

## Warfarin-induced Primary Dissection of Lower Peripheral Arteries: A Case Report<sup>1</sup>

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Primary dissection of a peripheral artery without involvement of the aorta is a rare entity. Warfarin is currently used as the standard oral anticoagulant in a variety of clinical settings. We report here on a case of focal dissection of the common iliac artery and the superficial femoral artery following prophylactic treatment with warfarin for a prosthetic heart valve. The patient's laboratory results showed a high international normalized ratio and prolongation of the activated partial thromboplastin time. Angiography showed a dissection of the left common iliac artery and the right superficial femoral artery. His symptoms immediately disappeared after deploying stents to the arterial dissections.

**Index words :** Arteries  
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The isolated, primary dissection of a peripheral artery without involvement of the aorta is a rare clinical entity and this has been described in connection with Marfan's syndrome, fibromuscular dysplasia, atherosclerosis, highly trained athletes and unknown etiologies (1–4). The most commonly involved artery is the common iliac artery (CIA) (1–3); the superficial femoral artery (SFA) and the popliteal artery (PA) are rarely involved (4). Warfarin is used for the treatment of many diseases and it has well known adverse effects with most of them being hemorrhagic in nature. Warfarin is

generally started within the first postoperative week for patients who have undergone cardiac valve replacement. We report here on a case of focal dissection of the CIA and SFA following prophylactic treatment with warfarin for a prosthetic heart valve.

### Case Report

A 48-year-old man who had experienced severe inguinal pain while driving visited our emergency room. He had been diagnosed with mitral stenosis 10 years previously and so mitral valve replacement had been performed. He had been taking warfarin at 7 mg/day. On the laboratory examination one month after starting warfarin, his international normalized ratio (INR) was 2.2 (therapeutic target level: 2.0 – 3.0), the activated partial thromboplastin time (aPTT) was 51% (normal range: 23.7 – 36.4), and the prothrombin time (PT) was 34.1% (normal range: 87 – 117). However, at admission, the INR had risen to 4.6, the aPTT had risen to 84% and the PT had dropped to 18.6%. First, we stopped his war-

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farin medication. The contrast-enhanced CT scan of the pelvis showed an intimal flap in the left CIA, as well as showing calcified plaque (Fig. 1A). Pelvic angiography performed after a puncture of the right femoral artery showed a dissection of the left CIA with a normal aorta (Fig. 1B). Minimal atherosclerotic changes of the CIA, the common femoral artery (CFA) and the SFA were also noted. A 10 × 59-mm self-expandable Sentinol stent (Boston scientific, Natick, MA, USA) was placed in the true lumen to cover the dissection. The control angiogram showed a patent true lumen with good blood flow of the left CIA. Further, his symptoms immediately disappeared after stent deployment. After stent deployment, the INR was 1.22, the aPTT was 36.0% and PT was 73.6%. We restarted his warfarin medication with an initial loading dose of 5mg to reach a therapeutic INR (2.0 to 3.0) level one day later after procedure. Six-months later, he readmitted at our emergency room due to severe popliteal pain in the right lower leg. On laboratory examination, the noted abnormalities were an INR of 4.1, an aPTT of 57.2% and a PT of 25.4%. We considered the possibility of recurrence of the focal dissection of the SFA or PA. Right lower arterial angiography showed a short-segmental dissection of the right SFA, as well as showing calcified plaque (Fig. 1C). A 6 × 59-mm self-expandable Sentinol stent was placed in the true lumen to cover the dissection. The post-angiogram

showed a patent true lumen with good blood flow of the right SFA. His symptoms immediately disappeared after stent deployment. After treatment, he has been taking warfarin at 4 mg daily to reach a therapeutic INR (2.0 to 2.5) level.

## Discussion

Warfarin is the standard oral anticoagulant used in a variety of clinical settings. The laboratory tests most commonly used to measure the effects of warfarin are the PT, aPTT, and INR. However, this laboratory monitoring is not completely protective because for the patients who have a bleeding episode associated with a high INR, there may be only a brief warning period during which time a slightly elevated INR can predict an imminent bleeding event. The major complications associated with the use of warfarin are bleeding that's due to excess anti-coagulation (5) and skin necrosis (6). The risk of complications in patients who are treated with warfarin is directly related to the degree of induced anti-coagulation. This complication may be more common in patients who are taking anticoagulants and even when the drug levels are within the therapeutic range. Studies on patients with atrial fibrillation have indicated that the risk of complications increases substantially when the INR values rise above 4.0 (7, 8).



Fig. 1. A 48-year-old man with focal dissections of the left common iliac artery and right superficial femoral artery. A. The contrast-enhanced CT scan of the pelvis shows an intimal flap in the left common iliac artery (arrow). B. The pelvic angiogram shows dissection of the left common iliac artery with an intimal flap (arrow). C. Six-month later, the right lower arterial angiography showed a short-segmental dissection of the right superficial femoral artery (arrow). The patient's symptoms immediately disappeared after stent deployment.

In our case, when the patient was admitted to the hospital, he had a high INR and prolongation of the PTT. Further, the two dissected lesions had calcified plaque. Blunt et al. (9) have reported on an elderly patient with an acute thoracic aortic dissection associated with a high INR due to warfarin. Massalha et al. (4) have reported on a case of stenosis of the SFA that led to a dissection that was caused by the stenosis-jet. Vulnerability of the intima is prerequisite for a dissection of an artery due to a stenosis-jet. The etiology of primary spontaneous dissection of arteries is usually related to atherosclerosis. Therefore, we can speculate that the high INR related to warfarin therapy might make the intima vulnerable due to subintimal bleeding of the intima-media complex with atherosclerotic plaque, and the stenosis-jet flow or limited flexibility of the artery due to the atherosclerotic plaque might cause detachment of the intima at this weak point of the intima-media complex.

In two previous reports, the patients with spontaneous dissection of the CIA had an acute onset of severe pain that was localized to the area of the disturbed vasculature (5, 6). The diagnosis of focal arterial dissection is often delayed because of the focal pain and discomfort on the initial attack (2). Ultrasound and a contrast-enhanced CT scan can diagnose a CIA dissection, but an angiogram is required as an interventional procedure to determine the extent of the dissection and the location of the proximal flap.

Medical, surgical and endovascular treatments have all been used to treat focal arterial dissections (1-3). In particular, endovascular treatment is an appealing alternative due to its relative ease and the minimal invasiveness of the procedure. Cook et al. (2) attempted to treat CIA dissections using balloon angioplasty, but this ultimately led to vessel occlusion; the placement of Palmaz stents finally produced satisfactory angiographic and symptomatic results. Lyden et al. (10) have also success-

fully treated a traumatic dissection with self-expanding stents. In our cases, we chose the approach that would adequately seal the proximal tear with using self-expanding stents. In our study, the patient did not complain of any symptoms after we treated the two points of arterial dissection with stent deployment.

In summary, we present here a case of endovascular treatment for managing warfarin-related focal arterial dissections. Although this was a rare finding, primary dissection of the atherosclerotic arteries should be considered in the differential diagnosis of a patient with a high INR level due to warfarin therapy and severe pain of the lower extremity.

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## 와파린에 의해 야기된 하지 동맥의 일차 박리: 증례 보고<sup>1</sup>

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대동맥 침범 없이 하지 동맥의 일차 박리는 드문 일이다. 와파린은 다양한 임상 상황에서 항혈전제로 사용되고 있다. 저자들은 인공판막 치환술 후 와파린 치료 중 총장골동맥과 대퇴동맥의 국소 박리 증례를 보고하고자 한다. 혈액학적 검사상 높은 국제 정상화비와 활성화부분트롬보플라스틴시간의 연장 소견을 보였다. 혈관조영술상 좌총장골동맥과 우대퇴동맥의 박리를 확인할 수 있었으며, 스텐트 삽입 후 증상은 소실되었다.