Severe Acute Aortic Regurgitation Due to Aortic Dissection

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CASE DESCRIPTION

Aortic insufficiency (AI) occurs frequently in patients with acute Type A aortic dissection. Exacerbation of this AI due to prolapse of the dissection flap is rare (1).

A 68-year-old man presented to an outside hospital with sudden onset of severe back pain and numbness in his right leg. A Stanford Type A thoracic aortic dissection was diagnosed by a computed tomography scan. He was transferred via helicopter to our hospital for emergency aortic surgery. To expedite the care of this patient, he was transported directly to the operating room from the helipad. After induction of general anesthesia, transesophageal echocardiography (TEE) confirmed the diagnosis of an ascending aortic aneurysm with a dissection in the ascending aorta that progressed through the aortic arch into the distal descending aorta.

In the midesophageal long axis view of the aorta, a definite, undulating dissection flap was seen as a mobile echogenic structure with a pattern of motion different than the aortic wall. Color flow imaging revealed an entry site into the false lumen in the ascending aorta and demonstrated blood flow in both the true and false lumens. The aortic valve was trileaflet. Color Doppler revealed severe AI because of incomplete leaflet closure from a dilated sinotubular junction. This AI was exacerbated by the back and forth movement of the dissection flap from the ascending aorta into the left ventricular outflow tract, further preventing coaptation of the aortic valve leaflets (Fig. 1). The midesophageal short axis view of the ascending aorta revealed a starfish-like appearance of the circumferential dissection flap (Fig. 2). In our patient, although it was not clear if the dissection involved the coronary arteries, both the left and right ventricles were normal in size and function, with no regional wall motion abnormalities. (TEE video loops are available online at www.anesthesia-analgesia.org.)

The patient was placed on cardiopulmonary bypass and his ascending aorta and aortic valve were replaced with a 25-mm Carboseal valve conduit with reimplantation of the coronary arteries. Circulatory arrest under deep hypothermia was used for a portion of the procedure.

TEE examination after weaning from cardiopulmonary bypass revealed a mechanical aortic valve prosthesis functioning normally and an ascending aortic graft with no evidence of leak. The dissection flap now seen in the aortic arch continued into the descending thoracic aorta. The patient was discharged home on the eighth day in satisfactory condition.

DISCUSSION

In a registry of 464 patients with acute aortic dissection, hospital mortality for a Type A dissection was 26% with surgery and 58% with medical therapy (2). Movsowitz et al. (3) used TEE to define the mechanisms and severity of AI in a study of 50 consecutive patients with acute Type A aortic dissection. Among 43 of the 50 patients who underwent aortic surgery, 33 (77%) did not require aortic valve replacement. Twenty-two of these 43 patients (44%) had significant AI. Of these 22 patients, there were 16 with intrinsically normal leaflets who had AI because of one or more correctable aortic valve lesion(s): incomplete leaflet closure due to leaflet tethering in a dilated aortic root in seven; leaflet prolapse due to disrupted leaflet attachments in eight; and dissection flap prolapse through the aortic valve orifice in five. The authors opined that intraoperative TEE, by delineating the severity and mechanisms of AI, could assist the surgeon in assessing the aortic valve in its physiologic state and in identifying those patients with intrinsically normal leaflets in whom valve repair is likely to be successful, as opposed to those in whom fixed abnormalities require aortic valve replacement. TEE can also provide confirmation of successful valve repair before closing the chest.
For patients in whom the suspicion of aortic dissection is high, TEE is performed initially in the operating room with the patient anesthetized and undergoing preparation for surgery. Due to paucity of time, the aim of the initial TEE study is to confirm the suspected diagnosis, evaluate the entry site and extent of dissection in planning the surgical approach, and to recognize such complications of the dissection, such as AI, coronary ostial occlusion leading to wall motion abnormalities or pericardial effusion, that affect the patient’s treatment. Although the sensitivity of TEE for the diagnosis of aortic dissection is more than 97%, specificity, though high, is <100% because of misinterpretation of ultrasound artifacts, such as reverberations and beam-width artifacts as intraluminal structures, especially when the image quality is suboptimal. Careful evaluation from multiple views helps avoid these false-positive diagnoses.

REFERENCES

Figure 1. Intraoperative transesophageal echocardiography (TEE) reveals prolapse of the dissection flap through the aortic valve in the midesophageal long axis view of the ascending aorta. LA = left atrium, LV = left ventricle, AV = aortic valve.

Figure 2. In the midesophageal short axis view of the ascending aorta, a circumferential tear in the media is seen.