Aortic Intussusception: A Rare Complication of Aortic Dissection

Anne M. Hudak, M.D., Steven N. Konstadt, M.D., F.A.C.C.

Aortic Intussusception is a separation of the layers of the media so as to create two lumens: a false lumen and a true lumen. We describe a patient having a potentially lethal complication of aortic dissection—intimal intussusception—that was undiagnosed preoperatively by computed tomography with contrast but was seen perioperatively with transesophageal echocardiography (TEE). This information altered surgical management and may have prevented a serious neurologic sequela.

Case Report

A 66-yr-old man with a medical history of hypertension presented to the emergency room of his community hospital after a syncopal episode. Physical examination revealed a cold, pulseless left upper extremity. Angiography of the left upper extremity suggested occlusion of the left axillary artery secondary to a probable embolus. Computed tomography of the chest showed an ascending aortic aneurysm. Contrast enhancement revealed an "ill defined low density opacity within the posteromedial aortic arch of undetermined significance." He was taken emergently to the operating room for a thromboembolectomy of the left upper extremity. Because no embolus was found, the possibility of an aortic dissection was considered, and TEE was performed. It revealed "extensive aortic dissection" and "severe" aortic insufficiency. With a copy of the computed tomography, and a verbal report of the TEE, he was transferred to our institution for surgical treatment.

After tracheal intubation, a biplane TEE examination was performed. A transverse-plane, short-axis view through the ascending aorta revealed an intimal flap just distal to the aortic valve (fig. 1). Color-flow Doppler confirmed communication between the true and false lumen. In the longitudinal plane, the spiral nature of the dissection could be seen (fig. 2), and the distal portion of the flap disappeared from view. Subsequent evaluation of the aortic arch in the transverse plane revealed the intussusception of the torn intimal flap (fig. 3), and the proximity to the subclavian artery was seen in the longitudinal plane (fig. 4). Color-flow mapping revealed 3+ aortic insufficiency and 1+ mitral regurgitation, and a left pleural effusion was detected. There was no evidence of a pericardial effusion, and biventricular function was normal.

After median sternotomy and establishment of bypass via right atrium and left femoral artery, the aortic cross-clamp was applied to the distal ascending aorta, and the ascending aorta was transected. Inspection of the ascending aorta confirmed the absence of the dissection flap. To permit retrieval of the intussusception flap, the patient was cooled to a core temperature of 14°C, and a period of deep hypothermic circulatory arrest was instituted. At this time, the surgeons removed the aortic cross-clamp and inspected the aortic arch lumen. The distal portion of the torn intima and media was completely prolapsed into the junction of the distal aortic arch and the descending aorta. The prolapsed flap was resected to ensure perfusion of the
cerebral vessels. The aortic cross-clamp was then reapplied, and the proximal portion of the aortic valve/conduit was sewn in place. On completion of the Bentall procedure, the patient was separated from bypass uneventfully and transferred to the intensive care unit.

Pathology report of the aortic specimen revealed recent dissection with extensive medial necrosis. The intussusception pathology report indicated it was composed of media, intima, and organized hematoma adjacent to the media. Atherosclerotic plaque also was noted.

Discussion

In addition to detecting the presence and location of an aortic dissection, *i.e.*, the intimal membrane, a number of important features of the dissection should be defined: (1) differentiation of the true and false lumen and determination of the blood flow pattern, (2) location of the intimal tear(s), (3) coronary artery integrity, (4) aortic valve function, (5) pleural effusion, and (6) pericardial effusion/tamponade. Among the various diagnostic modalities available, with its combination of two-dimensional imaging and color-flow Doppler mapping, TEE is uniquely suited to answer these questions.1–4

Intimal intussusception is a rare but potentially life-threatening complication of aortic dissection5,6 that occurs when the intimal flap partially or totally separates from the aorta and migrates distally. Often, the intimal flap folds together to form a mass, which may impair blood flow to the brain or other organs or initiate thrombus formation with later obstruction of flow or embolism. Clinically, intimal intussusception should be suspected in the presence of cerebral or limb ischemia associated with a dissection. Echocardiographically, it should be suspected when the distal end of the intimal flap is free-floating, *i.e.*, not attached to the aorta. This can be confirmed by surgical inspection of the inner layer of the dissection after opening the aorta.7

Although the preoperative TEE did not detect the intimal intussusception, as shown by the intraoperative images, it was visible later. It is possible that the intussusception had not occurred at the time of the initial
study, but it is also possible that after making the diagnosis of the type A dissection, the echocardiographer failed to completely image the aortic arch. This example underscores the need to perform a complete examination of the thoracic aorta. Knowledge of the intussusception diagnosed by TEE prompted the surgeon to alter the usual sequence of surgical events. Instead of performing the proximal anastomosis first, the aortic arch was explored first. The intussusception flap was resected to prevent potential obstruction of flow to cerebral vessels by the flap during femoral perfusion. The procedure then was performed in its usual manner.

Although intimal intussusception is a rare complication of aortic dissection, it may have grave implications if unrecognized. As shown in this case, if suspected, intussusception may be readily identifiable by a complete TEE examination. Once recognized, appropriate surgical intervention is possible.

References

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