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Repair of a Left Brachial Artery Pseudoaneurysm After Blood Donation in a 17-Year-Old Male

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Abstract

We present a rare case report of a 17-year-old male who developed a brachial artery pseudoaneurysm after donating blood at his high school blood drive. We describe our operative approach and review the literature on the risks of blood donation and incidence of brachial artery pseudoaneurysms.

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Introduction

According to the American Red Cross, 3 out of 10 American adults donate blood every year. Serious complications from donating whole blood are rare. The most common adverse events are presyncope or syncope and small hematoma formation at the site of donation. We present a rare case report of a young male who developed a brachial artery pseudoaneurysm after donating blood at his high school blood drive.

Case Report

*A 17-year-old male patient presented to us as a transfer from an outside hospital with a history of swelling, bruising, and pain in his left antecubital fossa. He had donated blood at his high school 10 days prior to this presentation, where only one needle stick was used to draw his blood. In the emergency room at the outside hospital, an ultrasound of the affected area was performed and it showed a 2.3 cm mass with turbulent arterial flow, diagnosed as a left brachial artery pseudoaneurysm. His parents requested transfer to a tertiary care center for definitive repair. On our initial exam, the patient complained of pain in that arm, but had no motor or sensory deficits. The left radial pulse was readily palpable and the left ulnar pulse had a strong Doppler signal. There was a palpable pulsatile mass in his left antecubital fossa with overlying ecchymosis. Of note, the patient’s medical history was negative except for tonsillectomy and an allergy to aspirin. His coagulation studies were normal.*

*The patient’s parents gave informed consent before he was urgently taken to the operating room for repair of this brachial artery pseudoaneurysm. A 4 cm incision was made just above the antecubital fossa and the brachial artery was examined. Care was taken not to disturb the median nerve lying in the antecubital fossa during the initial dissection. Hematoma was seen just distal to this incision so the incision was extended several centimeters down the forearm. At this point, a defect in the anterior brachial artery as well as a pseudoaneurysm was easily identified. The hole in the artery was repaired with 4 interrupted 6-0 nylon sutures. Post-procedure, the left radial artery was readily palpable and the left ulnar artery maintained the strong Doppler signal. The patient was monitored with vascular checks every hour on that extremity overnight and went home the next day. He was seen in the vascular clinic approximately 1 month later and was found to be without postoperative complications. His motor and sensory functions were intact and his incision was healing well. The patient returned approximately 2 years after the original surgery for a follow-up ultrasound and he reported no issues with that upper extremity. He stated that his motor and sensory function were intact.*

Discussion

The vessel cannulated during whole blood donation is usually the brachial vein at the antecubital fossa. Inadvertently, the brachial atery may be cannulated, resulting in a very quick appearance of bright red blood and an increased likelihood of complications for the donor. One study conducted by an American Red Cross blood donation center in Michigan looked at the frequency of arterial punctures during volunteer whole blood donation over the course of 2 years. They found that only 12 arterial punctures were identified out of 410,000 blood donations. Three of those patients developed hematomas at the site, and one patient developed a hematoma later diagnosed as a pseudoaneurysm of the brachial artery that required surgical repair. This study found that the rate of arterial cannulation was associated with the years of experience of the nurse performing the blood draw. Their recommendations after identifying an arterial puncture include 10 minutes of firm pressure at the puncture site, followed by a pressure bandage for 5 hours, and then abstaining from strenuous use of that limb for several days.1

Our patient suffered an unrecognized arterial puncture and it is likely that adequate pressure was not held to attempt to close the puncture hole in the artery, thus leading to the creation of a pseudoaneurysm.

Our patient was only 17-years-old, one of the youngest ages allowed to donate blood. This age group is targeted at high school blood drives.

Is it just as safe for adolescents to be donating blood as their adult counterparts? A study performed in 2006 looked at the rate of complications from blood draws based on age. They looked at 3 age groups: 16- and 17-year-olds (145,678 whole blood donations), 18- and 19-year-olds (113,307 whole blood donations), and adults older than 20 years of age (1,517,460 whole blood donations). They found that the younger donors (the 16- and 17-year-olds) suffered from the most complications out of all 3 groups. More specifically, 8.9% experienced presyncope, compared with 6.8% in the 18- and 19-year-olds and 2% in the older than 20-year-olds. With regards to hematoma formation, 1.19% of the 16- and 17-year-olds developed a hematoma compared to 1.06% in the 18- and 19-year-olds and 0.75% in the older than 20-year-olds, respectively. Lastly, in regards to arterial puncture, there were 28 recorded in the 16- and 17-year-old group, accounting for 0.019%. The other 2 groups had 16 (0.014%) and 111 (0.007%), respectively.2 Our patient falls into this youngest age group where complications are more common than in older adults.

Overall, reports of brachial artery pseudoaneurysms are rare. The first case report of this complication following blood donation was published in 1994 and involved a 49-year-old female patient.3 When the American Red Cross analyzed their data from 1999-2000 they found only 4 cases of brachial artery pseudoaneurysms in over 9 million blood donations.4 There has also been one report of a true brachial artery aneurysm following blood donation in a 69-year-old male, which was repaired by ligation of the aneurysm and saphenous vein interposition graft.5 Thus, our patient suffered from a rare complication of donating whole blood.

Conclusion

Our high school age male suffered from a very rare but real complication associated with donating whole blood. Luckily, his condition was recognized and treated in a timely manner and he suffered no long-term motor or sensory deficit. We feel it is important for vascular surgeons to be aware of this complication of blood donation and be able to ask the right questions to make a timely diagnosis.

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