Case reports

Upper limb compartment syndrome after an adder bite: a case report

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Abstract] Compartment syndrome after an adder bite is extremely rare, whose effects are only secondary to the cytotoxic and hemorrhagic effects of venom. Here we reported a case of compartment syndrome in the upper limb following an adder bite in the thenar eminence. Elevated compartment pressure was documented and immediate surgical fasciotomy was practiced. The patient achieved complete recovery with a good functional result. We discussed the controversies on fasciotomy and non-invasive measures in such a situation, and recommended intracompartmental pressure monitoring during the management of compartment syndrome following adder bites.

Key words: Snake bites; Compartment syndromes; Fascia

Adder bites rarely occur in our country and require vigilance because of the severe local and systemic impacts of venom. Compartment syndrome, as an exceptional complication of adder bites, requires careful management because of the functional compromise of the bite site. The treatment of compartment syndrome remains controversial between non-invasive measures and surgical management.

CASE REPORT

A 22-year-old man who was right hand dominant was admitted to the emergency room with a pain in his left upper limb, one hour after an adder bite (vipera lebetina) on the left thenar eminence (Figure 1). On the initial examination, he presented with a swelling extending from the palm to the forearm, but a normal neurovascular status of the limb. The patient’s blood pressure was 95/60 mm Hg, and arterial blood pH 7.31. He was arranged in an intensive treatment unit and received intravenous fluid and five vials of antivenin. Three hours later, the pain became severe, the swelling extended to the brachial segment (Figure 2), and the thenar eminence and the forearm became tense. The patient complained of paresthesias of the hand in both ulnar and median nerve distribution. There was no distal vascular deficit and the blood pressure rose to 120/75 mm Hg. Intracompartmental pressures were measured using the Whiteside technique. The compartment pressure was 49 mm Hg in the thenar eminence, 43 mm Hg in the volar forearm, and 40 mm Hg in the dorsal forearm. Immediately fasciotomy from the volar forearm to the brachial segment, associated with carpal tunnel release and thenar fasciotomy, was performed. During surgery, the muscles appeared healthy (Figure 3).

The elevation of the limb was unconditional postoperatively, and gradually the swelling, the pain, and the paresthesia were markedly diminished. Five days later, when the swelling had subsided, secondary closure was carried out in all wounds except those on the forearm segment where skin graft was performed (Figure 4). Seven months after surgery, the patient achieved full recovery with good functional and cosmetic results.

DISCUSSION

Compartment syndrome is the result of an increased...
tissue pressure within a limited space. When it arises, the function and vitality of the limb are compromised. The treatment we proposed aimed to save the affected limb.

Compartment syndrome is secondary to many conditions such as soft tissue injuries, burns and fractures. But that occurs on the hand or the forearm after an adder bite is extremely rare with few cases reported. Moreover, acute compartment syndrome after an adder bite that affects the bitten limb is rarely reported. The upper extremity is the most common envenomed site. Approximately, half (52%) of snake bites occurred on the hand.

Venom causes both local and systemic complications. The systemic effects of venom are well known (myocardial infarction, ECG change, bronchospasm, circulatory collapse, urticaria, haemorrhage, etc). The principal local effect is oedema, which occurs within two hours after a bite and intensifies during the following three days. Swelling and vasoconstriction lead to ischemia and compromise the vitality of the limb. Adder bites on the hand are more susceptible to systemic manifestations of venom because the dorsum skin of the hand is very thin with many superficial veins and a very rich vascular network distribution on the palmar area. The skin of the hand and the forearm covers various structures, including nerves, vessels, tendons, and muscles, which are easily damaged after skin loss by adder toxin. This skin loss is related to tissue necrosis around the site of envenomation.

The second phase of compartment syndrome management consists in the reconstruction of destroyed tissues.
rovascular compromise. Gold BS et al reported a case of compartment syndrome in the upper limb following a rattlesnake envenomation. They simultaneously used large dose of antivenom (10-15 vials) with 20% mannitol and hyperbaric oxygen to obviate the need for surgical fasciotomy. Mannitol, functions as an osmotic diuretic, was injected intravenously (1-2 mg/kg) for over 1 to 2 hours. In their case, after utilizing the non-invasive treatment, the authors consider that fasciotomy should be resorted when compartment pressure remains elevated.

In conclusion, monitoring compartment pressure is necessary in the management of acute compartment syndrome following adder bites on the limb. The choice between surgical and non-invasive measures depends on the clinical manifestations and evolution of pressures during the hours following adder bites. Fasciotomy must be performed immediately when non-invasive measures fail.

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REFERENCES


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