

Pseudoaneurysm in the Axillary Tail of the Breast After A Core Needle Biopsy

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ABSTRACT

We present the case of a forty-year-old asymptomatic female with no personal or family history of breast cancer, who underwent a core needle biopsy (CNB) following the identification of a focal asymmetry in the right breast on screening mammography. Eight months later, a prominent adjacent vascular structure with a round outpouching was detected on breast ultrasound, confirmed as a post-biopsy pseudoaneurysm. Breast pseudoaneurysms, although exceedingly rare, result from inadvertent vessel puncture during core needle biopsies, particularly when larger gauge needles are used. They present as palpable, throbbing lumps in the breast and are well-defined heterogeneous structures that exhibit turbulent flow with a feeding artery on color Doppler imaging. This swirling sign showing a to-and-fro waveform is also known as the "yin-yang" sign on Doppler ultrasound. Post-CNB pseudoaneurysms in the breast, while rare, should be considered as potential complications following core need biopsy. Understanding their characteristic imaging features, risk factors, and available management options is essential for early diagnosis and appropriate treatment. This case underscores the importance of vigilance in biopsy procedures and the need for prompt recognition and intervention in case of such complications.

Keywords: Ultrasound-guided core needle biopsy; vascular mass; pseudoaneurysm; yin-yang sign; CT angiogram; arterial phase hyperenhancement; thrombin

Cite this article as: Pluguez-Turull C, Toro CD, Brofman N, Feliciano YZ. Pseudoaneurysm in the Axillary Tail of the Breast After A Core Needle Biopsy. Eur J Breast Health. 2024; 20(4): 313-315

Key Points

- Although rare, breast pseudoaneurysms can occur as complications following core needle biopsies, especially when using larger gauge needles. Clinicians should be aware of this possibility and consider it in the differential diagnosis of palpable lumps or unusual vascular structures detected during followup imaging.
- Understanding the characteristic imaging features of breast pseudoaneurysms is crucial for accurate diagnosis. These features include well-defined heterogeneous structures with turbulent flow, often exhibiting the "yin-yang" sign on Doppler ultrasound.
- Management of breast pseudoaneurysms typically involves a multidisciplinary approach.

Introduction

Core needle biopsy (CNB) is a commonly performed procedure referred to as the gold standard for sampling suspicious lesions to obtain an accurate diagnosis (1). Given that CNB is both less invasive and less costly while maintaining accuracy in establishing a pathological diagnosis for suspicious breast lesions, it has the potential to effectively replace excisional biopsy (2). Complications following CNB of the breast are generally rare, occurring in less than 1% of cases. Some reported minor complications following CNB's of the breast include bruising, pain, and vasovagal reactions. More severe complications include severe bleeding, infection requiring antibiotics, and hematomas requiring treatment all occurring in less than 1% of cases (3).

Case Report and Discussion

A forty-year-old asymptomatic female with no personal or family history of breast cancer was sent for additional breast imaging after screening mammography identified a focal asymmetry in the right breast. Findings of a breast ultrasound included an indeterminate oval circumscribed hypoechoic solid mass in the right breast axillary tail region with an adjacent vessel (Figure 1). An ultrasound-guided CNB was recommended and performed with a 14-gauge needle. A biopsy marker was placed at the biopsy site and no complications occurred (Figure 2). The biopsy yielded benign lymphoid tissue.

Eight months later, the axillary mass appeared similar in appearance but a prominent adjacent vascular structure with a round outpouching was detected on breast ultrasound. It demonstrated classic "yinyang" flow on color Doppler imaging consistent with a post-biopsy pseudoaneurysm (Figure 3).

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Received: 07.05.2024 Accepted: 12.07.2024 Available Online Date: 26.09.2024 313

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Eur J Breast Health 2024; 20(4): 313-315

A breast pseudoaneurysm is a full thickness interruption of an arterial wall that typically results from an iatrogenic process (4). Breast pseudoaneurysms are very rare following CNBs and result from the accidental puncture of a vessel causing blood to leak into surrounding tissue. The latest The Breast Imaging Reporting and Data System lexicon categorizes pseudoaneurysms as a special case of vascular abnormality within its ultrasound section (5). The use of larger gauge needles increases the risk of a post-biopsy breast pseudoaneurysm typically presenting as a hematoma or palpable lump at the biopsy site.



Figure 1. Baseline imaging showed an oval, parallel, circumscribed hypoechoic mass (black arrowhead) in the right axillary tail with evidence of internal vascular flow and peripheral flow versus vessel (white arrowhead) on power Doppler US imaging

US: Ultrasonography



Figure 2. Right MLO mammogram demonstrates a postbiopsy clip placement in the right lower axillary tail (white circle)

Pseudoaneurysms are classically documented on ultrasound as a welldefined heterogenous structure that exhibits turbulent flow with a feeding artery on color Doppler imaging. This swirling sign showing a to-and-fro waveform is also known as the "yin-yang" sign (6). Computed tomography angiography can show pooled contrast within a breast mass focally dilated vascular structure in the region of the biopsy (4).

Computed tomography angiogram of the chest with intravenous contrast noted an approximately 0.4×0.6 cm soft tissue attenuation structure with evidence of mild contrast enhancement immediately adjacent to a small vessel in the lateral aspect of the right breast which could represent a small pseudoaneurysm, possibly with partial thrombosis (Figure 4).

Patients with a pseudoaneurysm following a CNB present with a palpable, and throbbing lump at the site of the biopsy in the breast (4). Some risk factors for developing a pseudoaneurysm include atherosclerosis, hypertension, anticoagulant therapy use, female sex, and older age (1).



Figure 3. Grayscale ultrasound images **A.** In the right axillary tail reveal post-biopsy changes in the oval hypoechoic right axillary tail mass (black arrowhead). Follow-up ultrasound color Doppler images **B.** and **C.** In the right axillary tail demonstrate interval rounded outpouching of a vessel (white arrowhead) within the previously biopsied hypoechoic mass (black arrowhead). The outpouching demonstrates a characteristic internal "yin-yang" sign on color Doppler

The interventional radiology service was consulted, and the decision was made to deliver percutaneous thrombin injection directly into the pseudoaneurysm. The first line of treatment uses the ultrasound for manual compression. Delivery of percutaneous thrombin injections directly into the pseudoaneurysm or placement of an intravascular coil can also be done (4). Surgical access may be performed to ligate the affected vessel or excise the mass as well (6). However, considering that breast pseudoaneurysms don't result in significant morbidity or mortality, a conservative approach has also been proposed in the management of low-risk patients (1).

Subsequent follow-up with breast ultrasound demonstrated an interval decrease in size of the right axillary tail pseudoaneurysm along with stable status of the axillary mass which was previously biopsied (Figure 5).



Figure 4. CT chest angiogram in arterial phase of contrast bolus and coronal MIP reconstruction demonstrates a saccular outpouching from a right axillary arterial vessel (white arrowhead) and adjacent hyperdense body, likely corresponding to post biopsy clip (blue arrowhead) at the site of previous biopsy

CT: Computed tomography; MIP: Maximum intensity projection



Figure 5. Additional follow-up with right axillary tail ultrasound with color Doppler technique demonstrates interval decreased size of the vascular outpouching (white arrowhead) after direct thrombin injection 5 months ago

Informed Consent: This manuscript does not involve experimental research on humans. This adult patient was consented for medical treatment and consented to the use of their non-identifiable medical data and photographs for educational purposes.

Authorship Contributions

Surgical and Medical Practices: C.P-T., Y.Z.F.; Concept: C.P-T., C.D.T., Y.Z.F.; Design: C.P-T., C.D.T.; Data Collection and/or Processing: C.P-T., C.D.T., N.B., Y.Z.F.; Analysis or Interpretation: C.P-T., C.D.T.; Literature Search: C.P-T., C.D.T., N.B., Y.Z.F.; Writing: C.P-T., C.D.T.

Conflict of Interest: No conflict of interest was declared by the authors.

Financial Disclosure: The authors declared that this study received no financial support.

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