Axillary artery thrombosis in a baseball pitcher

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Isolated nonatherosclerotic axillary artery disease is a rare condition. External axillary artery compression can result in occlusion or aneurysm formation and subsequent upper extremity ischemia or distal thromboembolism. Chronic compression from use of crutches and repetitive stretching/compression of the axillary artery secondary to overhead motion during high-performance athletic activities are often implicated as the cause. The uniqueness of these lesions and clinical setting requires a high index of suspicion for axillary artery pathology. Prompt diagnosis with arteriography and surgical treatment is necessary given the propensity for thromboembolism. We present a case highlighting this rare phenomenon in a collegiate baseball pitcher. (J Vasc Surg Cases 2015;1:168-70.)

The axillary artery is rarely affected by aneurysmal or atherosclerotic disease. This vessel, however, is subject to an uncommon lesion that can occur in high-performance athletes.[1-6] A delay in treatment can lead to complications such as exercise-induced ischemia, distal embolism, tissue loss, and permanent disability. Rare cases of stroke from retrograde progression of axillary/subclavian artery thrombosis have been reported.[7] We report a case of axillary artery thrombosis with distal embolization in a college athlete. The patient consented to publication of this report.

CASE REPORT

A 19-year-old male college baseball pitcher presented to us with several months of a painful and cool right upper extremity. Radial, ulnar, brachial, and axillary pulses were not palpable. The hand was cool with a pale, bluish discoloration. Motor and sensation remained intact. Magnetic resonance imaging showed no evidence of aneurysm or pseudoaneurysm. An arteriogram revealed focal occlusion of the right axillary artery (Fig 1) with evidence of distal embolization to the ulnar artery. The radial artery and palmar arch were intact. Because the patient had a palpable radial pulse and the ulnar artery lesions appeared to be chronic in nature, thrombolysis was not pursued.

The occluded portion of the artery was resected through an axillary incision and replaced with a reversed saphenous vein interposition graft (Fig 2). Pathologic examination of the resected arterial segment showed intimal-medial thickening, likely due to repetitive external compression. Postoperative wrist-brachial indices were normal. The patient was maintained on anticoagulation for 3 months postoperatively and, subsequently, returned to full activity. He was able to return to the college roster 3 months after the surgery.

DISCUSSION

Axillary artery occlusion is a rare condition that is difficult to recognize in competitive athletes. The injury can result from repetitive compression and stretching of the third portion of the axillary artery by anterior displacement of the humeral head during hyperabduction and external rotation,[8] a hypertrophied pectoralis minor muscle,[3,9-11] or positional compression due to forceful malrotation of upper limb among athletes.[12] The artery is relatively fixed in position at this location due to the circumflex humeral branch vessels. Repetitive compression can lead to focal intimal hyperplasia and stenosis, aneurysm formation, thrombosis, or segmental dissection. This form of distal axillary artery occlusion is a variant of arterial thoracic outlet syndrome, occurring with the use of crutches and in high-stress sports.[7,13,14]

It is likely that this condition is under-recognized, partly because of symptom similarity to usual causes in this cohort of high-performance athletes attributable to fatigue and musculoskeletal injuries. Unfortunately, some patients with axillary artery compression and thrombosis undergo extensive workups with other physicians before referral to a vascular surgeon.

We performed a comprehensive literature search for articles on arterial disease in competitive athletes and identified additional articles by cross-referencing the reference lists. Between 1972 and 2013, we found 51 additional patients with sports-related axillary artery occlusion or aneurysm, of which 78.4% of the athletes were baseball players, with sporadic reports seen among windsurfers, softball, handball, and tennis players.[1-6] With respect to the axillary artery lesions (alone or in combination), 14 patients (27.5%) had aneurysms, 21 (41.2%) had thrombosis, 21 (41.2%) had positional compression, and stenosis/occlusion occurred in 11 (21.6%).

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Author conflict of interest: K.M.C.-O. and A.A. are consultants for Medtronic and W. L. Gore and Associates.

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The editors and reviewers of this article have no relevant financial relationships to disclose per the Journal policy that requires reviewers to decline review of any manuscript for which they may have a conflict of interest.

2352-667X

http://dx.doi.org/10.1016/j.jvsc.2015.04.006

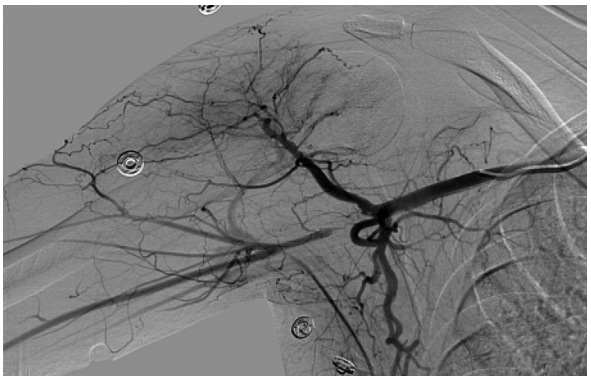

Fig 1. Intraoperative angiogram of the left upper extremity shows occlusion of the axillary artery.

Fig 2. Completion angiogram shows reconstruction of the occluded axillary artery with interposition bypass using reversed great saphenous vein.

Other reported causes of axillary artery occlusion are trauma, especially shoulder dislocation, and crutch use with axillary compression.[15,16] A recent review by Moon et al[16] demonstrated that repetitive trauma from crutch-induced axillary artery injury was associated with a similar phenomenon of aneurysm or occlusive lesion development. They reported 31 patients presenting with recurrent embolic or ischemic symptoms after intermittent, short-term, and chronic crutch use. As with sports-related axillary artery injury, the crutch-induced axillary artery injury literature shows that good functional recovery can be anticipated within several months after surgical treatment, consisting of segmental reconstruction of the diseased axillary artery and management of any distal thromboembolism.[16]

A decrease in wrist-brachial indexes and digital pressure suggests thrombosis or distal embolization. Upper extremity arteriography or computed tomography provides a definitive diagnosis by demonstrating stenosis or occlusion of the distal axillary artery at rest or with arm elevation.

Treatment involves therapeutic anticoagulation with or without catheter-directed thrombolysis, followed by definitive surgical repair. Tullos et al[17] described the first successful case of surgical treatment of axillary artery thrombosis in a baseball pitcher. Open repair involves excision of the affected segment of the axillary artery and reconstruction with interposition bypass graft using reversed great saphenous vein.[13,17] Care should be taken to leave enough laxity in the repaired segment to prevent recurrent compression by the humeral head. Alternative approaches include extra-anatomic bypass[17,18] and endarterectomy with vein patch angioplasty.[1,19]

Although there are no definitive guidelines for the use of antiplatelet and anticoagulation medications after resection and graft replacement of the axillary artery, our common practice is to continue both for 6 weeks postoperatively, and is similar to that reported by Duwayri et al.[19]

The limited available data from a large referral center and the published literature indicate that with timely recognition and management, full functional recovery can usually be expected within several months of surgical reconstruction and that patients are able to resume regular activity within 2 to 3 months.[19] Our own limited experience with this pathology has shown that with timely diagnosis and treatment, most young athletes with this condition are able to return to their sports.

Endovascular repair in these lesions is not often recommended given the anatomy of the region and potential for occluding a crucial branch of the axillary artery. However, reports of successful treatment with percutaneous transfemoral self-expandable covered stents have been described.[11]

CONCLUSIONS

Axillary artery thrombosis secondary to repetitive external compression is a rare problem with significant consequences, especially among elite overhead throwing athletes. Given their propensity for distal thromboembolism, prompt recognition of these lesions is paramount. This report demonstrates that complete functional recovery is possible within several months after open surgical resection and reconstruction of the diseased axillary artery.

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Submitted Dec 5, 2013; accepted Apr 17, 2015.