中文題目：有機磷中毒導致的心碎症候群

英文題目：Broken Heart Syndrome Caused by Organophosphate Intoxication

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Introduction:

Broken heart syndrome, also known as apical ballooning syndrome, is unique reversible cardiomyopathy frequently precipitated by a stressful event and has a clinical presentation indistinguishable from a myocardial infarction. Organophosphate intoxication could cause cardiotoxicity and is commonly associated with suicide related to intense stress. We herein present a case of broken heart syndrome caused by organophosphate intoxication.

Case Presentation:

This 81-year-old woman had a history of end-stage renal disease and received regular haemodialysis. She presented to ER with acute onset consciousness disturbance noted one hour ago.

Her sons said that when they entered her room to invite her to lunch, they found her lying on the floor, not responding to calls, and she was thoroughly drenched. They also saw a towel covering her left arm with fresh blood stains. They sent her to ER immediately. On the way to ER, they checked their closed-circuit television (CCTV) records, which showed she walked into her room at 8:30 a.m. and stayed there until she was found.

On arrival, she had hypertension and tachycardia. The initial examination showed miosis with poor light reflex over both eyes and a clear-cut bleeding wound over her arteriovenous fistula on her left arm. Her GCS was E1V2M4. Her electrocardiogram showed ST elevation over the V2-6, and she had elevated trop I (12247.4 pg/ml). Her COVID-19 tests were positive. After intubation for protecting her airway, she underwent emergent percutaneous coronary intervention (PCI), which reported apical ballooning syndrome with patent coronary arteries. Hypotension developed during the PCI, so she was commenced on inotropes.

In ICU, we noticed her heart rate became slower, and she had a strong smell of insecticide. On examination, she had persistent miosis with poor light reflex over both eyes. On further enquiring, her sons described that when they left home in the morning, they had gotten a sniff of the insecticide scent but thought it came from their neighbours. In the meantime, they rechecked their CCTV and found that at around 7 a.m., she had gone to the insecticide storage room and appeared nauseous when she returned to the yard. She had no history of suicide, but recently her husband threatened her, asking her to leave home as he believed she cheated on him many years ago. Based on the distinctive odour and the video recording, her sons thought she could have drunk 陶斯寧, a mixture of organophosphate and synthetic pyrethroid. Later, her serum level of cholinesterase was reported as below the detection limit. Though we started the necessary treatment immediately, her

condition worsened quickly, and she passed away the next day.

Discussion:

Organophosphate intoxication is commonly associated with suicide and has been known to cause cardiotoxicity. The common electrocardiographic findings include QTc prolongation, ST-T segment changes and T wave abnormalities. (Vijayakumar S, 2011) The echocardiogram findings comprise cardiac function without regional wall motion, global hypokinesia, and broken heart syndrome. (Ung Jeon, 2018)

Broken heart syndrome, also known as apical ballooning syndrome and takotsubo cardiomyopathy, is unique reversible cardiomyopathy frequently precipitated by stressful events and has a clinical presentation indistinguishable from a myocardial infarction. It has been hypothesised that multiple factors could give rise to broken heart syndrome. First, the intense emotional stress leading to suicide could also cause diffuse catecholamine-induced microvascular spasm or dysfunction, resulting in myocardial stunning. (Ilan S. Wittstein, 2005) Second, organophosphate inhibits acetylcholinesterase, which results in the accumulation of acetylcholine in the coronary artery and could bring on stress-induced cardiomyopathy. (Vijayakumar S, 2011)

In our case, although she had elevated trop-I and EKG changes, patent coronary arteries noted on PCI evidently excluded a myocardial infarction. Given her strong contact history and clinical course, her clinical presentation suggested broken heart syndrome caused by organophosphate intoxication.

Conclusion:

Although it is uncommon, organophosphate intoxication can induce broken heart syndrome, which is clinically indistinguishable from a myocardial infarction. The possible aetiologies include (1) intense emotional stress, which triggers the ingestion of organophosphate, causes catecholamine-induced microvascular spasm or dysfunction with myocardial stunning, and (2) organophosphate insecticide inhibits acetylcholinesterase, leading to stress-induced cardiomyopathy secondary to the accumulation of acetylcholine in the coronary arteries. Careful history taking and physical examination are the keys in this situation to make the diagnosis.

Bibliography:

Vijayakumar S, F. M. (2011). A Prospective Study on Electrocardiographic Findings of Patients with Organophosphorus Poisoning. *Cardiovasc Toxicol*, 11:113–117.

Ung Jeon, S. P.-y.-W. (2018). Clinical characteristics of stress cardiomyopathy in patients with acute poisoning. *Scientific Reports* , 223.

Ilan S. Wittstein, M. D. (2005). Neurohumoral Features of Myocardial Stunning Due to Sudden Emotional Stress. *The New England Journal of Medicine*.

AllisterVale, M. (2015). Organophosphorus and carbamate insecticide poisoning. In *Handbook of Clinical Neurology* (pp. 149-168). Elsevier B.V.