



Deep Vein Thrombosis in a Patient with Polycythemia Vera Who Underwent Hip Surgery: A Case Report

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A 68-year-old woman who suffered from polycythemia vera presented at our clinic with the chief complaints of pain, swelling, and a warm sensation in her left thigh. She had undergone a left bipolar hemiarthroplasty following a hip fracture 24 days prior to this presentation. Her erythrocyte sedimentation rate and C-reactive protein (CRP) levels were elevated. In addition, a postoperative infection was suspected in the 3-phase bone scan; therefore, she received intravenous antibiotic therapy. This approach proved to be ineffective and she was subsequently diagnosed with a deep vein thrombosis via color Doppler ultrasonography. It is interesting to note that a deep vein thrombosis can present with symptoms similar to those of a postoperative infection. Furthermore, an elevated CRP level is frequently observed in patients suffering from polycythemia vera. Therefore, the two conditions, which require completely different treatments, can be confused. We report on this case with a review of the relevant literature.

Key Words: Polycythemia vera, Deep vein thrombosis, Postoperative infection

Due to similar clinical signs and symptoms, it is often difficult to make an accurate diagnosis in cases where patients with a medical history of polycythemia vera present with a deep vein thrombosis following hip surgery. In the current study, we report the case of a patient with a deep vein thrombosis and polycythemia vera who may have been misdiagnosed as having a postoperative infection.

CASE REPORT

A 68-year-old woman visited the clinic with the chief complaints of pain, swelling, and a warm sensation in her left thigh for over 2 days prior to her visit. The patient also complained about a warm sensation during the nighttime but body temperature was normal when measured in the clinic. She had undergone a left bipolar hemiarthroplasty following a hip fracture 24 days prior to the current visit and was wearing compression stockings to prevent the occurrence of a deep vein thrombosis. She had been taking aspirin 100 mg daily, fexonadine 180 mg daily, and hydrea 500 mg twice a day for a diagnosis of polycythemia vera for 1 year and was phlebotomized in a hemato-oncology setting on an irregular basis. In advance of the operation, her erythrocyte sedimentation rate (ESR), and C-reactive protein (CRP) levels were 30 mm/hr and 4.99 mg/dL, respectively. Three days after her hip surgery, her ESR

Submitted: February 16, 2014 **1st revision:** March 14, 2014
2nd revision: April 14, 2014 **Final acceptance:** April 25, 2014

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and CRP levels were 23 mm/hr and 6.35 mg/dL, respectively. Medical care was administered in close cooperation with the Hemato-Oncology department and the level of hemoglobin was maintained at <12 g/dL to prevent a thrombosis prior to her operation. Other specific medical histories as well as traumatic injuries were not noted. The patient did not have a fever and her skin color seemed normal despite swelling and a slight warm sensation in the left hip and proximal femur. Results of a blood test showed that her complete blood count, electrolyte levels, and liver function were all within normal ranges (white blood cell count [WBC]: 4,700/ μ L, hemoglobin: 10.6 g/dL, hematocrit: 32.3%, platelet: 213,000/ μ L, neutrophil count 67.2%, lymphocyte 24.1%, monocyte 6.8%) whereas the ESR and CRP level were 38 mm/hr and 8.25 mg/dL, respectively. When compared to tests performed previously, no further observations of additional fractures, signs of infection, or loosening of inserts after the surgery were found (Fig. 1). In the 3-phase bone scan test, acute or sub-acute inflammation was diagnosed given the perfusion image of soft tissue in the left hip area as well as the blood pool image (Fig. 2). Due to the suspected infection of the left hip, the patient was injected intravenously with antibiotics for 1 week while staying in the hospital, however, symptoms were not alleviated.

In order to prevent a deep vein thrombosis, the patient started to move with the aid of a wheelchair and exercised her knee joints 3 days after the operation. One week later, she began walking exercises. In addition,

although the level of hemoglobin was well maintained at <12 g/dL, a color Doppler ultrasonography was performed due to her history of polycythemia vera. Results revealed a deep vein thrombosis in the common femoral vein as well as in the superficial femoral vein (Fig. 3). Symptoms were alleviated following the administration of low-molecular-weight heparin (enoxaparin, 40 mg) and warfarin (5 mg) for 5 days. Additional warfarin was prescribed (2.5 mg daily) for maintenance at discharge. During her first follow-up visit 2 weeks later, no symptoms were noted and all blood test parameters were within normal ranges.

DISCUSSION

It has been reported that patients with polycythemia vera present with various complications related to thrombosis due to excessive blood viscosity¹⁾. Several putative reasons have been postulated to explain such complications including hypervolemia, an increase in the volume of red blood cells, telangiectasia due to decreased blood flow velocity as well as vascular elasticity, thrombocytosis, and complex hemostatic disorders attributable to inefficient blood clotting processes²⁾. Thrombosis is the leading cause of death in those with polycythemia vera and has been associated with high morbidity as well. Approximately 12-49% of patients with polycythemia vera experience thrombosis and 20-40% will die as a result²⁾.

Thromboembolism is one of the major complications

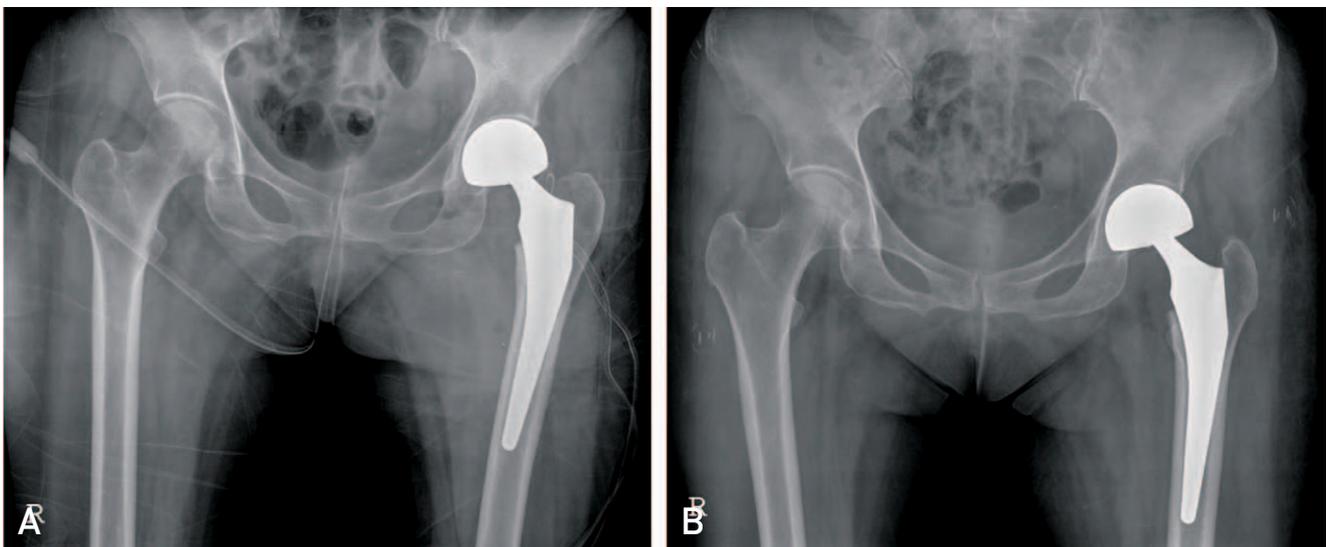


Fig. 1. Two plain radiographs showing no significant differences between the immediate postoperative radiograph (A) and the radiograph taken at the initial postoperative visit (B).

of hip surgery and contributes to its poor prognosis. Warwick et al.³⁾ reported that the incidence rate for a deep vein thrombosis was about 1.89% if proper medication was not provided after total hip arthroplasty. Therefore, in the case of the patient described in the

current case report, it was reasonable to expect that she would be susceptible to the high incidence rate of thrombosis as she underwent the hip surgery based on her history of polycythemia vera. For prophylactic purposes, aspirin was administered (100 mg daily) and

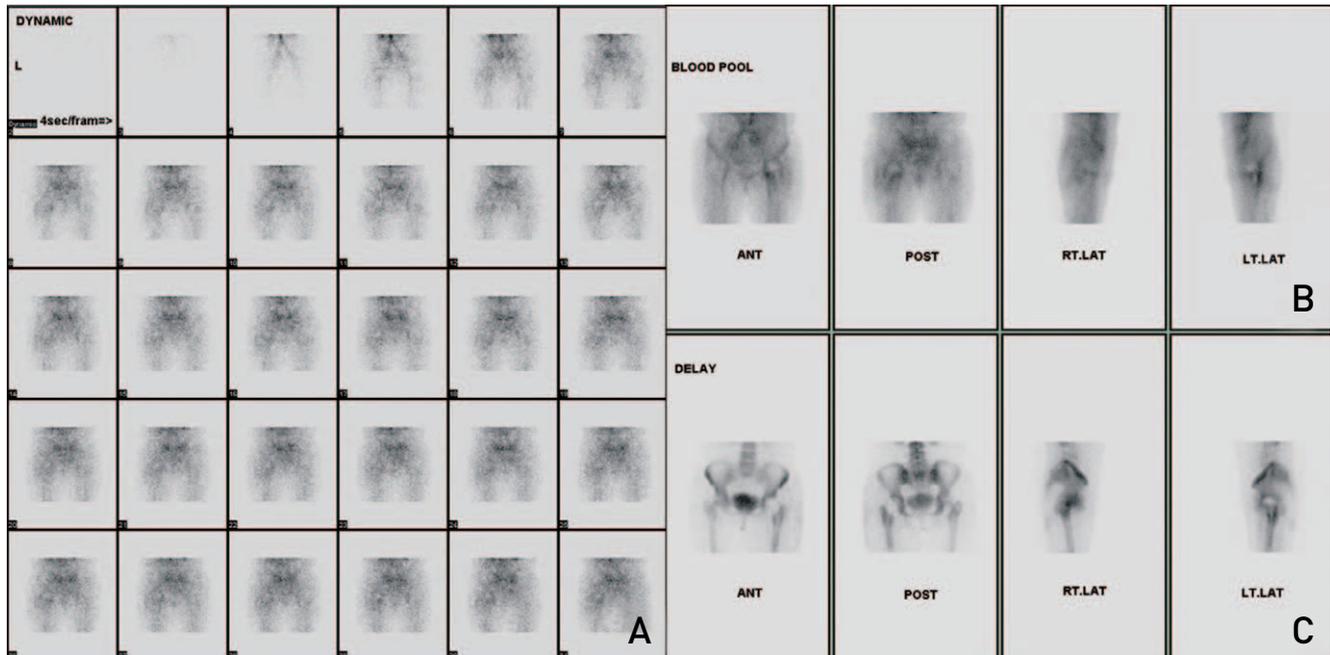


Fig. 2. A 3-phase bone scan showing diffuse mild-to-moderate increased uptake in the periprosthetic region and left buttock in the dynamic and pool phases (A, B) and no remarkable increased uptake in the delayed phases (C). ANT: anterior view, POST: posterior view, RT.LAT: right lateral view, LT.LAT: left lateral view.

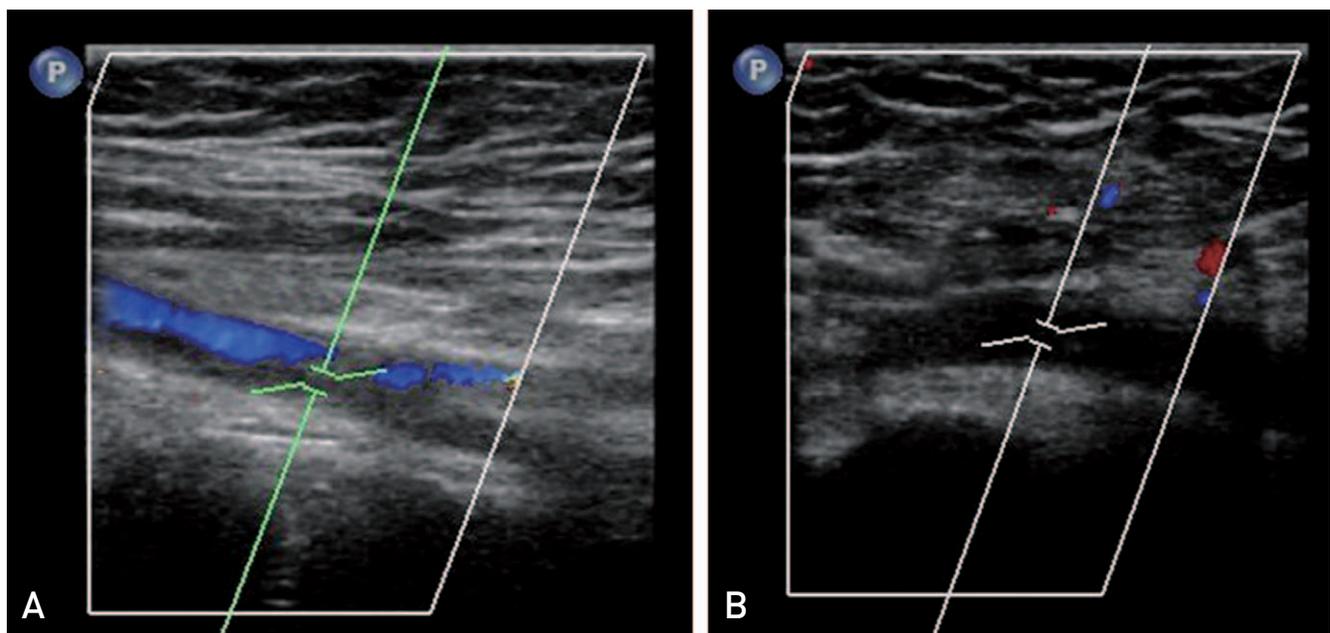


Fig. 3. Color Doppler ultrasonography shows the deep vein thrombosis in the left superficial femoral vein (A) and the common femoral vein (B).

early exercise and active movements were recommended for the patient in order to lower the risk of venous thromboembolism.

In the current case report, a patient with polycythemia vera exhibited clinical symptoms and signs of a postoperative infection following bipolar hemiarthroplasty due to femoral neck fractures. There was, however, a deep vein thrombosis which rendered the intravenous administration of antibiotics ineffective in the alleviation of symptoms. Early symptoms of a deep vein thrombosis, including swelling, pain, oppressive pain, and a warm sensation, can mimic those of a postoperative infection. Furthermore, features of systematic inflammatory responses such as increased levels of interleukin-6, interleukin-8, and CRP may be observed in patients with a deep vein thrombosis. Collectively, these findings suggest that appropriate clinical examinations are warranted at an early stage in order to avoid making an inaccurate diagnosis^{4,5}.

On the first visit after the operation, the patient was suspected to have had a postoperative infection due to the simultaneous increase in ESR and CRP levels. However, the specificity of ESR and CRP levels pertaining to the diagnosis of infections is questionable, as most patients display elevated levels of ESR and CRP following a hip surgery⁶. These inflammatory responses stimulate the production of cytokines due to the fractures and operation per se, thus biochemical parameters for inflammation are known to be elevated in a non-specific manner. In cases without postoperative infections, elevated CRP levels recover to the normal range within 3 weeks of the operation^{6,7}. In the current case report, the elevated CRP level that was maintained for up to 24 days after the operation led us to suspect a postoperative infection. However, the abnormally increased level of acute phase reactants (e.g., CRP) may be observed in patients with chronic myeloproliferative diseases (e.g., polycythemia vera) and therefore further specific clinical examinations are required for an infectious diagnosis⁸.

Regarding the diagnosis of a postoperative infection, elevated level of serum procalcitonin may be more valuable than WBCs and CRP levels⁷. Regrettably, the

level of serum procalcitonin was not measured in the current case but could have been informative in distinguishing between postoperative infection and a deep vein thrombosis.

Despite the presentation of similar clinical symptoms between a postoperative infection and a deep vein thrombosis, their etiological mechanisms are completely distinct. Therefore, different treatments are warranted, as patients receiving inappropriate medical treatments may experience exacerbated symptoms and conditions. The potential for a deep vein thrombosis requires continuous thought and attention regarding relevant examinations for patients at high risk for thrombosis as well as for embolism (e.g., polycythemia vera).

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