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Case Report

Deep vein thrombosis in the axillary and brachial vein after a midshaft clavicular fracture: a case report

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ABSTRACT

Upper extremity deep vein thrombosis is a rare condition and seldom described in orthopaedic literature. We report on a case of axillary and brachial vein thrombosis after a displaced, midshaft clavicular fracture treated conservatively. Deep vein thrombosis (DVT) was found 12 days after occurring trauma. Since the condition might be asymptomatic or with nonspecific symptoms it can be difficult to diagnose. A high degree of suspicion must be raised in cases of upper extremity swelling and pain on behalf of trauma or surgery, in order to avoid fatal complications like post-thrombotic syndrome and pulmonary embolism.

Essentials:

Upper extremity DVT is a rare condition.

Asymptomatic or with unspecific symptoms.

Rare complication to clavicular fractures.

A high degree of suspicion must be raised after upper extremity fracture.

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Introduction

Clavicular fractures are common and occur in 2,6-4% of all fractures in the adult [1-3]. The dominant etiologies are sport injuries, traffic accidents and falls. Most fractures are treated conservatively with good results, but an increasing number has been treated with plates the past decade. Upper extremity deep vein thrombosis (UEDVT) is a rare condition and accounts for approximately 4-10% of all cases of deep vein thrombosis (DVT) [4-6]. UEDVT can be either primary or secondary. Secondary forms of DVT caused by central vein catheters, port a cath's, pacemakers, cancer or trauma to vena Subclavia or vena

Axillaris are more common than primary forms (venous thoracic outlet syndrome, idiopathic, effort-related thrombosis, thrombophilia and Paget-Schroetter Syndrome) and accounts for approx. 80% of all cases of UEDVT [6, 7].

To our knowledge only a few cases of UEDVT after a clavicular fracture have been reported in the literature [8-12].

We present a case with a 53-year old male who developed a thrombosis in the right brachial and axillary vein following a conservatively treated clavicular fracture.

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The patient had no previous history of DVT in the upper or lower extremity, no coagulopathies. No familiar disposition to either. Non-smoker. BMI 29,5.

Case Report

A 53-year old male was referred to our department from an outpatient clinic. The patient had suffered a fall to the right shoulder while skiing 9 days prior to referral. (He had been seen twice in the outpatient clinic before being referred to our department). At referral he had had swelling of the right arm and a tingling sensation in the fingers for 4 days.

On physical examination he presented with haematoma on the right side of the chest and the anterior part of the right shoulder, swelling of the whole of the right arm, no discolouring, no pain on palpation, free movement and intact, but altered sensibility on the arm and hand. Pulse in the radial artery could not be felt because of the swelling. X-ray showed a displaced midshaft clavicular fracture, no contact between fracture ends (fig. 1). The patient was treated with a sling, compression and passive movement exercises. 1-week follow-up was planned. After 3 days the patient returned with pain in the upper arm, increased swelling (mostly above the elbow) and redness of the inside of the arm. UEDVT was suspected and an ultrasound was made to confirm. The ultrasound showed a massive thrombus in the brachial and axillary vein. No flow in the segment.

The patient was referred to the medical department for anticoagulation therapy with initially Low-molecular Weight Heparin (Fragmin) 18.000 IU for 5 days as a bridge to Rivaroxaban (Xarelto). Treatment with Xarelto was planned for 3 months, 15 mg x 2 day for 3 weeks, then 20 mg x 2. At follow-up about 4 months after the fall, the clavicular fracture presented no problem, the patient was pain free and x-ray showed ongoing healing. There was still some edema of the right arm, no discoloring, but accentuated veins at the right side of the chest.

Figures



Figure 1: Fracture of the right clavicle after skiing trauma

Discussion

The paraclinical background of a venous thrombosis was first described by Virchow: "Virchows Triad". The three components are: Injuries to the vascular endothelium, hypercoagulability and circulatory stasis. Virchows triad is still accepted as the etiogenesis of thrombosis.

Many orthopedic procedures increase the risk of developing a thrombosis, due to damage to the vessels during surgery, use of tourniquet, venous stasis on behalf of immobilizing bandages and

thereby activation of the coagulation system. Despite that, DVT in the upper extremity is a rare condition reported in only 4-10% of DVT cases [4-6] and is sparsely described in orthopedic literature. The most important independent risk factors are central vein catheters (CVC) and malignant disease [4,6]. Lately the incidence is increasing due to increasing use of CVC's and pacemakers [13].

The low reported numbers might be related to the considerably proportion of UEDVT (33-60%) that are asymptomatic [6] and therefore can go undetected. The symptoms of UEDVT can also be very subtle and rather unspecific. Most common symptoms are pain and swelling of the affected arm, but edema, prominent veins, redness and paresthesia are seen also [6,14].

Complications of DVT is less common in the upper extremities than in the lower extremities and include pulmonary embolism, recurrence within 12 months and post-thrombotic syndrome [7]. The most important complication is a pulmonary embolism which can result in pulmonary hypertension or death [6]. Mortality rates up to 12% has been reported [9,13]. In contrast to diagnosing lower extremity DVT, a negative result on a D-dimer test cannot be used to rule out an UEDVT. First of all, the D-dimer sensitivity in UEDVT hasn't been sufficiently tested in high-quality studies and secondly many of the patients suspected of UEDVT have coexisting conditions associated with an elevated D-dimer level such as cancer or CVC's [13, 7].

The golden standard, according to literature, for diagnosing an UEDVT is Doppler sonography [13,15]. It is re-producible, non-invasive and with a high sensitivity and specificity for UEDVT [10]. Known limitations to this modality are acoustic shadowing from the clavicle and the ribs [14-16]. The main aims of treatment are to prevent further progression of the thrombus and to avoid embolization. There are only limited data regarding treatment of UEDVT, therefore treatment recommendations for LEDVT are used as guidelines [6,7,13]. The treatment of choice is Heparin, unfractionated or low molecular weight (LMW), used as a bridge to either anti-vitamin K agents or NOAC (New Oral Anticoagulants). Treatment is typically continued for 3 months [6,7,13].

Conclusion

UEDVT is a rare condition and is often asymptomatic or with nonspecific symptoms. Only few cases are reported in orthopedic literature after upper extremity fractures. In this case the thrombosis is most likely a consequence of trauma to the vessel at the fracture time, since the swelling and paresthesia had already appeared at the time of referral. The patients' accentuated veins at the right side of the chest after a period of treatment might suggest some level of permanent obstruction of the thrombosed vein, resulting in impaired venous return and the formation of collaterals.

A high degree of suspicion must be raised in cases of upper extremity swelling and pain on behalf of trauma or surgery, in order to diagnose and treat the condition in time to avoid fatal complications. Anticoagulation therapy could be considered in patients with other high risk factors than a clavicle fracture, but further research must be made on this subject.

Addendum

M. Rosenstand is main author. R Thorninger has critically revised the article for intellectual content.

Both authors have given final approval of the manuscript.

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