

톡소카라증에 의한 호산구증으로 발생한 말초혈관혈전증 1예

고려대학교 의과대학 ¹내과학교실, ²흉부외과학교실

표정의¹ · 민병주² · 박민선¹ · 구대회¹ · 정창호¹ · 심재겸¹ · 민혜숙¹

A Rare Cause of Peripheral Vascular Thrombosis: Hypereosinophilia Caused by *Toxocara canis* Infection

Jeung Hui Pyo¹, Byoung-Ju Min², Min Seon Park¹, Dae Hoe Ku¹, Chang Ho Jung¹, Jae Kyeom Sim¹, and Hye Sook Min¹

¹Departments of Internal Medicine, ²Thoracic and Cardiovascular Surgery,
Korea University College of Medicine, Seoul, Korea

Hypereosinophilia is often associated with eosinophilic infiltration of tissue, which can lead to severe and irreversible organ damage. One of the most characteristic and critical complications is development of thrombosis in cardiac ventricles, and occasionally in deep veins. We report a rare case of hypereosinophilia, with peripheral vascular thrombosis, caused by *Toxocara canis* infection. (Korean J Med 2014;86:781-784)

Keywords: Hypereosinophilia; Toxocariasis; Peripheral vascular thrombosis

INTRODUCTION

Hypereosinophilia is an abnormal condition defined by the presence of more than 500 eosinophils per microliter of blood. The main causes of eosinophilia are infectious diseases including parasitic infections, allergic diseases, malignancies, drug hypersensitivity reactions, and idiopathic hypereosinophilic syndrome (HES), which is eosinophilia without any specific cause [1]. Toxocariasis can be contracted in any country by accidental ingestion of embryonated eggs, or by consumption of uncooked liver containing encapsulated

larvae [2]. In adults, transmission from uncooked cow liver is the most common cause of toxocariasis, though pig, lamb, and chicken livers are also reported sources [3]. Eosinophilic disease appears to be especially prevalent in Korea, most often associated with *Toxocara canis* infection from ingestion of uncooked cow liver [4]. Often patients are relatively asymptomatic, but occasionally there is invasion of specific target organs, such as the liver, lungs, and eyes, resulting in delayed-type and immediate-type hypersensitivity responses [5]. To date, only one aortic thrombosis due to *Toxocara* infection has been reported [6]. Here we describe a case of hyper-

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Correspondence to Byoung-Ju Min, M.D., Ph.D.

Department of Thoracic and Cardiovascular Surgery, Korea University Ansan Hospital, 123 Jeokgeum-ro, Danwon-gu, Ansan 425-707, Korea

Tel: +82-31-412-1020, Fax: +82-31-414-3249, E-mail: mbzoo21@naver.com

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eosinophilia caused by toxocariasis in an adult male with a rare clinical presentation of peripheral vascular thrombosis.

CASE REPORT

A 55-year old Korean male was referred to the Department of Rheumatology with coldness and bluish discoloration of third and fifth digits of left hand, and swelling of the right leg. One month



Figure 1. Upper extremity angiogram of the left wrist and hand shows thrombi occluding the vessels.

prior to admission, his right hand was severely injured in a roller machine, which required groin flap (please reword and explain what required groin flap). The patient had no history of illicit drug use, asthma, or allergies. The patient was a smoker of 30 years (0.7 packs/day). Physical examination revealed symmetrical and palpable peripheral pulses without murmurs. The third and fifth digits of his left hand were cold and violaceous. His right calf revealed tenderness and swelling with positive Homans' sign. An upper extremity angiogram revealed totally or partially occluding thrombus of the vessels in the left wrist and hand (Fig. 1). Lower extremity CT angiography identified a deep vein thrombosis in the right middle superficial femoral vein, and both popliteal and calf veins (Fig. 2). The patient was treated with aspirin 100 mg/day, enoxaparin 120 mg/day, and prostaglandin E1. Laboratory examination revealed an increase in white blood cell count with hypereosinophilia (WBC 28,040/ μ L, eosinophil 43%, 12,057/ μ L) with elevated serum IgE concentration (550 IU/mL; normal value < 20). No other abnormalities were found in standard blood tests. Evaluation of the underlying causes of hypereosinophilia and other eosinophil-mediated complications were not completed as the patient refused further treatment and discharged himself against medical advice.

The day following discharge, there was deterioration of the patient's finger ulcer deteriorated and the patient re-admitted to the department of cardiovascular surgery. Laboratory examination

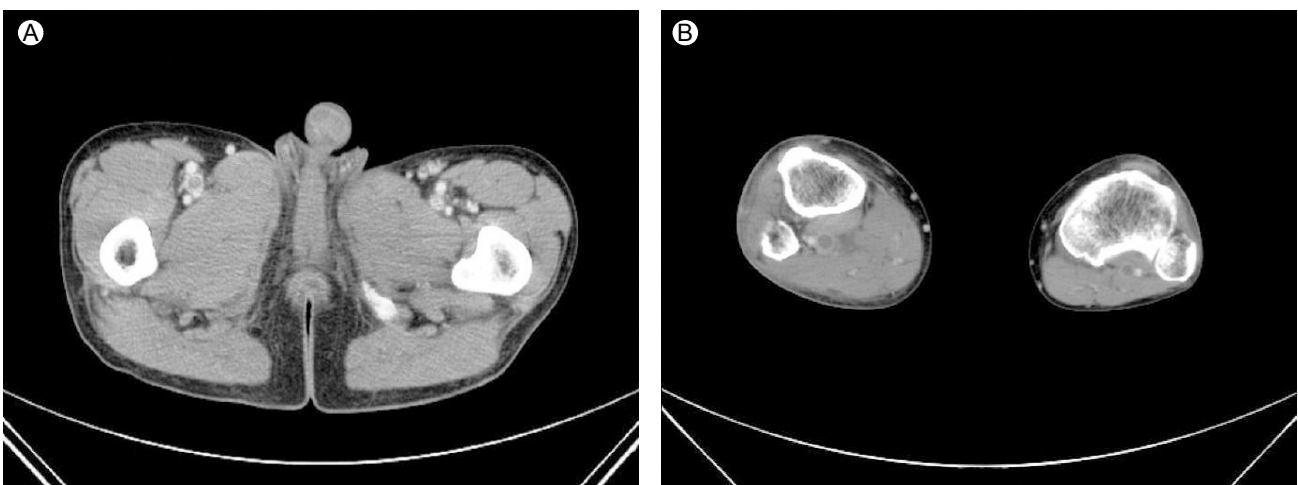


Figure 2. Lower extremity CT angiography shows deep vein thrombosis in (A) the right middle superficial femoral vein, (B) and both the popliteal and calf veins.

revealed increased eosinophil count (23,940/ μ L). Screening for ANA, ANCA, rheumatoid factor, and antiphospholipids (lupus anticoagulans, anticardiolipin, β -2 glycoprotein) were negative. Stool evaluation for ova and parasites were negative, and serologic tests (Toxocara Ab, Cysticercus Ab, P.westermani Ab, Sparganum Ab, C.sinensis Ab) for parasites were performed. A bone marrow biopsy showed hypercellular marrow with increased eosinophils with normal maturation. Fip1-like and platelet-derived growth factor receptor alpha gene (FIP1L1-PDGFR α) fusion were not detected. Chest radiography and abdominal/pelvic CT revealed no abnormality. Esophagogastroduodenal endoscopy and colonoscopy were without evidence of significant eosinophilia or parasites. An echocardiogram revealed no evidence of thrombus or any other abnormal findings. One week later, the diagnosis of toxocariasis was confirmed by serologic test (performed at Seoul Clinical Laboratory (SCL), Seoul, Korea) using a *Toxocara* ELISA kit (Bordier Affinity Products SA, Crissier, Switzerland), which has 91% sensitivity and 86% specificity. A detailed history revealed that the patient had consumed uncooked cow liver on several occasions in the past year.

Thus, the patient was diagnosed with peripheral vascular thrombosis due to *Toxocara canis* infection. He was treated with albendazole (800 mg daily for 5 days), with concomitant corticosteroid (prednisolone 1 mg/kg), and heparin. Eosinophil count normalized within 6 days of antihelminthic treatment but the necrotic ulcer of the third left fingertip worsened. On the day 10 of treatment, a follow-up arteriography on upper and lower extremities showed no improvement in multiple narrowing and occlusion of vessels. The patient underwent catheter directed thrombolysis, which was ineffective, and amputation of the digit 8 months later. The postoperative course was fair, and the amputated stump healed well. To date, this patient has been followed for 15 months; corticosteroids were gradually tapered off without recurrence of hypereosinophilia, *Toxocara* IgG remains positive, and the patient is still taking aspirin and warfarin without any adverse event.

DISCUSSION

This case of hypereosinophilia was caused by *Toxocara* infection

that had manifested with peripheral vascular lesions. In the setting of a HES, activated eosinophils can provoke thromboembolism in various organs. Isolated cases of intra-abdominal, cerebral, and cutaneous thrombosis have been reported [7], but there have been no reports of peripheral vascular thrombosis caused by this parasite infection.

Helminthic parasites typically elicit IL-5-mediated eosinophil expansion. Eosinophilia can be constant or fluctuate over time, and any level of severity can be observed. Toxocariasis is a common helminthic zoonosis caused by infestation with larvae of *Toxocara canis* or *Toxocara cati*. The parasitic eggs are excreted with the feces of their definite hosts: dogs and cats, respectively. Clinical presentation consist of visceral larva migrans (VLM) and ocular larva migrans (OLM) depending on organ oriented immunopathological host response to continued stimulation by parasite antigens, patients can also present with pulmonary involvement, chronic urticaria or eczema, lymphadenopathy, myositis or pseudorheumatic syndrome. A definitive diagnosis of toxocariasis can be made only by locating the larvae upon biopsy. All other indirect methods suggest only that a *Toxocara* infection may be responsible for a disease present in a particular patient. Major diagnostic factors include patient characteristics and history, clinical symptoms and signs, positive serology, eosinophilia, and increased levels of IgE. Among these, positive serology is the most important and cross reaction to other helminthic infections is negligible [8].

In this case, the patient had toxocariasis with a peripheral vascular lesion. Other diseases accompanied by eosinophilia were ruled out and the diagnosis was confirmed with serologic testing. Though concomitant hypereosinophilia is common in toxocariasis, eosinophil-induced peripheral vascular injury has not been reported. The underlying mechanism is poorly understood but eosinophil cationic granule proteins (ECP), such as major basic protein, are potent stimuli of platelet activation and aggregation [3] and can alter the clotting process by interfering with endothelial cell surface thrombomodulin [9].

One important differential diagnosis for toxocariasis is thromboangiitis obliterans (also known as Buerger disease), which is a recurring progressive inflammation and thrombosis of small and medium vessels of hands and feet. It is strongly associated with

smoking. The concomitant hypereosinophilia and lack of angiographic findings typical to Buerger's disease, such as "cork-screw" appearance of arteries, made the diagnosis of toxocariasis more likely than Buerger's disease in this case.

Irrespective of whether eosinophil expansion is secondary to an identifiable disease, the potential complications related to organ infiltration are identical. Urgent eosinophil-decreasing therapy with high-dose corticosteroid (1 mg/kg daily) should be administered for serious complications of hypereosinophilia such as myocardial damage, pulmonary involvement with hypoxia, and neurological involvement [1]. However, digital gangrene in HES has been reported to be poorly responsive to corticosteroid therapy [7]. Vascular angioplasty combined with the use of anticoagulants and systemic corticosteroid was successful in a single case report of arterial occlusion-associated digital necrosis in HES [10]. However, vascular intervention was not effective in our case.

Considering the dietary practices surrounding uncooked liver in Korea, toxocariasis is prevalent nationwide, and a significant cause of peripheral blood eosinophilia, eosinophilic infiltration in lung and liver, and even vascular thrombosis, as is presented in this case. This case demonstrates that consumption of uncooked liver is a potential public health issue in South Korea, where consumption of uncooked liver is considered to promote health.

SUMMARY

In summary, the case presented here shows that activated eosinophil by *Toxocara* infection can provoke thrombosis in peripheral vessels resulting in peripheral ischemia and even digital gangrene. When peripheral vascular thrombosis is encountered with hypereosinophilia, all causes of eosinophilia, including parasitic infections, allergic diseases, malignancies, drug hypersensitivity reactions, and HES should be considered. Regarding the dietary practices of uncooked liver in Korea: toxocariasis poses a public

health issue, and antiparasitic treatment (albendazole) with systemic corticosteroid to decrease peripheral eosinophil count is warranted.

중심 단어: 호산구증; 톡소카라증; 말초혈관혈전

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