

# Successful Aorta-osteal Stenting after Iatrogenic Acute Type-A Aortic Dissection during Primary Percutaneous Coronary Intervention

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**Background:** Iatrogenic acute dissection of the ascending aorta following coronary angiography and percutaneous intervention is rare. This complication, if not managed urgently, can have critical results.

**Case Report:** We present the case of a 70 year-old woman who was treated by primary percutaneous coronary intervention (PCI) of the right coronary artery (RCA) for acute inferior myocardial infarction; however, the procedure was complicated by anterograde dissection of the RCA with a simultaneous retrograde propagation to the proximal part of the ascending aorta. Successful stenting of the entry point

was able to heal the RCA and restrict the retrograde propagation to the ascending aorta. The aortic dissection was monitored by means of computerised tomography and the dissection repaired itself spontaneously within a day.

**Conclusion:** Treatment of the aorta coronary dissection (ACD) by urgent osteal stenting is a less invasive treatment compared with surgical treatment in appropriate cases. We demonstrated that immediate osteal stenting should be performed in ACD.

**Key Words:** Acute myocardial infarction, aorto-coronary dissection, percutaneous coronary intervention

It has been shown that the incidence of acute dissection of the ascending aorta (AD), as a complication of diagnostic coronary angiography and percutaneous coronary intervention (PCI), is 0.03 to 0.06% (1). Trauma to the coronary ostia and interventional procedures can cause AD (2). We wanted to introduce a patient with acute inferior myocardial infarction in whom aorta-coronary dissection (ACD) developed as a complication after PCI, and in whom ACD was stented successfully and dissection propagation was limited.

## CASE PRESENTATION

A 70-year old female patient applied to our hospital with chest pain. Examination of the cardiovascular system showed a blood pressure of 120/66 mmHg and pulse rate of 74 beats per minute. Other systemic review did not reveal any abnormality. Electrocardiography showed ST-elevation in inferior leads and ST-depression in anteroseptal leads. She was hospitalised with a diagnosis of inferior myocardial infarction. The

coronary angiography was performed quickly. Her coronary angiogram showed no significant lesions in the circumflex artery and the left anterior descending coronary artery. Also, 90% tubular stenosis was found in the proximal-portion and 100% narrowing with a thrombus mid-portion of the RCA (Figure 1). We decided to perform PCI of the proximal and mid-portion of the RCA. RCA was engaged with a JR4-6F guiding catheter (Guiding catheter, Medtronic, New York, USA). When interfering with the wire to the RCA using an intermediate wire (Intermediate wire, Simslide, Istanbul, Turkey), a dissection was apparent from the proximal part of the RCA. After the first contrast, the ACD was apparent; the ACD had spread to the RCA and AA (Figure 2). Patient rhythm showed complete block with a pulse of 32 beats per minute. Since the patient was haemodynamically unstable, a temporary pacing wire was implanted. Next, three bare-metal stents (BMS) (Bare metal stent, Simcross 3.0\*25, 3.0\*18, 3,5\*28 mm; Simeks, Istanbul, Turkey) were placed from the middle of the RCA to the ostium of the RCA. The ostium was stented after mid-distal segment stenting. After this applica-

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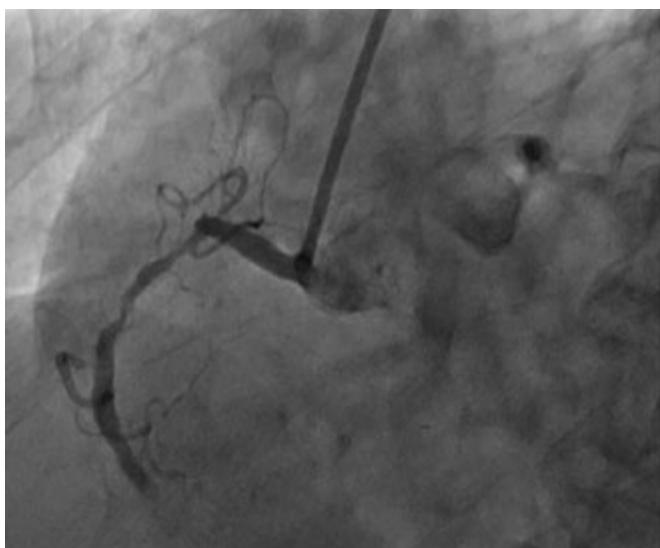
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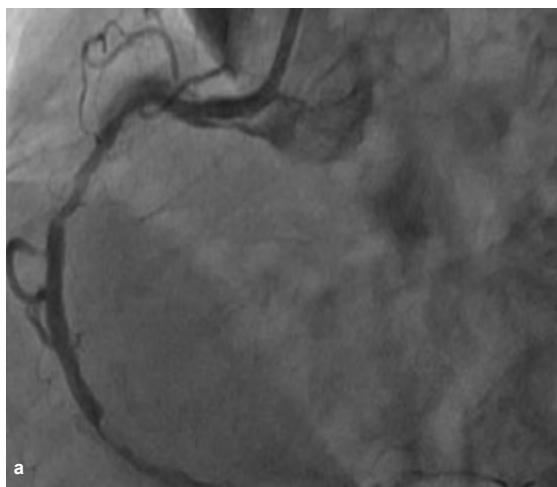
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tion, the stent portion was dilated using a noncompliant high pressure balloon (Noncompliant balloon, Sprinter 3.5\*27 mm Medtronic, New York, USA) up to 18 atm. Follow-up angiogram revealed that there was no contrast leakage to the false lumen (Figure 3). Emergent computerised tomography (CT) after the procedure revealed intramural haematoma (IMH) formation, with contrast retention (Figure 4a, arrows). The patient had an eventless hospital course and the follow-up CT scan after 2 days (Figure 4b, arrows) and 3 months (Figure 4c) demonstrated complete resolution of the false lumen. Informed consent was obtained from the patient for this case report.



**FIG. 1.** Coronary angiogram showing that 90% tubular stenosis was found in the proximal-portion and 100% narrowing with a thrombus in the mid-portion of the right coronary artery



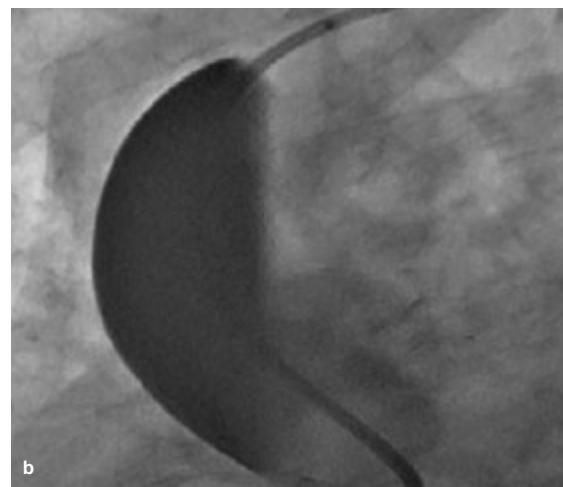
**FIG. 2. a, b.** Coronary angiogram showing the dissection propagated to the right coronary sinus (a). Coronary angiogram showing the dissection propagated to ascending aorta (b).

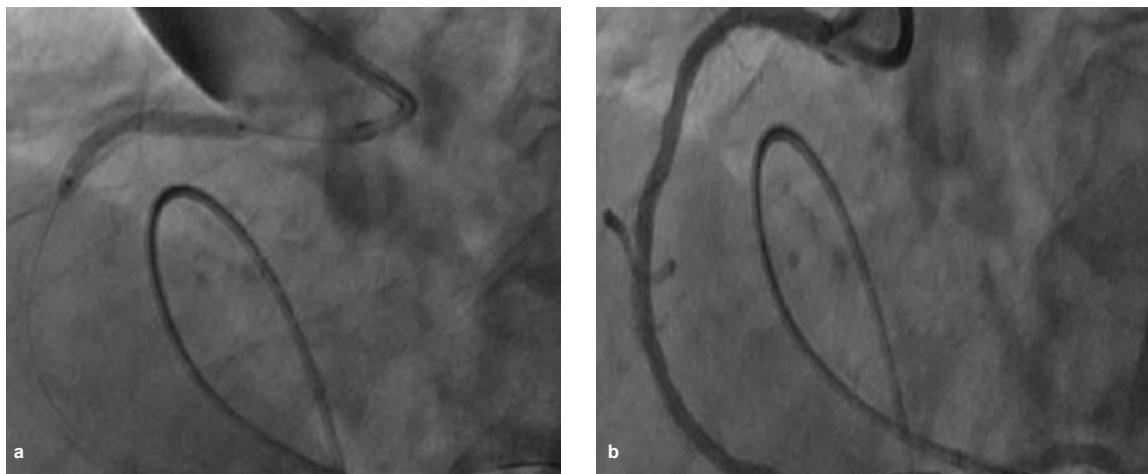
## DISCUSSION

The dissection of the ascending aorta (AA) is one of the major life-threatening complications of aortic diseases. ACD is a very rare complication of aortic interventions. Trauma to the coronary ostia and interventional procedures can cause AD (2). In our case, dissection in the proximal part of the RCA is caused and triggered by the Intermediate Wire. Hypertension, advanced age, diabetes mellitus, history of cardiac surgery and cystic medial necrosis can be included as predisposing factors for AD (3, 4). Goldstein et al. (5) reported that 89% of ACD is on the right side and 11% on the left side. López Minguez et al. (6) reported that most cases of ACD are in the RCA, because the RCA has fewer smooth muscle cells and matrix type-1 collagen fibrils than the left coronary artery sinotubular junction.

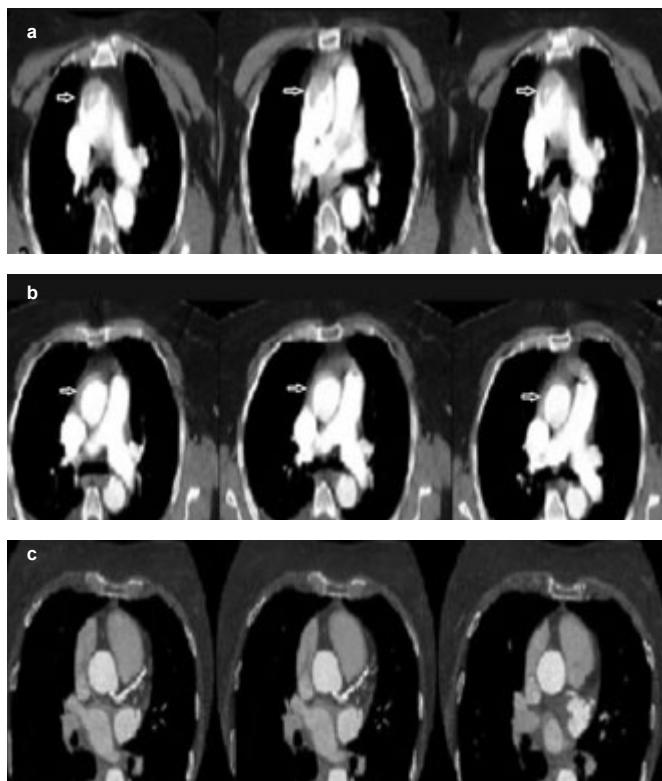
Naturally, the treatment of type-A AD is surgical resection and the replacement of AA. However, emergent stenting can be used as a novel treatment modality, because it may limit the extent of dissection in some iatrogenic ACD cases, and eliminate any further interventions (2, 7). As in our case, surgical treatment of AD due to interventions in patients with acute coronary syndrome can be quite dangerous, because AD propagation may more often be due to the administration of heparin and anti-platelet drugs during PCI. Therefore, in such cases, coronary stenting when ACD dissection develops can be quite helpful and therapeutic, because it closes entry and therefore prevents the spread of dissection. In some cases, the ACD can be monitored conservatively, and in others, surgery may be unavoidable.

Tanase et al. (8) performed emergency stenting in five of the eight patients in whom ACD developed. Two patients





**FIG. 3. a, b.** The aorto-coronary dissection stenting of the entry point to the right coronary artery (a). Successful stenting of the entry point to heal the right coronary artery and to restrict the retrograde propagation to the ascending aorta (b).



**FIG. 4. a-c.** CT immediately after PCI. Intramural haematoma with contrast retention; the ascending aorta near the coronary orifice also had contrast retention in the false lumen and descending aorta was not involved (a). CT two days after PCI. Intramural haematoma at the ascending aorta had minimal contrast retention (b). CT demonstrated complete resolution of the false lumen after 3 months PCI (c).

were monitored conservatively, and only one patient was treated surgically. They reported that it would be useful to followup with CT after aorta-coronary stenting. CT may

show the propagation of dissection and extra-aortic complications. The resolution of AD usually occurs between 48 hours and 3 months (9). Tanase et al. suggested performing CT imaging immediately and multi-detector CT imaging on the 2<sup>nd</sup> day and after 1 week, when ACD is developed. CT imaging may be repeated after one or two months (8). As a result, ostial stenting of ACD in appropriate cases is less invasive when compared with surgery. In this case, we showed emergent stenting in appropriate cases in which ACD developed.

**Ethics Committee Approval:** Ethics committee approval was received for this case.

**Informed Consent:** Written informed consent was obtained from the patients for the publication of this case report and any accompanying images.

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## REFERENCES

- Perez-Castellano N, Garcia-Fernandez MA, Garcia EJ, Delcan JL. Dissection of the aortic sinus of Valsalva complicating coronary catheterization: Cause, mechanism, evolution, and management. *Cathet Cardiovasc Diagn* 1998;43:273-9. [CrossRef]

2. Carstensen S, Ward MR. Iatrogenic aorto coronary dissection: The case for immediate aorto ostial stenting. *Heart Lung Circ* 2008;17:325-9. [\[CrossRef\]](#)
3. Dunning DW, Kahn JK, Hawkins ET, O'Neill WW. Iatrogenic coronary artery dissection extending into and involving the aortic root. *Cathet Cardiovasc Interv* 2000;51:387-93. [\[CrossRef\]](#)
4. Pande AK, Gosselin G, Leclerc Y, Leung TK. Aortic dissection complicating coronary angioplasty in cystic medial necrosis. *Am Heart J* 1996;131:1221-3. [\[CrossRef\]](#)
5. Goldstein JA, Casserly IP, Katsiyannis WT, Lasala JM, Taniuchi M. Aortocoronary dissection complicating a percutaneous coronary intervention. *J Invasive Cardiol* 2003;15:89-92.
6. López-Minguez JR, Climent V, Yen-Ho S, Gonzales-Fernandez R, Nogales-Asensio JM, Sanchez-Quintana D. Características estructurales de los senos de Valsalva y porción proximal de las arterias coronarias. Su relevancia durante la disección retrograda aortocoronaria. *Rev Esp Cardiol* 2006;59:696-702. [\[CrossRef\]](#)
7. Yip HK, Wu CJ, Yeh KH, Hang CL, Fang CY, Hsieh YK, et al. Unusual complication of retrograde dissection to the coronary sinus of Valsalva during percutaneous revascularization: a single-center experience and literature review. *Chest* 2001;119:493-501. [\[CrossRef\]](#)
8. Tanasie C, Chandonnet M, Chin A, Kokis A, Ly H, Perrault LP, et al. Catheter-induced aortic dissection after invasive coronary angiography: evaluation with MDCT. *AJR Am J Roentgenol* 2011;197:1335-40. [\[CrossRef\]](#)
9. Kim JY, Yoon J, Jung HS, Yoo BS, Lee SH. Percutaneous coronary stenting in guide-induced aortocoronary dissection: angiographic and CT findings. *Int J Cardiovasc Imaging* 2005;21:375-8. [\[CrossRef\]](#)