Kounis Syndrome; anaphylaxis causing coronary occlusion

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Dear Editor,

A 53-year-old male was transferred by ambulance to our centre with retrosternal chest pain immediately after treatment for anaphylaxis. The patient initially sought care after experiencing shortness of breath, diaphoresis, nausea and dizziness following ingestion of amoxicillin/clavulanic acid. On arrival paramedics found the patient collapsed on his premises with cyanosed lips and generalised urticaria. The patient was treated with two injections of 0.5mg adrenaline IM, and additionally given 700ml intravenous isotonic fluid and 200 mg hydrocortisone intravenously. Approximately two minutes after the second dose of IM adrenaline and resolution of anaphylaxis symptoms, the patient began to experience central chest pain. ECG performed on route to our centre displayed sinus tachycardia and ST-elevation in leads II, III and aVF. Aspirin, fentanyl, heparin and ticagrelor were administered and the cardiac catheter laboratory was activated pre-hospitally. On arrival in the Emergency Department (ED), the patient had minimal pain and vitals were BP 140/70, HR 140 and RR 20; peripheries were warm and well perfused. A subsequent ECG showed atrial fibrillation with presence of ST changes. The patient was transferred to the cardiac catheter laboratory where coronary angiogram revealed 50% stenosis of the LAD, minor disease of the circumflex, 60% stenosis mid RCA and 99% stenosis distal RCA (Figure 1). Drug eluting stents were placed in the right coronary artery, and the patient had an uneventful recovery.

The concurrence of acute coronary syndrome with hypersensitivity reactions is known as *Kounis Syndrome*.¹ There are three variants of the syndrome in decreasing prevalence.

Type I: Allergy-related angina due to coronary spasm; Type II: Allergy-related myocardial infarction due to plaque rupture and thrombus formation and Type III: Drug eluting stent thrombosis secondary to hypersensitivity reaction. Type II patients are believed to have inactive but quiescent pre-existing atheromatous plaques. An allergic insult then leads to plaque erosion or rupture and myocardial ischaemia.² Type I Kounis Syndrome is most frequently reported (72.6% of cases), with Type II representing 22.3% of cases and Type III 5.1%.³

The incidence of Kounis Syndrome is difficult to estimate, and it is likely that the condition is under-reported,³ with limited Australian cases reported in the literature. A prospective study⁴ estimated the incidence of Kounis Syndrome to be 19.4 per 100 000 admissions.⁴

Myocardial infarction in these circumstances can also be attributed to the therapeutic use of adrenaline for anaphylaxis, although IM adrenaline induced myocardial infarction is very uncommonly reported.² In this case, it is likely that the patient suffered Kounis Syndrome Type II, as there was evidence of coronary artery disease and had pre-existing atheromatous plaques as well as plaque rupture during catheterisation.

Anaphylaxis has the potential to alter the traditional initial management of STEMI, with Table 1 summarising management considerations for the three variants of Kounis syndrome.

Nitrates may not be appropriate in the setting of anaphylaxis as they may worsen hypotension. Additionally, opioids such as morphine may induce mast cell degeneration, aggravating the anaphylaxis. Beta blockers counteract the actions of adrenaline in anaphylaxis and some literature suggests not using them at all when acute coronary syndrome is suspected in the setting of anaphylaxis.¹ Even aspirin is potentially detrimental, producing more anaphylaxis mediators through cyclooxygenase inhibition.¹

These medicines are commonly used in the early hospital management of acute coronary syndrome, and it is unclear what the optimal management for patients with concurrent anaphylaxis and myocardial infarction is. This case highlights the need to outweigh the relative urgency and risk of anaphylaxis and its treatment against the risks of acute coronary syndrome and its treatment.

References

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Conflicts of interest: GK is a section editor for Emergency Medicine Australasia

Figure 1 - PCI, prior and post stent insertion in RCA

PCI: Percutaneous Coronary Intervention; RCA: Right Coronary Artery
Arrow indicates occlusion prior to stenting

Table 1 - Management considerations for Kounis syndrome variants

Type I	Type II	Type III
May benefit from treatment of allergic reaction, circumventing further complications. ⁵ H1 and H2 antihistamines (e.g. diphenhydramine 1-2mg/kg) for non-severe symptoms. ⁵ Must be given slowly as they can precipitate hypotension and compromise coronary blood flow. ⁵ There are no drugs of choice in initial severe allergic reaction. ⁵	Acute coronary event protocol. ⁵ Caution with nitrates in hypotension. ¹ Beta-blockers contraindicated ^{1,5} , patients may benefit from glucagon. ⁵ Opioids administered with caution ^{1,5} , consider fentanyl. ¹	Acute coronary event protocol. ⁵ Caution with nitrates in hypotension. ¹ Urgent aspiration of intrastent thrombosis. ⁵ Mast cell stabilisers along with corticosteroids and anti-histamines to potentially alleviate allergic symptoms from stent implantation. ⁵ Opioids administered with caution ^{1,5} , consider fentanyl. ¹

Type I: Allergy-related angina due to coronary spasm; Type II: Allergy-related myocardial infarction due to plaque rupture and thrombus formation; Type III: Drug eluting stent thrombosis secondary to hypersensitivity reaction

Figure 1 – prehospital ECG

Figure 2 – PCI, prior and post stent insertion in RCA

PCI: Percutaneous Coronary Intervention; RCA: Right Coronary Artery
Blue arrow indicates occlusion prior to stenting