Mesenteric ischemia after coronary artery bypass grafting: should local continuous intra-arterial perfusion with papaverine be regarded as a treatment?

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Received 21 August 1998; received in revised form 19 October 1998; accepted 20 October 1998

Abstract

Mesenteric ischemia after cardiac surgery is rare but dramatic. We present a patient who had acute mesenteric ischemia following low cardiac output after coronary artery bypass grafting. Our patient was successfully treated with continuous intra-arterial perfusion with papaverine. We think that selective angiography must be performed as early as mesenteric ischemia is suspected, to get earlier diagnosis and treatment of an ischemic patient.

Keywords: Mesenteric ischemia; Cardiac surgery; Local vasodilation

1. Introduction

Mesenteric ischemia after extracorporeal circulation is rare but dramatic. Extensive atheromatous disease, low splanchnic output during or after cardiopulmonary bypass, use of vasopressor substances and arterial spasm represent risk factors during coronary artery bypass grafting (CABG). We present a patient who was successfully treated with continuous intra-arterial perfusion with papaverine.

2. Case report

A 70-year-old man with severe respiratory insufficiency and multiple-vessel disorders was admitted to our institution with unstable angina. Coronary angiography performed in November 1997 revealed double-vessel coronary impairments with reduced left ventricular function (left ventricular ejection fraction 31%). The decision to perform coronary revascularization was confirmed and was carried out under extracorporeal circulation with non-pulsatile flow, continuous aortic cross-clamping, anterograde infusion of a cold cardioplegic solution and topical cold cooling. Two bypass grafts were constructed: the internal mammary artery for bypassing the left anterior descending coronary artery and a saphenous graft to bypass the right coronary artery.

During the immediate postoperative follow-up period, we observed a low cardiac output necessitating vasopressor substance (adrenaline), the assisted ventilation was discharged on the fifth postoperative hour. There were no electric and no enzymatic significant modifications.

On the second postoperative day, the patient had an acute abdominal distention and mottling on the skin with severe metabolic acidosis and collapse necessitating prolonged assisted ventilation and positive inotropic stimulation. During the following hours, we observed renal failure with anuria necessitating a continuous veno-venous hemofiltration with reinfusion.

The diagnosis of intestinal ischemia was suspected and the coloscopy showed a colic mucous membrane with ulceration, sphacelus, edema and ischemic area. As a result, a selective angiography of the superior mesenteric artery was performed. It showed non-occlusive mesenteric ischemia with narrow and spastic branches of superior mesen-
teric artery (Fig. 1). A papaverine intra-arterial infusion was performed and a selective control angiography of the superior mesenteric artery showed a reduction of arterial spasms and a splanchnic vascular expansion (Fig. 2). A continuous intra-arterial perfusion with papaverine (10 mg/h) was started through the angiography catheter and continued for 48 h. An intra-colic catheter and a preventive antibiotherapy against microbial translocation across the intestinal barrier was started. The assisted ventilation and positive inotropic stimulation were stopped after peritoneal distention subsided. The following hospital course was uneventful and the patient left our institution on post operative day 22.

3. Discussion

Several etiologic and risk factors for the development of mesenteric ischemia have been suggested [1–7]: prolonged cardiopulmonary bypass time, non-pulsatile flow, age of patients, preexisting arterial disease, low cardiac output, use of vasopressor substances.

Our patient had several risk factors including preexisting arterial disorders, severe left ventricular disease and post-operative low cardiac output necessitating vasopressor substances.

The diagnosis of mesenteric ischemia is made on a high level of suspicion in the group at risk. The diagnosis and the treatment must be done as soon as possible to avoid intestinal infarction and its fatal result [8].

In our patient the development of an acute abdominal distention with mottling of the skin, severe metabolic acidosis and collapse led us to perform a selective angiography, just after resuscitation of the patient. Neither peritoneal signs nor microbial translocation across the intestinal barrier were observed. A local papaverine infusion had avoided an unnecessary laparotomy and allowed the regression of abdominal distention.

There are a few case reports [1,2,7–9] about successful local infusion of vasodilators with interesting results: the mortality is reduced from between 60 and 90% to between 40 and 50%. Boley and coworkers’ [1] initial results make us hope that the extent of bowel resection during laparotomy could be significantly reduced if vasodilation was performed preoperatively.

Even if the real efficacy of local papaverine infusion is not easy to prove, papaverine vasodilation, prolonged...
assisted ventilation and cardiac output improvement have played a great part in redistribution of blood flow to splanchnic circulation avoiding a laparotomy in our unstable patient.

Even though some angiograms are unnecessary, we think that selective angiography must be performed as soon as mesenteric ischemia is suspected, to get earlier diagnosis and treatment of an ischemic patient.

References


Fig. 2. Selective angiography of the superior mesenteric artery after intra-arterial perfusion with papaverine.