Spontaneous Retro-Orbital Subperiosteal Hemorrhage with Complete Resolution Following Percutaneous Coronary Intervention for Acute Myocardial Infarction

Hsu-Ping Wu, 1 Chia-Jung Tsai, 4 Jui-Peng Tsai,1,2 Chung-Lieh Hung, 1 Jen-Yuan Kuo1,3 and Charles Jia-Yin Hou1

Among the several treatment strategies available for acute myocardial infarction, primary percutaneous coronary intervention concomitant with antithrombotic agents is the primary treatment used to facilitate coronary reperfusion. However, bleeding can create major complications. Here we have presented a case of acute myocardial infarction treated with reperfusion therapy, after which developed a sudden onset of proptosis, with high intraocular pressure, blurred vision, and ecchymosis of the left eye. Spontaneous retro-orbital subperiosteal hemorrhage, a rare complication, was diagnosed based on those symptoms as noted above, as well as other orbital signs and imaging evaluation. Multiple antithrombotic agents, including antiplatelets, low molecular weight heparin, and glycoprotein IIb/IIIa receptor inhibitor were thought to be the main precipitating factors of this complication. Thereafter, conservative medical treatment was applied. In the following 2 weeks, all the patient’s orbital signs resolved gradually without visual impairment. In conclusion, our experience with a rare case of complications arising from reperfusion therapy used to treat myocardial infarction suggests that clinicians should remain vigilant for any hemorrhagic events during acute myocardial infarction treatment.

Key Words: Acute myocardial infarction • Percutaneous coronary intervention • Retro-orbital subperiosteal hemorrhage

INTRODUCTION

According to American College of Cardiology/American Heart Association (ACC/AHA) guidelines, the optimal strategy to treat acute myocardial infarction (AMI) is to obtain coronary perfusion as soon as possible.1 This goal can be achieved by either primary percutaneous coronary intervention (PCI) or thrombolytic therapy. However, bleeding is one of the major complications encountered in both reperfusion options. We present a case with retro-orbital subperiosteal hemorrhage that caused acute proptosis and intraocular pressure (IOP) elevation following PCI for AMI.

CASE REPORT

A previously healthy 36-year-old male and confirmed 20-pack-year smoker, suffered from acute onset of chest pain, and visited Mackay Memorial Hospital emergency department 48 minutes later. Following a
preliminary examination, anterior wall ST-segment elevation myocardial infarction (STEMI) was diagnosed. It was noted that the patient suffered ventricular arrhythmia and acute consciousness loss without head injury or visible head trauma. Thereafter, cardiopulmonary resuscitation and subsequent primary PCI were performed. The patient was prescribed oral aspirin and clopidogrel (300 mg each) loading doses, together with parenteral heparin (4000 units). During primary PCI, intravenous provisional glycoprotein (GP) IIb/IIIa receptor inhibitor (Abciximab) was used due to substantial thrombus burden in infarct-related artery (15 mg loading and sequential 7.5 mg continuous dripping for 12 hours, in 72 kg of weight). Under intra-aortic balloon pump (IABP) support, the completely occluded left anterior descending artery was successfully reperfused after stent placement, while the right coronary atherosclerotic stenotic lesion was left untreated. This patient was then designated to receive intensive care in the coronary care unit.

During coronary care unit admission, the patient soon recovered from cardiogenic shock after successful PCI. The mechanical ventilator, IABP, and inotropes were all withdrawn without event. Further angiotensin-converting enzyme inhibitor and beta-blockade were uptitrated according to clinical hemodynamics. Additionally dual antiplatelet agents and low molecular weight heparin (LMWH), enoxaparin, were given to the patient. Besides, GP IIb/IIIa receptor inhibitor, Abciximab, was administered continuously 12 hours post primary PCI. The follow-up blood clotting factor data showed platelet count of 161,000/\mu L, prothrombin time international normalized ratio 0.9, and partial thromboplatin time measured as 30.4 seconds (control 30.0 seconds). A further review of potential risk factors revealed underlying hypercholesterolemia, hypertriglyceridemia, and impaired fasting glucose.

However, a sudden onset of proptosis and blurred vision of the left eye (oculus sinister, OS) occurred about 24 hours following primary PCI. The patient complained of binocular double vision. On examination, his uncorrected vision was 20/50 in the right eye (oculus dexter, OD) and 20/70 OS with normal color vision. IOP was 19 mmHg OD and 36 mmHg OS. Periocular ecchymosis and limited upward movement of left eyeball were also observed. The pupils reacted normally without relative afferent defect. The dilated fundi examination was normal. Orbital computed tomography (CT) showed a well-defined homogenous mass about 2.5 cm in size in the left superior extraconal orbital cavity and left ethmoid sinusitis (Figure 1). Spontaneous retro-orbital subperiosteal hemorrhage was diagnosed.

The patient was then treated with cold compression and topical beta-blockade to lower intraocular pressure. Enoxaparin was discontinued immediately after index hemorrhagic complication occurred. However, we continued aspirin 100 mg and clopidogrel 75 mg for daily use. Fortunately, IOP of the left eye returned to normal (17 mmHg) on the next day. His orbital signs improved gradually in the following 2 weeks, and visual acuity returned to 20/25 in both eyes. Follow-up orbital CT four months later confirmed the patient had complete resolution of the retro-orbital subperiosteal hemorrhage (Figure 2).

**DISCUSSION**

Reperfusion therapy, either primary PCI or thrombolysis, is the “gold standard” treatment of STEMI within the golden hours after index chest pain. Because
Thrombogenesis is the major cause of AMI, ACC/AHA guidelines recommend a combination of antiplatelets and antithrombotic agents, including GP IIb/IIIa receptor inhibitors in selective cases. Nevertheless, hemorrhagic complication is one of the major concerns in AMI treatment, which could even increase in-hospital mortality and reduce the benefit of reperfusion therapy. In our case, PCI had been chosen as the first priority reperfusion strategy due to available primary PCI facility. According to previous randomized meta-analysis trials, PCI outperforms thrombolytic therapy for STEMI treatment in reducing overall short-term death, re-infarction, and all causes of strokes, without increasing the frequency of major bleeding events. In the GUSTO-I trial, among all these hemorrhagic complications in AMI treatment, ocular hemorrhage after thrombolytic therapy is extremely uncommon. Apparently, there are few cases in the literature involving retro-orbital hemorrhage.

A more extensive review of the literature finds 3 similar cases reported. Cunneen et al. presented one 44-year-old man with retro-orbital hemorrhage which occurred after thrombolysis followed by coronary angioplasty for AMI. No ophthalmic treatment was administered, but follow-up CT obtained 6 days later showed complete resolution of the hemorrhage. Diatchuk et al. reported a 60-year-old man with spontaneous subperiosteal orbital hemorrhage following treatment with streptokinase and heparin for AMI. Conservative management in the absence of visual impairment was sufficient. His orbital signs resolved completely in 6 weeks. One earlier case report mentioned a 48-year-old woman with hypertension and hypercholesterolemia showing orbital hemorrhage 1 day after receiving abciximab and coronary angioplasty. She was managed conservatively because there was no evidence of optic nerve compression. Her vision recovered to 6/6 four months later.

Although another case report demonstrated the possibility of spontaneous intra-orbital hemorrhage without any cause, we still believe that a multiple antithrombotic agent combination could be the most important precipitating factor. Among these agents, thrombolyis therapy, such as tissue plasminogen activator, is related to increased ocular bleeding complications. Though GP IIb/IIIa receptor inhibitor also has potent antithrombotic effect, it is rarely reported to have such complication.

Orbital bleeding can be associated with sinusitis or the Valsalva maneuver where elevated venous pressure is transmitted back by the valveless orbital veins. Another possible factor is compromised vessel integrity due to aging or pathologic process, such as atherosclerosis. Regarding our presented case, this young man’s index episode CT image (Figure 1) showed left ethmoid sinusitis. Atherosclerotic coronary arteries and underlying hyperlipidemia implied possible fragile orbital vessels as well. These two factors increase the risk of retro-orbital hemorrhage.

The proper management of orbital hemorrhage can vary, from conservative treatment to administration of systemic steroids, and even to surgical decompression. Conservative medical treatment is usually the first step to lower IOP, which can help prevent damage to the optic nerve. Systemic steroid use can speed the recovery of orbital signs. If the mass effect persists despite medical treatment with unrelieved symptoms, instant surgical decompression is indicated.

This presenting case showed compromised vision initially, while relative afferent pupillary defect was absent, meaning no optic nerve involvement. Conservative treatment with IOP monitoring was the initial plan.

![Figure 2](image_url) Image follow-up four months later showed completely resolved hemorrhage.
Fortunately, the patient’s IOP soon returned to normal, and ultimately progressed to full recovery of visual function.

We concluded that in patients with coronary artery disease who received multiple antithrombotic agents, retro-orbital subperiosteal hemorrhage can be a rare complication. It requires prompt ophthalmological consultation and treatment. Because it may result in catastrophic vision sequelae, any manifestations should trigger prompt medical attention, including eyelid swelling, ecchymosis, acute ptosis, proptosis, double vision or blurring vision. When hemorrhage is present, the cardioprotective benefits of antithrombotic agents need to be weighed against the overall threat to the patient’s vision. This case showed retro-orbital hemorrhage can resolve with excellent visual outcome.

REFERENCES


