

## A case of disseminated intravascular coagulopathy developing rapidly after a suspected bamboo snakebite

### 懷疑被青竹蛇咬後患上彌散性血管內凝血病的個案

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We present a case of disseminated intravascular coagulopathy developing rapidly after being bitten by a snake suspected to be *Trimeresurus albolabris* in a 67-year-old man. The unusually fast onset of coagulation disturbances and the later renal complication should alert emergency physicians that snakebites (including *Trimeresurus albolabris*) can be devastating if not managed promptly. (*Hong Kong j.emerg.med.* 2006;13:168-171)

本文描述一個案，一名 67 歲的男子懷疑被青竹蛇咬後迅速顯現彌散性血管內凝血，並異乎尋常迅速地開始凝血失調及其後有腎併發症。急症科醫生應警覺蛇咬後（包括青竹蛇），如果不及時治理，破壞性可以是極大的。

**Keywords:** Antivenins, blood coagulation disorders, disseminated intravascular coagulation, snake bites

**關鍵詞：**抗蛇毒血清、凝血病、彌散性血管內凝血、蛇咬

### Case

A 67-year-old man with history of old pulmonary tuberculosis attended the emergency department in September 2005 half an hour after being bitten by a green coloured snake. He lived in a public housing estate in the suburb. There was no recent use of herbal medication or relevant drug history. His hobby was planting crops in the field close to his estate. He described the appearance of the snake in details. It was a green-coloured snake with yellowish discoloration on the ventral surface. The size was about one foot long.

He was bitten on the medial side of his right ankle once. The bite was transient and he got a peculiar feeling that toxin was injected directly into his blood vessels. He applied a tourniquet over the thigh and went to the emergency department immediately. On arrival, his vital signs were stable and he was triaged as Category 3 (urgent). The tourniquet was taken off upon arrival. He was seen by an emergency physician in 30 minutes. Mild local swelling (5 cm in diameter) was noted over the medial aspect of his right ankle. There were two small puncture wounds on the swelling corresponding to the fang marks. He coughed out two mouthful of fresh blood during the examination. He denied any history of smoking or recent symptoms of exacerbation of pulmonary tuberculosis. An intravenous line was set up immediately, and blood was drawn for complete blood count, clotting profile, cardiac enzymes, renal and liver function tests. A chest X-ray was taken and it was unremarkable. He was then admitted to the general medical ward. On the way to the ward, he developed coffee ground vomiting.

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One hour after admission, he developed gross haematuria. Urine was positive for haemoglobin but negative for myoglobin. The cardiac enzyme levels were normal. The first (taken in the emergency department) and second sets of blood's coagulation and complete blood count results are shown in Table 1. There was marked prolongation of APTT, PT and INR. The D-dimer, which indicated lysis of fibrin clot, was also raised. Together with the massive drop in platelet count and the active overt bleeding, there was no doubt that disseminated intravascular coagulopathy had occurred. He was treated with six units of fresh frozen plasma (FFP) and four units of platelets concentrate infusion. He was transferred to the intensive care unit (ICU)

where one vial of *Agkistrodon halys* antivenom was given 12 hours after the bite. The INR was 1.5 before and 1.4 after the infusion of antivenom (Table 2). He was discharged to the general medical ward after two days of stabilisation in the ICU. There was still ongoing haemolysis as evidenced by persistent haemoglobinuria and the presence of schizocytes in the blood film and raised serum lactate dehydrogenase, although the reticulocyte count was not elevated (1.1%). The haemoglobin level dropped down to 8.5 g/dl. His clotting profile kept on improving, but his renal function started to decline on day 6 after admission (Table 3). Urgent ultrasound was performed which showed no obstructive element. Intravenous fluid

**Table 1.** Complete blood count and coagulation profiles

	Day one 11:50 h	Day one 13:52 h	Normal range
White cell count	21.8	18.3	3.9-10.7
Haemoglobin	13.3	12.3	13.4-17.2 g/dl
Platelet count	18	23	152-358 x 10 <sup>9</sup> /L
PT	>60.0	>60.0	10.0-12.6 sec
INR	>4.5	>4.5	
APTT	>150.0	>150.0	24.5-37.6 sec
D-dimer	--	>1	<0.5 µg/ml

**Table 2.** Coagulation profiles after fresh frozen plasma (FFP) and antivenom infusion

Coagulation profile	Day one 19:47 h, 8 h after snake bite, after 6 units of FFP	Day two 04:45 h, 17 h after snake bite, after antivenom	Normal range
PT	16.8	16.4	10.0-12.6 sec
INR	1.5	1.4	
APTT	32.2	32.4	24.5-37.6 sec

**Table 3.** Renal and other biochemical profiles

	Day 7	Day 9	Day 10	Normal range
Sodium	140	135	135	135-145 mmol/L
Potassium	3.3	3.9	3.9	3.5-5.1 mmol/L
Urea	6.6	11.6	11.7	3.5-8.1 mmol/L
Creatinine	132	256	286	62-106 µmol/L
Bilirubin	21	23	--	5-20 µmol/L
Creatine kinase	--	126	152	62-297 U/L
Lactic dehydrogenase	--	429	561	87-213 U/L

infusion was tried to correct the renal impairment. However, he developed fluid overload after the intravenous fluid. The renal physician was consulted, and he opined that the acute renal failure was due to persistent haemolysis. Blood tests were done to look for the cause of the haemolysis (ANA, C3, C4, Coomb's test and G6PD level). Only G6PD deficiency was found. The echocardiogram showed good left ventricular function (ejection fraction 65%) and no vegetation. He was given intravenous diuretic instead of further fluid replacement. His condition improved afterward and the haemolysis subsided on conservative treatment. No steroid was given. He was finally discharged after 17 days of hospitalisation with mildly raised creatinine level stabilised around 200  $\mu\text{mol/L}$  and mild non-pitting oedema over the right ankle.

## Discussion

We see patients with snake bite frequently in the New Territories East Cluster of Hong Kong.<sup>1,2</sup> Although our patient could not bring the snake to us for identification, from his description, the culprit was likely the common bamboo snake (white-lipped pit viper or *Trimeresurus albolabris*). However, we could not exclude the possibilities of newly immigrated more venomous species of *Trimeresurus* e.g. *Trimeresurus mucosquamatus* or other green-coloured *Trimeresurus* e.g. *Trimeresurus macrops*. In Hong Kong, there are two common types of green snakes – *Trimeresurus albolabris* (bamboo pit viper) and *Ophedrys major* (greater green snake) – but the latter is uncommon in Hong Kong and non-venomous. The ventral surface of the latter is whitish in colour whilst in bamboo pit viper, it is yellowish. It has been reported that 10% of the patients bitten by the bamboo snake developed blood-clotting disturbance, but severe systemic bleeding rarely occurred. Also, the degree of envenomation for Viperidae may be judged by the amount of local swelling.<sup>3-5</sup> The astonishing features in this patient was the rapidity and the potentially lethal nature of the clotting disturbance. Whether it was due to (as the patient thought) the direct injection of venom into the blood vessels was difficult to prove. A study showed that the local and systemic effects of green pit viper

venom were inversely correlated, i.e. if a large amount of venom was injected and the systemic absorption was fast, the effect of local swelling and necrosis might be small but the coagulation disturbance and thrombocytopenia manifested rapidly.<sup>6</sup> There has been no local case report of disseminated intravascular coagulopathy developing after bamboo snake bite in just one hour's time. Detailed unravelling of the mechanism of the clotting disturbance would require the measurement of fibrinogen level, fibrin degradation product, and soluble monomer of fibrin clot, etc. but most of the time they are of academic interest only.<sup>5-10</sup>

For the emergency physician, bedside clotting time should be done immediately on patient arrival.<sup>2,4</sup> If it is prolonged more than 20 minutes, we should be alert to the possibility of severe clotting disturbance and antivenom therapy should be given as soon as possible to prevent fatal intracranial haemorrhage. We should give antivenom before replacement therapy. Giving FFP and others before antivenom may make the situation worse by "pouring more fuel into the fire".

We think the cause of the renal impairment in our patient was secondary to the coagulopathy. It is well known that Russell's viper has potential direct nephrotoxin in its venom, but other Viperidae do not have this direct nephrotoxin. There were reports of renal failure occurring in 5-30% of viperine bites. The degrees of renal damage and coagulation disturbance were positively correlated. The renal disturbance usually lasted longer than the coagulation problems. The early use of antivenom (preferably within four hours) may not only correct the coagulation problem but also the later acute renal failure as well.<sup>3,11-13</sup>

## Conclusion

We should be alert to the telltale signs (in this case the 'haemoptysis') that serious coagulopathy may be developing rapidly in patients with snake bite. Early admission to the ICU and administration of antivenom are crucial to reduce mortality or complications (e.g. in this case, the renal failure).

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