Successful thrombolysis of left subclavian arterial thrombosis with intravenous bolus dose of tenecteplase

Arterial occlusions of upper extremity are less common than lower extremity occlusions, and are caused by wide variety of etiologies such as vasospasm, intrinsic arterial disease, inflammatory diseases, non-inflammatory medical diseases, embolism and trauma. The shoulder and elbow tolerate ischemia due to well developed collateral system, hence ischemic symptoms are observed mostly below the elbow. The treatment options include medical management, interventional therapy and surgical embolectomy. Thrombolytic therapy is a viable option, but involves hospitalization, observation and prolonged infusion. We report a case of Subclavian Artery Thrombosis treated successfully with a bolus dose of Tenecteplase.

A 40 year old female with no co-morbidities, presented to the hospital with severe rest pain and swelling of left hand of 4–5 days duration associated with discoloration of index and middle fingers (Fig. 1). EKG showed sinus rhythm, normal PR interval, QRS duration and no criteria for chamber hypertrophy or dilation. 2D Echo cardiogram was normal. Connective tissue and thrombotic panel of investigations were within normal range. Arterial doppler study showed decreased flow velocities (systolic < 10 cm/s) in the distal left ulnar and radial arteries and beyond with maintained...

Fig. 1. Left sub-clavian arterial angiogram showing thrombus.
wave form, suggesting proximal stenosis or thrombus. The venous study was normal. Peripheral angiogram of the left subclavian artery showed thrombus at the origin of the left subclavian artery extending across the vertebral artery (Fig. 2).

n view of escalating pain and dry gangrene changes, various therapeutic options were explained to the patient’s family including surgical intervention. Family opted for the pharmaco-therapy. After ruling out absolute contraindications, a single bolus of Tenecteplase 40 mg Metalyse® (tenecteplase, TNK-tPA) was administered with prior i.v. injection 40 mg of Enoxaparin (Clexane® (enoxaparin sodium). Patient was started on oral anticoagulation with tablet Acenocoumarol 2 mg (Acitrom).

Within 24 h of thrombolysis, there was significant relief of pain and return of brisk pulses at the left wrist. Left subclavian Angiogram repeated after 24 h of thrombolysis showed complete resolution of the thrombus with good distal flow (Fig. 3). Patient was discharged on Acitrom 2 mg p.o and Diltiazem SR 90 mg p.o. od. Patient steadily improved, remained pain free on follow up.

Situations of acute vessel thrombosis are best suited for thrombolytic therapy; these typically present within few hours of onset, and are often due to in situ thrombosis or thrombosis from catheter-related access, embolism from a more central source, hypercoagulable states, and arterial drug injection.

The patho-physiology of upper limb ischemia in one study was embolism (53%), thrombosis (44%), and severe stenosis (3%) and the most common occlusive site is the origin of the left subclavian artery.

Intravenous heparin and subsequent oral aspirin may prevent formation of additional thrombi and are often used in the setting of arterial thrombosis, although their efficacy has not been established. Earlier, few authors have described thrombolysis using Urokinase, Tissue Plasminogen Activator, Tenecteplase either singly or as combination with IIb-IIIa inhibitors in peripheral arterial thrombosis. TNK is the only plasminogen activator available that has shown significantly enhanced safety profile versus alteplase in AMI. Approved for a 5-s, single-bolus injection in AMI, TNK possesses a longer half-life, increased resistance to plasminogen activator inhibitor, and improved fibrin specificity. TLT can be delivered in the form intra-arterial catheter directed thrombolysis or a bolus followed by a continuous infusion. Caution is required to follow the contraindications to bleeding.

Peripheral Angioplasty with Stenting was an option, but as the thrombus was close to vertebral artery, possibility of posterior circulation stroke was considered. Intravenous bolus dose of Tenecteplase is easy to administer, doesn’t require long duration infusions as is the case with Streptokinase or Urokinase. Bolus dose Tenecteplase has been reported to successfully treat Prosthetic Valve Thrombosis of Aortic Valve and also in the setting of acute pulmonary embolism (unpublished data).

Administration of Tenecteplase intravenous bolus effected complete resolution of acute upper limb ischemia in our case. Lack of antigenicity, ease of administration using weight based...
bolus regimen, lack of need for continuous infusion, intravenous route administration are the advantages of Tenecteplase when compared to other thrombolytic agents and may be an alternative to catheter directed TLT in acute limb ischemia.

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