SURGICAL TREATMENT OF COMPLICATIONS OF SUPERIOR MESENTERIC ARTERY ANEURYSM

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Trauma is a rare cause of superior mesenteric artery aneurysm and an isolated aneurysm following penetrating abdominal injuries is very rare. But the risk for missed arterial injury of superior mesenteric artery following penetrating abdominal injuries is very high. The haemorrhage may be masked because of the tamponade in the mesentery during initial surgery and the late complications of false aneurysms comes on the scene in future.

We report 2 cases of superior mesenteric artery aneurysms as missed arterial injuries, their complications of arteriovenous and enteric fistulas and results of their surgical treatment.

Two cases of superior mesenteric artery aneurysms underwent surgery. The artery was reconstructed and the arteriovenous fistula between superior mesenteric artery and vein was closed in case 1. The aneurysm was excised, enteric fistula was closed and an aorta-mesenteric bypass using a saphenous vein graft was performed in case 2.

The haemorrhage may become masked because of the tamponade in the mesentery during a penetrating abdominal injury and initial surgery, and the late complication of the false aneurysm comes on the scene in future. Extraanatomic bypass using a transmesenteric approach provides successful result in surgical treatment of superior mesenteric artery aneurysms.

Key words: Aneurysm, superior mesenteric artery, missed injury

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Superior mesenteric artery (SMA) aneurysms are the third most common visceral lesions comprising 8 % of all visceral artery aneurysms (1). In etiology they are most often infectious, and mycotic aneurysms account for more than half of these lesions (2,3). Arteriosclerosis and medial degeneration represent secondary events while trauma is a rare casue and isolated SMA aneurysms following penetrating abdominal injuries are very rare (4). Because of the close proximity of neighboring vessels such as abdominal aorta, inferior vena cava, celiac truncus and renal arteries, it is a very low probability to

encounter an isolated superior mesenteric artery aneurysm as a missed arterial injury without any other pathology in the related vascular structures. The most important and fatal complication of superior mesenteric artery aneurysms is rupture. Aneurysmal rupture, either freely or into the gastrointestinal tract or to the superior mesenteric vein is uncommon.

In this paper we report 2 cases of superior mesenteric artery aneurysms as missed arterial injuries, their complications of arteriovenous and enteric fistulas and the results of their surgical treatment.

CASE REPORT

Case I: A 25 years old femala patient had undergone operation following gunshot injury to the abdomen and the injured area on the third part of the duedonum was repaired by primary repour. During the first surgical intervention, no other important vascular trauma had been detected. Following an uneventful postoperative course for 15 days she had a pulsating mass in abdomen and a bruit was heard. Abdominal aortography revealed an aneurysm of mesenteric artery on its proximal portion and a fistula between superior mesenteric artery and vein. Under general anesthesia, placing the patient in supine position, a laparotomy through median incision was performed. Aneurysm and the fistula tract was approached directly through the base of the transverse colon mesentery, after pulling the small bowel downward and to the left. The pancreas was retracted superiorly and anteriorly to obtain control of superior portion of the artery. The vein was repaired by lateral suturation technique following proximal and distal control of the artery, and the artery was reconstructed by saphenous vein patchplasty. The patient was discharged 10 days after surgery with an uneventful postoperative course. Postoperative angiography demonstrated that the superior mesenteric artery was reconctructed successfully keeping its continuity and the arteriovenous fistula was closed (Figure 1).

Case II: A 21 years old male patient who had a gunshot injury to the abdomen had undergone laparotomy and a bowel anastomosis had been performed after excision of the injured segment. No important vascular trauma had been detected during surgical procedure. The patient who had an uneventful postoperative course for 26 days was admitted to our hospital with massive intestinal haemorrhage. Endoscopic examination demontrated a bleeding in the third part of duedonum through a fistula. The suture line of the jejunal anastomosis was intact without any bleeding. Selective arteriography revealed an aneurysm of the proximal portion of the superior mesenteric artery and enteric fistula (Figure 2). Under general anesthesia, following median laparotomy, the aneurysm was aproached through the mesentery of the transverse colon. The aneurysm was infected and resection of the aneurysm was decided. Aortomesenteric bypass using saphenous vein graft between infrarenal aorta and the distal portion of the mesenteric artery was

Figure 1. Postoperative angiography demonstrating superior mesenteric artery reconstructed and the arteriovenous fistula closed.

Figure 2.- Selective arteriography revealing the aneurysm of the proximal portion of the superior mesenteric artery and the enteric fistula.

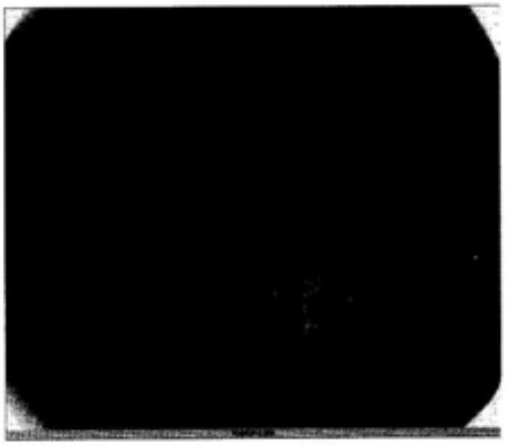

Figure 3. Postoperative angiography revealed the abdominal aorta-superior mesenteric artery bypass grafts were both open.

accomplished before opening the fibrous capsule of the false aneurysm. The proximal and the distal ends of the aneurysm were ligated and the aneurysm was excised. The orifice of the fistula in the duedonum was closed by primary sutures. Seeing that the bowel viability was not good enough at the middle portion of transvers colon, arteria colica media which was originating from aneurysm segment was bypassed with another saphenous vein graft. Proximal end of this saphenous vein graft was anastomosed to the former one (the one between infrarenal abdominal aorta-superior mesenteric artery) constructing a Y form. It was observed that the perfusion of whole intestinal system was good enough. The surgical wound was closed in layers. The patient had an uneventful postoperative course and discharged 12 days after surgery. The angiography which was performed 3 months after surgery revealed the superior mesenteric artery bypass grafts were both open (Figure 3).

DISCUSSION

Missed arterial injuries are among the traumatic vascular pathologies whose prompt diagnosis and definitive treatment methods remain uncertain (5,6). There is usually not enough time and possibility for the surgeon to evaluate the vascular system specifically by arteriography when he encounters a patient with general trauma. During surgical intervention the vasculer structures close to the injured area are evaluated. But the tamponade of an hemorrhage inside the mesentery may cause missing of any injury of mesenteric arteries. These missed mesenteric arterial injuries appear with delayed complications such as false aneurysms, rupture, arterio-venous fistulas, enteric fistulas after a period of time. Isolated injury of superior mesenteric artery is a very low probability because of its close proximity to aorta and inferior vena cava. During a penetrating injury which penetrates the body through anterior, posterior or oblique sides, superior mesenteric artery is usually injured at the same time with abdominal aorta and vena cava inferior because all these vessels course on the same line. But when an injury penetrates the body through lateral side isolated injury of any of these vessels may occur. Suchlike, in both of our 2 cases trajectory of the missiles were parellel to the anterior wall of the abdomen. Surgical exposure and revascularization in superior mesenteric artery aneurysms are still under debate (7-9). For a true aneurysm which involves the proximal portion a retroperitoneal approach provides advantage to achieve an easy exposure. For traumatic aneurysms, a transsperitoneal approach is a more

appropriate thinking because of possibility of intestinal surgical interventions and identifying intestinal perfusion. By medial rotation of the left-sided abdominal viscera (Mattox maneuver), they can be visualized just at the origin of the superior mesenteric artery (10). But in this approach reaching the middlle portion of the artery and its branches will be difficult. For this reason we preferred direct approach through the mesentery. The superior mesenteric artery can be isolated for length, needed for careful dissection through the mesentery with elevated pancreas and duedonum. In surgical treatment of mycotic and false superior mesenteric artery aneurysms, simple ligation has proved to be an acceptable procedure to avoid graft infection (11,12). The risk of bowel ischemia is high in patients in which ligation is done in a proximal segment, and arterial reconstruction, with an interposition graft or aortomesenteric bypass after exclusion or excision of the aneurysm is required. In our second case we identified that the bowel viability on the right side of transverse colon was not good enough because arteria colica media which was originating from the ligated segment had been ligated although the distal portion of superior mesenteric artery was bypassed. In the presence of infection, extraanatomic bypass with an autogenous saphenous vein is an appropriate method for arterial reconstruction and long term antibiotic therapy is recommended in such cases. We performed an aortomesenteric bypass between infrarenal abdominal aorta and distal portion of superior mesenteric artery using saphenous vein graft in our second case. Both proximal and distal anastomoses and the graft were left away from the infectious area.

CONCLUSIONS

In summary, the risk for missed arterial injury of superior mesenteric artery following penetrating abdominal injuries is very high. The haemorrhage may be masked because of the tamponade in the mesentery during initial surgery and the late complication of false aneurysms comes on the scene in future. Extraanatomic bypass by a transmesenteric approach provides successful results in surgical treatment of superior mesenteric artery aneurysms.

REFERENCES

1. Busuttil RW, Gelabert HA. Visceral artery aneurysms. In: Haimovici H, Ascer E, Hollier LH, Strandness DE, Towne JB, editors. Haimovici's Vascular Surgery. 4th ed. USA Blackwell Science Inc.1996:842-52.
2. Chan FY, Crawford ES, Coselli JS, Safi HJ, Williams TW Jr. In situ prosthetic graft replacement for mycotic aneurysms of the aorta. Ann Thorac Surg 1989;47:193-5.
3. Cordero JA Jr, Darling RC 3rd, Chang BB, Shah DM, Patsy PS, Leather RP. In situ prosthetic graft replacement for mycotic thoracoabdominal aneurysms. Am Surg 1996;62:35-9.
4. Zelenock GB, Stanley JC. Splanchnic artery aneurysms. In: rutherford RB, editor. Vascular Surgery. 5th edition USA W.B. Saunders Company 2000:1369-97.
5. Yılmaz AT, Arslan M, Demirkılıç U, Özal E., Kuralay E., Tatar H., et al. Missed arterial injuries in military patients. Am J Surg. 1997;173:110-4.
6. Perry OM. Complications of missed arterial injuries. J Vasc Surg 1993;17:399-407.
7. Wright CB, Schoepfle WJ, Kurtock SB, Corry RJ, Rose EF, Lamberth WC Jr, et al. Gatrointestinal bleeding and mycotic superior mesenteric aneurysm. Surgery 1982;92:40-4.
8. Mandel SR, Mackie JS, Capps JH. Superior mesenteric artery aneurysm: a case report of the fourteenth successful case. Am Surgeon 1971;37:293-7.
9. Olcott C, Ehrenfield WK. Endoaneurysmorraphy for visceral artery aneurysm Am J Surg 1977;133:636-9.
10. Mattox KL, McCollum WB, Jordan GL Jr, Beall AC Jr, DeBakey ME. Management of upper abdominal vascular trauma. Am J Surg 1974;128:823-8.

11. Cull DL,Winter RP, Wheller JR, Gregory RT, Snyder SO Jr, Gayle RG, et al. Mycotic aneurysm of the suprarenal aorta. J Cardiovasc Surg (Torino) 1992;33:181-4.
12. Pasic M, Carrel T, Vogt M, von Segesser L, Turina M. Treatment of mycotic aneurysms of the aorta and its branches: The location determines the operative technique. Eur J Vasc Surg 1992;6: 419-23.