www.jcimcr.org

JCIMCR OPEN ACCESS Journal of Clinical Images and Medical Case Reports

ISSN 2766-7820

Case Report

Open Access, Volume 6

Breast hematoma formation following therapeutic anticoagulation after implant-based breast reconstruction

Nicole Didonna[1]*; Cherie M Kuzmiak[2]

[1]University of North Carolina School of Medicine, Chapel Hill, USA.

[2]Department of Radiology, University of North Carolina, Chapel Hill, USA.

***Corresponding Author: Nicole Didonna**

University of North Carolina School of Medicine, Chapel Hill, USA.

Email: nicole_didonna@med.unc.edu

Received: May 29, 2025

Accepted: Jul 02, 2025

Published: Jul 09, 2025

Archived: www.jcimcr.org

DOI: www.doi.org/10.52768/2766-7820/3673

Abstract

We present a patient with hematoma formation secondary to anticoagulation therapy for upper extremity thromboses following implant-based breast reconstruction. This case illustrates that first-line ultrasound has limited utility in diagnosis when used on a breast with an implant, and cross-sectional imaging must be completed if high clinical suspicion is present. The prompt recognition and management of hematomas is critical to avoid secondary complications.

Keywords: Hematoma; Anticoagulation; Breast reconstruction; Ultrasound; CT.

Introduction

Implant-based breast reconstruction has become increasingly popular in recent decades, but it is not without complications, among which is postoperative breast hematoma [1-3]. While few risk factors have been elucidated regarding surgical technique or implant characteristics, anticoagulation therapy can increase bleeding risk and may be associated with breast hematoma formation [4-6]. Unfortunately, anticoagulation therapy is unavoidable in some cases. Here, we describe a case report of hematoma formation secondary to anticoagulation therapy for upper extremity thromboses following implant-based breast reconstruction. This case illustrates that first-line ultrasound has limited utility in diagnosis when used on a breast with an implant, and cross-sectional imaging must be completed if high clinical suspicion is present. The prompt recognition and management of hematomas is critical to avoid secondary complications.

Case report

A 58-year-old female with a history of prediabetes (HbA1c=6.2%), hypertension, hyperlipidemia, and obesity (BMI=33) developed a large hematoma in her reconstructed breast during anticoagulation therapy for right upper extremity thromboses following implant-based breast reconstruction. Four years prior, the patient presented to the breast imaging clinic with a palpable left breast mass. She underwent diagnostic mammography, which confirmed the presence of a 1.8 cm irregular mass in the left breast, as well as pleomorphic microcalcifications in the right breast spanning 13 cm. Biopsy of the suspicious areas revealed triple-negative invasive mammary carcinoma with medullary features in the left breast (cT1N1), and ductal carcinoma in situ in the right breast (grade 3, ER+, PR+). The patient underwent neoadjuvant chemotherapy, followed by right-sided mastectomy with sentinel lymph node biopsy and left-sided lumpectomy with axillary lymph node excision. Left-sided radiation was successfully completed, and

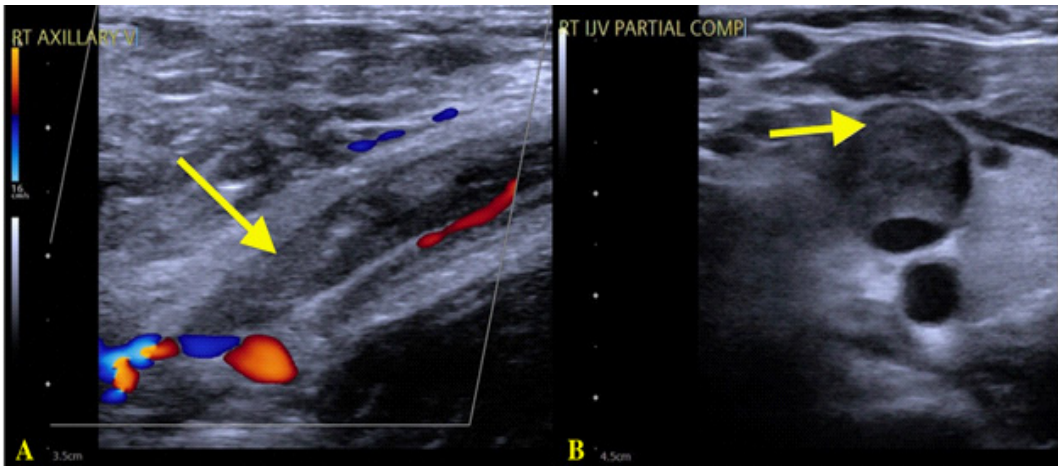

Figure 1: On postoperative day 13, the patient developed right upper extremity pain and swelling. Venous Doppler ultrasound of the region was notable for acute obstruction (arrow) of the axillary vein **(A)** and obstruction of indeterminate age (arrow) in the right internal jugular vein **(B)**.

Figure 2: One week after DOAC initiation, the patient presented to the emergency department with painful swelling (arrow) of the right reconstructed breast.

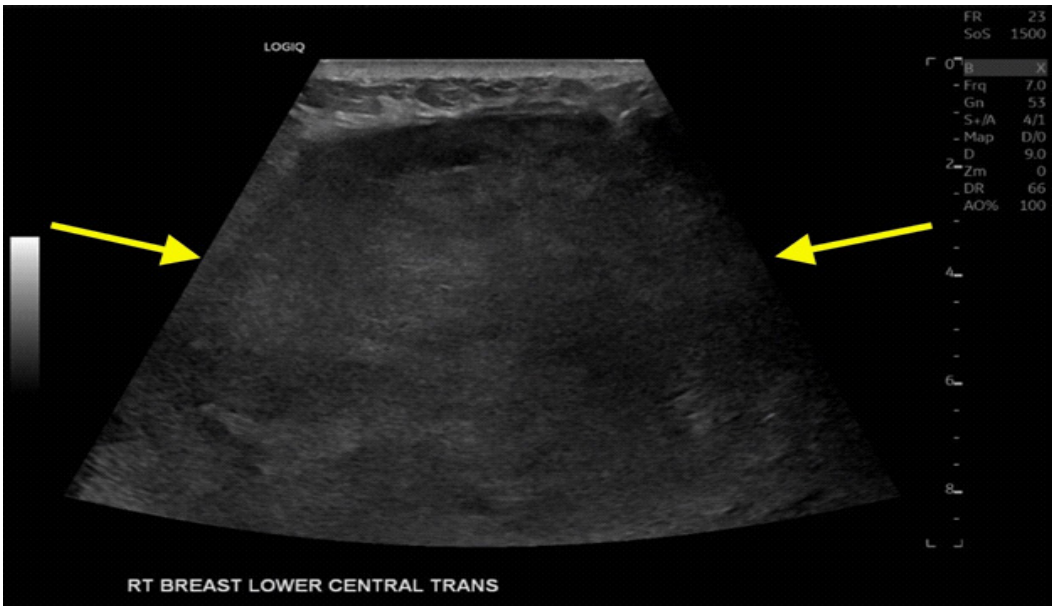

Figure 3: Ultrasound of the right reconstructed breast revealed a complex fluid collection (arrows) posterior to the patient's silicone implant.

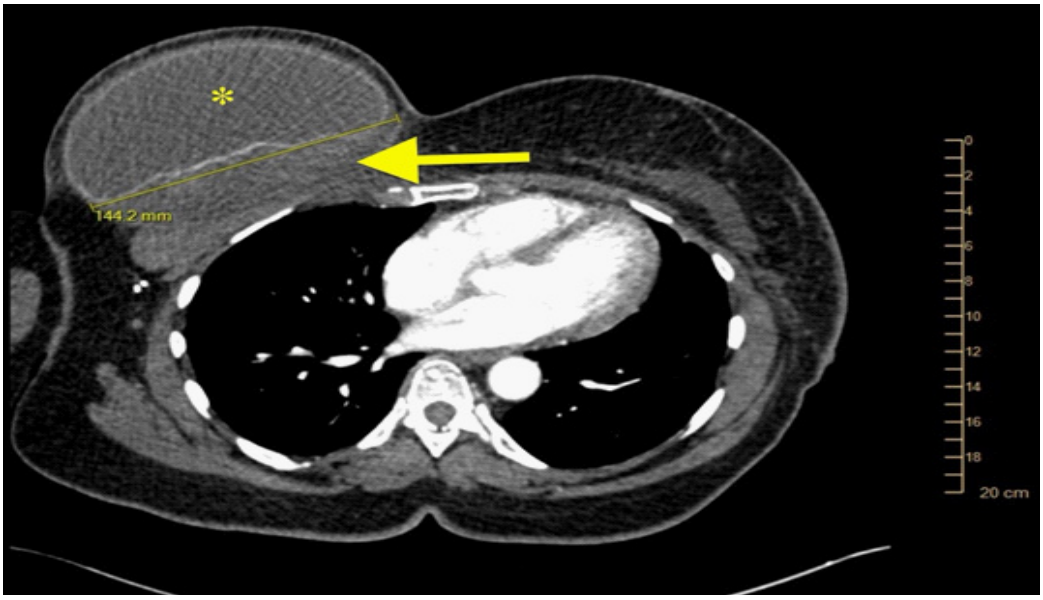

Figure 4: CT of the chest revealed a large heterogenous hematoma (arrow) without extravasation measuring 14.7 x 4.8 x 14.4 cm posterior to the implant (*).

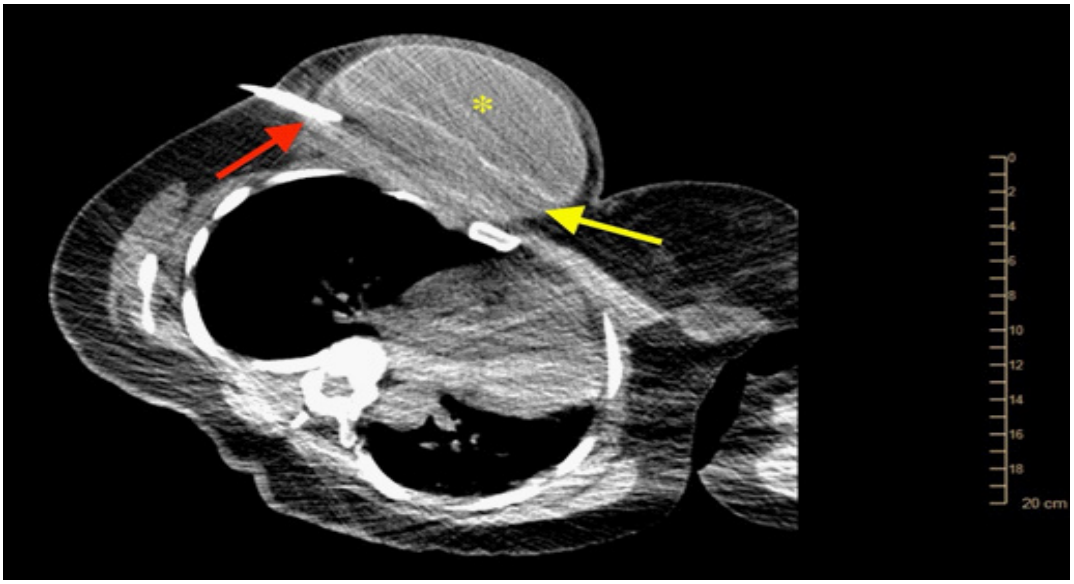

Figure 5: Interventional radiology performed CT-guided percutaneous drain placement (red arrow) for clinical management of the right breast hematoma (yellow arrow) posterior to the implant (*).

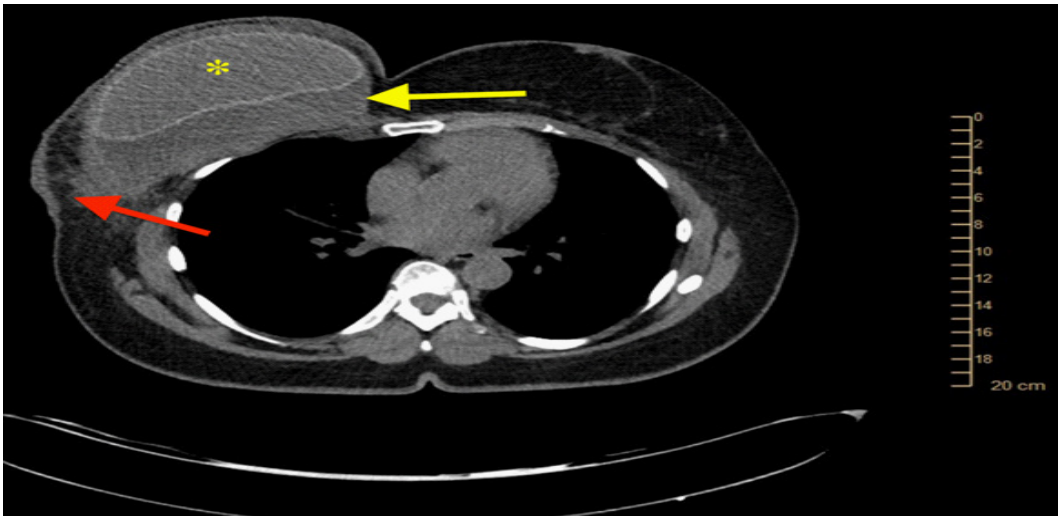

Figure 6: Repeat CT scan of the right reconstructed breast revealed an evolving fluid collection (yellow arrow) surrounding the implant (*) with increased fat stranding and skin thickening (red arrow).

the patient was initiated on endocrine therapy. There was no evidence of residual disease.

Two years after her right-sided mastectomy, the patient elected to undergo two-stage breast reconstruction with prepectoral placement of a tissue expander. The postoperative period was uncomplicated, and expansion was successful. Breast reconstruction was completed eleven months later, with replacement of the right-sided tissue expander with a permanent silicone implant, right-sided fat grafting, and left-sided mastopexy. On postoperative day thirteen, the patient notified her surgical team of pain and swelling in her right upper extremity. A venous Doppler ultrasound was ordered at that time, but the patient was unable to present for the study until postoperative day 40 due to extenuating circumstances. Ultrasound revealed acute obstruction of the axillary vein with prominent right shoulder collaterals; obstructions of indeterminate age were visualized in the internal jugular vein, brachiocephalic vein, and brachial vein at the mid-arm (Figure 1). She was sent to the emergency department. Hematology was consulted, who recommended direct oral anticoagulant (DOAC) therapy; she was prescribed 15 mg rivaroxaban BID for 21 days, to be followed by 20 mg rivaroxaban daily for 3 months. One week following DOAC initiation, the patient returned to the emergency department with painful right-sided breast swelling. Exam was notable for significant swelling and induration concerning for seroma or hematoma formation (Figure 2). Breast ultrasound demonstrated a complex fluid collection that was unable to be fully characterized given its positioning posterior to the implant (Figure 3). Subsequent CT of the affected area revealed a large, heterogenous right chest wall hematoma measuring 14.7 x 4.8 x 14.4 cm without signs of active extravasation (Figure 4). The patient was admitted for observation. Overnight the patient's hemoglobin dropped from 11.2 g/dL to 10.1 g/dL, but she remained clinically stable. Due to the risk of active bleeding, DOAC therapy was suspended, despite repeat venous Doppler ultrasound showing unchanged clot burden within the right upper extremity. The patient was discharged. At a follow-up appointment one week later, the patient continued to have significant right breast pain, however, physical exam remained stable. She was admitted to the hospital for definitive management with hematoma evacuation. Given that operative management would require implant removal, the patient opted for drain placement with the interventional radiology team (IR), who placed a 14 Fr pigtail drain with immediate return of 20 cc thick, bloody output (Figure 5). The drain was removed one week later. Unfortunately, she continued to have bloody output from the former drain site and reoccurrence of pain in the reconstructed breast, prompting rehospitalization 18 days following drain removal. Repeat CT showed evolution of the periprosthetic fluid collection with increased fat stranding and skin thickening (Figure 6). The patient was taken to the operating room for implant removal and capsule washout. Cultures of the hematoma grew methicillin-resistant Staphylococcus aureus and Enterobacter. She received three days of intravenous antibiotic therapy with vancomycin and cefepime before being discharged with a 7-day course of ciprofloxacin and doxycycline.

Discussion

Post-mastectomy breast reconstruction has become increasingly common in recent decades. An estimated 40-60% of mastectomy patients elect to undergo reconstruction, the majority of which are implant-based [1,2]. Despite its popularity, implant-based reconstruction is not without complications, with a cohort study estimating the 10-year complication risk to be 68.1% [3]. One of the well-documented complications of implant-based breast reconstruction is hematoma formation. Although overall incidence after implant-based reconstruction is relatively low at 1-3%, prompt recognition and appropriate management is critical to avoid severe secondary complications: skin flap necrosis, infection, hemorrhagic shock, implant displacement, or capsular contracture [7-9]. Most hematomas are diagnosed within the first week after implant-based reconstruction, however, the mean time of diagnosis is 37 days postoperatively with some hematomas not presenting until years after surgery [4,5,10-12]. Key symptoms of breast hematomas include breast swelling, pain, and overlying ecchymosis depending on etiology. However, painful breast swelling accompanies various other causes of fluid collection in the breast aside from hematoma, including seroma, abscess, or malignancy. As such, diagnosis is reliant on imaging studies, physical exam findings, and pertinent medical history. Ultrasound is typically the first-line imaging modality when there is concern for breast hematoma, which will appear as a hypoechoic or heterogenous mass. In patients with implants, however, identifying a suspected hematoma can be challenging depending on its location. The implants appear as an anechoic mass within an echogenic envelop; given silicone's density, the ultrasound waves are obscured as they pass through the dense implant, impairing visualization of the area posterior to the implant [13-15]. In such cases, cross-sectional imaging with MRI or CT is necessary. In the acute setting, CT confers added benefit by ruling out active bleeding if no contrast extravasation is present within the fluid collection [16]. The majority of postoperative hematomas occur secondary to inadequate hemostasis during surgery, with most bleeding attributed to vessels in the pectoralis muscle or axilla [4,7]. While no correlation has been found between the risk of hematoma formation in regard to surgical technique or implant characteristics, anticoagulation therapy within the perioperative period has been associated with higher risk of transfusion following implant-based reconstruction [4-6]. Further, anticoagulants may be an independent risk factor for breast hematoma formation outside of the postoperative period, with some reporting formation of spontaneous breast hematoma while on DOAC therapy [17,18]. Recent surgery and the need for DOAC therapy likely both played a role in hematoma formation in our patient. Interestingly, a recent cohort study shows that, among patients being treated for venous thromboembolism, rivaroxaban carried a greater risk of bleeding compared to apixaban and warfarin [19]. It is unclear whether the use of a different DOAC agent could have mitigated our patient's risk for hematoma formation. Management of breast hematoma varies based on size and symptom severity. The majority of hematomas can undergo conservative management, spontaneously regressing over a few months [20]. However, large hematomas, such as that in our patient, often require operative management [7]. In the absence of active bleeding, percutaneous drainage or vacuum-assisted evacuation may be an appropriate alternative to surgery, providing symptom relief while preserving the implant [21-23]. This approach was initially attempted for our patient who wished to forgo surgery. Unfortunately, percutaneous drainage was not curative, and the patient eventually required implant removal and breast pocket washout.

Conclusion

This report presents a patient who developed a large hematoma posterior to her breast implant while on anticoagulation therapy for upper extremity thromboses after breast re-

construction surgery. It demonstrates the need for multimodal imaging for diagnosis, as first-line ultrasound has limited efficacy in visualizing tissue posterior to implants. Additionally, it elucidates the need for further research comparing the efficacy of operative evacuation versus percutaneous drainage for the management of large breast hematomas.

References

1. Panchal H, Matros E. Current Trends in Post-mastectomy Breast Reconstruction. Plast Reconstr Surg. 2017; 140(5): 7S-13S. doi: 10.1097/PRS.0000000000003941.
2. Saldanha IJ, Broyles JM, Adam GP, et al. Implant-based Breast Reconstruction after Mastectomy for Breast Cancer: A Systematic Review and Meta-analysis. Plast Reconstr Surg Glob Open. 2022; 10(3): e4179. doi: 10.1097/GOX.0000000000004179.
3. Hvilsom GB, Hölmich LR, Steding-Jessen M, et al. Delayed breast implant reconstruction: a 10-year prospective study. J Plast Reconstr Aesthet Surg. 2011; 64(11): 1466-1474. doi: 10.1016/j.bjps.2011.06.026.
4. Seth AK, Hirsch EM, Kim JY, et al. Hematoma after mastectomy with immediate reconstruction: an analysis of risk factors in 883 patients. Annals of plastic surgery. 2013; 71(1): 20-23. doi:10.1097/SAP.0b013e318243355f.
5. Collins JB, Verheyden CN. Incidence of breast hematoma after placement of breast prostheses. Plast Reconstr Surg. 2012; 129(3): 413e-420e. doi: 10.1097/PRS.0b013e3182402ce0.
6. Wiegmann AL, Khalid SI, Alba BE, et al. Patients prescribed antithrombotic medication in elective implant-based breast reconstruction are high risk for major thrombotic complications. J Plast Reconstr Aesthet Surg. 2022; 75(9): 3048-3059. doi: 10.1016/j.bjps.2022.06.038.
7. Meshkin DH, Firriolo JM, Karp NS, Salibian AA. Management of complications following implant-based breast reconstruction: a narrative review. Ann Transl Med. 2023; 11(12): 416. doi: 10.21037/atm-23-1384.
8. Madden B, Phadtare M, Ayoub Z, Chebl RB. Hemorrhagic shock from breast blunt trauma. Int J Emerg Med. 2025; 8(1): 83. doi: 10.1186/s12245-015-0083-2.
9. Handel N, Cordray T, Gutierrez J, Jensen JA. A long-term study of outcomes, complications, and patient satisfaction with breast implants. Plast Reconstr Surg. 2006; 117(3): 757-772. doi: 10.1097/01.prs.0000201457.00772.1d.
10. Lee JH, Hong HK, Kim WH, et al. Delayed unilateral hematoma after reconstructive and aesthetic breast surgery with implants in Asian patients: two case reports. Gland Surg. 2021; 10(4): 1515-1522. doi: 10.21037/gs-20-854.
11. Ibrahim AE, Atiyeh BS. Management of delayed capsular hematoma after breast reconstruction. Aesthetic Plast Surg. 2011; 35(5): 923-937. doi: 10.1007/s00266-011-9685-0.
12. Grippaudo FR, Renzi L, Costantino B, Longo B, Santanelli F. Late unilateral hematoma after breast reconstruction with implants: case report and literature review. Aesthet Surg J. 2013; 33(6): 830-834. doi: 10.1177/1090820X13496249.
13. Juanpere S, Perez E, Huc O, et al. Imaging of breast implants – a pictorial review. Insights Imaging. 2: 653-670. doi: 10.1007/s13244-011-0122-3.
14. Krisnan RNK, Chotai N. Imaging Spectrum of Augmented Breast and Post-Mastectomy Reconstructed Breast with Common Complications: A Pictorial Essay. Korean J Radiol. 2021; 22(7): 1005-1020. doi: 10.3348/kjr.2020.0779.
15. Shah AT, Jankharia BB. Imaging of common breast implants and implant-related complications: A pictorial essay. Indian J Radiol Imaging. 2016; 26(2): 216-225. doi: 10.4103/0971-3026.184409.
16. Ingram AD, Mahoney MC. An Overview of Breast Emergencies and Guide to Management by Interventional Radiologists. Tech Vasc Interv Radiol. 2014; 17(1): 55-63. doi: 10.1053/j.tvir.2013.12.009.
17. Salemis NS. Breast hematoma complicating anticoagulant therapy: management and literature review. Breast Dis. 2012; 34(1): 25-28. doi: 10.3233/BD-130344.
18. Dagtekin E, Celik S. Breast Hematoma: A Rare Complication of Anticoagulant and Antiplatelet Use and Review of the Literature. Eur J Breast Health. 2023; 19(3): 257-260. doi: 10.4274/ejbh.galenos.2023.2023-3-8.
19. Schaefer JK, Errickson J, Kong X, et al. A Comparison of Bleeding Events Among Patients on Apixaban, Rivaroxaban, and Warfarin for Atrial Fibrillation and/or Venous Thromboembolism. Blood. 2023; 142(1): 135. doi: 10.1182/blood-2023-184457.
20. Molière S. Multimodality imaging of breast hematomas and their mimickers. Br J Radiol. 2022; 95(1133). doi: 10.1259/bjr.20210514
21. Almasarweh S, Sudah M, Joukainen S, et al. The Feasability of Ultrasound-guided Vacuum-assisted Evacuation of Large Breast Hematomas. Radiol Oncol. 54(3): 311-316. doi: 10.2478/raon-2020-0041.
22. Tong R, Kohi MP, Fidelman N, et al. Clinical outcome of IR drainage of breast seroma following mastectomy with reconstruction. J Vasc Int Radiol. 2013; 24(4): S57. doi: 10.1016/j.jvir.2013.01.132.
23. Johnson D, Kohi M, Fidelman N, et al. Hematomas – to drain or not to drain, the interventionalist's dilemma. J Vasc Int Radiol. 2013; 24(4): S57. doi: 10.1016/j.jvir.2013.01.133.