Localized Dissection of the Sinus of Valsalva Without Coronary Artery Involvement During Percutaneous Coronary Intervention

Yoshiyuki MASAKI, MD, Masataka SUMIYOSHI, MD, Satoru SUWA, MD, Hiroshi OHTA, MD, Eriko MATSUNAGA, MD, Hiroshi TAMURA, MD, Norihide TAKAYA, MD, Yoriaki MINEDA, MD, Satoshi KOJIMA, MD, and Yasuro NAKATA, MD

SUMMARY

Dissection of the sinus of Valsalva is an extremely rare accident during percutaneous coronary intervention (PCI), but it can lead to serious complications such as dissection of the ascending aorta. We experienced a localized dissection of the right coronary cusp without coronary artery involvement that was induced by a guiding catheter during PCI in a patient with acute myocardial infarction. The localized dissection showed pooling of the contrast medium in the acute phase, but it subsided spontaneously after 12 days without any sequelae. Manipulation of the guiding catheter should be performed with great caution not only in the coronary artery but also in the sinus of Valsalva. (Int Heart J 2005; 46: 323-326)

Key words: Sinus of Valsalva, Percutaneous coronary intervention, Dissection, Complication

DISSECTION of the sinus of Valsalva is an extremely rare but potentially life threatening complication of percutaneous coronary intervention (PCI) because it can progress to aortic wall dissection.1-7) We experienced an isolated dissection of the right coronary cusp (RCC) that was induced by a guiding catheter during PCI in a patient with acute myocardial infarction.

CASE REPORT

An 82-year-old woman was referred to our hospital for prolonged chest pain associated with ST elevation in the inferior leads on a 12-lead electrocardiogram (ECG). She had no coronary risk factors other than obesity; her height was 138 cm and body weight was 54 kg. A physical examination was unremarkable. On
admission, her ECG showed ST segment elevation in leads II, III, and aVF, and ST depression with inverted T wave in leads I, aVL, V₄, and V₅. Blood chemistry tests revealed the elevation of cardiac enzymes (CPK 1730 IU/L, GOT 207 IU/L, and LDH 721 IU/L). She was diagnosed with acute inferior myocardial infarction and underwent emergency coronary angiography. Selected coronary angiography demonstrated total occlusion in the proximal portion of the right coronary artery (RCA) and 90% stenosis in the proximal segment of the left anterior descending artery (LAD). Left ventriculography showed partial akinesis of the inferior wall with an ejection fraction of 58%. PCI was immediately performed for the culprit lesion of the RCA. When a 6 French 0.75-inch short-tip Amplatz left type guiding catheter (Medtronic Inc., Minneapolis, MN, USA) and BMW guide wire (Guidant Inc., St. Paul, MN, USA) were inserted into the RCA, localized staining by the contrast medium was recognized along the RCC (Figure 1). Although she had no specific complaints and her vital signs did not change, pooling of the contrast medium persisted, suggesting a localized dissection of the RCC. Therefore, we decided to suspend the procedure and postpone PCI. Computed tomography also showed localized staining by the contrast medium just anterior to the aortic root (Figure 2A). Two transthoracic echocardiograms performed just after the accident and 20 days later showed no aortic valve regurgitation. She was treated conservatively without any anticoagulants or antiplatelet medicines, and her systolic blood pressure was controlled under 130 mmHg by intravenous administration of propranolol, nicardipine, and nitroglycerin. Thereafter, her clinical course was uneventful without any complications. Repeat computed tomography scanning (12 days later) revealed no staining by the contrast medium around the aortic root (Figure 2B). She underwent a successful PCI for the culprit lesion of the

Figure 1. Localized staining by the contrast medium (arrow heads) was recognized along the right coronary cusp (RCC) when a 6 French 0.75-inch short-tip Amplatz left type guiding catheter and BMW guide wire were inserted into the right coronary artery (RCA) (A). Figure 1B shows a total occlusion in the proximal segment of the RCA and pooling of the contrast medium in the RCC (arrow heads).
RCA 18 days after the accident. Before the PCI, complete resolution of the dissection in the RCC was confirmed angiographically. Although she had repeat PCIs for re-stenosis in the RCA and the proximal lesion in the LAD 3 months later, her course was uneventful during a 6-month follow-up.

**DISCUSSION**

Localized dissection of the sinus of Valsalva is an extremely rare accident that may occur during PCI, but it can lead to serious complications such as dissection of the ascending aorta. In our catheter laboratory, we experienced only this case with isolated dissection of the coronary cusp among 2562 consecutive patients (0.04%) who underwent PCI. Although dissection of the sinus of Valsalva and aortic wall following coronary artery dissection induced by a guiding catheter or guidewire has been previously reported,1-7 a localized dissection of the coronary cusp without coronary artery involvement has not yet been reported in the English literature.

Iatrogenic coronary artery dissection involving the adjacent aortic wall has been treated successfully with conservative treatment,1,2,5) stenting,3-5) and surgery.3-6) Perez-Castellano, et al13) have reported that the localized dissections of the sinus of Valsalva tend to resolve spontaneously within a month because of the particular anatomy of the sinus of Valsalva. The upper limit of each aortic sinus consists of a well-defined circumferential supravalvular ridge that is very rich in collagen fibers, and therefore, dissections usually remain in the sinus of Valsalva.13) In our case, the particular structure of the sinus of Valsalva might act protectively against extension of the localized dissection.

Figure 2. A: A computed tomogram showing localized staining by the contrast medium (arrow) just anterior to the aortic root. B: Repeat computed tomography scanning (12 days later) revealed no staining by the contrast medium around the aortic root.
The precise mechanism of this unusual complication remains unclear. Vigorous hand injection of the contrast medium, subintimal passage of the guidewire, and inadvertent handling of the guiding catheter have been proposed as possible mechanisms of iatrogenic coronary and aortic dissection during PCI. Degenerative medial diseases, such as cystic medial necrosis and atherosclerotic change, might also play a role in the development of the iatrogenic dissection of the coronary cusp. Gentle manipulation of the guidewire and guiding catheter is mandatory not only in the coronary artery but also in the sinus of Valsalva.

REFERENCES