

中文題目：主動脈剝離引起之雙側冠狀動脈血流不足以心導管做為過渡治療的一位成功病例

英文題目：Percutaneous coronary intervention as a bridge therapy for aortic dissection related bilateral coronary malperfusion: A case report

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### **Introduction:**

Aortic dissection has been identified as a fatal disease for years, it can sometimes involve the ostium of the coronary artery, leading to malperfusion of coronary artery, and also easy to misdiagnosis as acute myocardial infarction (AMI). (1) When it occurs, it is often catastrophic due to delay diagnosis and acute heart failure. Furthermore, the management is controversial, as there are only few case reports and no current guidelines for treatment. Here we present a case with bilateral coronary malperfusion secondary to aortic dissection, which treated by percutaneous coronary intervention first, then transfer to cardiovascular surgeon operation with a satisfied outcome.

### **Case presentation:**

A 57 years old Taiwanese woman, with history of hypertension, was sent to emergency department with presentation of chest pain. She was suffered from conscious loss about 10 hours ago, and improved after went to local clinic. She had a low blood pressure of 92/68 mmHg, temperature 37°C and pulse rate of 61 beats per minute. Lab data showed hs-Troponin I 50.5pg/ml. EKG showed ST elevation in V2 lead with reciprocal ST depression in lead II, III, aVF and V6. (Figure1) As ST elevation myocardial infarction (STEMI) was impressed, she received emergent cardiac catheterization, which showed RCA ostium 95% stenosis and LAD ostium 99% stenosis. Drug eluting stent was inserted in LAD ostium, LAD-distal and RCA ostium area and showed TIMI3 flow. (Figure2) Intra-aortic balloon pump was inserted and Dopamine was prescribed for hemodynamic unstable status. She was then sent to intensive care unit for further care. Aspirin and Prasugrel was given. Cardiac echo was arranged for follow up cardiac function. However, the cardiac echo we followed showed aortic intima flap. Emergent computed tomography was done and showed aortic dissection, Stanford type A. (Figure3) Cardiovascular surgeon consultation was done and she was sent to emergent operation. The operation of ascending aorta replacement by was done smoothly, and she was transferred to ward on the day 21 after admission, discharged after another 7 days, with a totally independence activities of daily living.

### **Discussion:**

In our case, aortic intima flap leads to both LCA and RCA ischemia event, and, to our knowledge, we proved that emergent PCI first then followed with cardiovascular surgery may be a solution to AMI secondary to aortic dissection.

According to German registry and Japan published data, the incidence of coronary malperfusion caused by aortic dissection is 10%(2) and 9.3%(3). Due to its low morbidity and high mortality, no standard treatment regimen has been made. Pre-operative PCI first or straight to operation room for central repair is still controversial. In whole PCI procedure, coagulation drugs like heparin or low molecular weight heparin (LMWH) are essential, and may lead to aPTT prolong and bleeding tendency. It also takes time to completed the procedure. Therefore, preoperative PCI may delay central repair surgery and may increase the risk of fatal cardiac tamponade. However, some evidence showed the benefits of PCI for ensuring coronary blood flow and preventing acute heart failure outweigh the risk of worsening cardiac tamponade.

In previous case reports, Sharma et al published a successful treatment for spontaneous coronary dissection using a catheter and a cutting balloon to decompress the false lumen, which can create a reentry way and preserve the coronary flow. (4) Chol et al. presented a successful rescue procedure using only a guidewire. (5) This can be considered as another safer answer in similar situations. ZG Wang presented a case with successful treatment of acute myocardial infarction due to type A aortic dissection by right coronary artery stenting. (6) Thus, given the unstable hemodynamic condition due to overt myocardial ischemia, reestablishing blood flow by cardiac catheterization stenting is also reasonable.

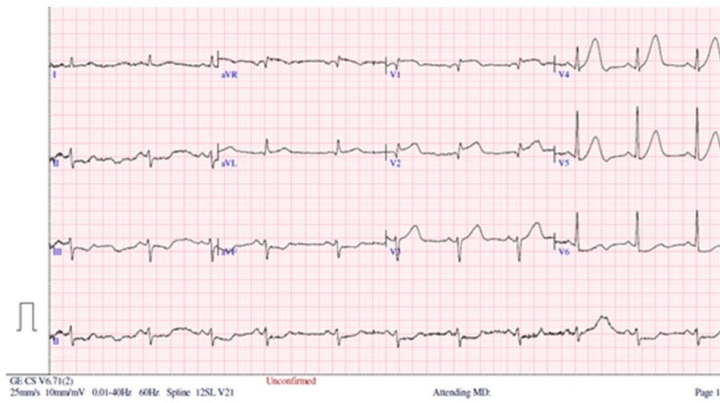
Coronary malperfusion may be an ever-changing occlusion, with reocclusion and spontaneous return of blood flow after aortic dissection. Therefore, in some patients, reperfusion time may take 2-3 hours, resulting in excessive ischemic myocardial injury, but PCI can restore cardiac function more quickly. We cannot predict the self-recovery of the coronary arteries, nor can we afford the time for central repair in the face of sudden acute heart failure.

In Keiji Uchida's 2018 retrospective study, they concluded that immediate preoperative PCI must be performed in patients with poor left coronary perfusion. For patients with poor right coronary perfusion, they also recommended preoperative PCI due to significantly reduced mortality. (7) Left coronary artery perfusion influences most left ventricular ejection fraction, may cause cardiogenic shock, and right coronary artery also induces right heart failure, both could lead to difficulty weaning patients from extracorporeal membrane oxygenation system and results in poor prognosis. Preoperative PCI may delay central repair surgery and may increase the risk of dreadful cardiac tamponade. However, the benefits of PCI in protecting cardiac function exceed the risk of cardiac tamponade. Indications for PCI prior to central repair in patients with poor coronary perfusion should be discussed case by case, especially considering the presence of cardiac tamponade, the severity of acute myocardial injury, cardiogenic shock, and most importantly of emergent availability of a cardiologist or cardiac surgeon, and the preparation time of operating room. Also, we should do our best to avoid misdiagnosis and delay diagnosis. It could save more time and save the ischemic cardiac muscle.

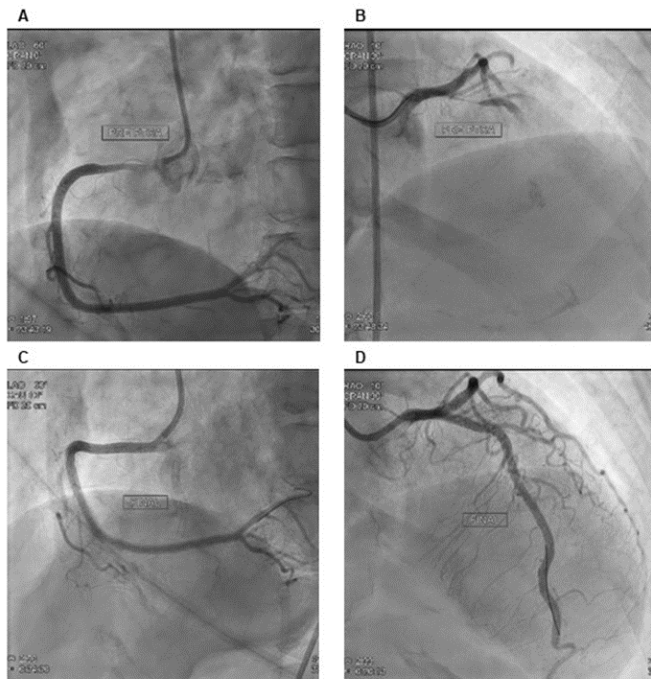
According to AMI guidelines, the door to wire time of emergent PCI should be done in 90 minutes, and our case revascularization time is 80 minutes to achieve coronary revascularization. Follow up cardiac echo one month later and left ventricular ejection fraction showed 33%. The patient is symptom free status. Although we found the aortic dissection unexpected, we handle the new situation as soon as possible. Our management maybe be better, compare to straight to operating room. We still recommend to do cardiac echo first in emergency room especially in the doubt of fatal aortic dissection. No previous reports about treatment of emergent PCI to both left coronary artery and right coronary artery ostium in an aortic dissection case. However, we believed that without emergent PCI, this patient could result in unstable hemodynamic condition due to obvious and more severe myocardial ischemia. Thus, percutaneous coronary intervention as a bridge therapy for aortic dissection related coronary malperfusion maybe a efficient and safety therapy.

### **Conclusion:**

Coronary malperfusion caused by aortic dissection is a high mortality disease, but the standard treatment has not been established. Percutaneous coronary intervention as a bridge therapy for aortic dissection related coronary malperfusion maybe a efficient and safety therapy



**FIGURE 1**  
 Electrocardiograms in the emergency room. Anterior wall MI is impressed.



**FIGURE 2**  
 Coronary angiogram of acute circumflex artery occlusion. (A) Basal angiogram showing ostium occlusion of the right coronary artery (RCA) (B) Ostium occlusion of the left anterior descending coronary artery (LAD) (C)(D) After stenting, RCA and LAD achieved TIMI 3 flow

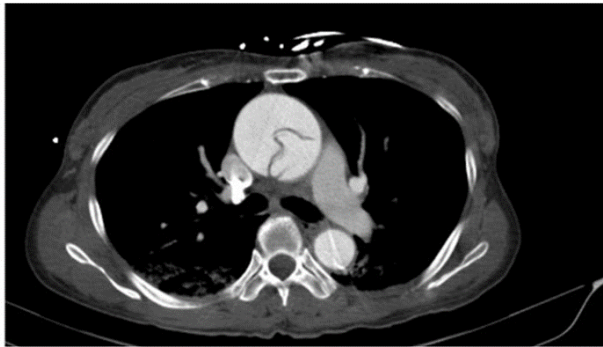
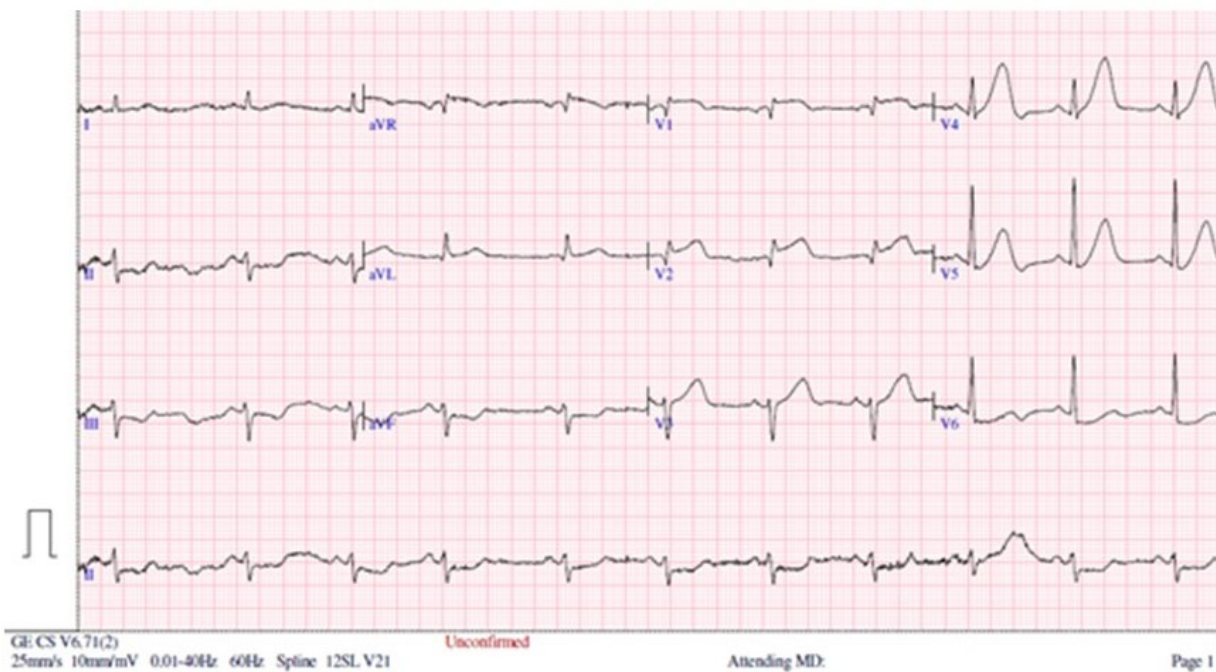


FIGURE 3  
Computed tomography showed intima flap and aortic dissection was detected.

## References

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Electrocardiograms in the emergency room. Anterior wall AMI is impressed.