Case Report

Successful Management of a Superior Mesenteric Artery Aneurysm by Ligation: A Case Report

Suvit Sriussadaporn MD*,
Supparerk Prichayudh MD*, Sukanya Sriussadaporn MD*,
Kritaya Kritayakirana MD*, Rattaplee Pak-art MD*

** Department of Surgery, Faculty of Medicine,Chulalongkorn University*

Superior mesenteric artery aneurysm (SMAA) is a rare entity. Management varies from simple ligation with or without revascularization to endovascular placement of a covered stent graft. The authors report a case of SMAA who presented with retroperitoneal hemorrhage. Diagnosis was made from abdominal computed tomography and angiography. The cause of SMAA was not definitely identified but infective origin was highly suspicious. The patient underwent successful treatment with ligation of the superior mesenteric artery proximal and distal to the SMAA.

Keywords: *Superior mesenteric artery aneurysm, Aneurysm ligation*

J Med Assoc Thai 2006; 89 (11): 1965-9
Full text. e-Journal: *http://www.medassocthai.org/journal*

Superior mesenteric artery aneurysm (SMAA) is a rare entity. The reported incidence was 5.5% of visceral artery aneurysms[1]. From autopsy studies, SMAAs occurred in approximately 1 in 12,000 patients' autopsied[2-4]. DeBakey ME and Cooley DA published the first successful treatment of SMAA in 1953 by excising the aneurysm without revascularization[5]. Since then, several methods of treatment of SMAAs have been reported including ligation of the superior mesenteric artery (SMA) with or without excision[6], obliterative aneurysmorrhaphy[7], revascularization of the SMA with autogenous vein graft or prosthetic graft[7-10], and recently endovascular placement of the covered stent grafts[11,12].

The authors presented a case of SMAA who was treated by ligation of the SMA proximal and distal to the aneurysm without any postoperative complication.

Case Report

A 55-year male patient presented at a rural hospital with symptoms of sudden abdominal pain radiated to the flank and back and a drop in the hematocrit level. He underwent emergency exploratory laparotomy on October 13, 2005, which revealed a large retroperitoneal hematoma. Since the hemodynamic status and the hematoma were stable and resources were limited, the abdomen was closed without opening the hematoma. The diagnosis was contained ruptured abdominal aortic aneurysm. Postoperative period was uneventful and he was transferred to the authors' institution 4 weeks later.

Physical examination on initial admission at the authors' institution (Department of Surgery, King Chulalongkorn Memorial Hospital) revealed a good conscious, well cooperative but malnourished patient. His blood pressure was 120/80 mmHg, pulse 110/minute, and body temperature 38.2°C. He had mild pale conjunctiva, no icteric sclera, and no lymphadenopathy. His abdomen was flat with no palpable mass and no hepatosplenomegaly. Laboratory studies revealed a hemoglobin of 13 gm/dL, a white blood cell count of 33,000 cells/mm^3 (neutrophils 88.4%, lymphocytes 6.6%, monocytes 4.2%, eosinophyls 0.5%, and basophils 0.3%), a platelet count of 357,000 /mm^3, a serum albumin of 2.8 gm/ dL, and a serum globulin of 4.1 gm/dL. The hemoculture grew no organism.

Computed tomography of the abdomen showed a 2.2 cm diameter aneurysm of the proximal SMA (Fig. 1). A 3 cm diameter aneurysm of the right

Correspondence to : Sriussadaporn S, Department of Surgery, Faculty of Medicine, Chulalongkorn University, Rama 4 Rd, Bangkok 10330, Thailand. Phone: 0-2256-4117, Fax: 0-2256-4194, E-mail: Suvit.s@chula.ac.th

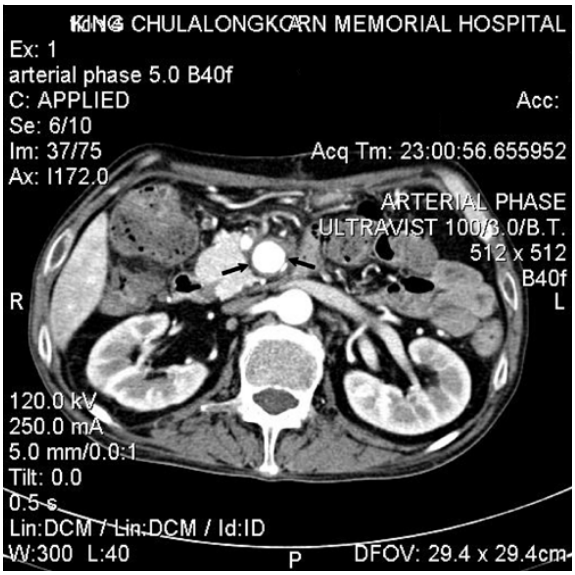

Fig. 1 Preoperative computed tomography of the abdomen showing a 2.2-cm diameter aneurysm of the proximal SMA (arrows)

common iliac artery was also diagnosed. Subsequent angiography demonstrated a fusiform aneurysm of the proximal SMA with no visualization of the distal SMA. A large arc of Riolan was noted (Fig. 2).

Endovascular treatment of the SMAA was first considered and the interventional radiologists were consulted. After careful evaluation and discussion, it was concluded that the patient was not a candidate for placement of a covered stent graft owing to poor visualization of the run off. Surgical treatment was then scheduled. Fifteen milligrams of methyl prednisolone was given daily to treat the exacerbation of his underlying pemphigus vulgaris. Broad spectrum antibiotics were administered intravenously to treat pre-existing occult infections. Nutritional status was improved by both oral and parenteral routes.

Surgical technique (December 22, 2005)

A long midline incision was made. No intra-abdominal pathology was found except a palpable pulsatile mass at the mesenteric root. The origin of the SMA from the aorta was approached by reflecting the visceral organ including the spleen, the stomach, the left colon, and the body and tail of the pancreas from left to right. The SMA proximal to the aneurysm was identified and encircled with a vascular loop (Fig. 3). To test the ischemic response of the bowel to the SMA ligation, a vascular clamp was applied to the SMA proximal to the aneurysm and left for 20 minutes. No ischemic change was observed on the small and large bowel along with the disappearance of the pulsation of the SMAA. The clamp was then removed and double ligations of the proximal SMA with no 1-0 silk were performed. Subsequently, the visceral organs were placed back to the normal position and the SMA distal to the aneurysm was isolated and ligated at the mesen-

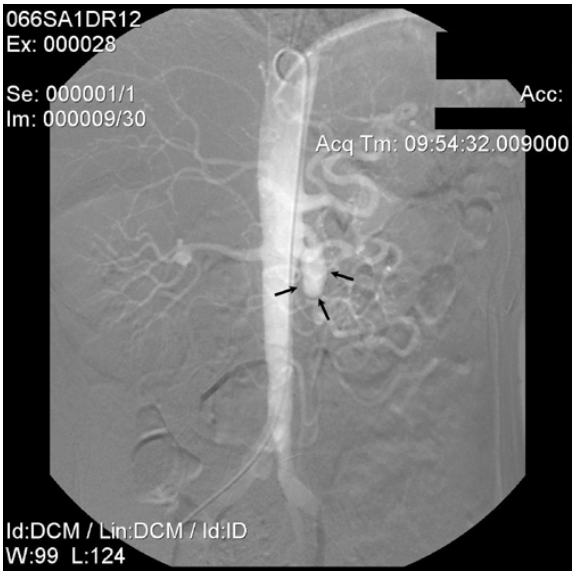

Fig. 2A Preoperative aortography reveals a wide neck fusiform aneurysm of the proximal SMA (arrows)

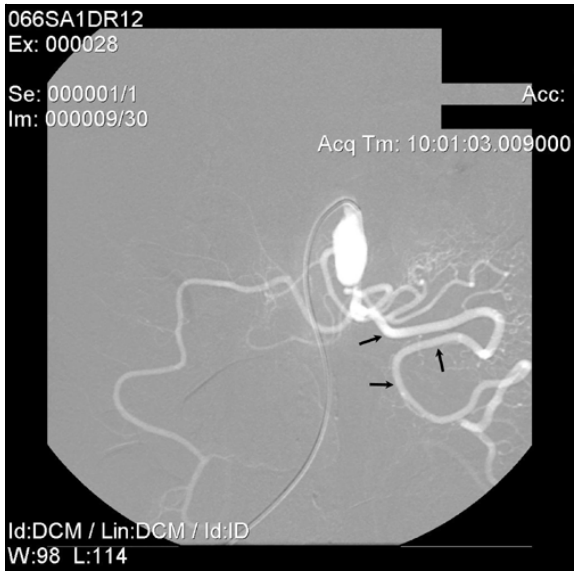

Fig. 2B Selective superior mesenteric angiography reveals obliteration of the distal SMA and a large arc of Riolan (arrows)

Fig. 3 Illustration shows surgical approach to the SMAA. The proximal SMA (neck of the aneurysm) is looped with a silastic sling

teric root. The abdomen was finally closed after careful evaluation and confirmation of good viability of the small and large bowel.

Postoperative period was uneventful. Cultures of the tissue around the SMAA and thrombus in the SMAA grew no organism. The patient was discharged home on January 4, 2006. Computed tomography on January 11, 2006 showed no contrast enhancement of the ligated SMAA (Fig. 4). The patient was last seen on January 19, 2006 with normal nutritional status and good health.

Discussion

SMAA is the third most common splanchnic aneurysms[6]. The etiology is frequently infectious (mycotic) in origin (60%)[6,13]. Other risk factors include atherosclerosis, connective tissue disease, congenital fibromuscular dysplasia, cystic medial necrosis, trauma, and idiopathy[6,7]. For the presented case, the exact etiology could not be identified. The authors speculated that his underlying pemphigus vulgaris and occult infection as evidenced by fever and marked leukocytosis may have played some role in the pathogenesis.

The patient presented with retroperitoneal/mesenteric hemorrhage. Although the diagnosis was not made at initial exploratory laparotomy when the retroperitoneal hematoma was found, subsequent investigations including computed tomography and angiography confirmed the presence of SMAA. Retroperitoneal/mesenteric hemorrhage and postprandial intestinal angina occurred in approximately 70% of symptomatic SMAA[14,15]. Gastrointestinal hemorrhage was another frequent presentation of SMAA[7,9].

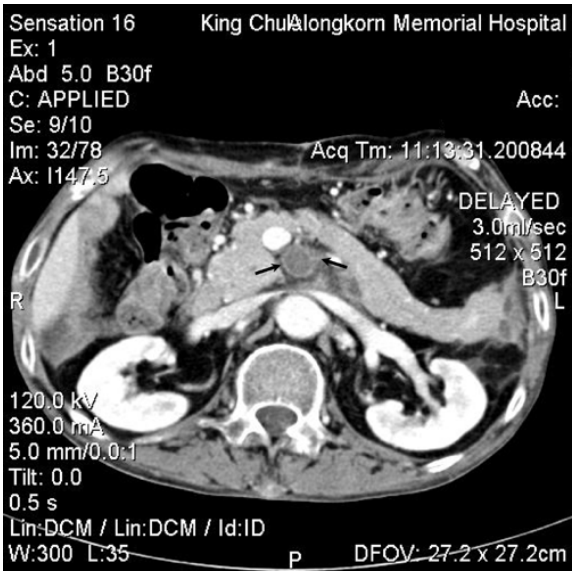

Fig. 4A Computed tomography of the abdomen 3 weeks after ligation of the SMA proximal and distal to the SMAA. There is no visualization of the contrast material in the thrombosed SMAA

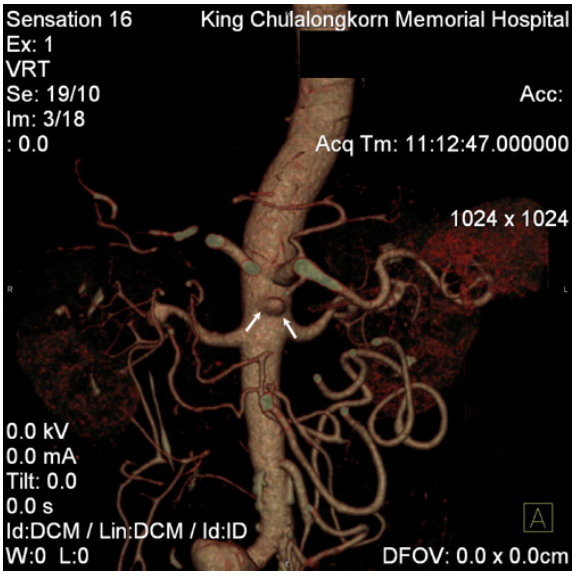

Fig. 4B CT angiography reveals an occlusion of the proximal SMA from ligation (arrows) with no demonstable SMAA. A 3-cm diameter aneurysm of the right common iliac aneurysm is also noted

Although computed tomography and angiography are ultimately required for definite diagnosis in stable patients, ultrasonography is very helpful in an emergency or when the patient is critically ill[16].

Management of SMAA has evolved from entirely surgical means in the past to endovascular treatment in selected cases nowadays. Endovascular stent graft placement in the presented patient was considered unsuitable owing to no visualization of the distal SMA. Among several surgical techniques, ligation of the SMA has been reported with satisfactory outcome. Ligation of the SMA without revascularization has been used successfully in one-third of the cases[17]. The explanation for the safety of ligation is extensive collaterals that develop following thrombus formation in the aneurysm. The authors chose to perform ligation without revascularization because preoperative angiography revealed numerous collaterals with a large arc of Riolan, which is an important connecting channel between the middle colic branch of the superior mesenteric artery and the left colic branch of the inferior mesenteric artery. The patient tolerated SMA ligation very well without evidence of ischemia of the small and large bowel throughout the operation. When viability of the bowel is doubtful, a second look operation is recommended[6].

In conclusion, the authors report a case of SMAA who presented with abdominal pain associated with retroperitoneal hematoma. Diagnosis was made from computed tomography and angiography. The patient underwent successful treatment with ligation of the SMA proximal and distal to the aneurysm without revascularization.

References

1. Zelenock GB, Stenley JC. Splanchnic artery aneurysms. In: Rutherford RB, editor. Vascular surgery. 5th ed. Philadelphia: W.B. Saunders, 2000: 1369-82.
2. Katz B, Jacobson LF. Aneurysm of the superior mesenteric artery successfully treated. Surgery 1957; 41: 613-8.
3. Garland HG. Pathology of aneurysms: review of 167 autopsies. J Pathol Bacteriol 1932; 35: 333.
4. Lucke B, Rea MH. Studies on aneurysm. I. General statistical data on aneurysm. JAMA 1921; 77: 935.
5. DeBakey ME, Cooley DA. Successful resection of mycotic aneurysm of superior mesenteric artery. Am Surg 1953; 19: 202-12.
6. Kopatsis A, D'Anna JA, Sithian N, Sabido F. Superior mesenteric artery aneurysm: 45 years later. Am Surg 1998; 64: 263-6.
7. Chiesa R, Astore D, Guzzo G, Frigero S, Tshomba Y, Castellano R, et al. Visceral artery aneurysms. Ann Vasc Surg 2005; 19: 42-8.
8. Violago FC, Downs AR. Ruptured atherosclerotic aneurysm of the superior mesenteric artery with celiac axis occlusion. Ann Surg 1971; 174: 207-10.
9. Wright CB, Schoepfle WJ, Kurtock SB, Corry RJ, Rose EF, Lamberth WC, et al. Gastrointestinal bleeding and mycotic superior mesenteric aneurysm. Surgery 1982; 92: 40-4.
10. Guinier D, Denue PO, Mathieu P, Landecy G, Heyd B, Mantion GA. Giant superior mesenteric artery aneurysm. J Am Coll Surg 2004; 199: 335-7.
11. Gandini R, Pipitone V, Konda D, Pendenza G, Spinelli A, Stefanini M, et al. Endovascular treatment of a giant superior mesenteric artery pseudoaneurysm using a nitinol stent-graft. Cardiovasc Intervent Radiol 2004; 27: 544-8.
12. Drescher R, Koster O, von Rothenburg T. Superior mesenteric artery aneurysm stent graft. Abdom Imaging 2006; 31: 113-6.
13. Friedmen SG, Pogo GJ, Moccio CG. Mycotic aneurysm of the superior mesenteric artery. J Vasc Surg 1987; 6: 87-90.
14. McNamara MF, Griska LB. Superior mesenteric artery branch aneurysms. Surgery 1980; 88: 625-30.
15. Graham JM, McCollum CH, DeBakey ME. Aneurysms of the splanchnic arteries. Am J Surg 1980; 140: 797-801.
16. Honarbakhsh A, Madjlessi HM, Davaii M, Saldjooghi H. Aneurysm of superior mesenteric artery: identification with ultrasonography. J Clin Ultrasound 1993; 21: 207-8.
17. McNamara MF, Bakshi KR. Mesenteric artery aneurysm. In: Bergan JJ, Yao JS, editors. Aneurysms: diagnosis and treatment. New York: Grune & Stratton; 1981: 285-403.

การรักษาภาวะโป่งพองของหลอดเลือดแดงซูพีเรียมีเซนเทอริก โดยการผูกเป็นผลสำเร็จ: รายงานผู้ป่วย 1 ราย

สุวิทย์ ศรีอัษฎาพร, สุกัญญา ศรีอัษฎาพร, รัฐพลี ภาคอรรถ, กฤตยา กฤตยากีรนะ, ศุภฤกษ์ ปรีชายุทธ

ได้รายงานวิธีการรักษาผู้ป่วยที่มีภาวะโป่งพองของหลอดเลือดแดงซูพีเรียมีเซนเทอริกจำนวน 1 ราย ภาวะโป่งพองของหลอดเลือดแดงซูพีเรียมีเซนเทอริกพบได้น้อย การรักษามีตั้งแต่ทำการผูกเพียงอย่างเดียว, ทำการผูกร่วมกับทำบายพาสให้เลือดไปเลี้ยงหลอดเลือดแดงซูพีเรียมีเซนเทอริกส่วนปลาย หรือใช้การรักษาแบบใหม่ ๆ ทางรังสีร่วมรักษาโดยใช้หลอดเลือดเทียมดามหลอดเลือดแดงที่โป่งพองจากภายในหลอดเลือด ผู้รายงานได้รายงานผู้ป่วยที่มีภาวะดังกล่าวซึ่งได้รับการผ่าตัดสำรวจช่องท้องเนื่องจากมีเลือดออกในชั้นรีโทรเพอริโทเนียม และได้รับการส่งต่อมารักษาที่โรงพยาบาลจุฬาลงกรณ์ การวินิจฉัยภาวะหลอดเลือดแดงโป่งพองดังกล่าวที่โรงพยาบาลจุฬาลงกรณ์ทำโดยใช้คอมพิวเตอร์ของช่องท้องและเอ็กซเรย์หลอดเลือดแดงภายหลังฉีดสารทึบรังสี ผู้ป่วยได้รับการรักษาโดยการผูกหลอดเลือดแดงซูพีเรียมีเซนเทอริกที่โป่งพองเป็นผลสำเร็จ โดยไม่ต้องทำบายพาสไปที่หลอดเลือดแดงซูทีเรียมีเซนเทอริกส่วนปลาย