

Pseudocirrhosis in metastatic breast cancer: an overview

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Background

Pseudocirrhosis is an uncommon but significant complication of metastatic malignancy, most commonly seen in primary breast cancer. Rarely, in patients who receive systemic chemotherapy for breast carcinoma metastatic to the liver, a morphological pattern develops that mimics cirrhosis with the serial development of hepatic changes, without the typical histopathological changes.

Despite being an uncommon finding, it remains a potentially lethal complication so it is important for breast radiologists to understand and aid in management of this condition.

Learning Objectives

- Improve awareness of pseudocirrhosis in breast cancer
- Background overview of pseudocirrhosis in breast cancer
- Emphasise importance of early diagnosis and imaging
- Understand that the pathophysiological mechanisms are distinctive from cirrhosis
- Illustrate the common radiological findings
- Discuss methods of assessing disease progression and management

Pathophysiology

Despite the radiological similarities with macronodular cirrhosis, pseudocirrhosis demonstrates a distinct pathophysiology and histology. The pathogenesis of pseudocirrhosis is thought to be multifactorial, likely secondary to the use of chemotherapy treatment of breast cancer.

One hypothesis is that scarring and capsular retraction occur as a result of hepatic tumoral response to chemotherapy with fibrosis surrounding the infiltrative masses.



Another theory suggests development as a result of the nodular regenerative hyperplasia in response to hepatic injury caused by chemotherapy, attributed to by ischaemic atrophy with secondary nodular hyperplasia in areas of favourable blood flow leading to development of portal hypertension. Several causative agents include paclitaxel, capecitabine and doxorubicin.

Imaging Findings

Many patients present with complications arising from portal hypertension and deranged liver function tests, although some patients may be asymptomatic with findings noted incidentally on surveillance imaging.

Radiologically, pseudocirrhosis is characterised by features that resemble cirrhosis such as capsular reduction, increased contour nodularity, caudate lobe hypertrophy and segmental volume loss. Development of signs of portal hypertension are often a feature including; splenomegaly, varices and ascites.

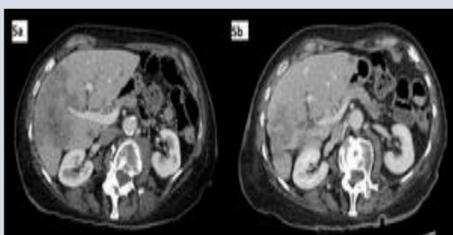


Fig. 1a. Axial contrast enhanced CT with multiple low attenuation liver metastases in a patient with breast cancer prior to chemotherapy. **Fig 1b.** Follow up CT performed 5 months later demonstrating chemotherapy induced pseudocirrhotic changes.

Since pseudocirrhosis progresses far more rapidly than true cirrhosis, it is easier to detect hepatic changes on serial staging CT imaging. Over time, there will be more significant capsular retraction and fibrosis, which usually demonstrates worsening over a relatively short interval.



Fig.2a. Axial CT with arterial phase contrast enhancement demonstrating pseudocirrhosis in a patient with metastatic breast cancer. **2b.** T2 weighted MRI image performed the same day demonstrates heterogeneity of hepatic parenchyma consistent with diffuse infiltration.



Fig. 3: Ultrasound image of a patient with metastatic breast cancer with evidence of pseudocirrhosis as seen on CT and MRI performed on the same day (see Fig. 2).

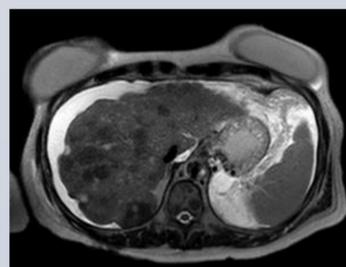


Fig. 4. MRI axial T2 image of a patient with metastatic breast cancer treated with chemotherapy showing multiple hepatic metastases with pseudocirrhotic changes.

Management

Not only does the similarity with cirrhosis lead to diagnostic uncertainty, pseudocirrhosis also impairs the ability to determine a patient's response to chemotherapy and monitor progression of metastatic disease.

Findings of pseudocirrhosis generally carry a very poor prognosis with the majority of patients dying within a number months and some cases weeks of diagnosis. It is important for radiologists to be able to detect these changes in order to try and diagnose earlier, prevent further progression and treat the complications of portal hypertension.

As a baseline, MRI liver should be performed on all patients to aid in evaluation of disease progression and to help in distinguishing between worsening metastases versus pseudocirrhosis. Figure 6. below shows comparison of contrast enhanced CT and MRI images of the same patient with pseudocirrhosis and hepatic metastases; comparatively MRI images delineate changes more clearly.

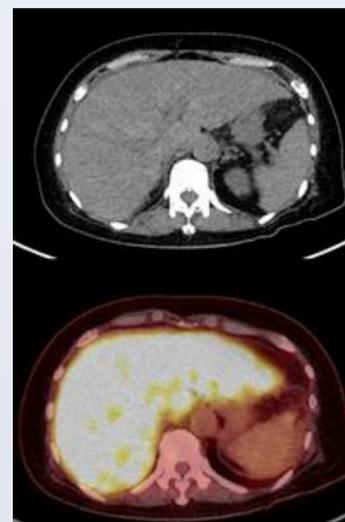


Fig. 5 F-18 FDG PET CT images demonstrate intense hypermetabolism involving the entire liver which is diffusely nodular with small volume ascites in a patient with known metastatic breast cancer and pseudocirrhosis.

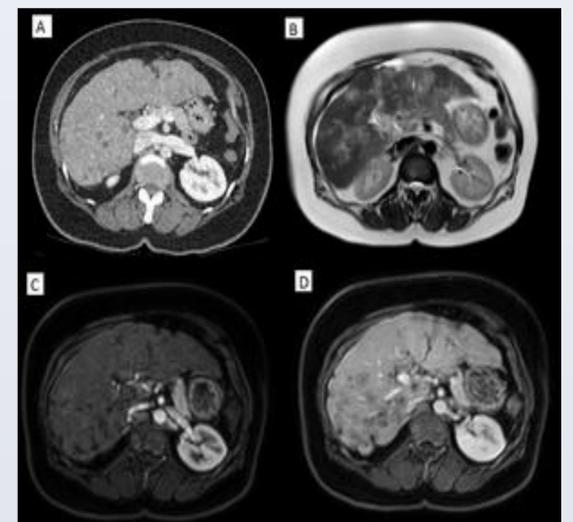


Fig. 6 A. Contrast enhanced CT of pseudocirrhotic change with hepatic metastases. MRI images of the same patient performed shortly afterwards demonstrate these changes more clearly; B. axial T2 images C. T1 arterial contrast D. T1 portal venous contrast MRI images.

Due to the rare nature of this condition the management plan is often unclear. Since there is a risk of hepatic decompensation, portal hypertension, encephalopathy and variceal bleeding the patient should be regularly monitored for progression of hepatic failure and treated accordingly. Furthermore, clinicians need to be aware of this situation in these patients as often chemotherapy agents should be modified and in some cases stopped to prevent disease progression.

Some studies have found no relationship between the number of metastases, receptor status, histopathology or chemotherapeutic regimen making pseudocirrhosis complications difficult to predict and subsequently treat. It remains a poorly understood entity and further studies are required to better risk stratify patients and develop more robust treatment strategies.

Conclusion

Pseudocirrhosis is a rare but clinically significant cause of morbidity in metastatic breast cancer being treated with chemotherapy. Ultimately, the process typically progresses to liver failure, portal hypertension and death.

It is important for radiologists and oncologists to be aware of this condition and be aware of how to recognise the imaging findings in order to guide management and improve morbidity. However, given the lack of evidence base in this area, further studies are required to develop more robust treatment strategies.

References and Acknowledgments

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