

Deep Venous Thrombosis and Pulmonary Embolism as Rare Complications After Hallux Valgus Surgery

Case Report and Literature Review

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The incidence and life-threatening complications of thromboembolic disease after major orthopedic surgical procedures have been extensively defined in the medical literature. However, there are few studies concerning the incidence of thromboembolic disease after foot and ankle surgery. We describe a 57-year-old female patient who underwent surgery for bilateral hallux valgus deformities and was diagnosed as having deep venous thrombosis and pulmonary embolism after the surgery despite early mobilization and mechanical prophylaxis. Her preoperative physical examination revealed varicose veins in both cruris. She was treated for pulmonary embolism with low-molecular-weight heparin and an oral anticoagulant in the postoperative period. Although venous thromboembolism is more commonly described after proximal lower-extremity procedures, it can occur after foot and ankle surgery, particularly if the patient has certain risk factors. Therefore, in addition to mechanical prophylaxis, pharmacologic prophylaxis should be kept in mind in such patients. (J Am Podiatr Med Assoc 103(2): 145-148, 2013)

Venous thromboembolism (VTE) and pulmonary embolism (PE) are among the devastating complications that can be seen particularly after major surgical procedures in orthopedics and traumatology. Because the incidence of VTE without prophylaxis is reported to be 40% to 60% and potential life-threatening complications of thromboembolic disease have been extensively defined in the literature, routine prophylaxis should be applied after major orthopedic surgical procedures.¹ However, there are few studies concerning the incidence of thromboembolic disease after foot and ankle surgery. The number of published studies that evaluate the incidence of VTE after distal procedures of the foot is even smaller.

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Elective foot and ankle procedures are considered by most surgeons to be low-risk procedures for the development of VTE, with a reported incidence of 0.22% to 4%.²⁻⁶ Some authors^{5,7} have concluded that VTE prophylaxis should be considered in high-risk patients, whereas others^{3,4} did not recommend routine prophylaxis after foot and ankle surgery.

We describe a patient who underwent surgery for bilateral hallux valgus deformities and was diagnosed as having deep venous thrombosis and PE after the surgery despite early mobilization and mechanical prophylaxis. The purpose of this paper is to discuss the literature about VTE as a rare complication in foot and ankle surgery.

Case Report

A 57-year-old female patient presented to the Orthopaedics and Traumatology Outpatient Clinic of Yeditepe University Hospital (Istanbul, Turkey) with the chief concerns of pain and deformity around the first metatarsophalangeal joints of both feet. Physical examination revealed valgus deformi-



Figure 1. Preoperative (A) and postoperative (B) anteroposterior radiographs of the patient.

ties of the first metatarsophalangeal joints and varicose veins in both cruris. Plain radiographs showed bilateral hallux valgus deformities, with hallux valgus angles of 15° and 21° and intermetatarsal angles of 10° and 14° on the right and left feet, respectively (Fig. 1A). Her medical history was normal. She ultimately requested surgical intervention and was informed of the risks, complications, and postoperative course.

She underwent surgical correction of her deformities under tourniquet control with a distal metatarsal osteotomy and screw fixation (Fig. 1B). Total operation time was 90 min, with 40 min of tourniquet time for each lower extremity. After the surgery, forefoot bandages were applied to both feet. Pharmacologic VTE prophylaxis was not applied to the patient, but mechanical prophylaxis, including active ankle range-of-motion exercises and knee-high antiembolic compression stockings for both limbs, was performed. She was discharged from the hospital on the first postoperative day and was allowed weightbearing as tolerated with custom-made hallux valgus shoes that restricted the load to the forefoot on walking.

Sixteen days after surgery, the patient was admitted to the emergency department with right-sided chest pain and shortness of breath. After computed tomographic angiography of the thorax (Fig. 2A) and venous Doppler ultrasonography of the lower extremities (Fig. 2B), a distinct filling defect in the pulmonary artery on the right lower lobe and a partial thrombus in the right superficial femoral vein were detected. She was hospitalized with a diagnosis of deep venous thrombosis and PE. Low-molecular-weight heparin (enoxaparine, 80 mg;

2×1 subcutaneously) and oral anticoagulant (warfarin, 5 mg; 1×1 orally) treatment was initiated. Concerns about right-sided pain and difficulty breathing subsided in a few days, and the patient was discharged on the 10th day of treatment as her international normalized ratio was 2.4. Low-molecular-weight heparin administration was stopped on the 10th day, and warfarin therapy was continued for 6 months. During this period, the international normalized ratio was evaluated every 3 weeks with a goal of 2 to 3. Another VTE episode or bleeding complication secondary to warfarin use was not observed. In the laboratory examination, the hypercoagulable panel and genetic tests revealed no abnormalities. She had no significant family history of hypercoagulable states. The only known risk factor was the presence of varicose veins in both calves.

The patient remained asymptomatic after thrombotic therapy and did not experience chest pain or shortness of breath. She ultimately healed from her hallux valgus reconstruction. At the final follow-up, 6 months postoperatively, the examination revealed no evidence of postphlebotic syndrome or sequelae secondary to the embolism. Written informed consent was obtained from the patient for publication of this case report and any accompanying images.

Discussion

Most orthopedic surgeons do not use or recommend routine VTE prophylaxis after foot and ankle surgery.^{3,4,8} Gadgil and Thomas⁹ stated that only

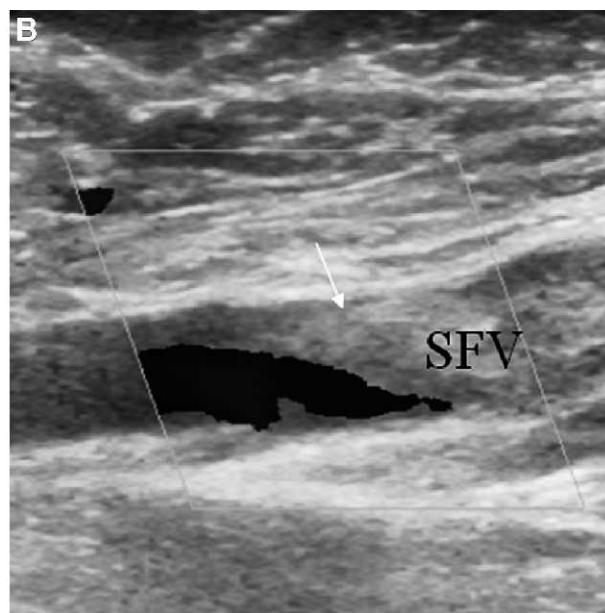
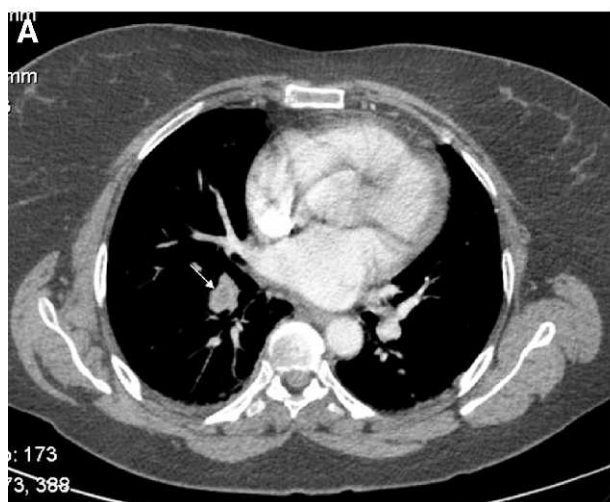


Figure 2. A, Computed tomographic angiography shows a distinct filling defect (white arrow) in the pulmonary artery on the right lower lobe. B, Venous Doppler ultrasonography shows a partial thrombus (white arrow) in the right superficial femoral vein (SFV).

19% of the surgeons practicing in England and the United States used routine prophylaxis in elective and trauma foot and ankle surgery. A lack of published evidence and a low rate of thromboembolism were the most commonly cited reasons for not using thromboprophylaxis.

There are few studies in the literature that include large series of patients. In a prospective, multicenter study³ with 2,733 patients, the occurrence of VTE after foot and ankle surgery was evaluated. Six patients developed clinically detectable deep venous thrombosis (four in the calf and two in the thigh) confirmed by ultrasound or venography. Of those six patients with deep venous thrombosis, four developed nonfatal PE confirmed by ventilation-perfusion scans. The total incidences of thromboembolic events and PE in this study were 0.22% and 0.15%, respectively. Based on these findings, the authors concluded that routine prophylaxis for thromboembolic disease after foot and ankle surgery was not warranted. In another study, Wukich and Waters² reviewed and evaluated a consecutive series of 1,000 patients who underwent foot and ankle operations. The incidences of symptomatic deep venous thrombosis of the lower extremity and nonfatal PE were found to be 0.4% and 0.3%, respectively. In a retrospective study reported by Hanslow et al,⁶ the incidence of thromboembolic disease after foot and ankle surgery in 602 patients was found to be 4%.

Except for these studies, some others evaluated the VTE incidence after surgical procedures for forefoot pathologic conditions. In a single-center, prospective, phlebographically controlled study¹⁰ that quantified the rate of venous thrombosis in 100 patients who underwent Chevron osteotomy for the correction of hallux valgus deformity, 4% of the patients showed venous thrombosis. None of the patients included in the study received pharmacologic prophylaxis against thrombosis. The mean age of patients in whom thrombosis developed was statistically significantly higher than that of patients in whom thrombosis did not develop. It was concluded that the patients were at low risk for venous thrombosis after surgical treatment for hallux valgus and that routine medical prophylaxis might be justified for patients older than 60 years. In a prospective, randomized study of 117 lower extremities of 71 patients after forefoot surgery, Simon et al¹¹ found no cases of thrombosis formation based on the results of I-labeled fibrinogen, Doppler ultrasound, and phlebography.

Some risk factors for thromboembolism have been reported in the literature after foot and ankle procedures. The sedentary postoperative period of immobilization with splinting or casting, nonweight-bearing or weightbearing limitations, hindfoot surgery, advanced age, history of rheumatoid arthritis, recent history of air travel, previous deep venous thrombosis or PE, and varicose veins are further

factors potentially contributing to thromboembolism.^{2-4,6,12,13} Tourniquet time of more than 90 min, operating room time of more than 105 min, and time to surgery of more than 27 hours after ankle trauma were also found to be predisposing factors associated with an increased incidence of VTE after foot and ankle surgery.^{4,7} Presence of varicose veins, age of the patient, bilateral procedure, and limitation of mobility of the patient were among the predisposing factors to deep venous thrombosis and PE in the present case.

The American College of Chest Physicians guidelines suggest that routine prophylaxis is necessary after surgical procedures below the knee only when risk factors are present for VTE.¹ Prophylaxis for VTE can be performed by mechanical or pharmacologic methods. Intermittent foot compression pump, compression stockings, and ankle exercises are mechanical methods. The pharmacologic agents available include low-molecular-weight heparin, warfarin, and fondaparinux. The results of several studies indicate that mechanical methods alone are less effective than are pharmacologic agents.^{1,14} However, some reports show that mechanical prophylaxis alone is adequate.¹⁵⁻¹⁷ In the present case, mechanical prophylaxis, including early active range of motion and antiembolic compression stocking use, was applied to the patient in the early postoperative period. Despite these methods, we conclude that the presence of varicose veins as a risk factor played a major role in the development of deep venous thrombosis and PE in the present patient.

The current therapy guidelines do not differentiate low- and high-risk factors or mechanical and pharmacologic prophylaxis by evaluating the number of risk factors. Under these circumstances, it is the surgeon's decision to evaluate the risk factors related to the individual and the surgical procedure. The current medical literature does not support the need for routine pharmacologic thromboembolism prophylaxis in patients undergoing foot and ankle surgery.² Although VTE is more commonly described after proximal lower-extremity procedures, the case presented herein and the few reported studies in the literature demonstrate that VTE can occur after foot and ankle surgery, particularly if the patient has certain risk factors. Prospective, randomized clinical trials are needed to establish the true incidence of thromboembolic disease after surgical procedures and to define the indications for routine thromboprophylaxis.

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