Upper extremity deep vein thrombosis in a triathlete: Again intense endurance exercise as a thrombogenic risk

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Abstract

Triathlon followers increase each year and long-distance events have seen major growth worldwide. In the cycling phase, athletes must maintain an aerodynamic posture on the bike for long periods of time. We report a case of a 38-year-old triathlete with symptoms of an axillary vein thrombosis 48 h after a long triathlon competition. After 3 days of hospitalization with a treatment consisted on enoxaparin anticoagulant and acenocumarol, the patient was discharged with instructions to continue treatment under home hospitalization with acetaminophen. Four weeks after the process, the patient was asymptomatic and the diameter of his arm was near normality. Due to the growing popularity of events based on endurance exercise, it is necessary more research to determine the etiopathogeny of deep venous thrombosis in athletes.

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1. Background

Effort-induced thrombosis or Paget-Schroetter disease, is defined as a spontaneous deep vein thrombosis, localized typically in the axillary and/or subclavian veins. To date, cases have been reported in relation to weight training [1], wrestling [2], marathon [3], baseball [4], triathlon [5,6] and dumbbell exercises [7], requiring early diagnosis and treatment. Rates of pulmonary embolism are essentially the same for upper extremity deep vein thrombosis (UEDVT) and lower extremity at approximately 12% [8].

The patient consented to the publication of this report.

2. Case presentation

A 38-year-old male (height, 1.89 cm; weight, 80 kg) without any medical history of interest arrived in the Emergency Room (ER) complaining of edema and pain in his upper left extremity which had begun spontaneously 24 h before.

The patient had never suffered from coagulopathies nor did he recall any cases in his family. He wasn’t a smoker, did not drink alcohol and denied having taken any abusive drugs or illicit ergogenic substances.

He had been regularly doing the triathlon for years. Just 48 h prior to his visit to the ER, he had completed a Half-Ironman (1900 m swimming, 90 km on bike and 21 km running).

The patient denied any type of trauma or problem in his left arm while participating in the event. His hydration and nutrition before, during and after the event were correct.

During the physical exam, there proved to be inflammation from the underarm to his fingers. The largest diameter of his arm was 33 cm on the left side and 30 cm on the right. The extremity was compressible and soft, showing no pain from palpation. There was complete mobility in all axes of the joints.

Neither the electrocardiogram nor the chest X-ray showed any pathological findings.

Blood analysis: RBC 4.8 × 1012/l, hemoglobin 14.4 g/dl, hematocrit 42.8%, prothrombin time 12.5 s, prothrombin activity 100%, INR 1, cephalin time 30.4 s, D-dimer value 492 ng FEU/ml (1–500).

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With a clinical suspicion of deep vein thrombosis, a Doppler ultrasound was ordered which clearly showed an extensive clot extending from the subclavian vein to the axillary vein. (Fig. 1)

A computed tomography was done of the patient’s chest without any radiological signs of a pulmonary embolism. (Fig. 2)

The patient was admitted to hospital and began treatment with 1 mg/kg of an enoxaparin anticoagulant every 12 h and subsequently acenocumarol until reaching right range of anticoagulation without bleeding complications. After three days of hospitalization, he was discharged with instructions to continue treatment under home hospitalization with acetaminophen, 1 g every 8 h.

During a check-up four weeks after the process, the patient was asymptomatic and the diameter of his arm was near normality. A doppler ultrasound objectified endovascular recanalization in the affected area.

3. Discussion

UEDVT most often occurs in young people and is generally associated with repetitive physical activity in the upper limbs [1].

The few reports of venous thromboembolism occurring during a sports activity have been related to different sports activities [9-11], with a bigger incidence in long strenuous events like a marathon [3] or a triathlon [5,6]. The etiopathology of upper extremity deep vein thrombosis is not completely clear; the external compression and/or stress on the lining membrane of the axillary or subclavian veins due to postures or gestures associated with the retroversion and hyperabduction of the arm are possible causes [1].

In our patient, the blood clot was located from the subclavian vein to the axillary vein meaning it is possible the compression could have had an influence as a pathogenic mechanism.

The hypercoagulability that is associated with exercise could also have contributed to the appearance of the thrombosis [12]. Several studies have described an increase in platelet aggregability in response to exertion particularly when highly intense exercise (above the lactic threshold) [13].

Factors such as dehydration and perhaps a certain relative circulatory stasis in the arms due to the triathlete’s “coupled” position could have fostered the appearance of the deep vein thrombosis.

The case of the long-distance triathlon is special because it exposes athletes to the mentioned risk factors simultaneously.

Athletes in these competitions participate in swimming, cycle and running resistance events consecutively. In the cycling phase, the athlete must maintain an aerodynamic posture on the bike for long periods of time. This posture is known as “coupled” in triathlon terminology (Fig. 3). Just like a cervical rib or fibromuscular band can cause a mechanical conflict with the upper extremity veins, the position triathletes adopt coupled to the bike handlebar with their shoulders and elbows flexed can foster the development of Paget-Schroetter disease.

Although the incidence of Paget-Schroetter disease is low, long-distance triathletes must receive medical recommendations to prevent this pathology like proper hydration, changes in the trunk and arm posture on the bike as well as periodic isometric mobilization or contractions of the arm and forearm.

References