Successful Treatment of Axillary-Subclavian Artery Thrombosis by Catheter-Based Thrombolytic Therapy: A Case Report

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ABSTRACT

In this study, thrombolytic therapy is described and a case of left subclavian artery thrombosis with acute clinical symptoms is presented. The patient was an 82-year-old woman with the symptoms of axillary artery thrombosis. Catheter-directed thrombolysis was performed and thrombolytic medication was injected via a catheter. In addition, a low dose of heparin was infused intravenously. Following treatment, clinical symptoms were normal. The repeated angiography indicated a good blood flow to the left upper distal limb. Minimally invasive methods, such as catheter-based thrombolytic therapy may be a suitable alternative for patients with viable limb acute ischemia.

Keywords: Axillary artery, Subclavian artery, Thrombolytic therapy, Thrombosis

Introduction

The subclavian artery is located along the axillary artery. It provides various branches, including vertebral arteries that supply about 20% of brain blood (1). Axillary artery thrombosis is an occlusion in the axillary artery path accompanied by acute limb ischemia (ALI) symptoms in the upper limb causing significant ischemic symptoms. This condition may damage vital organs, including the brain or rarely heart. Therefore, axillary artery thrombosis is associated with a high risk of stroke and mortality (2).

Axillary artery thrombosis is a rare phenomenon that affects 3%-4% of the total population and accounts for approximately 11%-18% of peripheral artery disease cases (1). Atherosclerosis is the most prevalent facilitating etiology for thrombosis with less common causes being arthritis, radiation exposure, nerve compression syndrome, neurofibromatosis, and dysplasia (3). There are few studies about the successful treatment of axillary artery thrombosis by thrombolytic therapy thorough catheterization. Oliveira in 2014 presented a 45-year-old woman with left upper ALI with three days of progression after the distension of scapulohumeral articulation. Although digital amputation was finally performed, the hand was saved through thrombectomy and catheter-directed thrombolysis (4).

The ALI, as one of the results of arterial thrombosis, is a sudden decrease in limb perfusion posing a potential threat to limb survival. It may occur by involving any of the vessels, such as the axillary artery. The prevalence of this vascular accident is four times higher in the left subclavian artery, compared to the right subclavian artery (5).

Patients with subclavian artery thrombosis may refer to the emergency department (ED) with various or specific clinical symptoms known as six Ps (i.e., pain, poikilothermia, paresthesia, paralysis, pulselessness, and pallor) (6). Other symptoms of axillary artery thrombosis and ALI, typically in the upper limb, can include...
Limbs are prone to various diseases due to a high risk of microvascular injury. Patients can experience significant pain, which can be disabling in severe cases. Additionally, patients may experience loss of sensation or motor function, which can lead to significant impairments in daily life. Therefore, it is crucial to monitor the symptoms and perform diagnostic tests to confirm the diagnosis and initiate appropriate treatment. The patient described in this case study presented with severe pain in the left upper limb, indicating a potential arterial obstruction. The patient’s symptoms were assessed, and arterial obstruction was confirmed using diagnostic tests. Treatment was initiated, which resulted in significant improvement in the patient’s symptoms. The patient’s rehabilitation plan included pain management, physical therapy, and occupational therapy to help the patient regain function and independence.

The patient remained under close monitoring and was discharged with a follow-up appointment scheduled. The patient was also provided with advice on lifestyle modifications to reduce the risk of future arterial obstructions. The patient was advised to maintain a healthy diet, engage in regular exercise, and avoid smoking and alcohol consumption.

In conclusion, patients with arterial obstructions require prompt diagnosis and treatment to minimize the risk of serious complications. Early intervention can significantly improve outcomes and quality of life for patients. While additional research is needed to fully understand the mechanisms underlying arterial obstructions, these findings can help guide future treatment strategies and improve patient care.

References
Discussion

Most of the times, subclavian thrombosis treatment requires aggressive procedures, such as open surgery and embolectomy (10). The majority of the patients with other underlying illnesses, including coronary artery disease, diabetes, and hypertension are at high risk for open surgery relevant complications. Consequently, nowadays, minimally invasive procedures are regarded as a better option for treating

Figure 1: The angiography picture before thrombolysis of the left axillary-subclavian artery thrombosis

Figure 2: The angiography picture after thrombolysis of the left axillary-subclavian artery thrombosis
these patients. Currently, about 40% of damaged peripheral vascular patients are treated by interventional methods, namely stenting, ballooning, and mechanical thrombectomy (11).

One of the common therapies for patients with ALI is thromboembolectomy surgery using Fogarty arterial embolectomy catheter by a vascular surgeon. Another treatment is catheter-based thrombolysis by percutaneous transluminal angioplasty (12). The condition of patients determines which invasive therapy should be performed. Limb amputation is carried out in cases with complete gangrene (13).

Catheter-directed thrombolysis is one of the minimally invasive treatments for arterial occlusion. Ebben and colleagues (2019) conducted a retrospective review of patients who underwent catheter-directed thrombolysis for ALI during 2011-2016. The study outcomes showed that the angiographic potency and clinical success rates were more than 60% (8). Minimally invasive methods, such as catheter-based thrombolytic therapy could be more favorable alternatives. Alteplase is a preferable fibrinolytic and thrombolytic agent to the other fibrinolytic medications, namely streptokinase and reteplase (14).

In the present study, there were numerous surgical procedure hazards for the patient, including general anesthesia complications and cardiopulmonary risks concerning the age of the patient, atrial fibrillation rhythm, and high creatinine level. Therefore, the concurrent administration of anticoagulant and thrombolytic therapy was selected as the best treatment. Overall, minimally invasive methods may be a good alternative for invasive ones. Particularly, in the applied technique, the thrombosis was resolved through the administration of a thrombolytic agent during an angiography without anesthesia. Immediately after the procedure and arterial sheath removal, recovery was observed based on clinical signs and symptoms. Following repeated angiography, an apparent improvement was noted in the patient vascular status.

Conclusion

Catheter-based thrombolytic therapy is primarily reserved for patients with acute viable limb ischemia. As observed in the presented case, thrombolytic therapy is recommended to be considered as an alternative therapeutic method for patients with artery thrombosis due to the rapid response of the patient, shorter treatment time, and lower cost, compared to common and sometimes unsuccessful therapies.

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References


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