12-00386 Case Report J INVASIVE CARDIOL 2013;25(3):E60-E62

Management of Brachial Artery Thrombosis Post Catheterization

Muhammad Umer Siddiqui, MD, Daniyeh Khurram, MD, Mahir Elder, MD

Abstract: Introduction. Brachial artery occlusion is a documented complication after catheterization procedures performed via the brachial artery. These are mainly managed conservatively or with surgical thrombo-embolectomy. We present a case with acute brachial artery occlusion successfully managed with balloon angioplasty and thrombolytic therapy. **Case presentation.** A 68-year-old African-American female with a history of aorto-bi-iliac bypass graft presented with acute right upper extremity pain and discoloration after undergoing peripheral catheterization via right brachial artery. We performed emergency angioplasty with lesion reduction from 100% to less than 20% with TIMI grade flow improving from 0 preintervention to 3 postintervention. Postprocedure, the patient was kept on heparin infusion for 24 hours and discharged on aspirin and clopidogrel, with instructions to go to the emergency room in case of bleeding. **Conclusion.** Acute brachial artery thrombosis is a rare complication post cardiac catheterization. Previously, it was managed with surgical thrombo-embolectomy; however, with advancement of interventional procedures, a more conservative approach is preferred as stated by the 2005 American College of Cardiology/American Heart Association guidelines. We followed these guidelines and performed successful percutaneous balloon angioplasty with tPA administration in our patient. Careful literature search revealed that this is the first published case report dealing with the matter of acute brachial thrombosis post catheterization.

J INVASIVE CARDIOL 2013;25(3):E60-E62

Key words: brachial artery, complication, brachial thrombosis

---

A thrombus is an accumulation of blood factors that may form when the blood flow in the arteries or veins is impeded. Thrombosis of limb arteries can occur secondary to injury after catheterization. This is a rare complication, and is slightly more common in brachial as compared to femoral approach. There are several risk factors of brachial artery thrombosis, some major and some minor.[1] The classic physical signs of acute limb ischemia are the five "Ps" — pain, pulselessness, pallor, paresthesias, and paralysis. Diagnosis is mainly based on history and physical examination. Management includes urgent revascularization. Previously, arterial thrombosis was managed by surgical thrombo-embolectomy, but recently, intra-arterial thrombolytic therapy with or without peripheral angioplasty has gained more importance as compared to surgical revascularization. We describe a case of brachial artery thrombosis after catheterization and its management.

Case Description

A 68-year-old African-American female presented with past medical history of hypertension, hypercholesterolemia and peripheral arterial disease status post aorto-bi-iliac graft in 2009. She presented to us with lower-extremity claudication, Rutherford class III. On examination, pulses on the left side were diminished, with abnormal ankle-brachial index.

A brachial approach was taken to evaluate the patency of the aorto-bi-iliac graft. Angiography showed patent grafts, but 100% occlusion of the left superficial femoral artery (SFA), left popliteal, and anterior tibial artery. Revascularization was performed, with improvement of TIMI flow 0 to TIMI flow 3 post intervention. Hemostasis of the right brachial artery was achieved with manual compression.

The next morning, the patient developed severe pain and discoloration of her right upper extremity. Physical examination revealed diminished right brachial and absent radial pulses. Emergency catheterization was performed through right common femoral artery, and showed 100% occlusion of the right brachial artery. We crossed the lesion with a 0.014˝ wire and performed multiple angioplasties with a 2.5 x 120 mm balloon at 4 atm. We delivered 8 mg of tPA through a 4 Fr Glide catheter (Terumo) with repeated angioplasties through a 2.5 x 20 mm balloon at 8 atm with lesion reduction from 100% to less than 20% and TIMI flow improvement from 0 preintervention to 3 postintervention. Postprocedure, the patient was kept on heparin infusion for 24 hours. She was discharged the following day on dual-antiplatelet therapy (aspirin 325 mg once daily and clopidogrel 75 mg once daily). Repeat Doppler ultrasound at 6 months showed patent brachial artery.

Discussion

Acute extremity ischemia is associated with high rates of hospital morbidity and mortality, as well as of limb loss. Surgical series have quoted rates of 30% for limb loss and 20% for hospital mortality.[2] For diagnostic catheterizations, there was a 2% complication rate when brachial artery access was used, compared with a 0.4% complication rate for the femoral route ($P<.001$).[3] In a study published in *Chest* regarding complications of brachial artery catheterization, out of the 104 procedures, there were 22 complications (21%), the majority of which were brachial artery obstructions.[4]

Depending on the method applied for catheterization and the puncture site, the complication types vary. When cardiac catheterization is performed through the arteries of the arm, vascular occlusions will mostly occur as local vascular complications. These occlusions can often be managed conservatively or by a surgical procedure.[5] Since our patient had an aorto-bi-iliac graft placed previously, we opted to use the brachial artery approach to check the patency of the graft. Our patient presented with acute right extremity ischemia secondary to peripheral catheterization. Her ischemic limb was classified as viable (Table 1).[6] Anticoagulation was initiated for the patient and aspirin and clopidogrel were continued. Further plan regarding the approach of management was discussed in detail. The options available were thrombolytic therapy (with or without percutaneous intervention) or surgery.

We elected to perform simultaneous intra-arterial tPA and angioplasty. Intra-arterial thrombolysis (with or without angioplasty) is an alternative to surgical therapy in patients with ischemic extremities.[7,8] The usefulness of thrombolytic therapy is limited by the severity and duration of the ischemia. As per 2005 American College of Cardiology/American Heart Association guidelines on peripheral arterial disease, catheter-based thrombolytic therapy is effective and beneficial and is indicated in patients with acute limb ischemia of less than 14-day duration.[9] The 2012 American College of Chest Physicians guideline also supported the above reference.

Our case report is unique as it is the first case to describe the use of percutaneous angioplasty and intra-arterial tPA in the management of post catheterization thrombosis.

Table 1. Society for Vascular Surgery/International Society for Cardiovascular Surgery classification of acute extremity ischemia.[6]

	Viable	**Threatened**	**Non-Viable**
Sensory deficit	None	Partial	Complete
Arterial Doppler	Audible	Inaudible	Inaudible
Motor deficit	None	Partial	Complete
Pain	Mild	Severe	Variable

Capillary refill	Intact	Delayed	Absent
Venous Doppler	Audible	Audible	Inaudible
Treatment	Urgent Workup	Emergency Surgery	Amputation

References

1. Nasser TK, Mohler ER III, Wilensky RL, Hathaway DR. Peripheral vascular complications following coronary interventional procedures. *Clin Cardiol.* 1995;18(11):609-614.
2. Yeager RA, Moneta GL, Taylor LM Jr, et al. Surgical management of severe acute lower extremity ischemia. *J Vasc Surg.* 1992;15(2):385-391.
3. Khoury M, Batra S, Berg R, et al. Influence of arterial access sites and interventional procedures on vascular complications after cardiac catheterizations. *Am J Surg.* 1992;164(3):205-209.
4. Barnes RW, Petersen JL, Krugmire RB Jr, Strandness DE Jr. Complications of brachial artery catheterization: prospective evaluation with the Doppler ultrasonic velocity detector. *Chest.* 1974;66(4):363-367.
5. Heintzen MP, Strauer BE. Peripheral arterial complications after heart catheterization. *Herz.* 1998;23(1):4-20.
6. Rutherford RB. Acute limb ischemia: clinical assessment and standards for reporting. *Semin Vasc Surg*.1992;5:4.
7. Riggs P, Ouriel K. Thrombolysis in the treatment of lower extremity occlusive disease. *Surg Clin North Am.* 1995;75(4):633-645.
8. Huettl EA, Soulen MC. Thrombolysis of lower extremity embolic occlusions: a study of the results of the STAR registry. *Radiology*. 1995;197:141-145.
9. Hirsch AT, Haskal ZJ, Hertzer NR, et al. ACC/AHA 2005 practice guidelines for the management of patients with peripheral arterial disease (lower extremity, renal, mesenteric, and abdominal aortic): a collaborative report from the American Association for Vascular Surgery/Society for Vascular Surgery, Society for Cardiovascular Angiography and Interventions, Society for Vascular Medicine and Biology, Society of Interventional Radiology, and the ACC/AHA Task Force on Practice Guidelines (Writing Committee to Develop Guidelines for the Management of Patients With Peripheral Arterial Disease): endorsed by the American Association of Cardiovascular and Pulmonary Rehabilitation; National Heart, Lung, and Blood Institute; Society for Vascular Nursing; TransAtlantic Inter-Society Consensus; and Vascular Disease Foundation. *Circulation*. 2006;113(11):e463-e654.

From Harper Hospital, Wayne State University, Detroit, Michigan.

Disclosure: The authors have completed and returned the ICMJE Form for Disclosure of Potential Conflicts of Interest. The authors report no conflicts of interest regarding the content herein.
Manuscript submitted August 6, 2012, provisional acceptance given October 1, 2012, final version accepted October 10, 2012.

Address for correspondence: Muhammad Umer Siddiqui, MD, Heart & Vascular Institute, Harper Hospital, 4160 John R, Suite 510, Detroit, MI 48201. Email: siddiqi.umer@gmail.com

Figure 1. *Complete occlusion of brachial artery pre-intervention.*

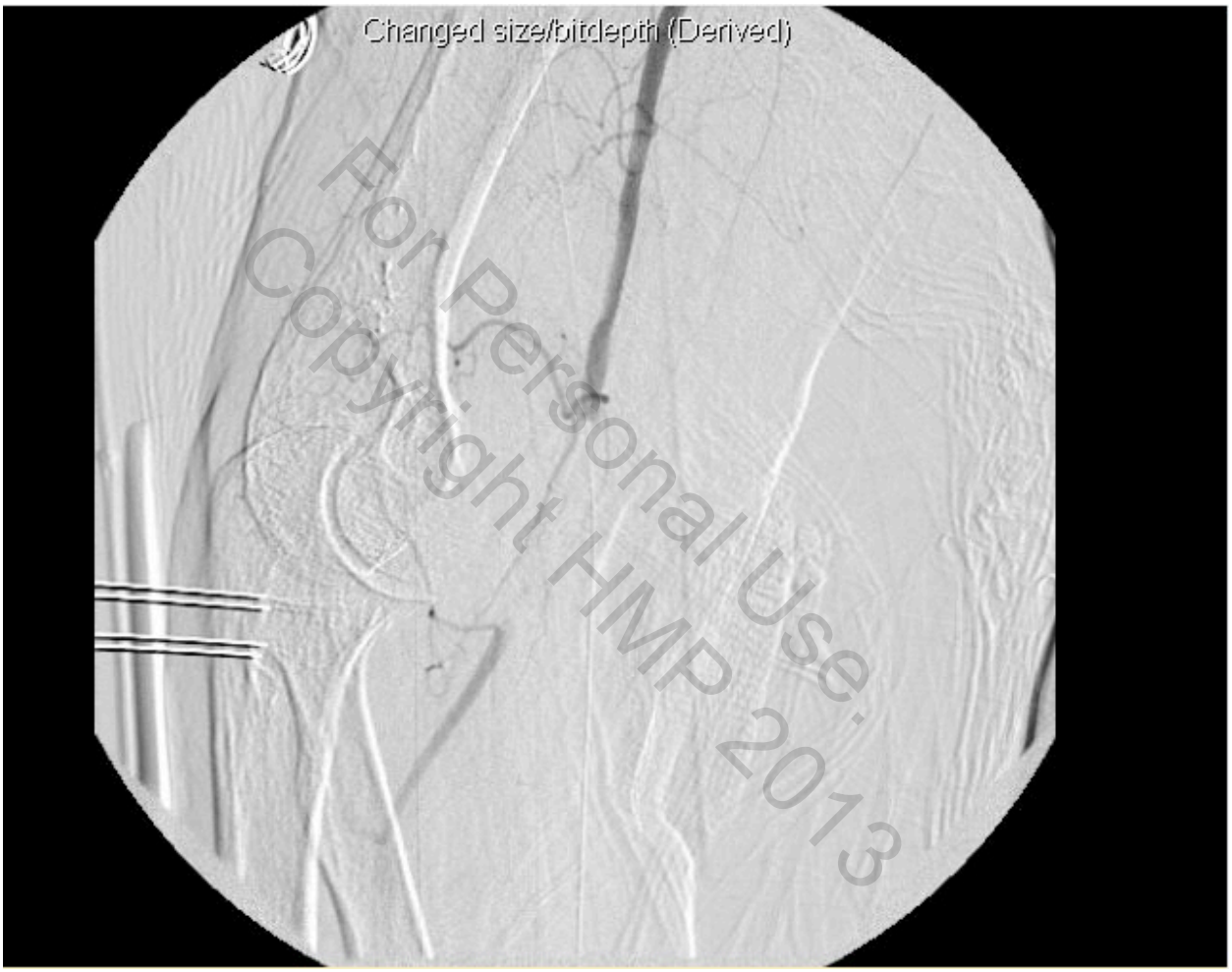

Figure 2. *Partially patent brachial artery post-intervention.*

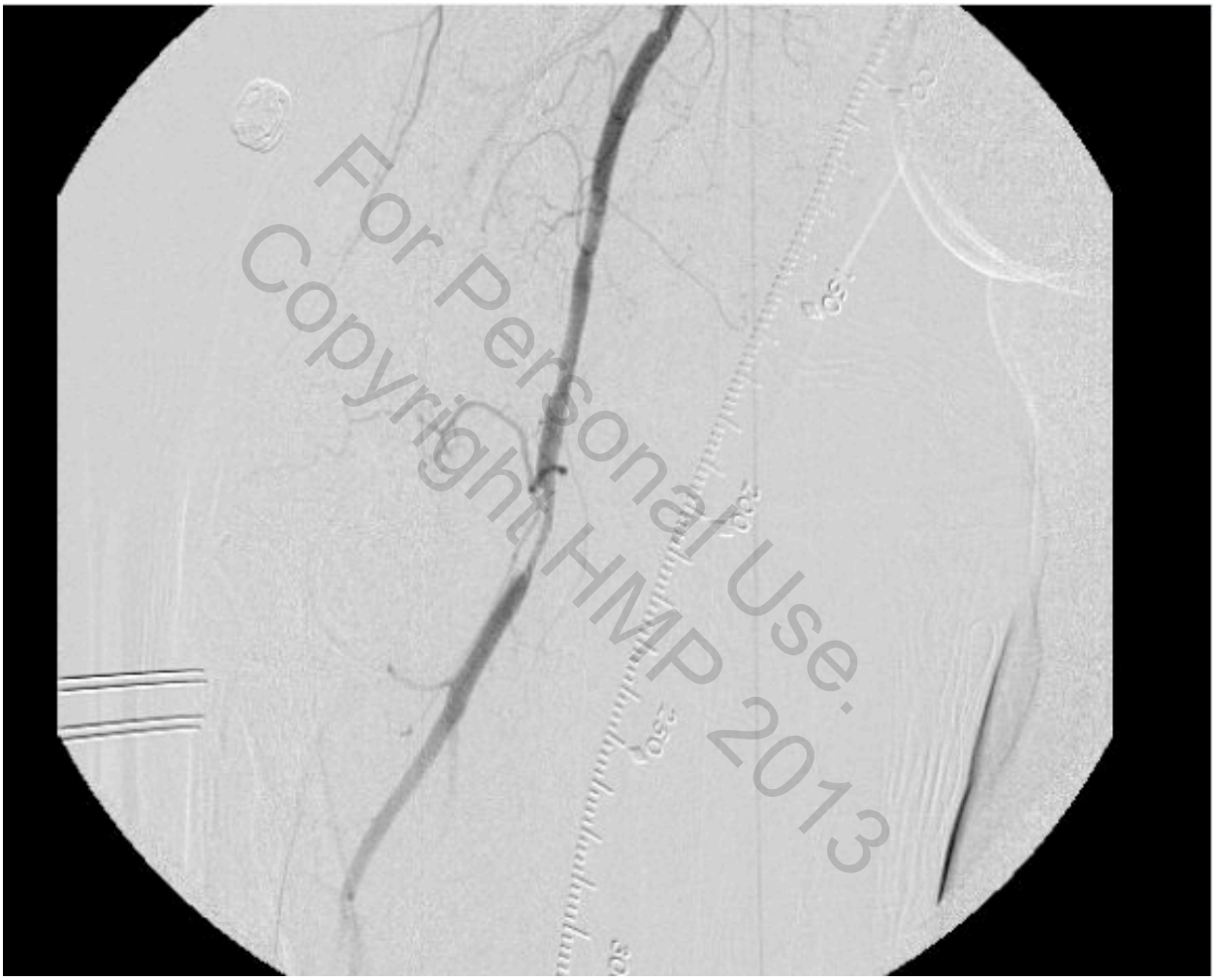

Figure 3. *Completely patent brachial artery post-intervention.*