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Pseudoaneurysm of the Breast: An Uncommon Complication of Core Needle Biopsy

Alexis A. Davenport
Henry Ford Health System

Paul Williams
Henry Ford Health System

David Pickney
Henry Ford Health System

Mark Segel
Henry Ford Health System

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Alexis Davenport MD, Paul Williams MD, Mark Segel MD, David Pinkney MD
Department of Radiology
Henry Ford Hospital, Detroit, MI, USA

Introduction

Image guided core needle biopsy is the standard technique used for tissue sampling and pathologic diagnosis of focal breast lesions. Reported complications after image guided core needle biopsy of the breast are rare, the most common being hematoma and infection [1,2]. The majority of procedural complications are minor and of no clinical consequence, resolving spontaneously under observation or with medical management. Major complications requiring intervention are exceedingly rare [1].

Case Presentation

We report the case of a 63-year-old post menopausal female who presented with persistent left breast pain several months after image guided core needle biopsy of a benign fibroadenoma. Clinical evaluation at that time revealed no palpable abnormality of the left breast. She was referred to HFHS Breast Imaging Center for diagnostic work up.

Diagnostic mammography demonstrated a circumscribed mass in the upper outer quadrant of the left breast at the site of the previously biopsied benign fibroadenoma. Additionally, there was a new smaller mass directly adjacent to the previously biopsied mass. Further work up with targeted grey scale and color Doppler ultrasound was then performed. Grey scale images showed the two adjacent masses. The new mass was noted to be oval, well-circumscribed, and anechoic. Color Doppler ultrasound images revealed marked vascularity with to-and-fro flow. Findings were consistent with an iatrogenic pseudoaneurysm of the left breast secondary to core needle biopsy. The patient was then referred to Interventional Radiology for definitive management.

Utilizing a 22-gauge spinal needle, the pseudoaneurysm sac was accessed under ultrasound guidance. 5000-international units/5 ml of thrombin was mixed and approximately 1 cc (1000 IU) of thrombin was injected into the sac under continuous ultrasound guidance. Post injection color Doppler images demonstrated successful thrombosis of the pseudoaneurysm sac.

References

[1] Apesteguía, L., & Pina, L. J. (2011). Ultrasound-guided core-needle biopsy of breast lesions. Insights into Imaging, 2(4), 493–500.

[2] Meyer JE, Smith DN, Lester SC, Kaelin C, DiPiro PJ, Denison CM, et al. Large-core needle biopsy of non-palpable breast lesions. JAMA 1999;281:1638–41.

[3] Wilkes AN, Needleman L, Rosenberg AL. Pseudoaneurysm of the breast. AJR Am J Roentgenol 1996;167:625–6.

[4] Saad, Nael E. A., Wael E. A. Saad, Mark G. Davies, David L. Waldman, et al . "Pseudoaneurysms and the Role of Minimally Invasive Techniques in Their Management." RadioGraphics 25, no. suppl_1 (2005/10/01 2005): S173-S89.

[5] Schwartz LB, Clark ET, Gewertz BL. Anastomotic and other pseudoaneurysms. In: Rutherford RB, ed. Vascular surgery. 5th ed. Philadelphia, Pa:Saunders, 2000; 752–763.

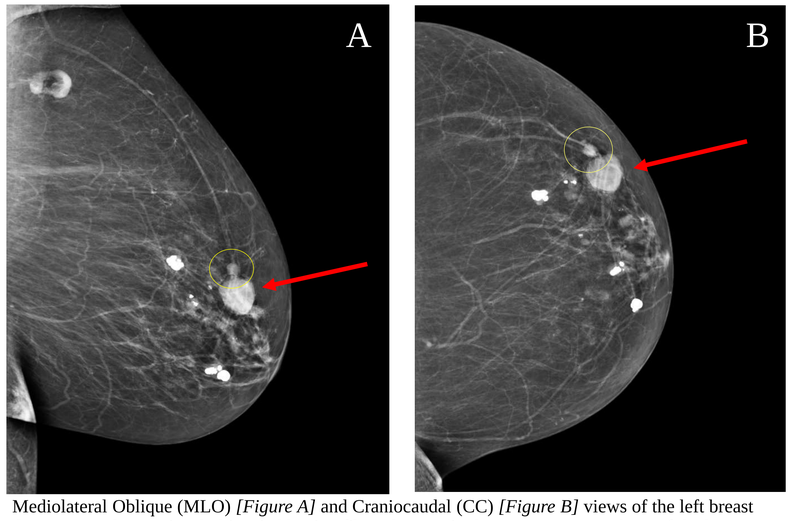
[6] Kruger K, Zahringer M, Sohngen FD, et al. Femoral pseudoaneurysms: management with percutaneous thrombin injections—success rates and effects on systemic coagulation. Radiology 2003; 226(2):452–458.

[7] Lennox AF, Delis KT, Szendro G, Griffin MB, Nicolaides AN, Cheshire NJ. Duplex-guided thrombin injection for iatrogenic femoral artery pseudoaneurysm is effective even in anticoagulated patients. Br J Surg 2000;87(6):796–801.

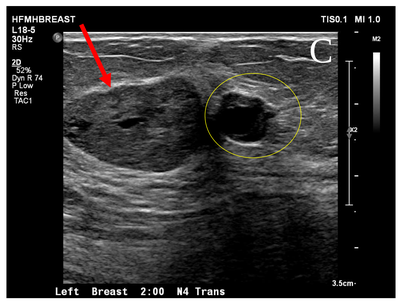
[8] Dixon AM, Enion DS. Pseudoaneurysm of the breast: case study and review of literature. The British Journal of Radiology 2004;77(920):694-97.

[9] Bazzocchi M, Francescutti GE, Zuiani C, Del Frate C, Londero V. Breast Pseudoaneurysm in a Woman After Core Biopsy: Percutaneous Treatment with Alcohol. American Journal of Roentgenology 2002;179(3):696-98.

Figures

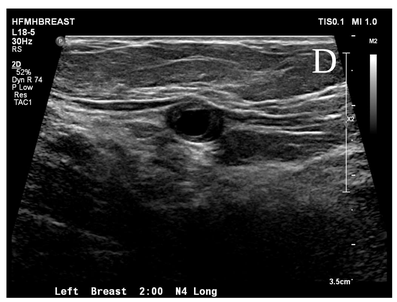


Mediolateral Oblique (MLO) *[Figure A]* and Craniocaudal (CC) *[Figure B]* views of the left breast demonstrate the previously biopsied benign fibroadenoma in the upper outer quadrant of the breast (arrow) with a new and smaller mass (circle) directly adjacent to this. Note the absence of a biopsy clip due to significant bleeding at the time of the procedure.

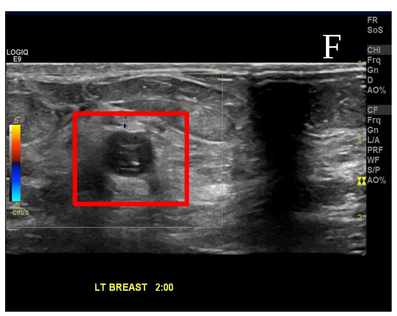


[Figure C] Grey scale ultrasound image of the left breast at the 2 o'clock position shows two adjacent masses (arrow and circle) corresponding to the mammogram findings noted above.

[Figure D] Dedicated grey scale image of the new, smaller mass demonstrates a 5 mm oval, well-circumscribed, and anechoic mass with posterior acoustic enhancement.



[Figure E] Corresponding Color Doppler ultrasound image of the new, smaller mass shows significant vascularity with "to-and-fro" flow or a "ying-yang" appearance.



[Figure F] Color Doppler ultrasound image of the pseudoaneurysm sac post thrombin injection shows markedly decreased/absent flow compared to pre-procedure images, indicating successful sac thrombosis.

Discussion

Pseudoaneurysm of the breast is an exceedingly rare complication of core needle biopsy. However, as the use of image guided biopsy for preoperative breast diagnosis increases, the incidence of procedure related pseudoaneurysm is also likely to increase [3].

Any artery is susceptible to the development of a pseudoaneurysm. Pseudoaneurysms result from rupture of all three layers of an arterial wall with extravasation of blood through the wall, which is then contained by adventitia or surrounding perivascular soft tissue. A direct communication of blood flow exists between the vessel lumen and the aneurysm lumen through the hole in the vessel wall [4,5]. Pseudoaneurysms have a variety of causes, including trauma, inflammation, and iatrogenic causes such as biopsy or surgery [3]. Risk of pseudoaneurysm formation is greater in patients with known atherosclerosis, in the elderly, and in patients on anticoagulation therapy [4].

Pseudoaneurysms rarely come to the attention of a physician as most spontaneously thrombose [5]. Symptomatic pseudoaneurysms typically produce local symptoms secondary to mass effect on adjacent structures. Patients may report throbbing pain in the region of a pseudoaneurysm. On physical exam, clinicians may be able to palpate a pulsatile mass. Rupture is the most serious cause of morbidity from a pseudoaneurysm [4,5].

In the case of breast pseudoaneurysm, mammography may demonstrate a mass with or without an identifiable feeding vessel. Sonographic features include a well-circumscribed anechoic to hypoechoic mass. Color Doppler ultrasound will demonstrate a typical "to-and-fro" waveform, which represents blood filling and draining from the sac in phase with the cardiac cycle [4,5]. This appearance has been likened to a ying-yang sign. A communicating channel between the sac and the feeding artery further clinches the diagnosis [4].

Therapeutic options have evolved from the traditional surgical approach to a less invasive approach including radiologic procedures. Thrombin or alcohol injection by ultrasound guidance are first line treatments, assuming a negative pathology result [4,7]. For this case, we used thrombin which converts inactive fibrinogen to fibrin leading to thrombus formation. Thrombin is injected into the sac under ultrasound guidance using sterile technique. The needle is positioned in the center of the sac and thrombin is injected at a constant rate while flow within the sac is monitored with Doppler ultrasound. The thrombin is continuously injected until flow within the sac ceases, usually within seconds [4,6]. Coil embolization is also a useful means of thrombosis, although coils can obscure evaluation of the region in the future. If initial attempts with thrombin or alcohol injection fail to thrombose the pseudoaneurysm and the patient's symptoms persist, surgical excision would be the next option [6].