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Case Report

Management of Antithrombotic Therapy in Post Percutaneous Coronary Intervention Patient Undergoing Pericardiostomy due to Large Pericardial Effusion: A Case Report

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ABSTRACT

Background : Stent thrombosis is a serious complication following percutaneous coronary intervention (PCI), and dual antiplatelet therapy (DAPT) is necessary to avoid it. Surgery, on the other hand, is a common cause for stopping DAPT. Because patients were exposed to the possibility of a major adverse cardiovascular event (MACE) when DAPT was stopped, this circumstance poses a clinical dilemma.
Objective : This case report aimed to describe the management of antithrombotic therapy in post PCI patient requiring DAPT who underwent pericardiostomy.
Case : A 69-year-old woman with large pericardial effusion without cardiac tamponade, breast cancer on chemotherapy, heart failure stage C NYHA functional class II, chronic coronary syndrome post-DES implantation at proximal-mid LAD, and hypertension. The patient underwent pericardiotomy procedures five days after DAPT discontinuation. For the bridging therapy, continuous UFH administration was initiated at a dose of 18 IU/kg/hour after the cessation of DAPT. The UFH dose was adjusted to achieve activated partial thromboplastin time (APTT) 1.5 to 2.0 times the control value. The UFH was discontinued 6 hours before surgery. After surgery, UFH infusion was restarted 6 hours after the confirmation of hemostasis. The administration of UFH then continued until three days after DAPT was restarted. No complications were found during and after the pericardiostomy.
Conclusion : We reported an antithrombotic treatment strategy in a post PCI patient undergoing pericardiostomy with discontinuation of DAPT, which was successfully treated with UFH without any complication. The UFH has been widely used in perioperative settings as a bridging therapy during the interruption of DAPT and may be considered in this condition.

1. Introduction

Percutaneous coronary intervention (PCI) with drug-eluting stent (DES) is the most frequent procedure performed in both stable coronary artery disease (SCAD) and an acute coronary syndrome (ACS). Every year, worldwide, approximately 3 million individuals undergo coronary stent implantation.[1,2] About 15% and 25% of these patients will undergo surgery within one and five years after stenting, respectively.[3,4]

Antithrombotic therapy has declined the prevalence of death in recent years.[5] Dual antiplatelet therapy (DAPT) is required after DES implantation to prevent stent thrombosis.[6] Surgery represents a common reason for premature DAPT discontinuation. This situation creates a clinical dilemma because stopping DAPT exposes patients to the risk of a major adverse cardiac event (MACE), including stent thrombosis presented with perioperative myocardial infarction (MI), revascularization, and mortality. Continuing DAPT, on the other hand, may be linked to an increased risk of bleeding problems.[7,8,9] In high bleeding and ischemic-risk patients, when DAPT discontinuation is required, perioperative treatment with bridging therapy should be considered.[3,10]

2. Case Illustration

A 69-year-old woman suffered from chest discomfort that occurred one week before admission. Shortness of breath was present within the last two days and did not correlate with activity. She had a history of dyspnea on effort while doing moderate activities. She was diagnosed with breast cancer three years before and received chemotherapy. Hypertension and SCAD have been known for five years before. She was diagnosed with MI, hospitalized for five days in ICU six months before admission. Two months prior to admission, she

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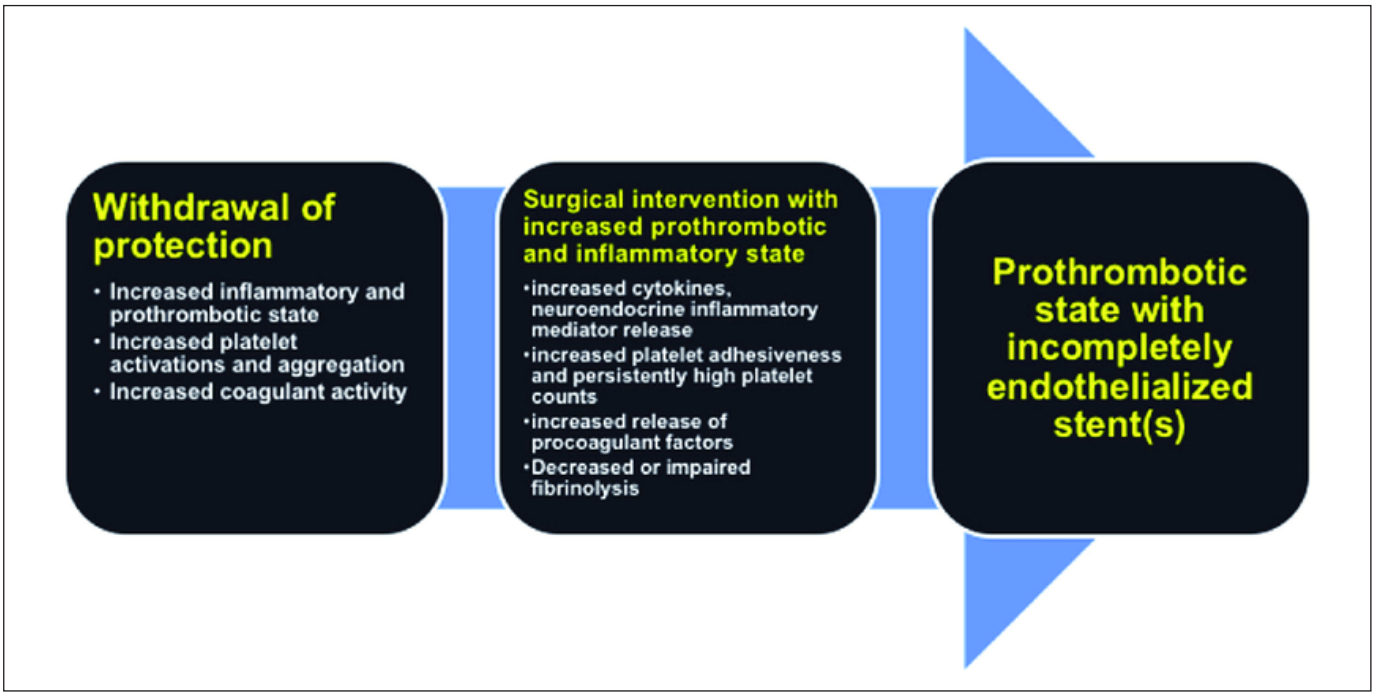

Figure 1. Pathogenesis of stent thrombosis, myocardial infarct, and death in coronary stenting patients undergoing surgery.[4]

underwent cardiac catheterization with the result of three-vessel disease (3VD). After that, a 3.5 x 33 mm sirolimus-eluting stent was implanted in the proximal-mid left anterior descending artery (LAD). She routinely took aspirin 80 mg, clopidogrel 75 mg, atorvastatin 40 mg, bisoprolol 5 mg, and Ramipril 10 mg.

During admission, the hemodynamic was stable. The ECG showed sinus tachycardia with the QS pattern in lead V1 to V3. T inversion in lead V3 to V4. Chest X-ray revealed cardiomegaly with a high suspicion of pericardial effusion. Echocardiography revealed low left ventricular ejection fraction (LVEF) and large pericardial effusion (posterior diameter 3.8 cm) without cardiac tamponade.

We assessed this patient with large pericardial effusion without cardiac tamponade, breast cancer on chemotherapy, heart failure stage C NYHA functional class II, chronic coronary syndrome post-DES implantation at proximal-mid LAD, and hypertension. Because of the pericardial effusion predominantly in the posterior, we asked the college from the cardiothoracic surgery department to perform pericardiostomy. The patient underwent pericardiotomy procedures five days after aspirin and clopidogrel discontinuation. For the bridging therapy, continuous UFH administration was initiated at a dose of 18 IU/kg/hour after the cessation of antiplatelet drugs. The UFH dose was adjusted to achieve activated partial thromboplastin time (APTT) 1.5 to 2.0 times the control value.

Table 1. Thrombotic risk in patients with coronary stenting undergoing surgery.[4]

	PCI Patients With Clinical* or Angiographic† Increased Ischemic Risk Characteristics					PCI Patients Without Clinical* or Angiographic† Increased Ischemic Risk Characteristics				
Surgery to PCI Time	POBA	BMS	First-Generation DES	Second-Generation DES†	BVS	POBA	BMS	First-Generation DES	Second-Generation DES†	BVS
<1 months	High	High	High	High	High	High (<2 weeks) intermediate	High	High	High	High
1-3 months	Intermediate	High	High	High	High	Low	Intermediate	High	Intermediate	High
4-6 months	Intermediate	High	High	Intermediate/high	High	Low	Low/intermediate	Intermediate	Low/intermediate	High
6-12 months	Intermediate	Intermediate	Intermediate	Intermediate	High	Low	Low	Intermediate	Low	High
>12 months	Low	Low	Low	Low	Undetermined	Low	Low	Low	Low	Undetermined

Note; PCI = Percutaneous Coronary Intervention; POBA = Percutaneous Old Balloon Angioplasty; BMS = Bare Metal Stents ; DES = Drug-Eluting Stent; BVS = Bioresorbable Vascular Scaffolds

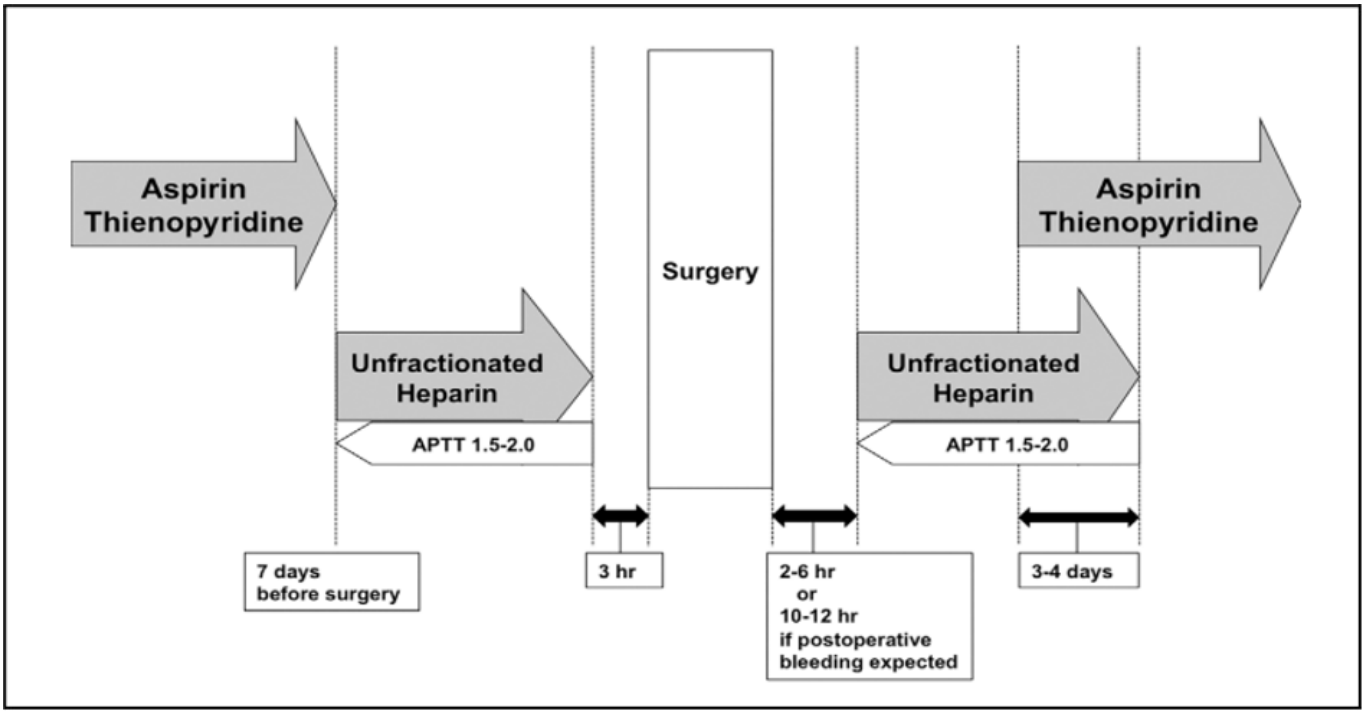

Figure 2. Bridging therapy using UFH.[10]

The UFH was discontinued 6 hours before surgery. After surgery, UFH infusion was restarted 6 hours after the confirmation of hemostasis. The administration of UFH then continued until three days after DAPT was restarted. No complications were found during and after the pericardiostomy. She was discharged five days after the procedure.

3. Discussion

The safety and efficacy of PCI advanced dramatically. Stent thrombosis was recognized as an important complication.[6] Thrombosis is also a significant clinical problem in post-surgery and cancer patients.[11] The use of antithrombotic therapy in ACS effectively reduced mortality in recent years.[5] Antithrombotic drugs that are widely used include anticoagulants and antiplatelet.[12] In patients with CAD treated with DES implantation, DAPT with aspirin and P2Y12 inhibitor is recommended during 6-12 months.[13] The PRECISE-DAPT score showed advanced integrated reclassification and discrimination performance. The effect of a long (12–24 months) or short (3–6 months) treatment duration on bleeding and ischemia was also measured using this score.[13]

The most common reason for DAPT termination is surgery, which has a proinflammatory and prothrombotic effect that can increase the risk of stent thrombosis.[14] Withholding antiplatelet therapy to reduce the risk of bleeding is linked to an increased risk of ischemia, which includes stroke, stent thrombosis, and MI. On the other hand, continuing antithrombotic therapy may raise the risk of bleeding. Antithrombotic therapy should be considered perioperatively based on the recommendations of the anesthesiologist, cardiologist, and surgeon.[4]

The "combined ischemic risk" is used to evaluate a patient's thrombotic risk and is influenced by a number of factors, including the period between PCI and surgery and the premature withdrawal of DAPT. Angiographic characteristics (small stent diameter [<2.5 mm], overlapping stents, long stents, multiple stents, bifurcation lesions, incomplete revascularization, and extensive coronary artery disease, and stent type) and clinical characteristic (previous stent thrombosis, multiple previous MI, ACS at time of PCI, LVEF <35%, diabetes mellitus, and chronic kidney disease).[4]

Bridging antiplatelet therapy is a temporary shift using an intravenous (IV) antiplatelet in patients requiring DAPT. This approach is often reserved for individuals with a high thrombotic risk who undergo nondeferrable surgery with a high risk of bleeding.[13] Cangrelor (P2Y 12 inhibitor) and glycoprotein IIb or IIIa inhibitors (GPIs) are available IV antiplatelet agents with potential utility for bridging.[13,14] Oral P2Y 12 inhibitory medication should be continued within 24 to 48 hours after establishing adequate hemostasis, using a loading dose.[4] To ensure a low rate of ischemic events, perioperative bridge therapy with intravenous antiplatelet drugs is an effective and safe treatment option.[18]

The UFH has been widely used in perioperative management as a bridging therapy during the discontinuation of DAPT. However, data regarding the administration of UFH in this period are scarce. Tanaka et al. reported no cases of MACE after 210 surgical procedures with UFH during the interruption of all APTs among the DES patients .[10] Continuous UFH administration was started at from rate of 200 U/kg/-day immediately after the cessation of antiplatelet. The dose was adjusted to achieve the APTT 1.5 to 2.0 times the control value, and UFH administration was stopped 3 hours before the procedure. After surgery, UFH infusion was restarted as soon as possible. The administration of heparin was continued until 3-4 days after APT was restarted.[10] Postoperative bleeding occurs rarely and is not life-threatening.[19]

In our case, the older woman with pericardial effusion without cardiac tamponade, breast cancer on chemotherapy, heart failure stage C NYHA functional class II, chronic coronary syndrome post-DES implantation at proximal-mid LAD, and hypertension planned to pericardiostomy procedure and met high thrombotic risk criteria. The high ischemic risk characteristics included MI history, PCI to surgery time 1-3 months, and a first-generation DES implantation. She met intermediate hemorrhagic risk characteristics (Pericardiostomy/mini-thoracotomy in cardiac surgery).

The pericardiostomy procedure is non-deferable surgery. In preventing thrombotic risk, the suggestion is to continue the aspirin, discontinue clopidogrel five days before surgery and consider bridging therapy. In our case, the anesthesiologist suggested discontinuing all antiplatelet therapy for this patient. However, the patient had high thrombotic characteristics. Therefore, we decided to give bridging therapy with UFH because of the unavailability of IV antiplatelet (Cangrelor or GP IIb/IIIa inhibitor) to prevent MACE in perioperative conditions.

4. Conclusion

We reported an antithrombotic treatment strategy in a post PCI patient undergoing pericardiostomy with discontinuation of DAPT, which was successfully treated with UFH without any complication. However, the recommended strategy for bridging antiplatelet therapy is IV cangrelor or GP IIb/IIIa inhibitor. Unfortunately, these drugs were unavailable. The UFH has been widely used in perioperative settings as a bridging therapy during the interruption of DAPT and may be considered in this condition.

5. Declarations

5.1. Ethics Approval and Consent to participate
Patient has provided informed consent prior to involve in the study.

5.2. Consent for publication
Not applicable.

5.3. Availability of data and materials
Data used in our study were presented in the main text.

5.4. Competing interests
Not applicable.

5.5. Funding source
Not applicable.

5.6. Authors contributions
Idea/concept: DEN. Control/supervision: SW. Data collection/processing: DEN. Literature review: DEN, SW. Writing the article: DEN. Critical review: SW. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

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