

## Intestinal Ischemia Following Cardiac Surgery: An Unusual Clinical Presentation

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Cardiac surgery; Mesenteric ischemia; Bowel perforation

### 1. Abstract

Mesenteric ischemia is a dreadful complication with a high mortality rate. Early diagnosis and management is mandatory to improve prognosis.

We report a 72-year-old woman who has undergone a bioprosthetic aortic valve replacement. She presented an abdominal pain associated to an occlusive syndrome. Angio-CT scan has found initially a functional bowel obstruction without mesenteric ischemia. 3 days later, she became febrile and her abdominal distension increase. The follow up Angio-CT scan revealed a pneumoperitoneum suggestive of a bowel perforation. A diagnostic laparotomy had found two ischemic ileal perforations. The ischemic origin was confirmed by histo-pathological examination. She underwent segmental ileal resection with end-to-end anastomosis. The follow up was favourable.

### 2. Introduction

Gastrointestinal complications after cardiac surgery are rare, but are associated with significant morbidity and mortality which varies between 13,9 and 63% [1-3]. Mesenteric ischemia accounts for approximately 14% of post cardiac surgery gastrointestinal complications with a mortality rate of 50-100% in some studies [3]. Early diagnosis allows timely management to improve patient prognosis. However, definitive diagnosis remains difficult in most cases because of the variety and non-specificity of clinical presentations.

We presented a case of a non-specific clinical presentation of a post-ischemic bowel perforation, revealed by an occlusive syndrome after

biological aortic valve replacement. She was successfully undergone a surgical resection of the ischemic bowel.

### 3. Observation

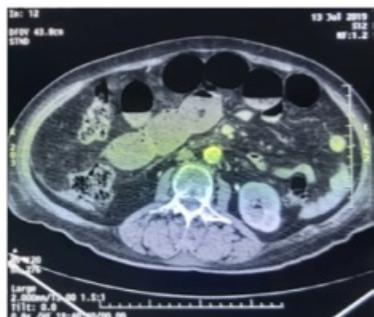
A 72-year-old woman was admitted to our department for a severe symptomatic aortic valve stenosis. Her medical history included diabetes mellitus, hypertension, osteoporosis and a primary thrombocytopenia. The left ventricular ejection fraction was normal (63%) and coronarography revealed atherosclerosis without significant stenosis. She underwent a bioprosthetic aortic valve replacement. The cardiopulmonary bypass (CPB) and cardiac ischemic times were 84 and 55 minutes, respectively. She was extubated 4 hours after surgery and unfractionated heparin was started at 6<sup>th</sup> hours, replaced by a low molecular weight heparin after drains removal.

At postoperative day (POD) 5, she presented a diffuse abdominal pain associated with an abdominal distension. The clinical examination was unremarkable. Laboratory parameters revealed elevated white blood cell (WBC) count (16,000/ $\mu$ l) and C-reactive protein (CRP) level (27 mg/dl), but a normal lactate rate (1.2 mmol/L). Abdominal angio-CT scan was performed, it showed a functional bowel obstruction with a normal mesenteric vascularization (Figure 1). The general surgery recommended a simple observation.

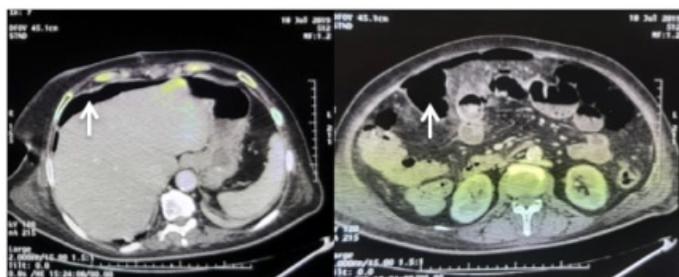
Three days after (at POD 8) she presented fever (38°C) and an increase of abdominal distension with persistent of abdominal pain. At the examination right lower quadrant tenderness developed. Laboratory exams revealed persistent of a high WBC and CRP with a normal lactate. A control angio-CT scan found a significant pneumoperitoneum with air bubbles in bowel wall, suggestive of

microperforation (Figure 2). A diagnostic laparotomy was decided. Intraoperative exploration had found two ischemic ileal perforations (Figure 3). (The ischemic origin was confirmed by histo-pathological

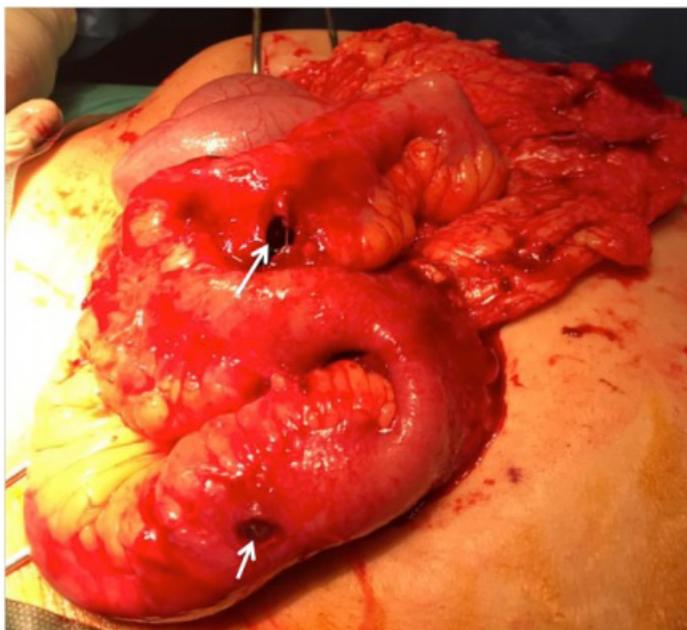
examination). She underwent segmental ileal resection with end-to-end anastomosis. The follow up was favourable. She was discharged from the hospital at POD 20.



**Figure 1:** Bowel distension secondary to a functional occlusion.



**Figure 2:** Pneumoperitoneum suggesting bowel perforation.



**Figure 3:** Operative view; small bowel perforation.

#### 4. Discussion

Mesenteric ischemia occurring after open-heart surgery is a rare but potentially life-threatening complication. It can lead to desquamation of the intestinal mucosa, necrosis or perforation of intestinal wall [2]. Factors favouring the occurrence of mesenteric ischemia include advanced age, cardiac failure, low cardiac output, chronic renal failure, valve surgery, prolonged bypass surgery, use of vasoactive drugs and intra-aortic balloon pulse [3]. In our case, the patient presented

only age as risk factor and she underwent a valvular surgery with a duration of CPB <120min and without use of vasoactive drugs.

Abdominal pain is one of the early signs of mesenteric ischemia and often disproportionate to physical examination. The clinical presentation is often non-specific because the majority of patients are sedated and under mechanical ventilation after open-heart surgery. In our case the patient was extubated early. The first symptom that she presented was abdominal pain followed by an occlusive syndrome.

When there is a clinical suspicion of mesenteric ischemia, abdominal ultrasound, CT scan, endoscopy, angiography or laparoscopy should be considered without delay.

There are 2 types of mesenteric ischemia: non-occlusive due to hypoperfusion, and occlusive secondary to mesenteric arterial occlusion resulting from embolism or thrombosis which can lead to rapid clinical deterioration [4].

Initial treatment of non-occlusive mesenteric ischemia consists of improving cardiac output to improve bowel perfusion, decreasing vasoconstriction to minimize bowel ischemia, and large-spectrum antibiotic therapy [5], if no improvement, an injection of arterial trans-catheter papaverine can be considered. The treatment of mesenteric occlusive ischemia is based on thrombolytic therapy, embolectomy, endovascular techniques (angioplasty, stent) or surgery in case of peritonitis, perforation or sepsis [6].

In our case, we suggest that it is an embolic cause rather than a non-embolic cause. Aortic stenosis surgery is highly emboligenic especially in the presence of diffuse calcifications, as was the case in our patient. Also, our patient did not have any period of low flow or the use of vasoconstrictor drugs. Finally, the intraoperative appearance showed, apart from localized perforations, a well-vascularized pink bowel. These are all arguments in favour of the emboligenic cause by micro-emboli.

## 5. Conclusion

Mesenteric ischemia after cardiac surgery is a rare but fatal complication. The challenge is to make an early diagnosis in order to start an adequate and timely management. Despite the progress of therapeutic means, the prognosis remains poor, hence the importance of prevention.

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