

Intensive Long Distance Running as a Possible Cause of Multiple Splanchnic Arterial Aneurysms: A Case Report

Lee Chan Jang and Sung Su Park

Department of Surgery, Chungbuk National University College of Medicine, Cheongju, Korea

This is a case report that suggests the possible association between multiple splanchnic arterial aneurysms and long-distance running. The clinical features of one patient admitted at Chungbuk National University Hospital for treatment of multiple splanchnic arterial aneurysms were reviewed. A 54-year-old man had a recurrent, intermittent and epigastric pain for 2 months. There was no abnormality in gastroscopy and colonoscopy. An abdominal computed tomography angiography documented calcified superior mesenteric artery (SMA) and splenic artery aneurysms. The patient had a history of recreational long-distance running for over 10 years. His average running time per week was more than 10 hours. There was no evidence of systemic arteritis, connective tissue disorder or infectious process that may have caused the aneurysms. He did not take any drugs. The SMA aneurysm was opened, and the aneurysmal segment of SMA was replaced with a vein graft. The splenic aneurysm was observed. The patient recovered without any sequelae.

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Corresponding author: Lee Chan Jang
Department of Surgery, Chungbuk National University Hospital, 776
1sunhwan-ro, Seowon-gu, Cheongju 28644, Korea
Tel: 82-43-269-6337
Fax: 82-43-266-6037
E-mail: lcjang@chungbuk.ac.kr
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INTRODUCTION

Multiple splanchnic arterial aneurysms are uncommon and usually result from connective tissue diseases [1-3], drugs [4], mycotic lesions [5] or systemic arteritis [6]. Long-distance running may be a cause of multiple splanchnic arterial aneurysms. A possible association between long-distance running and multiple splanchnic arterial aneurysms is reported here for one patient in whom other risk factors were absent. The potential for long-distance running to cause multiple visceral aneurysms is not well defined but decreased arterial compliance, dissection, mechanical factors and recurrent vasoconstriction during running may contribute to aneurysm formation.

It was well known that long-distance running may be a cause of many cardiovascular and gastrointestinal problems. A rare case of a superior mesenteric artery (SMA) aneurysm

and a splenic artery aneurysm is herein being reported. We postulate the mechanism by which long-distance running may cause multiple splanchnic arterial aneurysms through a review of the literature.

CASE

A 54-year-old man presented to the emergency department with recurrent abdominal pain and a palpable abdominal mass. He had suffered from an intermittent epigastric pain for 3 months. There was no abnormality in gastroscopy and colonoscopy. In abdominal computed tomography (CT) (Fig. 1), there was a calcified 4-cm-sized aneurysm in the SMA, a calcified 12-mm-sized dilatation of the splenic artery, and a nonfunctional right kidney with hydronephrosis. His medical history was not remarkable. He was not a smoker and had no other atherosclerotic risk

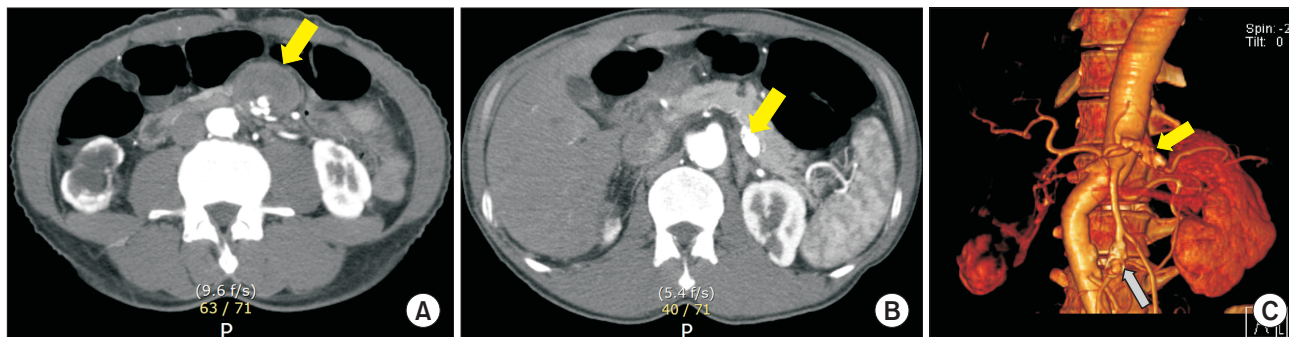


Fig. 1. Computed tomography angiography: the arrow indicates the superior mesenteric artery aneurysm (A), the arrow indicates the splenic artery aneurysm in the axial view (B) and 3-dimensional volume rendering reconstruction (C).

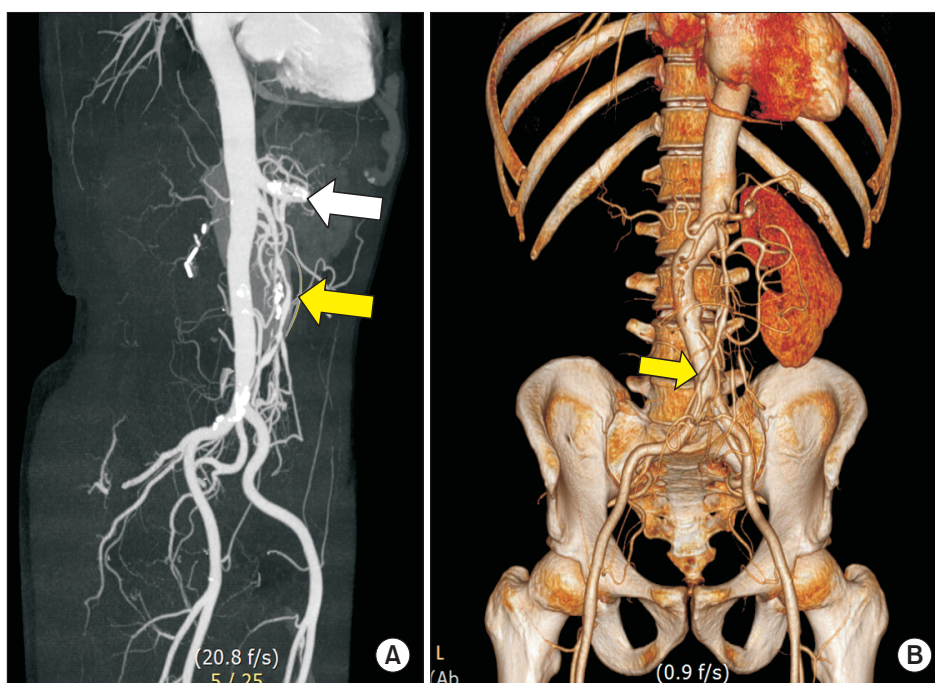


Fig. 2. Follow-up computed tomography angiography 14 months later: the white arrow indicates a calcified splenic artery aneurysm. The line and gray arrow indicate the reconstructed superior mesenteric artery with a vein graft in 3-dimensional reconstruction (A). The arrow indicates another distal aneurysmal change (B).

factors. The family history was negative for connective tissue diseases, aneurysms and sudden deaths. On physical examination, the abdomen was scaphoid, and a 4-cm-sized pulsatile mass was palpated. There was no tenderness over the mass or in the abdomen. Blood pressure was 120/80 mmHg; body temperature was 36.5°C. There was a complete atrioventricular (AV) block on electrocardiogram. Laboratory tests revealed a white cell count of 6,230/mL, platelet count of 171,000/mL, aspartate aminotransferase 32 U/L, alanine aminotransferase 19 U/L, serum creatinine 1.77 mg/dL, p-amylase 75 U/L and lipase 114 IU/L. Genetic tests for connective tissue diseases and immunologic tests for rheumatic evaluation were not performed. However, there was no evidence of other diseases. He had an emergency operation for the visceral artery aneurysms.

In operative findings, a 4-cm-sized SMA aneurysm was identified at the SMA after the proximal jejunal branch. The splenic artery aneurysm was not resected because it was relatively small and heavily calcified. After distal and proximal control of the SMA, the aneurysm was opened. The aneurysmal wall was very thick and heavily calcified. After the aneurysm sac was opened, the posterior jejunal branch was controlled. The aneurysm was partially resected. An aneurysmal portion of the SMA was replaced with a great saphenous vein graft. There was no ischemic bowel. On CT angiography at 14 months postoperatively (Fig. 2), there was a small aneurysmal dilatation in the distal SMA. A chylous ascites was drained for 10 weeks. However, he finally recovered without any problems. Since then, his postoperative course was uneventful. An echocardiogram

was checked, and left ventricular hypertrophy, complete AV block was confirmed. Five months later, he underwent another operation for an exacerbating hydronephrosis. He recovered without any sequelae.

DISCUSSION

Long-distance running has been implicated as a cause of various cardiovascular and gastrointestinal disorders or abnormalities, such as iliac artery endofibrosis [7,8], lower leg artery stenosis or occlusion [9], arterial dissection [10], left sided ventricular hypertrophy [11], increased vascular compliance [12], ischemic colitis [13,14], hyponatremia [15], myoglobinuria, increased troponin, leukocyte abnormalities [16], coagulopathy and sudden death [17]. A reduced arterial compliance and stiffness can induce endofibrosis or stenosis in the aorta, large arteries and visceral arteries of long distance runners. Many other confounding factors, such as arterial dissections during exercise, hypertension during running, repetitive swinging movements of the bowel and inappropriate vasoconstriction of the mesenteric arteries, may have contributed to the visceral artery aneurysms. There is a case report of a common iliac artery dissection and renal artery dissection in a marathoner. Long-distance running may initiate an inappropriate and chronic vasoconstriction of the mesenteric arteries and thereby disrupt blood flow through the vasa vasorum within the vessel wall. Arterial wall ischemia as a result of long-distance running may cause lysis of the media or an actual vascular necrosis with eventual aneurysmal change [18]. It is postulated that segmental arterial mediolysis

induced by ischemic bowel disease or shock may be a result of inappropriate splanchnic vasospasm. The repetitive flexion and extension of the iliac artery may cause arterial endofibrosis and occlusion. The mean duration of running or cycling associated with iliac artery endofibrosis is over 10 years, and the mean exercise time per week is over 10 hours. This patient had over 10 years of running history with more than 15 hours a week. During long-distance running, a repetitive swinging motion of the small bowel along the vascular pedicle may cause some vascular problems.

This patient has unique characteristics. He had no known conditions for visceral arterial aneurysms. A long-distance running for over 10 years might be associated with aneurysmal formation. A small aneurysmal bulging at the distal portion of the SMA was found on immediate postoperative CT. After having stopped running for several months, he restarted running although with less intensity. The splenic artery aneurysm and SMA aneurysmal change have been stable in the follow-up.

In conclusion, we report a case of an SMA and splenic artery aneurysm who presented with recurrent abdominal pain. This is the first report suggestive of an association between long-distance running and multiple visceral artery aneurysms.

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