Case report of visceral ischemia: The "tail" of an intra-aortic balloon pump

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The intra-aortic balloon pump (IABP) has a multitude of uses, including increasing myocardial oxygen supply, assisting in hemodynamic stability, and more recently to wean from cardiopulmonary bypass surgery.^{1,2} Its therapeutic effects arise from a combination of physiologic and metabolic impacts. The IABP increases coronary blood flow and decreases afterload, which reduces myocardial oxygen requirements; it also augments diastolic blood pressure, which improves tissue perfusion.³ The overall complication rate for IABPs has been reported at 8%.⁴ This case report describes an important complication and suggests ways that it can be recognized.

Clinical Summary

A 60-year-old man (5 feet 6 inches, 140 pounds, body mass index 22.6 kg/m²) with a history of hypertension, hypercholesterolemia, and previous myocardial infarction, sustained a witnessed cardiac arrest while at work. Emergency medical services arrived and found the patient to be in ventricular tachycardia. He was defibrillated twice and transferred to a tertiary care hospital in stable condition. Angiography revealed severe three-vessel disease, and triple coronary artery bypass grafting was done urgently. At chest closure, the cardiac output was noted to be decreased. An IABP was placed by the surgeon under transesophageal echocardiographic guidance.

On postoperative day 2, the patient had abdominal pain and distention with hypovolemia necessitating vasopressor support. Urinary output remained adequate, with values between 20 and 30 mL/h. The lower extremities became cool and slightly mottled, but peripheral pulses remained palpable. Blood work revealed lactic acidosis, with a lactate level of 8.95 mmol/L (0.55–2.2 mmol/L). Elevated liver enzymes were noted (aspartate transaminase 8533 U/L, alanine transaminase 3326 U/L, lactate dehydrogenase 8214 U/L), and the international normalized ratio doubled from 1.1 to 2.2. An urgent computed tomographic scan of the patient's abdomen revealed wall thickening and pneumatosis of the ascending colon (Figure 1), with the IABP effacing much of the celiac axis lumen (Figure 2). Diagnosis was intestinal ischemia with a shocked liver as the result of a malpositioned IABP.

The IABP was removed, and the patient underwent an emergency laparotomy with ileocecal resection, terminal ileostomy, and a mucous fistula. The patient recovered in the intensive care unit for 9 days and was discharged home in good condition on postlaparotomy day 27.

Discussion

This case demonstrates a known complication of the IABP. Although the IABP was initially thought to be displaced, it was later determined that the length of the IABP (calculated by using height, body surface area, and aortic diameter) was greater than the distance between the left subclavian artery and the celiac trunk. This is an important point, because the tail of the IABP is rarely visualized on plain film radiography. Instead, IABP placement is usually checked by locating the radiopaque marker in relation to the left subclavian artery. Postoperative serial chest x-ray films revealed that this was normal in our patient.

The IABP is a valuable adjunct in the care of patients with cardiovascular compromise. Although complications related to its use have declined from 10% to 2% with increased familiarity

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Figure 1. Pneumatosis intestinalis of ascending colon.

and better equipment designs,⁵ it is still important to recognize complications when they occur. Signs of sepsis require immediate consideration of possible visceral ischemia. Appropriate training and monitoring are essential to circumvent these complications or treat them when they occur. To our knowledge, we report the first case of visceral ischemia caused by anatomic variation rather than displacement of the IABP.

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Figure 2. Intra-aortic balloon pump (IABP) effacing lumen of aorta adjacent to superior mesenteric artery (SMA).

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