

## Case Report

# Incidentally Detected Mixed Type Mucinous Carcinoma of the Breast in an Asymptomatic 79 Year Old Female

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- Neoplasm
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- MRI

**Abstract**

Mucinous carcinoma is a rarely occurring form of breast cancer that exists in two forms, pure and mixed. Differentiation between these is based on the amount of extracellular mucin in the tumor. This malignancy has a more favorable prognosis when compared to other forms of breast cancer, however diagnosis can be challenging as the imaging findings may not be suggestive of breast cancer. Because of a high mucin content these tumors can demonstrate findings associated with benign entities such as enhanced through transmission on ultrasound and high T2 signal on MRI. This report describes the incidental diagnosis of a case of mixed type mucinous carcinoma in an asymptomatic elderly female.

**INTRODUCTION**

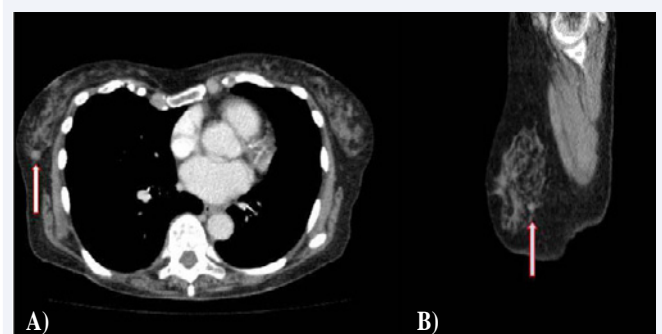
Mucinous carcinoma of the breast is a rare entity that accounts for 1-7% of all invasive breast cancers [1]. Prevalence is age related, and can be up to 7% in patients that are over 75.

In patients 35 or less the prevalence is 1%. It is characterized by a large amount of extracellular mucin and exists as two distinct entities, pure and mixed. Pure mucinous carcinoma consists almost exclusively of tumor tissue with extracellular mucin production while the mixed type includes an invasive ductal epithelial component without mucin [2]. The specific percentage of mucin required for diagnosis of mucinous carcinoma has not been agreed upon. However, by consensus, a diagnosis of pure mucinous carcinoma is given to those tumors containing 90% or more of mucin [3]. Differentiation between subtypes is important because pure mucinous tumors have a better prognosis than mixed tumors [1]. The pure subtype has a lower rate of metastasis to the axillary lymph nodes than does the mixed subtype. In patients with pure mucinous carcinoma, the frequency of axillary metastasis has been reported as 14-15% while in the mixed subtype it is 46% [4]. Survival is also improved in the pure subtype compared to the mixed subtype, with the 10 year survival rates ranging from 87-90.4% and 54-66% respectively [4,5].

**CASE PRESENTATION**

A 79 year old female with a past history of treated small lymphocytic lymphoma presented for a routine follow up CT of

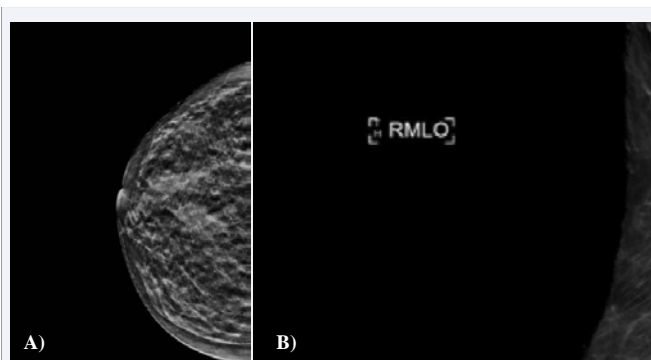
the chest, abdomen, and pelvis which revealed an incidental 1.1 cm round mass in her right breast (Figure 1A, 1B). Subsequent diagnostic mammogram and ultrasound were then performed. Although the mass was difficult to appreciate on mammogram (Figure 2A, 2B), ultrasound of the breast revealed a 7 mm oval, circumscribed, mixed echogenicity mass, with enhanced through-transmission at 9:00 (Figure 3). This mass was biopsied under ultrasound guidance. Interestingly, the mass became smaller with each subsequent pass (Figure 4). Pathology revealed a diagnosis of grade 1 invasive ductal carcinoma with mucinous features. Contrast enhanced MRI of the breast was then performed and demonstrated an irregular, peripherally enhancing mass representing the biopsy proven cancer (Figure 5).



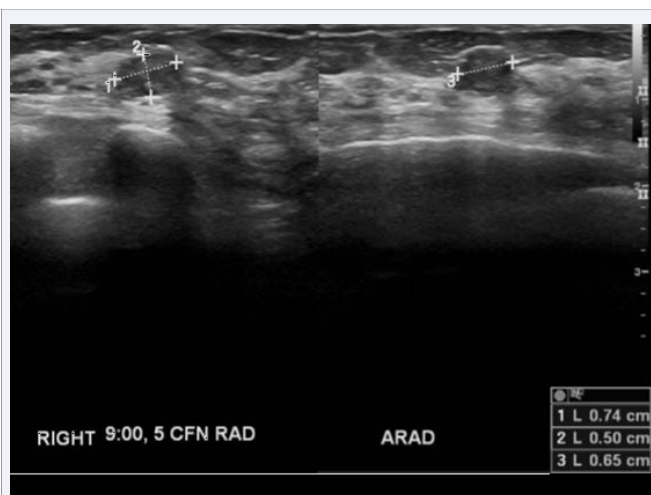
**Figure 1** (A) Axial and (B) sagittal contrast enhanced CT images reveal a new 1.1 cm mass in the right breast at 9:00.

## DISCUSSION

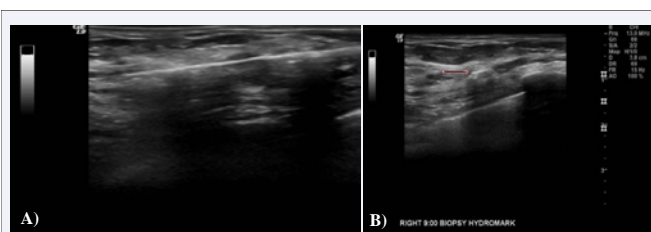
Diagnosis of mucinous carcinoma can be challenging from a radiological and clinical perspective. When mammographically apparent, it commonly presents as an oval mass with either circumscribed or microlobulated margins [6]. Circumscribed margins are associated with the pure subtype while indistinct margins are associated with the mixed subtype. More benign mammographic features have been reported to correspond with increasing amount of mucin in the tumor [7]. Conversely, the



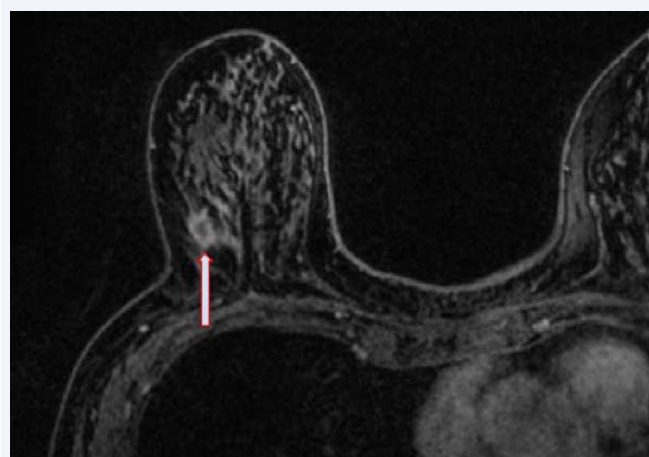
**Figure 2** (A) CC and (B) MLO views of the right breast do not demonstrate the known mass.



**Figure 3** Ultrasound of the right breast revealed a 7 mm oval, circumscribed, mixed echogenicity mass, with enhanced through-transmission, in the right breast at 9:00.



**Figure 4** Biopsy images show (A) the mass after the first core needle pass and (B) the placement of the biopsy clip after 5 passes. The mass is no longer apparent by the end of the procedure.



**Figure 5** Contrast enhanced MRI of the breasts revealed a peripherally enhancing mass in the right breast representing the biopsy proven mixed mucinous carcinoma.

concerning mammographic finding of spiculation has been shown to be associated with decreased mucin volume and invasive histological margins [7]. Because of the high mucin content, these tumors are typically low density [8]. Calcifications are a rare feature of mucinous carcinoma but can be seen histologically [7]. If clinically apparent, these tumors present as soft masses although reports of palpable abnormalities resulting in diagnosis have ranged from 55-92% [1,2].

The sonographic appearance of mucinous carcinoma can vary, ranging from a homogenous mass, either isoechoic or hypoechoic to surrounding tissue, to a complex mass with cystic and solid components [6]. Enhanced through-transmission is also a characteristic that can be present. Homogeneity on ultrasound is associated with pure mucinous carcinoma. Previous reports in small groups of patients have shown that most lesions are hypoechoic. Of these, 37.5-71% demonstrated enhanced through-transmission [7,9]. Echogenicity may be used to predict histologic subtype as isoechoic masses were found to represent pure mucinous carcinoma while hypoechoic masses were associated with mixed mucinous carcinoma [10].

The MRI appearance of mucinous carcinoma can be characterized by very high signal on T2 weighted images. This is because the extracellular mucus is rich in free water, especially in the pure subtype. However, this finding may not be present in tumors with secondary pathological changes such as necrosis, hemorrhage, or calcification. Morphologically, pure tumors have been reported to have smooth or irregular margins

whereas mixed tumors are exclusively associated with irregular margins [11]. Mucinous tumors demonstrate persistent enhancement on dynamic imaging with some mild rim or heterogeneous enhancement on early phase images and strong rim or heterogeneous enhancement on delayed phase images [11]. Microscopically, mucinous carcinoma is characterized by small clusters or individual uniform epithelial cells with mild to moderate nuclear atypia, prominent nuclei, vesicular nucleoli, and a moderate amount of cytoplasm floating in abundant pools of extracellular mucoid material [2]. Mixed type

mucinous breast cancer includes a component of intraductal or invasive carcinoma, either ductal or lobular, usually at the periphery of the lesion [2]. This case is representative of many of the common features of mucinous breast cancer, specifically the mixed subtype. Initial discovery of the mass was incidental which is not unusual for an indolent malignancy such as this one. Although it was mammographically occult, ultrasound and MRI yielded characteristic imaging findings. The enhanced through transmission seen on ultrasound could represent a diagnostic pitfall and lead the radiologist to misinterpret the finding as a complicated cyst rather than a more serious entity. Interestingly, on biopsy, the mass became smaller and smaller with each successive pass. This phenomenon could further strengthen the perception of a benign entity and result in false reassurances to the patient before pathology results are returned.

As demonstrated by this case, mucinous carcinoma of the breast may be difficult to detect solely by mammography and when actually detected may mimic a less serious finding. Consideration should be given to this entity anytime a mixed echogenicity mass with enhanced through transmission is identified on ultrasound, especially in an older patient.

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