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CASE REPORT

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장간막 허혈증에서 경피적 혈관성형술의 임상적 유용성: Case Series 6예

정유민, 조윤주, 안상봉, 손병관, 김성환, 박영숙, 배준호, 조영권[1]
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Clinical Effectiveness of Percutaneous Angioplasty for Acute and Chronic Mesenteric Ischemia: A Six Case Series

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Intestinal ischemia is divided into three categories, namely, acute mesenteric ischemia (AMI), chronic mesenteric ischemia (CMI), and colonic ischemia. AMI can result from arterial or venous thrombi, emboli, and vasoconstriction secondary to low-flow states. It is an urgent condition which can result in high mortality rate. The predominant causative factor of CMI is stenosis or occlusion of the mesenteric arterial circulation, and it is characterized by postprandial abdominal pain and weight loss. Surgery is the treatment of choice for intestinal ischemia. However, it has been recently reported that percutaneous transluminal angioplasty with stent placement and/or thrombolysis is an effective therapy in various types of mesenteric ischemia. We report six cases of mesenteric ischemia which were successfully treated by percutaneous angioplasty, and review the literature from South Korea. **(Korean J Gastroenterol 2011;57:243-248)**

Key Words: Ischemia; Mesenteric arteries; Mesenteric vascular occlusion; Thrombolytic therapy; Angioplasty

INTRODUCTION

Mesenteric ischemia is roughly classified into acute and chronic ischemia by symptoms and arterial or venous ischemia by the blood vessels involved. Arterial embolism is the most common cause of acute mesenteric ischemia (AMI),[1] but as many as 20% of such cases are nonocclusive in nature.[2] It is usually presented with severe acute abdomen. Most common pathophysiology of chronic mesenteric ischemia (CMI) is stenosis or occlusion of the mesenteric arterial circulation. CMI is characterized by postprandial abdominal pain and unintentional weight loss. Atherosclerosis occlusive disease is the most common cause of arterial insufficiency, and smoking, diabetes, and hyperlipidemia are risk factors.[3]

The main treatment for acute mesenteric ischemia is surgical revascularization and resection of the infarcted bowel. But the perioperative morbidity and 30-day mortality rates of AMI are still high, at 39% and 31%, respectively.[4] Recently, a well-timed study found that combined use of aspiration thrombectomy with angioplasty and stent placement proved effective and safe.[5,6] However, clinical experience of angioplasty is not sufficient to draw a conclusion.

A physician must evaluate the cause of chronic abdominal pain and weight loss through a multidisciplinary approach to

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diagnose and treat CMI[3] effectively with angioplasty and stent placement for the involved vessel, and produce a good prognosis.[7] However, a randomized clinical trial has not been performed comparing this approach with endovascular surgery.[8]

We report our clinical experiences of CMI (cases 1-4) and AMI (cases 5 and 6) successfully treated with angioplasty and/or stent insertion and review the Korean literature.

CASE REPORTS

CASE 1

An 84-year-old female with a prior medical history of diabetes, hypertension, and reflux esophagitis had complained of postprandial epigastric pain for several months and anorexia for a month. She had lost about 5 kg of weight in 3 months. Laboratory test results were in normal ranges.

There were no definite organic causes explaining the chronic abdominal pain in esophagogastroduodenoscopy (EGD), colonoscopy, or abdominal computed tomography (CT) findings. Abdominal CT revealed segmental narrowing of the celiac artery. Angiography showed focal severe stenosis of the proximal portion of the celiac artery (CA) and superior mesenteric artery (SMA). Percutaneous transluminal angioplasty (PTA) was performed in the CA accompanied by stent placement, and the blood flow into the SMA then increased. The symptoms were greatly relieved 12 months after the procedure.

CASE 2

A 59-year-old woman was admitted for aggravated abdominal pain and hematochezia. She complained of postprandial abdominal pain over the previous 6 months and had diabetes, hypertension, and chronic renal failure, which had required her to receive peritoneal dialysis for the previous 3 years. She had a cerebral vascular attack history and took warfarin due to mitral and tricuspid regurgitation. A laboratory test showed decreased hemoglobin of 8.9 g/dL at admission. A gastric ulcer without active bleeding was shown in the EGD. She still complained of abdominal pain even after taking ulcer medication for over 2 weeks. In further evaluation, subtotal occlusion of the SMA was shown in an abdominal CT (Fig. 1A). We performed PTA (Fig. 1B) and stent placement in the ostium of the SMA (Fig. 2). She was symptom free for 24 months after the procedure.

CASE 3

A 78-year-old man had abdominal pain, constipation, and weight loss for a year. He was a heavy smoker (2 packs/day) and very depressed. He had been admitted several times in attempts to evaluate the cause of symptoms. An abdominal CT revealed severe stenosis of the CA. After angioplasty and

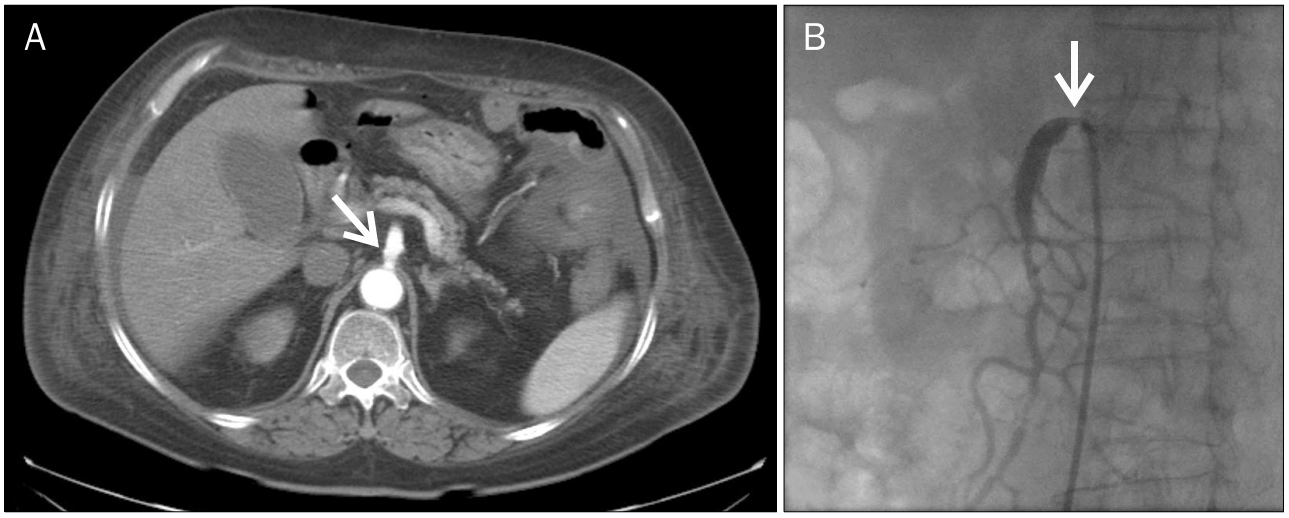

Fig. 1. Abdominal CT and percutaneous angiography in case 2. (A) A filling defect was revealed in the ostium of the SMA and proximal portion in the abdominal computed tomography. Arrow indicates a thrombotic stenosis. (B) Severe stenosis (arrow) is shown in the proximal portion of the SMA in the percutaneous angiography.
CT, computed tomography; SMA, superior mesenteric artery.

stent placement to the CA, postprandial abdominal pain markedly improved. However, he complained of abdominal pain with a similar pattern again after 8 months. He was still smoking and chose to stop taking aspirin. We found re-occlusion (above 75%) within the stent (Fig. 3A) and placed a new stent in the base of the CA (Fig. 3B). His abdominal pain improved, but he still had severe constipation and depression. After 13 months, he was lost to follow-up.

CASE 4

A 49-year-old male patient had periumbilical and postprandial abdominal pain for years. He underwent peritoneal dialysis for 3 years due to diabetic chronic renal failure. During several hospitalizations, we tried to find the causes. He was only able to eat little due to pain and lost weight about 10 kg over the course of a year. An abdominal CT revealed severe stenosis of the SMA, so we performed angioplasty with balloon dilatation. Stent placement failed because stenosis was so tight and angulated. He has visited the outpatient clinic for 10 months after the procedure. He gained weight and was doing well.

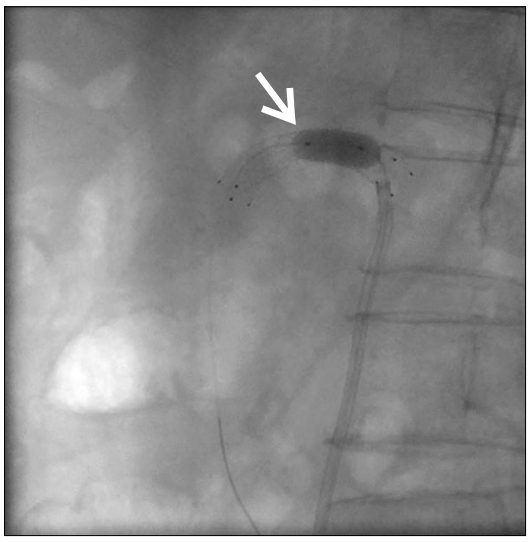

Fig. 2. Percutaneous angiographic findings in case 2. A stent was placed in the stenotic portion of the SMA. The balloon expanded fully (arrow) in the most stenotic lesion.
SMA, superior mesenteric artery.

CASE 5

A 72-year-old man was admitted for abdominal pain lasting 1 day. He had ischemic-cardiomyopathy and hypertension. His abdomen was rigid and tense. Bowel sounds were not audible. WBC count was elevated to 17,000/uL, and CRP was 21.42 mg/dL. Thrombosis of the SMA was noted in the abdominal CT performed to evaluate the acute abdomen. Diffuse edematous thickening of the small intestine and ascites suggested AMI. Urokinase 1,700,000 IU was infused immediately, and then we performed PTA with thrombolysis. After confirming revascularization, a stent was placed in the middle and distal SMA. He was improved after the procedure and discharged after 16 hospital days. He was symptom free for 24 months after the procedure.

CASE 6

A 67-year-old man was admitted for chest discomfort and dyspnea through the emergency room. He had chronic heart failure, atrial fibrillation, diabetes, and hypertension. At hospital day two, he suddenly complained of periumbilical pain with diarrhea. Laboratory findings revealed the following:

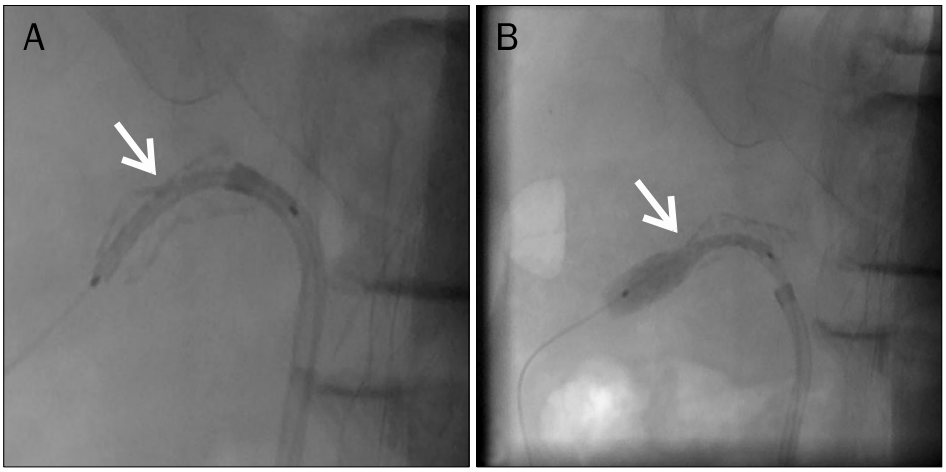

Fig. 3. Percutaneous angioplasty for the reoccluded lesion with previously implanted stent in case 3. (A) Severe stenosis (arrow) is visible in the distal portion of the stent placed in the celiac artery. (B) A new stent was inserted (arrow) in the restenotic lesion.

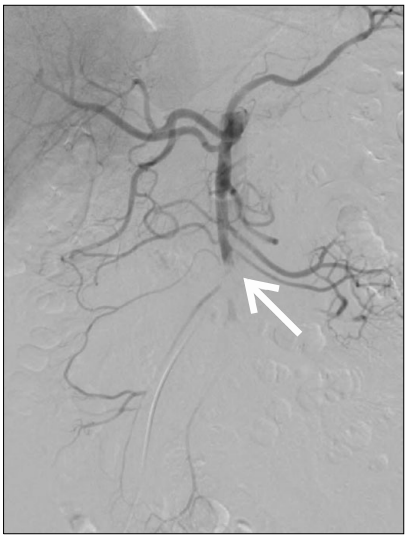

Fig. 4. Percutaneous angiographic finding. Total occlusion of SMA due to thromboembolism (arrow) is shown in the mesenteric angiography in case 6.

WBC count 13,590/uL; total bilirubin 1.5 mg/dL; AST/ALT 39/54 IU/L. Abdominal CT showed acute thromboembolism of the mid-SMA (Fig. 4). We infused urokinase 1,200,000 IU and performed PTA with thrombus aspiration and stent placement in the SMA. He did not complain of any GI symptoms for 9 months after the procedure.

DISCUSSION

The following summarizes our six cases of AMI and CMI along with the previous cases in South Korea, for a total of 18 cases (Table 1).[8-13] The average age was 61.5 years and all CMI patients had postprandial abdominal pain and significant weight loss, while AMI patients had acute abdominal pain. The average duration of symptoms was 10.5 months in CMI patients. However, there was no clinical information such as symptoms, duration of symptom and past histories, available for the 7 mesenteric ischemia cases reported by Gweon et al.[8] Those cases included 3 acute mesemteric ischemia in which treated by thromobolysis with urokinase. The main vascular lesion was SMA in 16 patients, CA in one patient, and inferior mesenteric artery (IMA) in one patient. Five out of sixteen patients whose vascular lesion was SMA also had significant CA stenosis. The PTA procedure was performed in all patients, and stent placement was possible in 17 patients. In all of our cases, we prescribed aspirin and antiplatelet agent for at least 6 months after PTA and stent insertion. Aspirin or antiplatelet agent should be prescribed continually. Among 13 patients with CMI there was no significant complication related with PTA, but ischemic symptoms recurred in 3 patients, and stent restenosis was confirmed by angiography. One of our 6 cases had a poor prognosis due to heavy smoking, stopping the antiplatelet agent, and depression. On the other hand, there was no recurrence reported in the remaining 5 patients with AMI. When performing percutaneous angioplasty in CMI, long term prognosis and prognostic factors will be considered in a further study.

The most common symptoms of CMI are postprandial pain and weight loss that results from a decrease in food intake due to postprandial pain. It is very important for a clinician to search thoroughly for specific causes, especially malignancy, by performing an upper and lower endoscopy as well as radiologic studies.[3]

Surgery has been the traditional treatment of choice for CMI. Cluzel et al.[14] reported a 96% rate of initial technical success, and 84% primary patency during follow-ups of 36-48 months. However, surgical revascularization was associated with a high rate of perioperative complication (19% to 54%) and mortality (17%).[15,16] The efficacy of surgical revascularization in CMI may be doubted in practice.

In the initial stage, mesenteric angioplasty and stenting was reported as an alternative to surgical bypass in elderly or high-risk patients, but have become the primary treatments in patients who had mesenteric ischemic lesions.[6,17] Recently, more than 70% of patients with mesenteric ischemia are treated with mesenteric angioplasty and stent placement.[17] According to a literature review, the mean angiographic success rate was 94%, the clinical success rate was 85%, and the primary patency rate was 74%. The complication rate and mortality rate were 14% and 2.4%, respectively.[8] Dias et al.[18] reported forty-three CMI patients who were treated with endovascular revascularization. Median follow-up was 43 months and the estimated 3-year survival rate was 76%.

In two of our cases with AMI, the main symptom was acute abdominal pain. Atherosclerosis, heart failure, arrhythmia, recent myocardial infarction, and hypotension were associated with AMI as a risk factor. In case 5, the patient was a 72-year--old male with ischemic cardiomyopathy, myocardial infarction, and hypertension. In case 6, the patient was a

Table 1. Clinical Characteristics of Cases with Mesenteric Ischemia

Case	Sex/ Age (yr)	Symptoms	Duration of symptom	Past history	Involved vessels	Stenosis (%)	Urokinase	Procedure	Follow up (months)	Recurrence	Improvement of abdomianl pain (visual scale score)
1	F/84	Epigastric pain Anorexia Weight loss	7 months	DM HTN DM	CA SMA	75	No	Stent	12	No	60-80%
2	F/59	Epigastric pain	6 months	HTN AF ESRD CVA	SMA	90	No	Stent	24	No	70-80%
3	M/78	Epigastric pain Constipation Weight loss	12 months		CA	95	No	Stent	13	8 months	70-80%
4	M/49	Periumbilical pain Weight loss	24 months	DM HTN ESRD	SMA	75	No	Balloon dilatation	10	No	90%
5	M/72	Abdominal pain	1 day	HTN Myocardial infarction	SMA	100	Yes	Stent	17	No	100%
6	M/67	Abdominal pain	1 day	DM HTN AF	SMA	100	Yes	Stent	9	No	100%
7	M/46	Abdominal pain	NA	NA	CA SMA	80 90	Yes	Stent	23	8 months	NA
8	M/58	Hematochezia	NA	NA	CA SMA	90 90	Yes	Stent	25	No	NA
9	M/57	Abdominal pain	NA	NA	SMA	90	No	Stent	17	No	NA
10	F/43	Abdominal pain	NA	NA	SMA	100	No	Stent	5	No	NA
11	M/48	Abdominal pain	NA	NA	CA SMA	100 80	Yes	Stent	6	6 months	NA
12	M/66	Abdominal pain	NA	NA	SMA	70	No	Stent	8	No	NA
13	F/65	Abdominal pain	NA	NA	SMA	80	No	Stent	1	No	NA
14	M/63	Epigastric pain Weight loss	2 months	RA	SMA	80	No	Stent	NA	No	NA
15	M/69	Abdominal pain Chronic diarrhea	12 months	HTN AMI	SMA	80	No	Stent	NA	No	NA
16	M/46	Epigastric pain	1 month	HTN	CA SMA	80 100	Yes	Stent	NA	No	NA
17	F/60	Dyspnea Abdominal pain	NA	ESRD MI	CA SMA	80 100	No	Stent	18	No	NA
18	M/78	Abdominal pain Bloody stool	3 days	HTN	IMA	90	No	Stent	5	No	NA

M, male; F, female; NA, not available; CA, celiac artery; SMA, superior mesenteric artery; IMA, inferior mesenteric artery; DM, diabetes mellitus; AMI, acute mesenteric ischemia; HTN, hypertension; ESRD, end stage renal disease; AF, atrial fibrillation; CVA, cerebrovascular accident; RA, rheumatoid arthritis.
Case 1-6 from our cases; Cases 7-13 from reference[8]; Case 14 from reference[9]; Case 15 from reference[10]; Case 16 from reference[11]; Case 17 from reference[12]; Case 18 from reference[13].

67-year-old male with chronic heart failure, atrial fibrillation, and diabetes. To identify risk factors is very important in evaluating AMI. Surgical exploration is the treatment of choice if there is any evidence of an infarcted bowel.[19,20] Recently, it has been proven that a well-timed combined use of PTA and stent placement is effective and safe even for AMI.[5,6] In our last 2 AMI cases, urokinase, thrombectomy, and stent placement were used successfully after diagnosis of SMA occlusion. Each follow up period is 16 and 9 months respectively, and the patients have done well so far.

In conclusion, a physician may exclude other organic causes thoroughly and consider the possibility of mesenteric ischemia as the cause of abdominal pain. For this reason, we may reserve percutaneous mesenteric stenting for patients with chronic or subacute presentations who do not require a detailed assessment of bowel viability. However, there is a

clear trend toward increasing use of PTA with stent placement for CMI and AMI, which appears to be a reasonable first line therapy in selected patients. Furthermore, a well timed combined use of angioplasty and a stent or thrombectomy could be effective and safe for mesenteric ischemia.

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