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CASE REPORT

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Pulmonary thromboembolism after surgical treatment of ulnar pseudoarthrosis: a case report

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Deep vein thrombosis (DVT) and the consequently developed pulmonary embolism are devastating complications in orthopedic surgery. DVT occurs less frequently (1-2% of all cases) in the upper extremity than the lower extremity. We report a 54-year-old male patient who developed DVT and pulmonary thromboembolism after surgical treatment of an ulnar pseudoarthrosis. The presented case suggested the use of a low molecular weight heparin prophylaxis after upper extremity surgeries necessitating long-term immobilization.

Key words: Deep vein thrombosis; prophylaxis; pulmonary embolism, ulna non-union.

Deep vein thrombosis (DVT) can cause severe morbidity and mortality. DVT and consequent pulmonary embolism (PE) usually occur after pelvic fractures, prolonged lower extremity surgeries and long-term immobilization periods. It is seen less common (1-2% of all DVTs) in the upper than the lower extremities.[1-3] DVT prophylaxis is rarely considered after upper extremity surgeries which do not necessitate longer periods of immobilization. We report a 54-year-old male patient who developed DVT and pulmonary thromboembolism after surgical treatment of an ulnar pseudoarthrosis. The presented case suggested the use of a low molecular weight (LMW) heparin prophylaxis after upper extremity surgeries necessitating long-term immobilization.

Case report

A 54-year-old male patient presented at our clinic with forearm pain and range of motion limitation in the elbow and forearm. Four months prior, the patient had undergone surgery for a fracture in his right ulna proximal shaft and radius head, caused by a fall. Osteosynthesis had been performed using a 3.5 mm 5-hole plate and four screws. On physical examination, the elbow was fixed at 90° of flexion and forearm rotation was limited. The X-rays revealed ulnar non-union with implant failure (Fig. 1). The patient was re-operated under general anesthesia. After the exsanguinations of the extremity with an Esmarch bandage, a pneumatic tourniquet was applied with 250 mmHg pressure. Osteosynthesis was performed with a 3.5 mm locking compression plate and autologous iliac crest graft (Fig. 2). The procedure lasted 110 minutes, 85 of which were under tourniquet. Radial head was healed and the release of the fibrous adhesions was sufficient to ensure pronation and supination. Postoperative elbow range of motion was full.

Postoperatively no prophylactic anticoagulation regiment was considered as it was not the routine practice in our clinic, following upper extremity surgery. Eighteen hours postoperatively, the patient experienced chest pain and a short term loss of consciousness. There was no family history of DVT or PE. The

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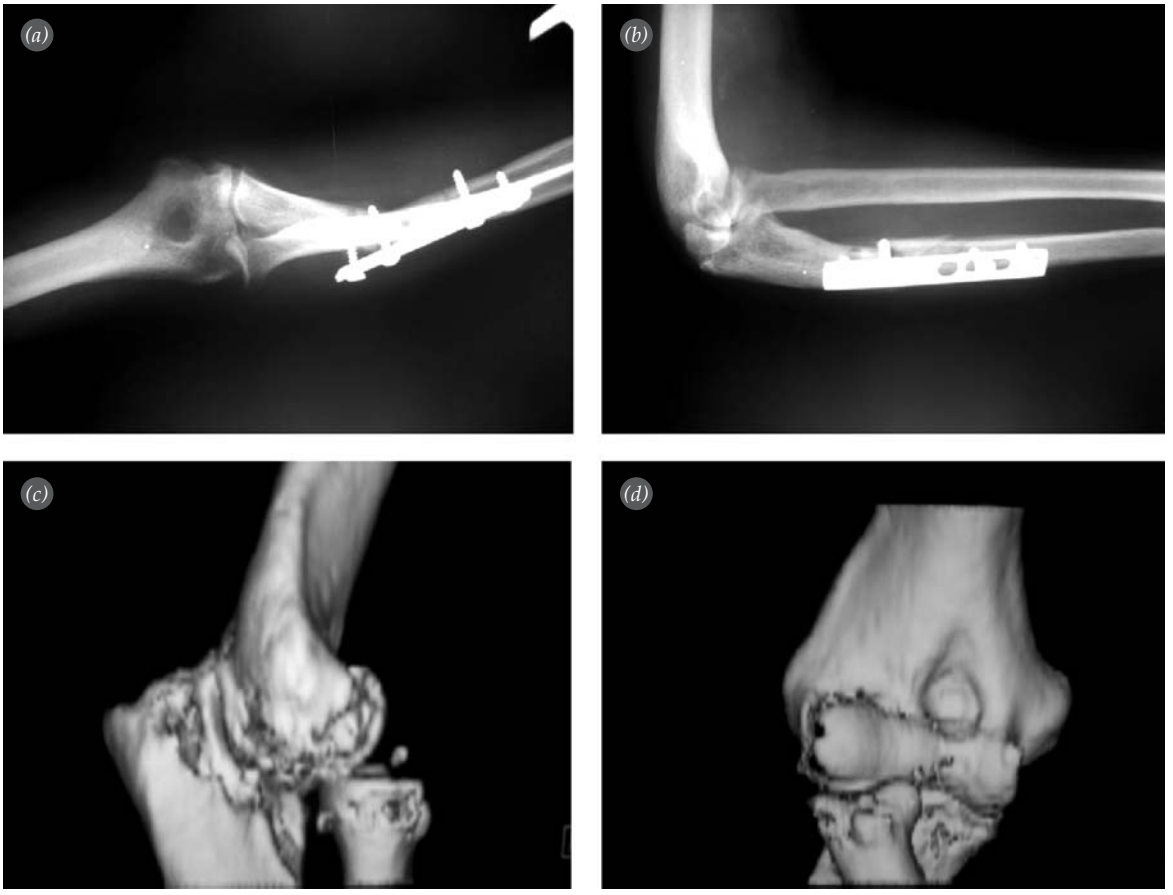

Fig. 1. Preoperative **(a)** AP, **(b)** lateral X-rays and **(c, d)** 3-D CT images. Delayed union of ulna and fractures of radial head are seen.

patient had tachypnea and tachycardia. His ECG was in sinus rhythm, R spikes were seen in anterior derivations, non-segmental ST depressions were present and an incomplete right branch block was diagnosed (Fig. 3). Echocardiography showed a dilated right ventricle and overloading signs at the interventricular septum. The patient was transferred to the coronary ICU, with a diagnosis of PE, and heparinized. In the pulmonary

Fig. 2. Postoperative **(a)** AP and **(b)** lateral X-rays. Fixation with an 8-hole 3.5 mm locking compression plate is seen.

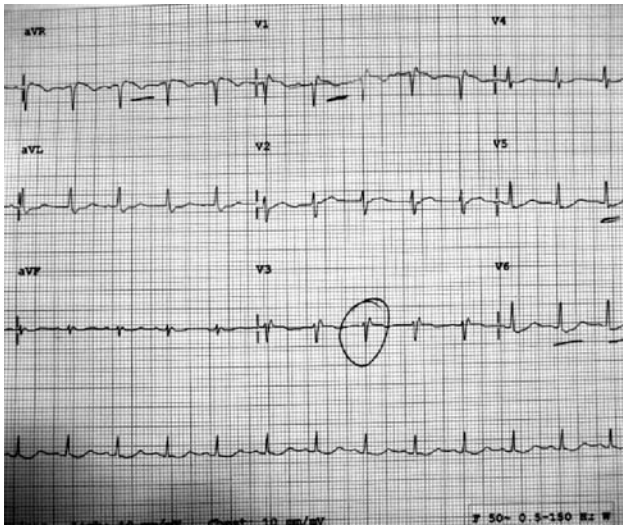

Fig. 3. ECG showing right heart load as a result of pulmonary embolism.

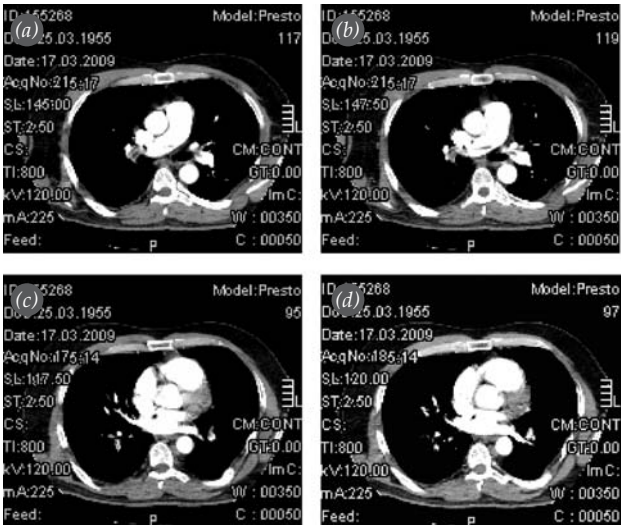

Fig. 4. Pulmonary CT angiography. In images 117 **(a)** and 119 **(b)**, a massive embolus is seen in bilateral main pulmonary arteries. In images 95 **(c)** and 97 **(d)**, a massive embolus is seen in the segmental arteries of the inferior lobes.

CT angiography, a massive embolus was diagnosed in the bilateral main pulmonary arteries and segmentary arteries of the inferior lobes (Fig. 4). There were no thrombus signs on the Doppler scan of the superficial and deep lower extremity veins, however, thrombus at the right brachial vein was detected (Fig. 5). To treat the PE, the activated clotting time was held at 300 seconds using unfractionated heparin for the first 24 hours. On the second day, LMW heparin was introduced to maintain anti-Xa levels below 0.4 units. The patient was transferred from the ICU on the third day and treatment was continued with warfarin maintaining INR levels of 2.5. On the seventh day, the patient was discharged from the hospital with stable test results. At the fifth month postoperatively, no intravenous thrombosis was detected on the Doppler scan. At the sixth month, warfarin was discontinued. The patient had no complaint at the ninth month follow-up (Fig. 6).

Discussion

DVT and consequently developed PE are devastating complications in orthopedic surgery. Upper extremity DVT has no specific signs and approximately half of all patients are asymptomatic.[4] Edema at the affected extremity, discomfort, erythema, dyspnea, chest pain, cough, syncope, hemoptysis and fever can

Fig. 5. Color Doppler ultrasonography of upper extremity. Brachial vein thrombosis is seen. [Color figure can be viewed in the online issue, which is available at www.aott.org.tr]

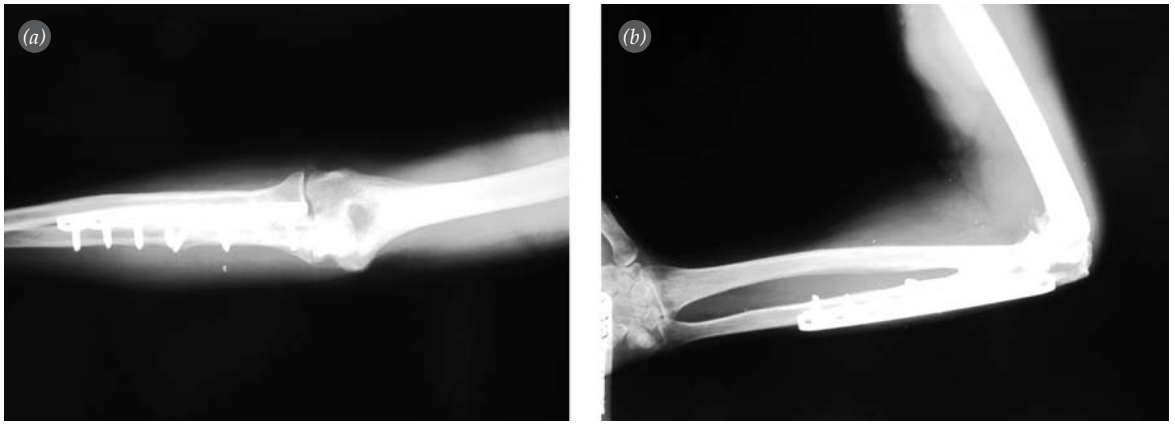

Fig. 6. **(a)** AP and **(b)** lateral X-ray images of the elbow. 9 months after the surgery, the ulna and radial head fractures are healed.

be seen. PE history, superior vena cava syndrome, DVT history or family history of DVT, major operations, immobilization for more than 30 days, general anesthesia, malignancy, central venous catheterization, major injuries, foreign body, polycythemia, thrombocytosis, cor pulmonale, congestive cardiac failure, thoracic outlet syndrome, coagulation disorders, and usage of oral contraception pills are considered predisposing factors.[2,3,5]

In PE, pulmonary arterial pressure is increased following thrombotic obstruction. Vasoconstriction, pulmonary hypertension, right-sided heart failure, and bronchoconstriction may be seen in the advanced stage.[6,7]

DVT of the upper extremity can be classified as primary or secondary. Primary cases constitute 20% of all upper extremity DVTs and are either idiopathic or exercise induced.[3] Treatment goals should be to reverse the acute symptoms, decrease the chance of reoccurrence, and prevent thrombosis induced syndrome.[8]

Heparin, LMW heparin and warfarin are the main medications in treatment.

In a case report by Singh et al., left proximal subclavian vein thrombosis was diagnosed in a 27-year-old male three days after a soft tissue injury in the left shoulder. Urokinase was administered for the first 24 hours and treatment was continued with intravenous heparin and oral warfarin. Oral anticoagulation was continued for 12 months. The patient's symptoms resolved after the third month of medication.[9]

Our experience with the presented case suggested the necessity of considering low molecular weight heparin prophylaxis after upper extremity surgeries in patients, necessitating long-term immobilization.

Conflicts of Interest: No conflicts declared.

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