Case Report

# Acute Type A Aortic Dissection with Intestinal Ischemia Predicted by Serum Lactate Elevation

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**Mesenteric ischemia can complicate acute aortic dissection. We report a case of acute type A aortic dissection with perioperative intestinal ischemia, which clinically manifested on the second postoperative day. Serial monitoring of serum lactate level by a conventional blood gas analyzer was useful for early diagnosis and for timely treatment of intestinal ischemia. In this report, monitoring of serum lactate level as a key for the successful management of intestinal ischemia is suggested. (Ann Thorac Cardiovasc Surg 2003; 9: 79–80)**

**Key words:** lactate, intestinal ischemia, aortic dissection

## Introduction

Acute aortic dissection (AAD) complicated by intestinal ischemia is extremely difficult to manage and high mortality has been reported.[1] In many cases, diagnosis and early surgical treatment are hindered, because clinical symptoms of intestinal ischemia are often atypical or lacking. Especially in type A AAD, even if the emergent central grafting for ascending aorta is performed successfully, enormous systemic damage caused by the concomitant procedure for intestinal ischemia causes a poor prognosis.

Among several studies that have attempted to find a simple laboratory test for early identification of intestinal ischemia, serum lactate appears to be most useful and sensitive.[2-4] Murray et al. reported that peripheral D(-)-lactate levels are elevated only at two hours after onset of experimental intestinal ischemia and demonstrated the clinical usefulness in diagnosing acute ischemi.[2] Furthermore, serum lactate can be monitored conveniently and simply by a blood gas analyzer in either the operating room or intensive care unit.

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In the present report, our patient developed intestinal ischemia on the second postoperative day after primary central grafting of the ascending aorta. We resected necrotic and unhealthy intestine promptly, and rescued the patient from any catastrophic event following mesenteric ischemia. We eventually performed the implantation of a nutritional port for the short bowel syndrome, and the patient returned home.

## Case Report

A 58-year-old man presented with severe back pain and lack of left femoral artery pulse. Enhanced computed tomography (ECT) showed aortic dissection extending from the ascending aorta to the abdominal aorta just above the iliac bifurcation. There were no symptoms or ECT findings of intestinal ischemia on his arrival. Emergent ascending aortic graft replacement and femorofemoral bypass grafting were performed concomitantly, and the early postoperative course was uneventful. Thirty hours after the primary surgery, the value of plasma lactate abruptly increased to 106 mg/dL, although the lactate value had been constant between 30 and 40 mg/dL, postoperatively (Table 1). Other clinical findings of intestinal ischemia, including abdominal distention, peritoneal signs, plasma creatine kinase level, and C-reactive protein level were negative or acceptable at this time. We strongly suspected intestinal ischemia, and took the patient to the operating room to explore his bowel. On exploration, we found a discolored or necrotic bowel extending from the lower

**Table 1. Perioperative serum lactate level**

| Time course | Serum lactate (mg/dL) |
|---|---|
| On arrival | 16 |
| During central grafting | 22-57 |
| 1 hour after central grafting | 56 |
| 10 hours after central grafting | 40 |
| 20 hours after central grafting | 37 |
| 30 hours after central grafting | 106 |
| 1 hour after colectomy | 60 |
| 24 hours after colectomy | 28 |

ileum to rectum and the decision was made to perform an extended colectomy (total colectomy with ileotomy) with ileostomy for his survival. Recovery was uneventful except that the patient presented with transient renal failure postoperatively. Subsequently, we performed the implantation of a nutritional port (BardPort, Bard Inc., Salt Lake City, UT) for his short bowel syndrome, and the patient was discharged to his home 35 days after the initial surgery.

## Discussion

The operative mortality in patients with AAD has been reported to be considerably high, when the intestinal ischemia is evoked perioperatively.[1] Even if the revascularization of mesenteric vessels or resection of the bowel is performed, progressive multisystem organ failure (MOF) often occurs and leads to subsequent death.[5] Levison et al. reviewed their experiences of intestinal ischemia, after ruptured abdominal aortic aneurysm repair, and reported that operating in a timely fashion is important because a delay in diagnosis of ischemia is related to a dismal prognosis.[4] In this regard, early diagnosis and timely treatment may improve the operative mortality of AAD complicated with perioperative intestinal ischemia.

Lactate has been reported to be a sensitive serum marker for the early diagnosis of acute mesenteric ischemia.[3] Although mammals produce only L-lactate as a physiological metabolite which is enzymatically metabolized rapidly, it is known that D(-)-lactate, a stereoisomer of L-lactate, is also detected under diseased conditions. During intestinal ischemia, the resident microbial flora of the intestine multiply rapidly and soon overgrows the ischemic segment.[6] This bacterial overgrowth subsequently releases D(-)-lactate into the portal and the systemic circulation. Because the production of D(-)-lactate in mammals usually occurs only in minor quantities and mammals do not possess the enzyme systems to rapidly metabolize D(-)-lactate, the lactate level in the peripheral blood can be a sensitive marker early in the ischemic process of the intestine. Although the blood gas analyzer (ABL, Radiometer medical A/S, Copenhagen, Denmark) which we use in our hospital can measure only total lactate (both L- and D(-)-lactate) level, we believe that a rapid increase in total lactate value often reflects intestinal ischemia.

Accordingly, it is important to observe the plasma lactate level carefully for a case with the risk of perioperative intestinal ischemia. Especially when the clinical symptoms of intestinal ischemia are atypical or lacking, plasma lactate levels give us an early warning sign. Considering that intestinal ischemia is a fatal complication in AAD cases, and that its surgical treatment in a timely fashion is important, even a test laparotomy should be performed on the basis of plasma lactate levels.

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