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ORIGINAL ARTICLE

Iatrogenic type A aortic dissection during percutaneous coronary intervention: A single-center experience

Perkütan koroner girişimler sırasında oluşan iyatrojenik tip A aort diseksiyonu: Tek merkezli deneyim

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ABSTRACT

Objective: Iatrogenic aortic dissection (IAD) during coronary interventions is a rare but fatal complication. There is not enough experience and trial on this subject. In this study, we report our IAD cases and their acute, short-term, and long-term results.

Methods: In this study, we screened 6,096 coronary angiographies performed in our center between February 2016 and February 2019. Ascending aortic dissection developed in 8 patients. A total of 7 patients had computed tomographic angiography images after the event and during the follow-up. We performed 1-month and 1-year follow-up examinations.

Results: The incidence of IAD was 0.13%. The female sex ratio was as 63%. A total of 37% of the patients had presented with acute coronary syndrome. In 37% of the patients, dissection occured while support catheter use, but in the remaining patients, dissections developed owing to hydraulic pressure. Regardless of the Dunning staging, 7 patients were followed-up with medical treatment, and 1 patient with decreased coronary flow was referred to emergency coronary bypass surgery. Regression was in the first tomography in 4 patients and observed in the control tomography in the remaining patients with medical treatment. The in-hospital 1-month and 1-year mortality rates were 0%.

Conclusion: IAD is a fatal disease, and conservative follow-up is suggested due to lack of clear management recommendations. The findings in our study showed that medical treatment is the first choice for the hemodynamically stable patients when dissection is sealed by stenting; however, surgical treatment is required in patients with the decreased coronary flow.

ÖZET

Amaç: Koroner girişimler sırasında oluşan asendan aort diseksiyonu nadir fakat ölümcül olabilen bir komplikasyondur. Bu konuda deneyim ve çalışmalar çok kısıtlıdır. Bu çalışmada,merkezimizde koroner girişim sırasında karşılaştığımız iyatrojenik aort diseksiyonu vakalarının akut, kısa ve uzun dönem sonuçlarını paylaştık.

Yöntemler: Şubat 2016 ve Şubat 2019 tarihleri arasında merkezimizde yapılan 6096 adet koroner jiyografi geriye dönük tarandı. Sekiz hastada asendan aort diseksiyonu gelişmişti. Yedi hastada olay sonrası ve kontrol bilgisayarlı tomografi anjiografi görüntüleri mevcuttu. Hastaların bir ay ve bir yıl poliklinik muayene kontrolleri mevcuttu.

Bulgular: İyatrojenik aort diseksiyonu insidansı %0,13 olarak hesaplandı. Kadın cinsiyet oranı %63 idi. Hastaların %37'si akut koroner sendrom ile başvurmuştu. Hastaların %37'sinde destek kateter kullanımı sonrası diseksiyon izlenirken diğer hastalarda basınçlı opak verilmesi ile diseksiyon geliştiği izlendi. Duning evrelemesine bakılmaksızın yedi hasta medikal tedavi ile takip edilirken, koroner akımı azalan bir hasta acil koroner baypas cerrahisine gönderildi. Medikal tedavi ile takip edilen yedi hastanın dört tanesinde ilk tomografide regresyon geri kalanında ise kontrol tomografilerde regresyon izlendi. Hastane içi ölüm, bir ay ve yıllık mortalite oranları %0'dı.

Sonuç: İyatrojenik aort diseksiyonu mortal seyredebilen bir durum olup, güncel kılavuzlarda kesin tedavi önerisi bulunmamaktadır. Çalışmamıza göre hemodinamik olarak stabil seyreden, stent ile diseksiyon flebinin sınırlandığı, koroner akımın korunduğu hastalarda medikal tedavi ile takip; ancak koroner akımın bozulduğu hastalarda cerrahi tedavi ile mükemmel sonuçlar alınmaktadır.

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Percutaneous coronary intervention (PCI) is a reliable and effective procedure that is increasingly used in stable coronary artery disease and acute coronary syndromes. Aortic dissection is a clinical condition that is rarely seen during PCI but can be fatal, and treatment recommendations are not clear. There are various case reports in the literature because there is no prospective randomized study on this mortal complication; however, there are very few observational studies. Therefore, the treatment approaches in this area are not clear, and there are no clear recommendations on this issue in guidelines.

The most cited observational study was published by Dunning et al.[1] In their study, the cases were divided into 3 groups according to the degree of dissection, and treatment options were suggested accordingly. However, it is difficult to use this dissection staging in daily practice because it does not have a physiological or anatomic basis and does not evaluate coronary flow. In this study, we present our treatment recommendations according to clinical tomographic and long-term follow-up of iatrogenic aortic dissection (IAD) cases in our center.

METHODS

In this study, 6,096 coronary angiography and PCI imaging studies performed between February 2017 and February 2019 in Gülhane Training and Research Hospital (Ankara, Turkey) were retrospectively reviewed. In 8 patients, aortic dissection was observed. The main clinical features of the patients who developed IAD and the materials used during the procedure were reached through the file and patient information system. The patients' follow-up and their 1-month and 1-year health statuses were obtained from the patient's own doctor or from the patient's information system. Dunning dissection classification of these patients was performed retrospectively on angiographic images.[1] The study protocol was approved by the Gülhane Ethics Committee of Health Science University on September 25, 2018 (Approval Number: 215/219). This investigation complied with the principles outlined in the Declaration of Helsinki.

RESULTS

During the 6,096 PCI and coronary angiography, 8 IADs were observed, and the incidence was 0.13%. Dissection flap was detected in 2 patients with left main coronary artery (LMCA) and left coronary cusp, in 5 patients with right coronary artery (RCA) and right coronary cusp, and in 1 patient with a noncoronary cusp. It was observed that we used the radial artery approach in just 1 patient, and the standard femoral artery approach was used in other patients. Dissection occurred in 3 patients during the primary PCI, in 2 patients during the elective PCI, and in 3 patients during the chronic total occlusion (CTO) procedure. No patient developed aortic dissection during standard, elective coronary angiography. The most common cause of dissection was opaque material pressure injection (in 4 patients) and wrong or deep engagement of the catheter (in 3 patients). Dissection was observed in 2 patients while using Amplatz-2 guiding, in 5 patients while using Judkins right-4 guiding, and in 1 patient while using extra back-up (EBU) guiding catheter and guideliner catheter (GUIDEZILLA II Guide Extension Catheter, Boston scientific, USA) (Table 1). In-hospital death was not developed in any patient, and 1-month and 1-year mortality rates were 0%.

Abbreviations:

CT	*Computed tomography*
CTA	*Computed tomographic angiography*
CTO	*Chronic total occlusion*
Cx	*Circumflex artery*
DM	*Diabetes mellitus*
EBU	*Extra back-up*
HT	*Hypertension*
IAD	*Iatrogenic aortic dissection*
ICU	*Intensive care unit*
LAD	*Left anterior descending coronary artery*
LMCA	*Left main coronary artery*
MI	*Myocardial infarction*
OM	*Obtus marginalis*
PCI	*Percutaneous coronary intervention*
RCA	*Right coronary artery*
TIMI	*Thrombolysis in Myocardial Infarction*

Patient details

Patient 1

A female patient aged 61 years with a history of peripheral arterial disease and hypertension (HT) was admitted for coronary angiography due to stable angina. Coronary angiography revealed noncritic stenosis at the RCA and left anterior descending coronary artery (LAD) but significant luminal stenosis at the obtus marginalis (OM)-1 branch (Fig. 1A). The circumflex artery (Cx) was cannulated with 6F Amplatz Left 2 guiding catheter through left radial access. A total of 2 drug-eluting stents were implanted at the OM-1 branch. Aortic root and LMCA dissection occurred, which arose from a deep and wrong engaged guiding

Table 1. Patient characteristics

Case	Age (years)	Sex	Procedure	Dissection origin	Catheter type	Cause	Dunning stage	Hospitalization duration (days)	Therapy modality	Outcome	1-month follow-up	1-year follow-up	First CTA	Control CTA
1	61	F	Cx-OM electivePCI	LMCA	AL-2 6F	Malapposed catheter	3	15	Stent	D/C	uneventful	uneventful	Tip A dissection	Total regression
2	73	M	OM AMI	Noncoronary cusp	AL-3	Malapposed catheter	3	5	Medical follow-up only	D/C	uneventful	uneventful	Tip A dissection	Total regression
3	48	F	RCA AMI	RCA	JR 4 7F	Hydraulic dissection	1	5	Stent	D/C	uneventful	uneventful	Total regression	–
4	70	M	RCA electivePCI	RCA	JR 4	Deep Engage	1	1	Stent	D/C	uneventful	uneventful	Total regression	–
5	38	F	RCA AMI	RCA	JR 4	Hydraulic dissection	1	5	Stent	D/C	uneventful	uneventful	Partial regression	Total regression
6	57	M	RCA CTO	RCA	JR4	Hydraulic dissection	1	5	Medical follow-up only	D/C	uneventful	uneventful	Tip A dissection	Total regression
7	50	F	RCA CTO	RCA	JR4	Hydraulic dissection	3	3	Medical follow-up only	D/C	uneventful	uneventful	Total regression	–
8	50	F	RCA CTO	LMCA	EBU	Hydraulic dissection	1	16	CABG	D/C	uneventful	uneventful	–	–

AL: Amplatz Left; AMI: Acute myocardial infarction; CABG: Coronary artery bypass graft operation; CTA: Computed tomographic angiography; CTO: Chronic total occlusion; Cx: Circumflex artery; D/C: Discharge; EBU: Extra back-up catheter; F: Female; JR: Judkins right; LMCA: Left main coronary artery; M: Male; OM: Obtus marginalis; PCI: Percutaneous coronary intervention; RCA: Right coronary artery.

catheter with rapid contrast filling into the wall of the aorta (Fig. 1B). Soon afterward, the dissection proceeded into LAD and Cx, and coronary circulation was abruptly ceased. Therefore, cardiac arrest was developed. Immediate stents implantations were performed on LMCA, LAD, and Cx with the aid of cardiopulmonary resuscitation. Control angiography showed perfect covering of the dissected segment and no further contrast filling in the aortic wall (Fig. 1C). Echocardiography after the procedure showed tricuspid aortic valve and first-degree aortic valve insufficiency; ejection fraction was 45%. After the percutaneous intervention, we performed control computed tomographic angiography (CTA), and it showed aortic dissection that was limited before arcus aorta (Fig. 1D and E). At this point, we performed cardiovascular surgery consultation; conservative therapy was approved owing to high surgical risk. The patient was extubated a day after the procedure. After 2 weeks of control visit, CTA revealed the complete resolution of the aortic dissection (Fig. 1F and G). The patient was discharged in a stable condition after 1 month. At 1 year later, the patient was stable and had no cardiac symptoms.

Patient 2

A male patient aged 73 years was admitted for emergent coronary angiography due to acute coronary syndrome. There are significant lesions at LAD and the OM branch (Fig. 2A and B). The LMCA was cannulated with 7F Judkins 4 guiding catheter using right femoral access. First, the LAD lesion was treated with a drug-eluting stent without any complication. Then, PCI was attempted in the OM branch, but the Judkins guiding catheter did not provide sufficient backup, and we decided to try with Amplatz Left 3 guiding catheter. While attempting to selectively intubate the

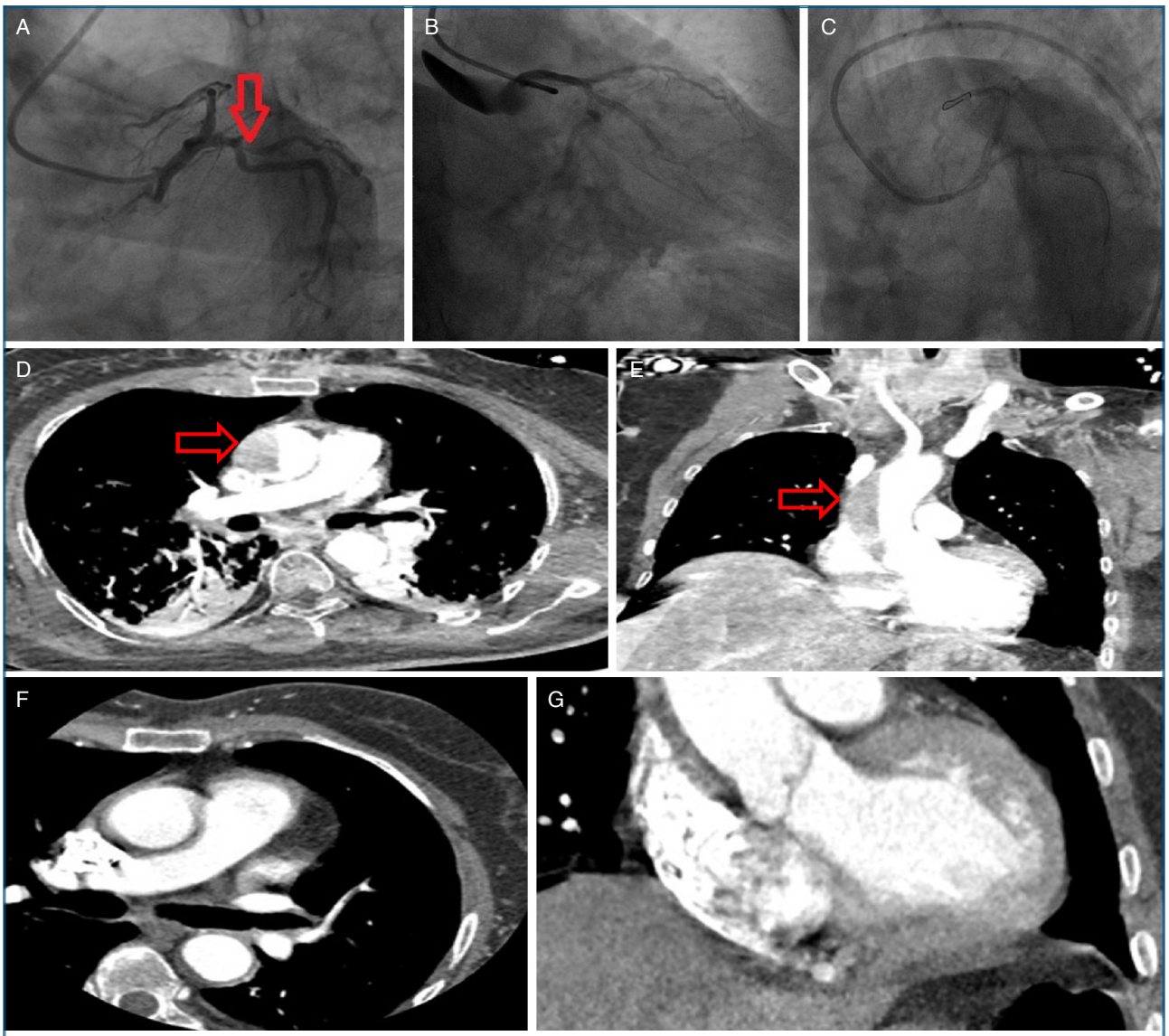

Figure 1. (A) There is a significant lesion on the OM branch. **(B)** IAD occurred owing to the wrong engagement of the AL 2 catheter. **(C)** Control angiography after stent implantation showing a perfect covering of the dissected segment and no further contrast filling in the aortic wall. **(D)** CTA showing aortic false lumen in the horizontal plane. **(E)** In the transverse plane, the dissection flap was limited before the arcus aorta. **(F, G)** Control CTA showing complete resolution of dissection and false lumen in the horizontal and transverse planes. AL: Amplatz left; CTA: computed tomographic angiography; IAD: iatrogenic aortic dissection; OM: obtus marginalis.

LMCA, dissection of the aorta was observed on the noncoronary cusp (Fig. 2C). On the development of aortic dissection, the right and left coronary arteries were rechecked with the Judkins catheter. Because no flow-limiting lesion was observed in the coronary ostium and the coronary blood flow was Thrombolysis in Myocardial Infarction (TIMI) 3, the patient was taken to the intensive care unit (ICU), and intervention to OM-1 was postponed. The patient was followed up with an intravenous beta-blocker and nitroglycerine infusion. Echocardiography after the procedure showed tricuspid aortic valve insufficiency, but there was no aortic valve insufficiency; ejection fraction was 50%. The first aortic CTA showed dissection on the aortic noncoronary cusp (Fig. 2D). The patient was followed up with medical treatment for 48 hours. On control CTA, dissection was self-limited, and intramural hematoma formation occurred (Fig. 2E). One week later, PCI was performed in the OM-1 branch successfully.

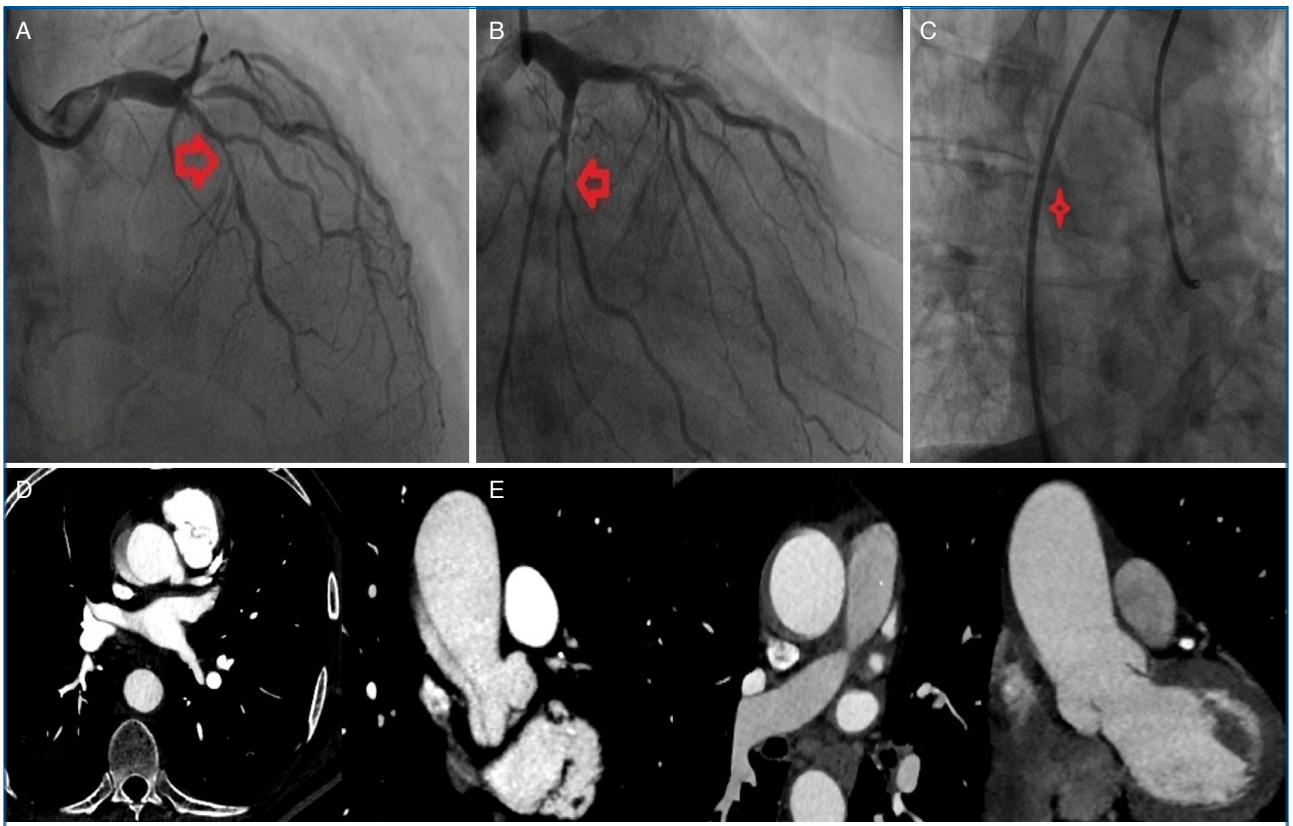

Figure 2. (A, B) There were significant lesions on the LAD and OM branches. **(C)** IAD occurred on the noncoronary cusp with AL-3 guiding. **(D)** In the first CTA, IAD can be seen on the horizontal and transverse planes. **(E)** Control CTA showing a complete resolution of the IAD. AL: Amplatz Left; CTA: computed tomographic angiography; IAD: iatrogenic aortic dissection; LAD, left anterior descending coronary artery; OM: obtus marginalis.

Patient 3

A female patient aged 48 years with a history of diabetes mellitus (DM) was admitted to our hospital with ST-elevation myocardial infarction (MI). Coronary angiography was performed, and plaques were detected in Cx and LAD. RCA was cannulated with a right Judkins 4 guiding catheter, and the first angiographic image revealed antegrade midsegment occlusive dissected long lesion; unfortunately, at the same time, retrograde aortic dissection occurred owing to contrast medium delivery pressure (Fig. 3A). Immediately, the guidewire was advanced to the RCA. Stent implantation was performed starting from the ostium to prevent the progression of the aortic dissection (Fig. 3B). Despite the interventions, distal TIMI 1 flow was obtained, and the patient was followed up with medical treatment in the ICU. Echocardiography after the procedure showed tricuspid aortic valve insufficiency, but there was no aortic valve insufficiency; ejection fraction was 45%. There was no dissection flap in the aorta on the control CTA (Fig. 3C). The patient was discharged with medical treatment 1 week after her admission. No additional cardiovascular pathology was detected in the patient's control visit 1 month later.

Patient 4

A patient aged 70 years with a diagnosis of HT, DM, and hyperlipidemia in her history was referred for coronary angiography on detection of inferolateral ischemia on myocardial perfusion scintigraphy. Coronary angiography showed no significant lesion in LAD and Cx, but a severe lesion was detected after the RCA conus branch, and it was decided that PCI be performed. The RCA was cannulated with the right Judkins 4 guiding catheter, but the deep engagement of the catheter caused dissection from the right coronary ostium to the aorta (Fig. 4A and B). RCA was quickly passed with a guidewire. After balloon predilatation, drug-eluting stent implantation was performed to close the osteal flap starting from the

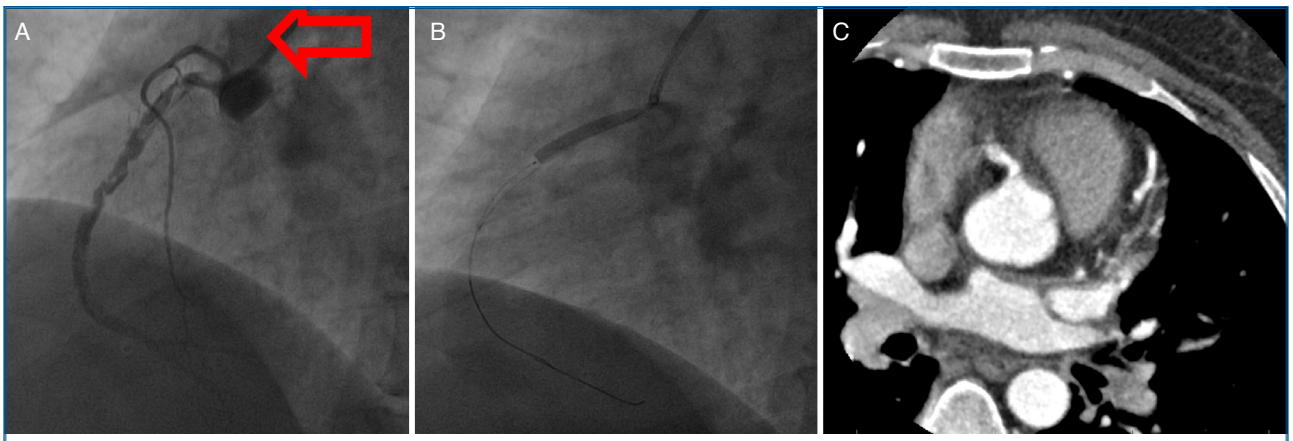

Figure 3. (A) Retrograde aortic dissection occurred owing to high-pressure contrast delivery. **(B)** The RCA ostium was stented to prevent the progression of the aortic dissection. **(C)** There was no dissection flap in the aorta on the control CTA. CTA: computed tomographic angiography; RCA: right coronary artery.

distal conus branch to osteal RCA (Fig. 4C). In the control image, aortic dissection was observed to be self-limiting, and TIMI 3 flow was achieved in RCA (Fig. 4D). Echocardiography after the procedure showed tricuspid aortic valve and first-degree aortic valve insufficiency; ejection fraction was 45%. Control CTA showed no dissection flap (Fig. 4E).

Patient 5

A female patient aged 38 years without known chronic disease underwent coronary angiography for inferior MI. The RCA of the patient who had no serious lesion in LAD and Cx was cannulated with a right Judkins 4 guiding catheter. Retrograde dissection occurred with rapid administration of contrast medium during image acquisition in the RCA, and it spread to the aorta (Fig. 5A). The dissected lesion was passed through to the guidewire, and a stent was implanted to include the entire dissection flap ostium (Fig. 5B). Control angiography showed TIMI 3 flow in the RCA and stable self-limiting dissection of the aorta (Fig. 5C). Echocardiography after the procedure showed tricuspid aortic valve and mild aortic valve insufficiency; ejection fraction was 55%. There was no significant dissection flap in the aorta after the procedure (Fig. 5D). A 1-year follow-up of the patient was uneventful.

Patient 6

A male patient aged 57 years was admitted to the catheter laboratory for a CTO lesion of the RCA. We decided to perform retrograde cannulation to the RCA through to septal collateralization. During bilateral injection, hydraulic dissection developed with the rapid delivery of contrast medium from the catheter in the RCA (Fig. 6A). The patient was followed up in the ICU with stable hemodynamic parameters. Echocardiography after the procedure showed tricuspid aortic valve and first-degree aortic valve insufficiency; ejection fraction was 47%. CTA showed a self-limiting dissection flap after the procedure (Fig. 6B). Control CTA showed thrombosis and closure of the dissection flap after 5 days (Fig. 6C).

Patient 7

A female patient aged 50 years was admitted to the catheter laboratory for CTO to RCA (Fig. 7A). We decided to perform retrograde cannulation to RCA through to septal collateralization. During bilateral injection, hydraulic dissection developed with the rapid delivery of contrast medium from the catheter in the RCA (Fig. 7B). Control coronary angiography showed good coronary blood flow and self-limiting dissection of the aorta. At this point, we decided to end the procedure. Echocardiography after the procedure showed tricuspid aortic valve and mild aortic valve insufficiency; ejection fraction was 43%. The control CTA showed no dissection (Fig. 7C).

Patient 8

A female patient aged 50 years underwent CTA for RCA. We decided to perform retrograde cannulation to the RCA through to septal collateralization. The LMCA was cannulated using EBU guiding catheter. Because the septal perforator artery was tortuous, microcatheter and extension catheter (GUIDEZILLA II

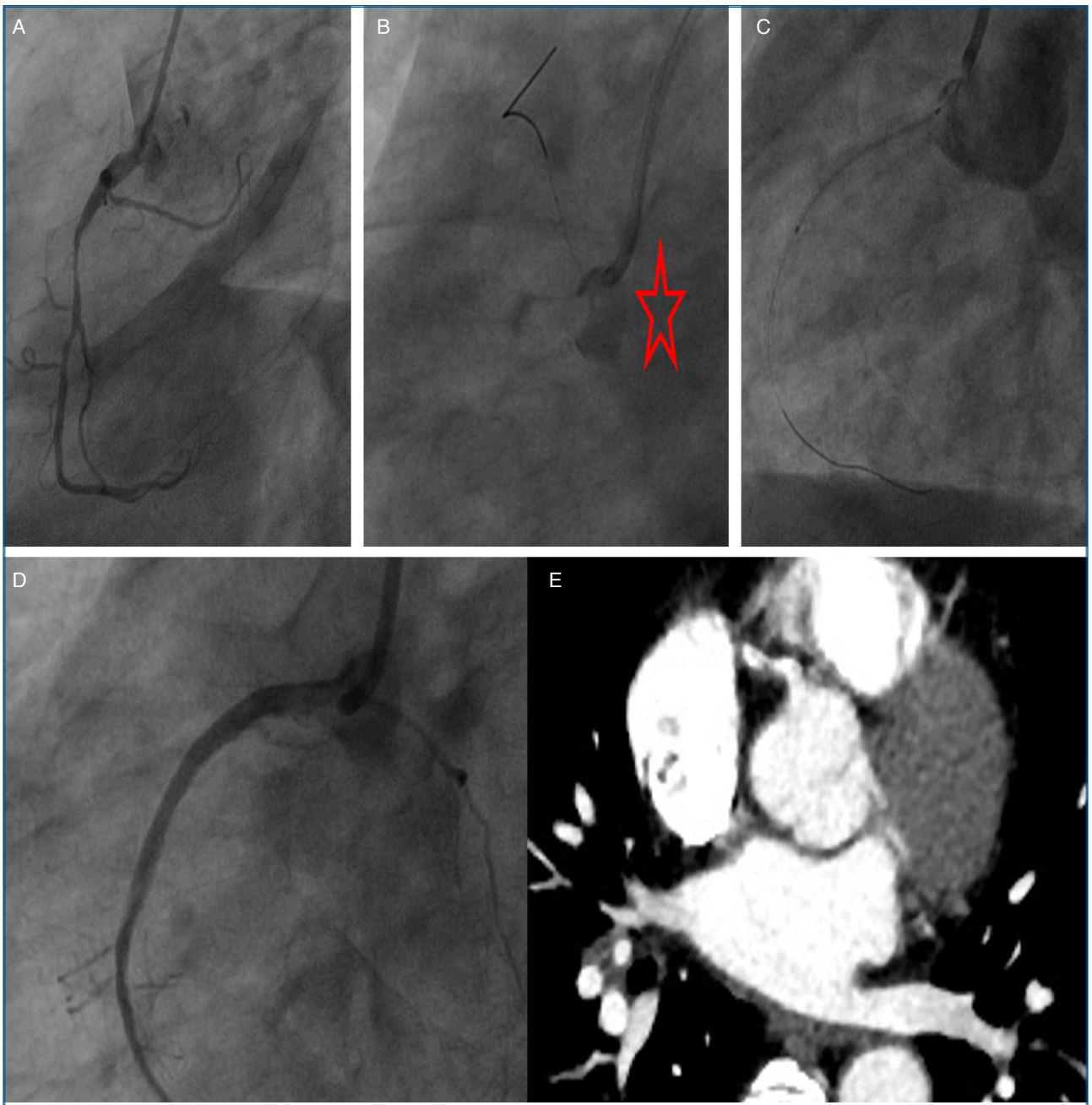

Figure 4. (A) Coronary angiography showing a severe lesion after the RCA conus branch. **(B)** Deep engagement of the catheter caused dissection from the right coronary ostium to the aorta. **(C)** After balloon predilatation, drug-eluting stent implantation was performed to close the osteal flap starting from the distal conus branch to the osteal RCA. **(D)** Control angiography showing a self-limiting aortic dissection and TIMI 3 flow in the RCA. **(E)** Control CTA showing no dissection flap. CTA: computed tomographic angiography; RCA: right coronary artery; TIMI: Thrombolysis in Myocardial Infarction.

Guide Extension Catheter) were used for better support. Although the RCA was retrogradely wired through, Dunning type 1 dissection occurred from the LMCA to the aorta (Fig. 8A). Balloon angioplasty was performed on the LAD, Cx, and LMCA owing to a decrease in coronary blood flow in the LMCA. TIMI 2 flow was achieved in the LAD and Cx, and the patient was clinically stabilized (Fig. 8B). Echocardiography after the procedure showed tricuspid aortic valve and mild aortic valve insufficiency; ejection fraction was 35%. After that, the cardiovascular surgery council was convened urgently, and the patient underwent an emer-

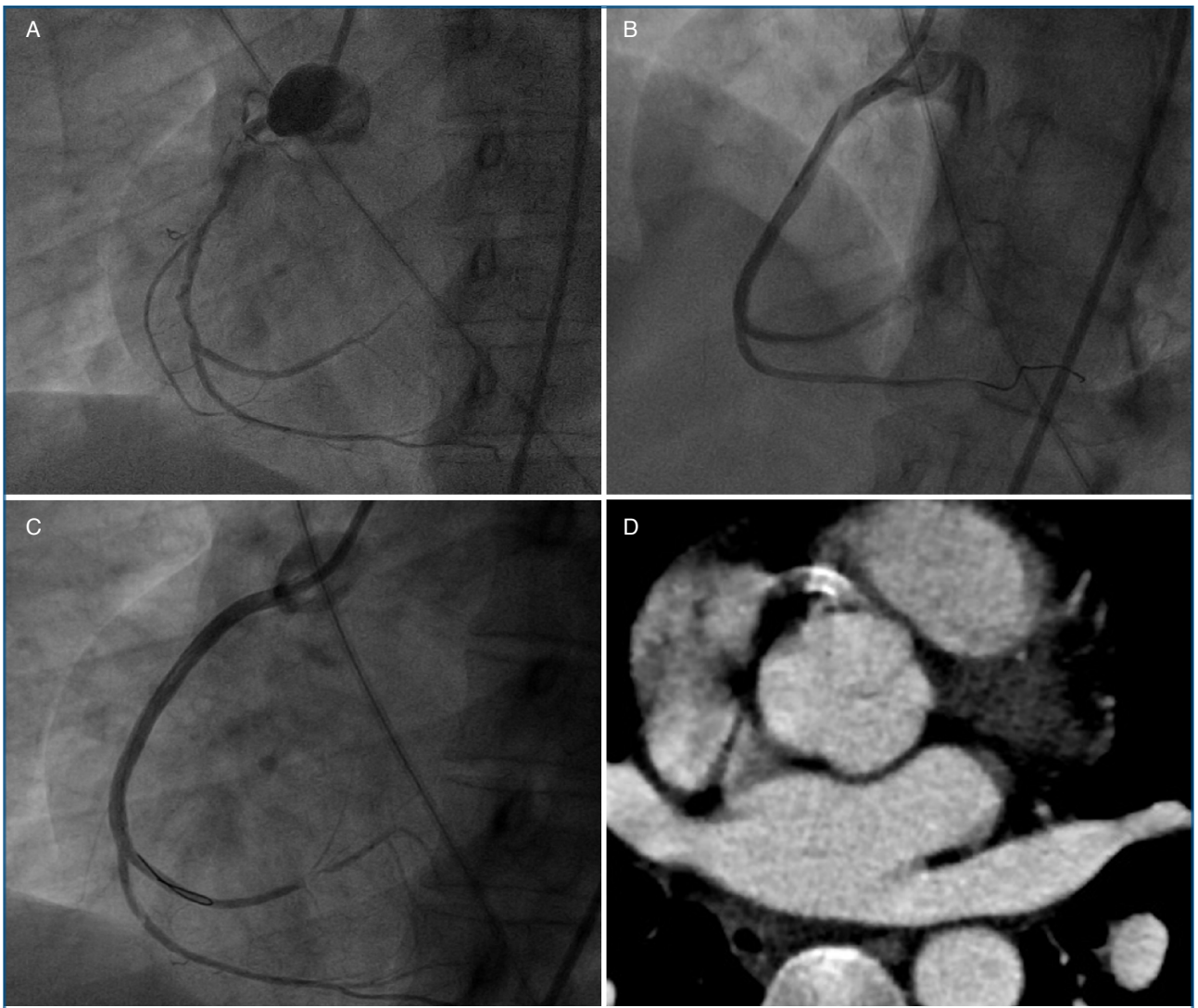

Figure 5. (A) Retrograde dissection has occurred with rapid administration of contrast. **(B)** The dissected lesion was passed through to the guidewire and stent implanted to include the entire dissection flap ostium. **(C)** Control angiography showing TIMI 3 flow in the RCA and stable self-limiting dissection of the aorta. **(D)** In the control CTA image; there was no significant dissection flap in the aorta after the procedure. CTA: computed tomographic angiography; RCA: right coronary artery; TIMI: Thrombolysis in Myocardial Infarction.

gency bypass surgery because of decreased coronary blood flow.

DISCUSSION

There is a lack of information on IAD in the literature, and its management was still controversial. In light of our experiences in our center, we think that medical follow-up can be performed in an aortic dissection that occurs during PCI (regardless of the degree of Dunning stages, that is, the length of the dissection flap) if there is no coronary flow limitation, if there is a progression in the dissection flap, and if the patient is hemodynamically stable. Surgical treatment should be considered in cases where the coronary flow is reduced, where medical treatment cannot provide hemodynamic stability, and where dissection extends to the carotid arteries that may cause neurological sequelae.

Advances in PCI led to many complex procedures to be performed percutaneously without the need for surgical treatment.[2,3] In addition to the advantages of PCI, it should be known that it may lead to compli-

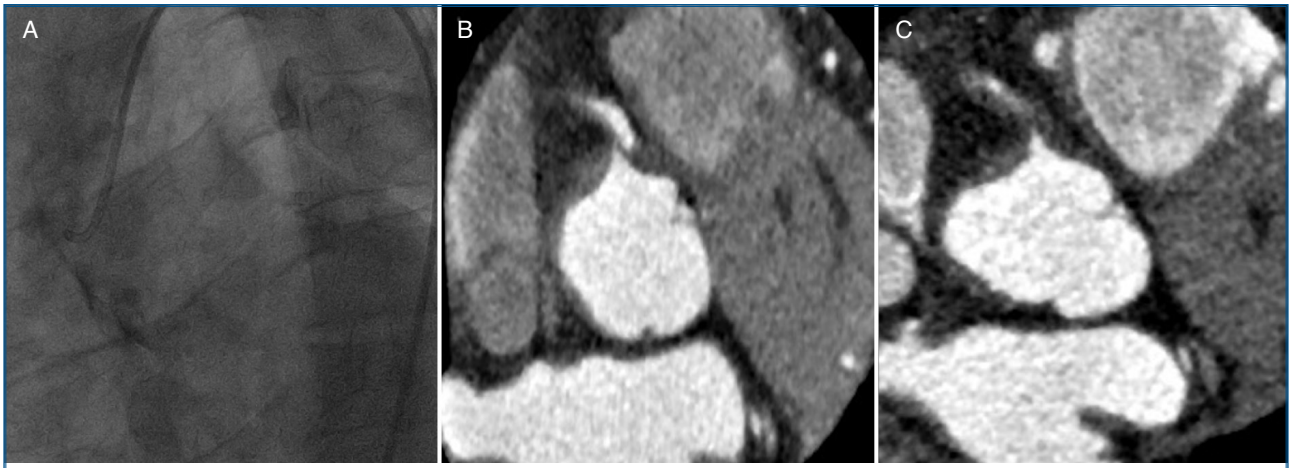

Figure 6. (A) During bilateral injection, hydraulic dissection developed with the rapid delivery of contrast medium from the catheter in the RCA. **(B)** The first CTA showing a self-limiting dissection flap after the procedure. **(C)** Control CTA showing a thrombosis and closure of the dissection flap after 5 days. CTA: computed tomographic angiography; RCA: right coronary artery.

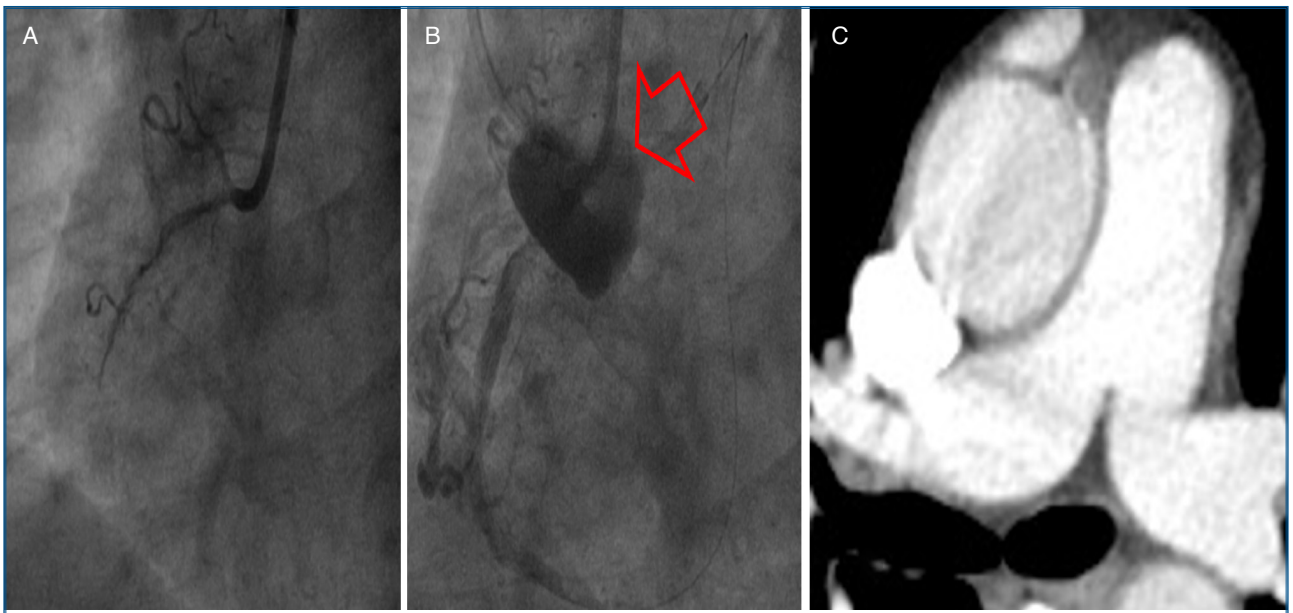

Figure 7. (A) Angiography showing chronic total occlusion on the RCA. **(B)** During bilateral injection, hydraulic dissection developed with the rapid delivery of contrast medium from the catheter in the RCA. **(C)** The control CTA showing no dissection. CTA: computed tomographic angiography. RCA: right coronary artery.

cations that are very challenging to manage. The best known and most feared complications are coronary dissection, coronary perforation, and aortic dissection.[4]

The incidence of IAD is around 0.01% in diagnostic coronary angiography, 0.19% in patients with acute MI, and 1.8% in patients with CTO.[5] Mortality rates of IAD cases are around 50% with surgical treatment.[6] In the past, because of the less complex coronary interventions, IAD was seen less, but these days, it is thought that the incidence of IAD increases with increasing complex procedures. Because there is no possibility of prospective studies for this rare but fatal complication, treatment recommendations are based on observational studies. Treatment recommendations from these studies, in which the number of patients is limited and imaging methods, such as

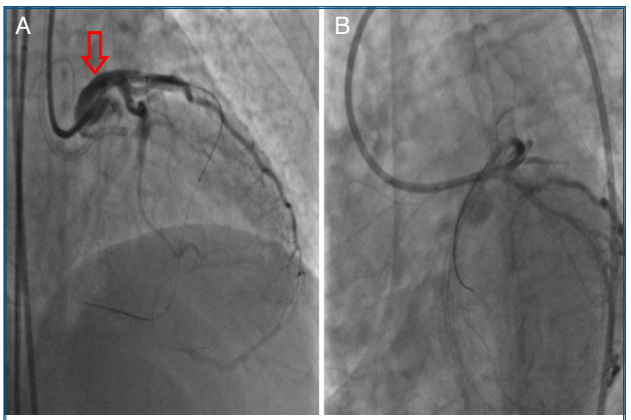

Figure 8. (A) LMCA was cannulated with EBU guiding catheter; microcatheter and guideliner catheters (Guidezilla II guide extension catheter) were used for better support. While the RCA was being retrogradely wired through, Dunning type 1 dissection occurred from the LMCA to the aorta. **(B)** After balloon angioplasty, TIMI 2 flow was achieved in the LAD and Cx. Cx: circumflex artery; EBU: extra backup catheter; LAD: left anterior descending coronary artery. LMCA: left main coronary artery. RCA: right coronary artery. TIMI: Thrombolysis in Myocardial Infarction.

coronary CTA, cannot be used, have not been included in the current guidelines.[7]

These treatment recommendations are based on an observational study by Dunning et al.[1] Their study included 20,475 PCI cases, and there were 9 cases of IAD. The incidence of IAD was 0.02%, and all dissections originated from the RCA ostium. Because their study was an observational study between 1993 and 1999, there were cases of acute MI rather than complex coronary procedures, and there were no dissection cases after the radial intervention. In our study, 5 dissections originated from the right coronary ostium, but there were 2 dissections that originated from the left coronary ostium and 1 that originated from the noncoronary valve. In addition, 3 dissections developed during the CTO procedure. Therefore, it is clear that our study will better reflect the daily practice of the patients.

In the study by Dunning et al.,[1] cases were divided into 3 classes. Class 1 was defined as a focal dissection restricted to the coronary cusp, class 2 was defined as dissections extending up the aorta but are 40 mm, and dissections ≥40 mm are defined as class 3. Medical treatment was recommended primarily for classes 1 and 2 dissections, whereas surgical treatment was recommended for class 3 dissection. This classification is based on previous case reports by the authors but does not have any histological or physiological basis and does not evaluate coronary flow. Therefore, we think that the proposed treatment options with this classification are not correct. Although Dunning type 3 dissection developed in patients 1 and 2 in our study, dissection flap was kept under control with medical treatment, and the patients were discharged without additional complications. In the eighth patient, although Dunning class 1 dissection developed, because of a decrease in coronary flow, the patient underwent emergency surgery and was discharged without additional complications. In addition, as in patients 6 and 7, CTO lesions can be monitored with medical treatment even without stent implantation to seal the dissection flap. It is unclear whether to determine the Dunning classification during a major complication, such as aortic dissection. It is not clear whether this grading can be performed better by coronary angiography or by computed tomography (CT). In addition, Dunning et al. did not have any postcomplication tomography recordings. In our study, we can see that the dissections are completely lost by tomography in patients who were followed up with a medical treatment.

There are also studies investigating the value of CT in IAD.[2,8] In these studies, CT has been shown as a useful noninvasive imaging method in the follow-up of the dissection flap. In these studies, aortic dissections that were sealed with a stent or treated with medical therapy were regressed on control tomography. Similarly, in our study, aortic dissection regressed almost completely on control tomography. In these studies, it was shown that the dissection flap regressed without the need for emergency surgery if the dissection flap was sealed by stent implantation, although it was Dunning type 3. Similar findings are also shown in our study.

Current guidelines recommend emergency surgery as the first choice for spontaneous acute type A dissections.[7] Although conservative follow-up is mentioned in IAD, there is no clear recommendation.[7] There is a study showing a 50% mortality rate after surgical treatment in IAD during PCI.[6] This rate is very high compared with the rate of spontaneous aortic dissection surgery.[6,9] However, in a large multicenter study including 74 cases of IAD, feasible patients were followed-up with stent implantation or medical treatment, and mortality

rates were very low with this attitude.[10] Comparing our study with previous studies, it is seen that a follow-up with medical treatment in feasible patients has a lower mortality rate than a follow-up with a routine surgical operation.

There are many case reports and reviews in the literature on IAD.[11–17] When these articles were analyzed, it was shown that mortality rates are very low with osteal stenting and medical treatment follow-up, even if the case is Dunning Class 3.[18] For example, Carstensen and Wart presented an IAD case who was treated using osteal stenting.[19] The patient was discharged uneventfully. Moreover, a search of their literature can relive the role of osteal stenting in preventing in-hospital mortality.[19]

Limitations

The most important limitations of this study are (1) the data are observational in nature and are based on a single-center experience only, (2) the study is retrospective and (3) includes a small number of cases. The absence of cases with neurological dysfunction makes it difficult for this study to provide treatment recommendations in this area.

Conclusion

We should note that although IAD is the most critical and feared complication of PCIs, there is no clear treatment recommendation in the current guidelines. In such cases, where randomized controlled studies are not possible, observational data are very valuable. In our study, we emphasize that in patients with a hemodynamically stable course, conservative follow-up with medical treatment may be considered for limited dissection flap that does not disrupt the coronary antegrade flow and also in patients in whom the flap does not progress toward the aortic arch, and surgical treatment may be administered in patients whose coronary flow is impaired and dissection to the aortic arch progresses.

Ethics Committee Approval: Ethics committee approval was received for this study from the Gülhane Ethics Committee of Health Science University (Approval Date: September 25, 2018; Approval Number: 215/219).

Peer-review: Externally peer-reviewed.

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