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Correspondence

Mis-diagnosis of brown snake bite?

We read with interest Faunce *et al's* article presenting an alleged Brown snake envenomation associated with near drowning and amphetamine overdose.[1] We certainly agree with the importance of early and appropriate use of the snake venom detection kit (VDK) (CSL Limited) when snake bite is clinically suspected. However, it remains uncertain that this was actually a case of snake bite. We write to highlight the need for critical interpretation of VDK results and to correct a possible mis-diagnosis.

Several pieces of evidence, combining history, physical examination and laboratory investigations, are needed to diagnose snake bite.[2] In this case, the diagnosis of brown snake envenomation is based on the presence of coagulopathy, a single positive urine VDK result, and information from the patient's associates that he 'kept snakes'.

Unfortunately, the time at which the first set of coagulation studies was performed is not mentioned in the article. From the description of the patient's discovery, resuscitation and retrieval, however, it seems unlikely that the patient could have reached the hospital and had blood sent for coagulation in less than thirty minutes after the bite; it was probably significantly later. As the authors themselves state, secondary afibrinogenaemia may be 'total' within thirty minutes of a brown snake bite.[3] In the absence of effective first aid, it is therefore unlikely that the patient's initial clotting profile would have been normal, if a significant brown snake envenomation had occurred. Although the patient received 8,000 units (8 ampoules) of brown snake antivenom, as well as replacement clotting factors, the results of coagulation studies after this treatment are not provided.

A single positive urine VDK result, whilst probably justifying the use of antivenom in a life-threatening situation, does not prove the diagnosis. Despite the authors' assertion that the snake venom detection kit has 'a high sensitivity and specificity', false positive results are known to occur, and are observed more frequently in urine and blood samples than bite site samples.[4] It was therefore unfortunate that no mention is made of a repeat urine or serum VDK test being undertaken. Venom should have been readily detected in the serum, by this assay within the first few hours after significant untreated snake bites. In addition, although it is mentioned that the patient 'kept snakes', no detail is provided on the species kept; they may have been non-venomous pythons.

In this case of alleged snake bite, there was no culprit snake, no history of snake bite, no bite site identified, no confirmation of venom detection and no response to monovalent antivenom. There is, therefore, doubt as to whether the patient actually suffered a brown snake envenomation as part of his complex illness.

As a general comment it should be noted that post-mortem confirmation of the diagnosis of snake bite using the VDK requires that tissue samples be snap frozen as soon as possible to avoid bacterial degradation (if not tested immediately). Urine samples should be mixed with VDK yellow sample diluent (which contains antibacterial activity) and stored or transported at 4°C until tested soon thereafter. Clinicians should also be aware that formalin fixation will destroy the venom antigens for the purposes of the VDK assay. Where there is doubt regarding the *post mortem* diagnosis of snakebite, we urge the assessment of several samples and suggest that expert advice be sought from CSL Limited staff, its consultants or the Australian Venom Research Unit.

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In reply

The letter by Winkel *et al* is useful reminder about *post mortem* diagnosis of snake bite. Their allegations of a misdiagnosis are less convincing, however, in a Popperian sense. This is due both to their restrictive interpretation of our hypothesis and reluctance to suggest a clinically relevant and testable alternative. As noted in our report, the clinicians involved reviewed other uncommon causes of coagulopathy. These include amphetamines, but also near drowning.[1] They were also, as mentioned, diagnostically concerned about the unusual progressive thrombocytopaenia, a feature not referred to by Winkel *et al*. Further, Winkel *et al* rely on conjectures which need correction in at least two respects. First, response times for ACT ambulances are rapid and, according to protocol, venous blood samples are taken immediately on admission, making sampling within half an hour of initial notification not unlikely. Second, all the available evidence was that the patient kept venomous snakes (to protect certain illicit pharmaceuticals in which he traded). These matters of fact may be settled by the report of the ACT Coroner which has been requested and will be reported here once it becomes available. Finally, it must be noted that the Director of the Emergency Department and the Hospital Toxicologist also came to the conclusion that the most appropriate diagnosis was snakebite complicated by amphetamines and, in particular, near drowning and have independently published to that effect.[2]

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