Iatrogenic Brachial Artery Occlusion as a Result of Subclavian Steal Syndrome

Iatrogenic brachial artery occlusion is an uncommon complication occurring during cardiac catheterizations.

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Iatrogenic brachial artery occlusion is a rare phenomenon occurring postoperatively in patients that have undergone catheterization. Approximately 0.9% of patients who have undergone cardiac catheterization experience brachial artery injury and/or thrombosis.[1] Various potential factors can contribute to brachial artery complications. Most frequently, brachial artery complications are related to factors such as redoing the catheterization, prolonged catheterization time, catheter change, brachial artery atherosclerosis, improper arteriotomy closure, the experience of the cardiologist, female patient, and failure to use heparin.[1] Clinical manifestations of brachial artery occlusion can include upper extremity pain, weakness, acute monoparesis, pallor, coolness of the arm, and a lack of radial and ulnar pulses.[2] Iatrogenic brachial artery occlusions can be treated with balloon angioplasty and thrombolytic therapy.[3] The clinical manifestations and treatments presented are similar to non-iatrogenic brachial artery occlusions and mainly reported through case-based literature. Here, we describe a case of iatrogenic brachial artery occlusion, manifesting in relation to a catheterization for subclavian steal syndrome, that eventually required vascular surgery.

Case Report

A 77-year-old female with a past medical history significant for chronic obstructive pulmonary disease, hypertension, hyperlipidemia, mild obesity, insomnia, hypothyroidism, and depression presented with progressive dizziness and increasing pain in the left arm and forearm. A peripheral angiogram revealed left subclavian stenosis diagnosed as subclavian steal syndrome (Figure 1). On the night of admission, she underwent catheterization for the removal of the clot (Figures 2-3). During the procedure, a piece of the clot embolized down to the left upper extremity. On physical examination, her skin was mottled, and no pulses were detected in the left ulnar and radial arteries. Her left-hand grip was also weak. Given these findings, she underwent another catheterization to remove a 4.0 mm clot in the left brachial artery (Figures 4-5). During the angioplasty, the brachial clot reformed despite many attempts at removal and tPA administration. Vascular surgery was consulted. As a result of the clot, the patient had developed compartment syndrome, and her cardiologist advised the family to consent to a thrombectomy and fasciotomy. During the procedure, a clot was removed from both the ulnar and radial arteries, and pressure in the forearm was relieved (Figure 6). An angiogram revealed patent radial and ulnar arteries, and flow was detected in the palmar arch (Figure 7). Upon completion of the procedure, the patient had palpable radial and ulnar pulses. The flexor muscles of the forearm were dusky but viable and responded with contraction to electrocautery.

Post procedure, the patient was maintained on 81 mg of aspirin and clopidogrel to prevent restenosis. The postoperative care of the patient was further complicated by a pulmonary embolism and renal infarction, both of which originated from the subclavian artery clot. The patient experienced severe metabolic acidosis and severe anemia due to acute renal failure. Despite being maintained

Figure 1. Aortic arch injection showing left subclavian occlusion.

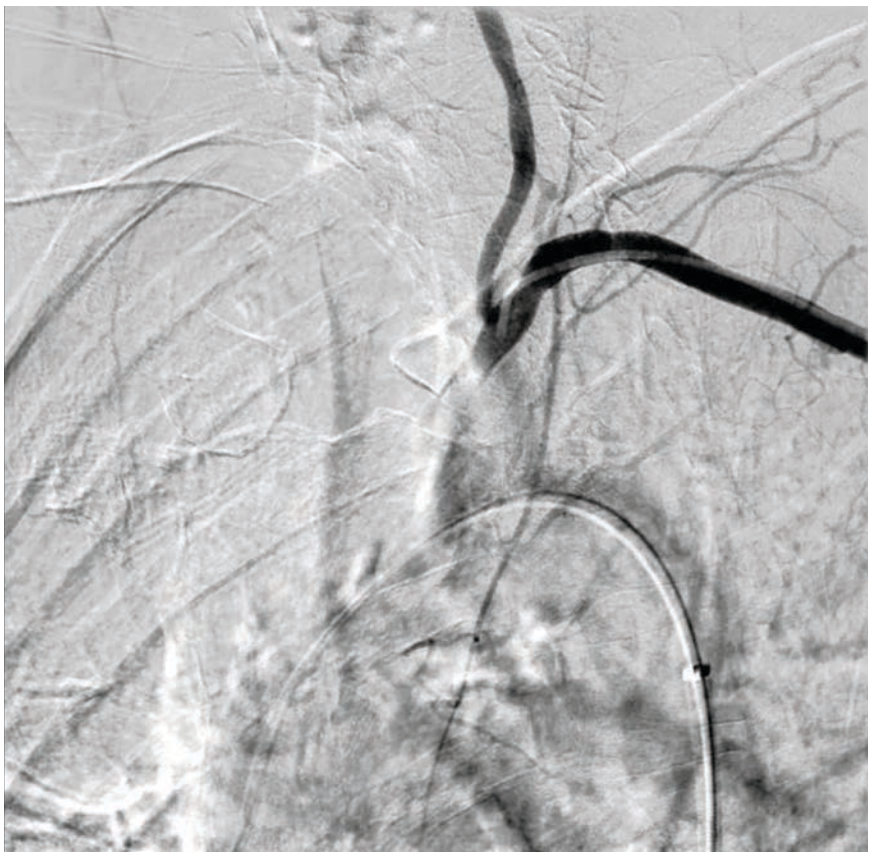

Figure 2. Brachial injection (retrograde) defining the left subclavian occlusion.

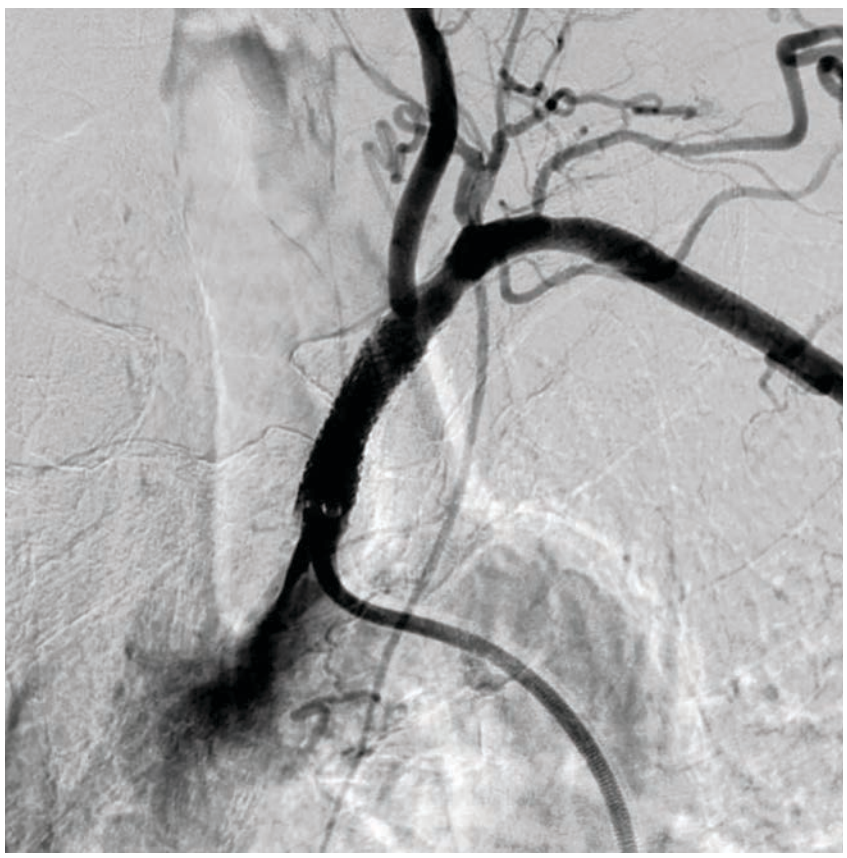

Figure 3. Left subclavian stent deployed.

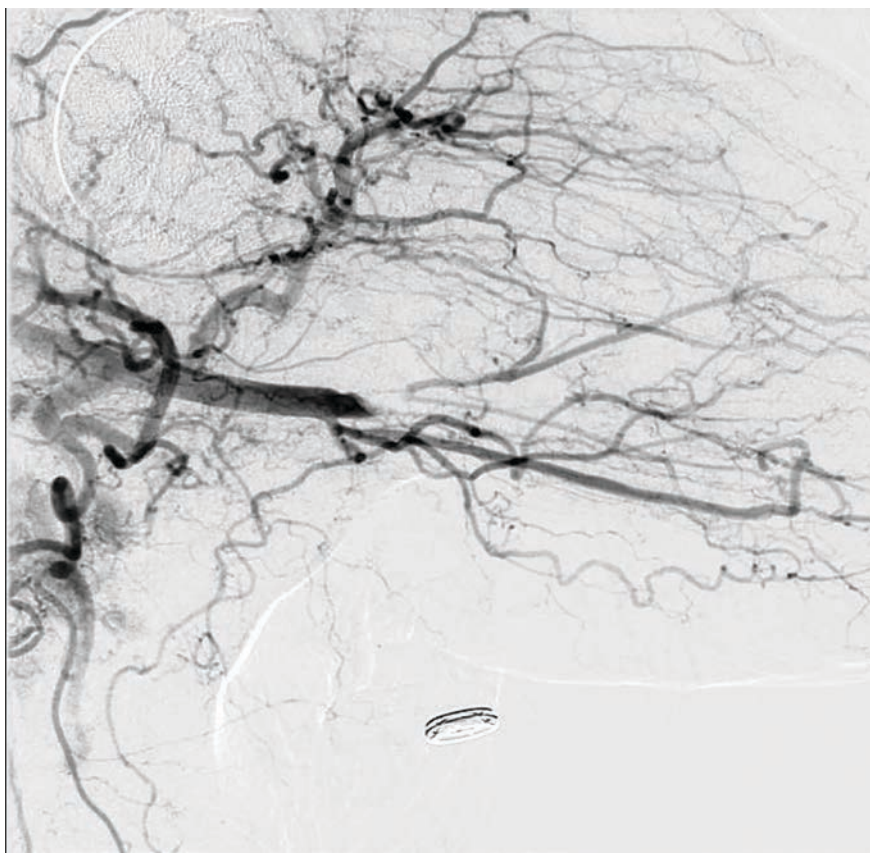

Figure 4. Next day, the left brachial artery at the incision site found to be occluded.

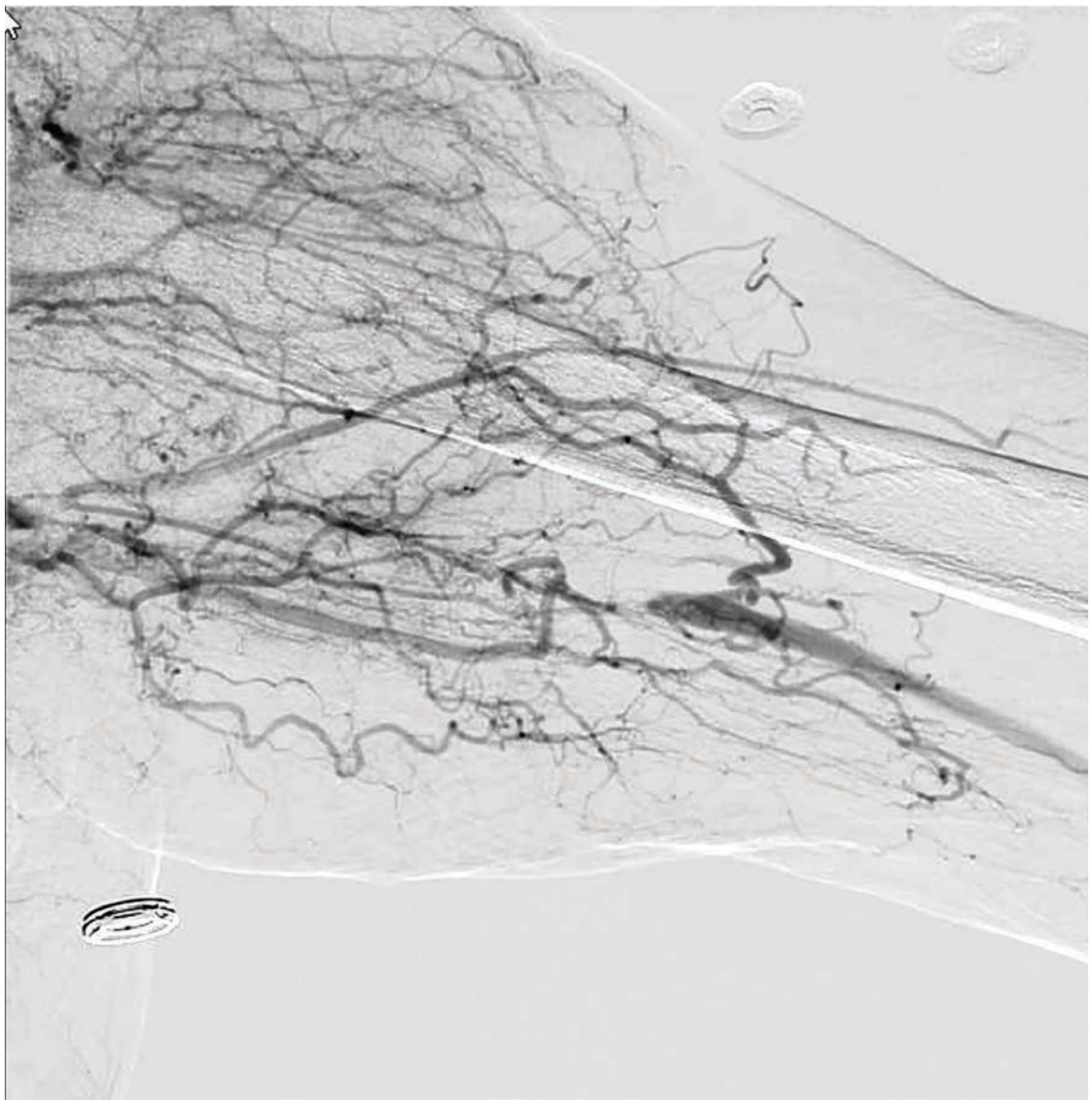

Figure 5. Distal embolism to the left hand with significant thrombus burden.

Common etiologies for iatrogenic brachial artery occlusion in this case could include prolonged catheterization time and repeated catheterization, among others.[1]

on 1 ampule of intravenous sodium bicarbonate every 15 minutes, the patient passed away due to complications.

Discussion

Iatrogenic brachial artery occlusion is an uncommon complication occurring during cardiac catheterizations. The overall major complication rate, meaning the requirement of transfusion or surgical intervention due to a vascular interventional radiology procedure, is less than 1%.[6] A more common cause of iatrogenic brachial artery occlusion is percutaneous vascular injuries due to arterial line placement.[6,7]

Common etiologies for iatrogenic brachial artery occlusion in this case could include prolonged catheterization time and repeated catheterization, among others.[1] As with any limb ischemia, symptoms include pain, pulselessness, pallor, paresthesia, and paralysis.[3] Brachial artery access during cardiac

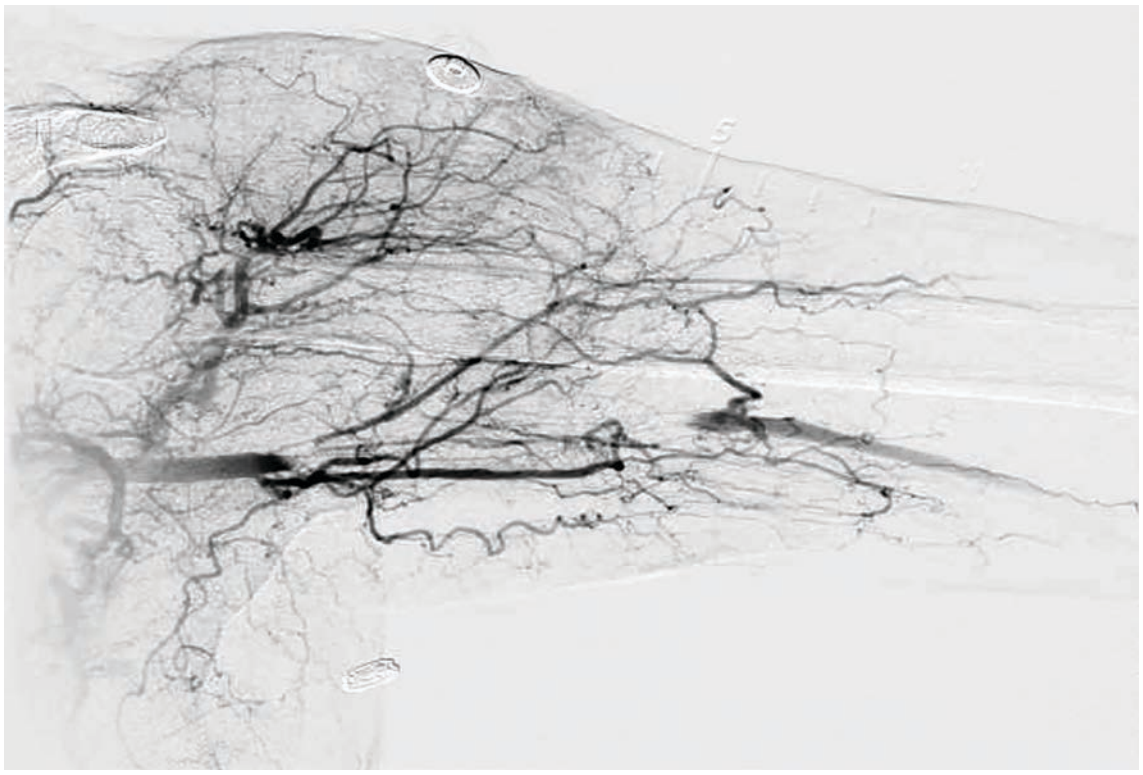

Figure 6. **Thrombectomy initiated.**

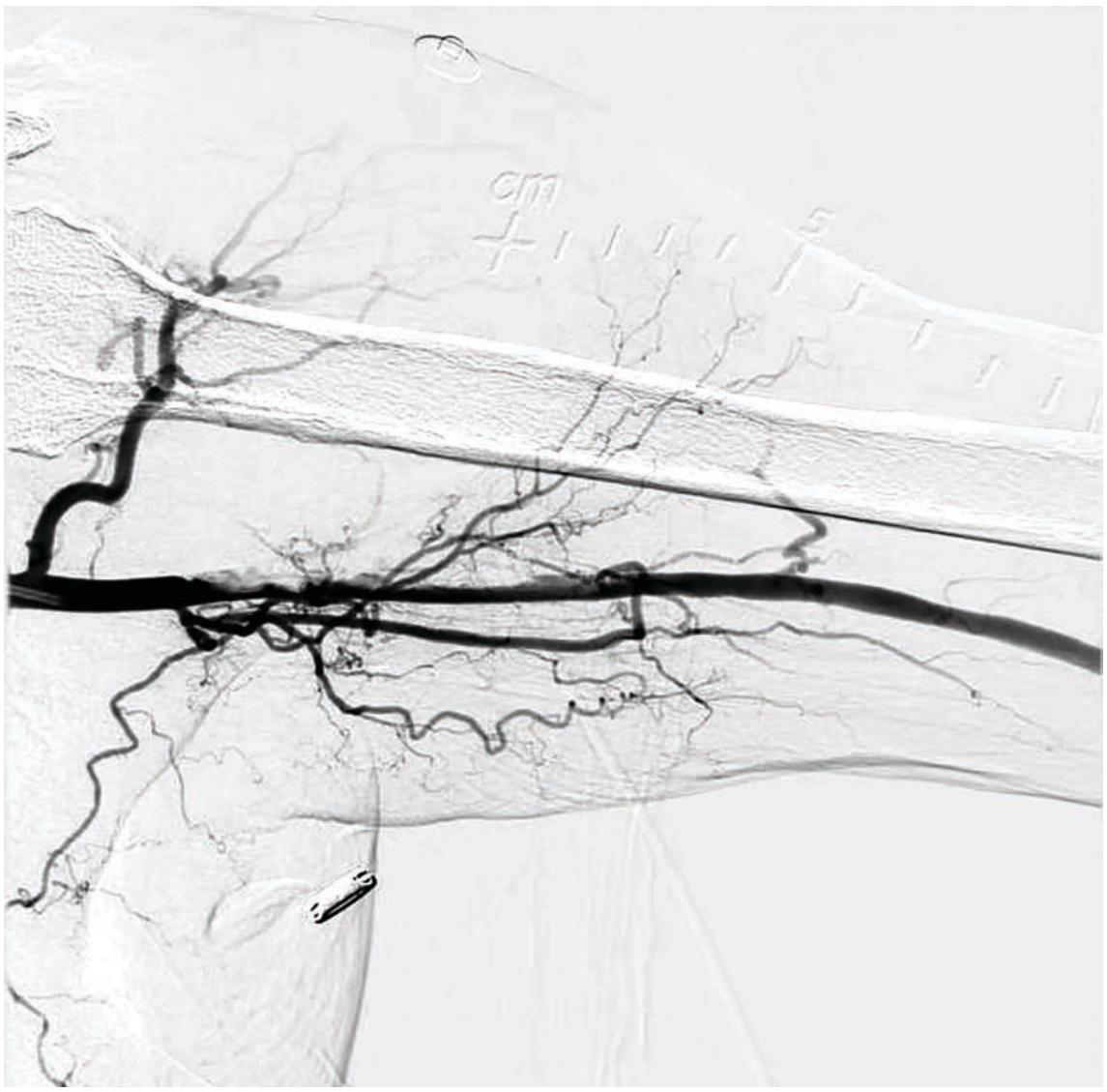

Figure 7. **Re-establishment of flow in the left brachial artery after AngioJet thrombectomy (Boston Scientific) and angioplasty.**

catheterization has a higher likelihood of causing an occlusion rather than femoral access. Our patient experienced occlusion due to clot remnants post catheterization for subclavian stenosis.

Iatrogenic brachial artery occlusions are unique entities that present as postoperative complications and can lead to further complications if not addressed immediately. Diagnostic techniques for brachial artery occlusion include angiography, as was applied in the case of our patient, with treatment options that incude angioplasty and stenting. Vascular surgery can also be utilized for clot removal if re-thrombosis continues to occur. Angioplasty provides better results and less postoperative pain than open vascular surgery.[4] The success rate for angioplasty in complete total occlusion is 79.6%.[5] Due to the rarity of the complication, only a few case studies exist in the literature to support treatment options and prognosis. ■

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