



Acute atraumatic carpal tunnel syndrome due to flexor tendon rupture following palmar plate osteosynthesis in a patient taking rivaroxaban

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Abstract

Introduction Few case reports describe the development of a hematoma under oral anticoagulation as the cause of an atraumatic carpal tunnel syndrome.

Case report A 76 years old woman presented an acute atraumatic carpal tunnel syndrome of her left hand under oral anticoagulation with rivaroxaban due to atrial fibrillation. 12 years ago, palmar plate osteosynthesis of a distal radius fracture had been performed on the affected wrist. Open decompression of the carpal canal was performed due to persistent severe pain under intense pain therapy and progressive neurological symptoms. The cause of the pain was a hematoma due to a rupture of the flexor pollicis longus and the second flexor digitorum profundus tendon with concomitant synovitis at the plate's distal rim. After decompression, pain relieved and neurological deficits improved rapidly.

Discussion Ruptures of the flexor tendons occur in palmar plate osteosynthesis in up to 1.5% in the long term postoperative course. Very distal plate positions, like in this case, increase that risk. Under anticoagulation, the rupture induced a hematoma increasing local pressure resulting in an acute carpal tunnel syndrome. Acute nerve compression syndromes should be treated surgically without delay.

Conclusion Therapy with anticoagulants may increase hematoma after tendon rupture, thus supporting the development of an atraumatic acute carpal tunnel syndrome and complicating the surgical therapy. Hardware removal after fracture healing should be advised in patients with Soong grade 2 plate positions especially those taking anticoagulants.

Keywords Oral anticoagulants · Carpal tunnel syndrome · Tendon rupture · Palmar plate osteosynthesis

Introduction

There are only few case reports with the development of a hematoma under oral anticoagulation as the cause of a carpal tunnel syndrome [1–3]. If it is triggered by a haemorrhage it typically causes severe pain and is often associated with

a rapid increase in neurological deficit requiring an urgent carpal tunnel release [4].

The palmar plate osteosynthesis is the standard fracture treatment for distal radial fractures. The risks of this procedure have been described in a recent review with 4.5% for tenosynovitis and 1.5% for tendon ruptures [5].

Case report

A 76-year-old women noticed an acute pain and local swelling of her left wrist with numbness of the radial three digits without trauma, and thus presented in our emergency department. Twelve years ago, a palmar plate osteosynthesis on the affected wrist was performed due to a distal radius fracture (AO 23-A3). In addition, the patient reported that she had been suffering from increasing movement restrictions of the flexion of the thumb for several years. The patient denied any acute trauma. She had a history of persistent

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atrial fibrillation and was taking oral anticoagulants (rivaroxaban) as a permanent therapy.

Clinical examination showed a swelling of approximately 4 cm in diameter directly at the palmar side of the wrist in the course of the old scar. Active flexion of all fingers was impossible and dysesthesia involved the 1st to 3rd digit and the radial side of the 4th finger. Even intensified pain therapy with ketamine could hardly relieve the patient's pain. X-ray control showed no material loosening or visible pathologies of the bone, but a juxta-articular palmar plate being located distal to the Watershed line [6] and at the volar rim representing a Soong type 2 plate position [7] (see Fig. 1). The laboratory examination did not show any other relevant changes or coagulopathies as the cause of the complaints. The ultrasound scan showed a hematoma of a maximal diameter of 4 cm palmar of the median nerve between the flexor tendons.

Despite the effective anticoagulation we decided to immediately operate the patient due to the acute neurological symptoms with strongest non treatable pain. The patient agreed to the proposed operation and the carpal tunnel release was performed the same day.

We used an exsanguinating soft bandage and then inflated a tourniquet. Intraoperatively, we found a hematoma in the Parona space with hourglass-shaped constriction of the median nerve. There was a hematoma in the area of the peritendinous tissue, which had contact to the palmar plate and

the flexor tendons (see Fig. 2). It showed a ruptured tendon of the flexor pollicis longus with synovitis and an acute erosion of the long flexor tendon of the index finger (see Fig. 3). After hematoma evacuation, partial synovectomy was performed with hemostasis of the synovial vessels and release of the carpal tunnel. The plate was left in situ, because we feared plate removal could impair bleeding. After opening of the tourniquet, subtle hemostasis with insertion of a local hemostyptic, wound drainage and closure were realized.

Normal wound healing was observed postoperatively. The pain and numbness declined completely immediately post-surgery. The patient received a postoperative therapeutic anticoagulation with low molecular weight heparin. At the time of discharge after 5 days there was no restriction of sensitivity.



Fig. 1 X-ray of wrist AP and axial view

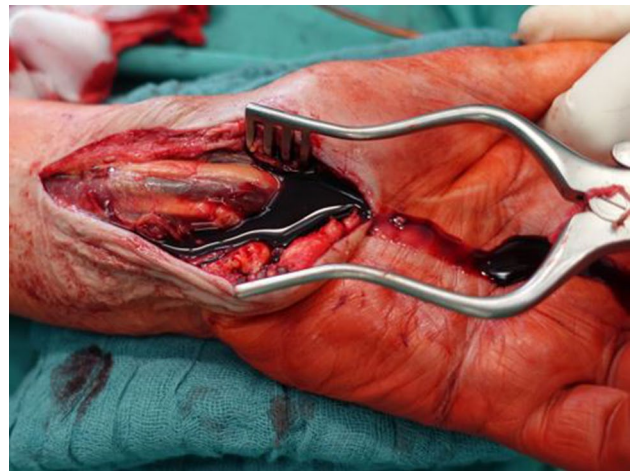


Fig. 2 Evacuation of the hematoma

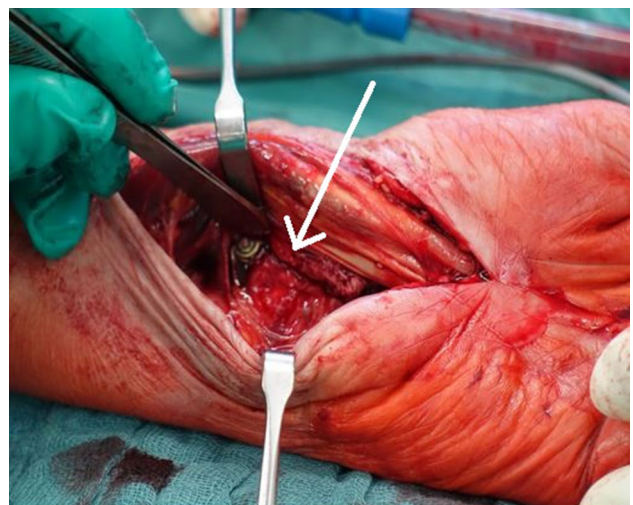


Fig. 3 Erosion of the flexor tendons by the rim of the palmar plate—arrow points at flexor digitorum profundus II tendon

We discussed with the patient in detail the further treatment options and we recommended the elective material removal with reconstruction of the flexor pollicis longus tendon. Currently, the patient does not want any further surgery.

Discussion

The acute atraumatic carpal tunnel syndrome is a very rare condition, for which there may be various causes. In the presented case, there were no signs of infection, but a swelling under anticoagulation preoperatively. Thus, a hematoma was the most likely cause of the complaints. In addition, the patient reported of long-standing and progressive movement restrictions of the finger flexion, beginning at the thumb, so that a tendon erosion or rupture was suspected as the cause of the hematoma. The clinical appearance with the interphalangeal joint of the thumb in hyperextension and the described impairments of movement might indicate that the flexor pollicis longus rupture had existed for a longer time. The intraoperative findings demonstrated an erosion of the long flexor tendon of the index finger with signs of local bleeding representing evidence of a recent event.

In the presented case, a very distal plate position with use of a juxta-articular plate made erosion of the flexor tendons more likely [8]. Kitay et al. recommended hardware removal for symptomatic patients with such Soong type 2 plate positions due to the increased risks for tendon rupture [9]. The presented patient is a perfect example for that and probably would have benefited of an early removal. Under anticoagulation with rivaroxaban, the rupture induced a hematoma with local pressure effect in the Parona space which led to an acute carpal tunnel syndrome by direct pressure of the median nerve [1, 10]. The intraoperative appearance of the median nerve with hourglass-shaped constriction might suggest a partially chronic impairment of the nerve—in contrast the patient described the symptoms as lasting since the morning and she denied any previous dysesthesia. Possibly it had been an acute on chronic event; a clinically inapparent median constriction suddenly deteriorating due to the hematoma.

The treatment of the presented case was aggravated by an ongoing anticoagulation with a new oral anticoagulant, rivaroxaban [11, 12]. Although adverse side effects of the new oral anticoagulants are considered less than those of vitamin K antagonists, spontaneous hemorrhages have been reported [13]. Moreover, in the present case, tendon erosion had been the cause of hematoma formation, so that anticoagulation was probably not the cause of hemorrhaging but of the intensity of it. In addition, it might represent a perioperative risk factor for the management of this patient although retrospective studies with patients taking vitamin-K-antagonists did not show an increased risk of perioperative

bleeding in elective hand surgery [14]. Studies with direct oral anticoagulants are still missing.

Conclusion

This case illustrates the risks associated with prominent palmar plate osteosynthesis and the recommendation for hardware removal for Soong type 2 positions. Therapy with anticoagulants promotes the development of atraumatic acute carpal tunnel syndrome and aggravates the surgical therapy. Hardware removal in patients combining these conditions should be mandatory to prevent such complications.

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Compliance with ethical standards

Conflict of interest Wolfram Weschenfelder, Reinhard Friedel, Gunther O. Hofmann and Mark Lenz declare that they have no conflict of interest.

Research involving human and/or animal participants This article does not contain any studies with human participants or animals performed by any of the authors.

Informed consent Informed consent was obtained from all individual participants included in the study.

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