Milana F, Sagona A, Gatzemeier W, Barbieri E, et al. Mucinous breast cancer: A narrative review of the literature and a retrospective tertiary single-centre analysis. Breast. 2020;49:87-92. Doi: 10.1016/j.breast.2019.11.002. Epub 2019 Nov 11. PMID: 31783314; PMCID: PMC7375663.

[2] Lu K, Wang X, Zhang W, Ye H, Lao L, Zhou X, et al. Clinicopathological and genomic features of breast mucinous carcinoma. Breast. 2020;53:130-37. Doi: 10.1016/j.breast.2020.07.010. Epub 2020 Aug 6. PMID: 32781417; PMCID: PMC7419658.

[3] Hernandez IG, Marcos MC, Montemayor MG, Sotomayor DL, Ochoa DP, Gomez Macias GS. Her2 positive mucinous carcinoma breast cancer, case report. Int J Surg Case Rep. 2018;42:242-46. Doi: 10.1016/j.ijscr.2017.12.025. Epub 2017 Dec 26. PMID: 29291541; PMCID: PMC5752214.

[4] Lam WW, Chu WC, Tse GM, Ma TK. Sonographic appearance of mucinous carcinoma of the breast. AJR Am J Roentgenol. 2004;182(4):1069-74. Doi: 10.2214/ajr.182.4.1821069. PMID: 15039190.

[5] Monzawa S, Yokokawa M, Sakuma T, Takao S, Hirokaga K, Hanioka K, et al. Mucinous carcinoma of the breast: MRI features of pure and mixed forms with histopathologic correlation. AJR Am J Roentgenol. 2009;192(3):W125-31. Doi: 10.2214/AJR.07.4021. PMID: 19234240.

[6] Luna-Abanto J, Mendoza Tisoc G. Mucinous carcinoma of the breast: A case report and review of the literature. Medwave. 2017;17(6):e7003. Spanish, English. Doi: 10.5867/medwave.2017.06.7003. PMID: 28753591.

[7] Kryvenko ON, Chitale DA, Yoon J, Arias-Stella J 3rd, Meier FA, Lee MW. Precursor lesions of mucinous carcinoma of the breast: Analysis of 130 cases. Am J Surg Pathol. 2013;37(7):1076-84. Doi: 10.1097/PAS.0b013e31828de420. PMID: 23759933.

[8] Bae SY, Choi MY, Cho DH, Lee JE, Nam SJ, Yang JH. Mucinous carcinoma of the breast in comparison with invasive ductal carcinoma: Clinicopathologic characteristics and prognosis. J Breast Cancer. 2011;14(4):308-13. Doi: 10.4048/jbc.2011.14.4.308. Epub 2011 Dec 27. PMID: 22323918; PMCID: PMC3268928.

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