Python Bite: An Unusual Cause of Hand Injury

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Abstract We report a patient that sustained a severe hand injury following a python bite. Python bite injuries are rare and we were unable to find guidelines in literature regarding the management of this injury. This report details our experience in managing this case and summarizes the available literature.

Keywords Hand injury · Oral flora · Python bite · Snakebite

Introduction

Snakebites are reported infrequently and a study from the emergency department of one of the larger public hospitals in Singapore estimated a frequency of 10 bites per year [1]. The Asiatic reticulated python (*Python reticulatus* or *Broghammerus reticulatus*) is the largest snake species in Singapore. According to the Animal Concerns Research and Education Society (ACRES), the reticulated python is the most commonly sighted and captured species of snake in Singapore. It is a non-venomous constrictor, with adults averaging 3–6 m in length. They reside in forests and nature reserves and occasionally venture into the sewer system. They are usually spotted in large drains and at construction sites. Python bites are rare, with 1–2 cases reported a year. This article reports a patient that sustained a severe hand injury following a python bite and provides guidelines that may be useful in management of similar cases.

Case Report

A reticulated python was spotted in an open drain of a housing estate. The police was informed, who in turn called ACRES. A pest control officer who happened to be at the scene managed to extricate the snake from the drain. He was in the process of transferring it into a bag when the python bit and held on to his left hand. The officer was not using proper equipment to capture the snake, and was not wearing protective gloves. It took about 5 min before the python's jaws were pried open using a screwdriver and the python delivered into a bag by ACRES personnel. The python was taken to ACRES, where it was examined for injuries, tagged, and released unharmed to the forest. The documented length of the python was 4 m (Fig. 1).

The injured pest control officer (35 years old, male, and right handed) was seen in the emergency department of our hospital about an hour after the bite. On examination, he had multiple puncture wounds in a semi-circular pattern over the dorso-radial aspect of the left hand (Fig. 2). He was unable to raise his thumb off the table (retropulsion) suggesting an injury to the extensor pollicis longus (EPL) (Fig. 3). He also had diminished sensation over the radial aspect of the dorsum of the hand and the radial three digits suggesting an injury to the superficial branch of the radial nerve. He was given prophylactic antibiotics intravenously (1.2 g amoxicillin/clavulanic acid) and scheduled for emergency debridement under general anesthesia.

Intra-operatively, the wounds were not grossly contaminated, but there appeared to be significant contusion to the soft tissue. The python's teeth had penetrated the dorsal cortices of the first and second metacarpals, and the capsule of the second carpometacarpal joint (CMCJ). The EPL tendon was divided at the level of the first CMCJ as were the dorsal branch of the radial artery and branches of the superficial radial nerve (Fig. 4). The wound was thoroughly debrided, washed, and dressed. He was continued on intravenous antibiotics. Three

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Fig. 1 The head of the reticulated python. Note the recurved teeth that provide a firm grip on seized prey and facilitate swallowing. These teeth can make it difficult to remove the snake during a prolonged bite on a human victim, and hence result in a more severe wound

days later, he underwent debridement and repair of the EPL. The patient was discharged on day four. On his last follow-up 10 weeks after injury, the patient had regained full range of motion at the thumb and returned to work (Fig. 5)

Discussion

Pythons are ambush hunters, usually waiting until prey wanders within strike range. They attach themselves to the prey by biting on it, before seizing it in their coils and killing via constriction. They do not typically attack humans, but will bite and possibly constrict if they feel threatened, or mistake a hand for food. A python may exhibit different biting strategies based on circumstance. These may include defensive bites and prey bites [2]. In a defensive bite, the python aims to scare away potential predators and will strike and release immediately. In a prey bite, the python strikes, coils around its prey and does not let go. If the hand is bitten, the python interprets the movement in the hand as the ‘prey being alive’ and follows its instinct, maintaining the bite and continuing to constrict. It should be noted that while snakes may exhibit differentiable types of striking behaviour, the terminology of defensive bites and prey bites should not be considered exact,

Fig. 2 Re-operative photograph showing curvilinear pattern of bite marks over dorsum of wrist with accompanying swelling

Fig. 3 Photograph shows inability to perform retropulsion of left thumb

as the strikes may not be delivered with a clear intent of prey capture, or the reverse.

The backward facing teeth help to attach the python to its prey firmly and facilitate swallowing (Fig. 1). The pattern of dentition, combined with the size and muscularity of a python's jaw, and the duration of the bite can result in multiple lacerated wounds with a high likelihood of injury to the underlying structures and may cause a crush injury (e.g. contusion). This is further exacerbated with the victim attempts to disengage the python's head. In our case, the initial injury appeared innocuous and the true extent of the injury was revealed only on formal surgical exploration. This case demonstrates how it is essential to test all the separate tendons that may have been damaged, for example by checking retropulsion to isolate the EPL tendon. However, in the presence of any penetrating wound with nerve symptoms, surgical exploration of the wound is recommended in order to prevent the formation of a neuroma.

In facilities equipped with MRI, a scan may be considered in order to ascertain the degree of soft tissue pathology prior to invasive procedures. This could obviate surgery in those who might not require it, and confirm the need in those who do. Although expensive, it could be desirable in order to avoid unnecessary risks to the patient, as well as cost effective as it might avoid the accumulated costs of unnecessary treatment. Conversely, it can provide some guidance for the surgical

Fig. 4 Intra-operative photograph demonstrating the divided ends of the EPL and dorsal branch of radial artery

Fig. 5 Outcome at 10 weeks

team if the injury does merit exploration in the setting of subtle functional dysfunction.

An internet search brings up a number of amateur reports of bites by pythons kept as pets. The vast majority of these bites were superficial and the pet owners did not seek medical attention. There are a handful of reports in the scientific literature documenting pet python bites. Herman RS (1988) reported a 30-year-old female patient that presented with a dorsal subcutaneous abscess several weeks after the bite of a pet python. A radiograph revealed a 4 mm fragment of a python's tooth that was removed surgically and patient started on antibiotic therapy [3]. McCarty et al. (1989) reported the case of a 21-month-old infant that was bitten by a pet reticulated python and died as a result of asphyxia caused by constriction. They also summarized the five cases of confirmed asphyxial human deaths caused by pythons [4]. Weed HG (1993) reported four cases of pet python bites out of 72 cases of bites by pet non-venomous snakes [5]. Kelsey et al. (1997) reported a case of a bite of pet python over the dorsum of the hand that required surgical debridement and intravenous antibiotics [6].

There are a few reports of bites by wild pythons. A retrospective review of 126 snakebites seen at a large public hospital in Malaysia in the period 1999–2003 by Jamaiah et al. (2006) included three python bites [7]. Hon et al. (2009) reported the case of an 18-year-old girl that was bitten by a wild python, but only sustained minor local soft tissue injuries that did not require surgery or antibiotics [8]. Tan (2010) retrospectively reviewed 52 snakebites, including four inflicted by pythons, seen at the emergency department of a large public hospital in Singapore from 2004 to 2008 [1].

A study from South Korea reported on the oral and cloacal flora of Burmese pythons (*Python bivittatus*) [9]. These

pythons were not wild caught, rather were maintained in a natural setting at a python farm in Vietnam and imported to a private zoo in Korea. The study described isolation of nine bacterial strains from 18 python specimens. The strains included *Acinetobacter* sp., *Bacillus brevis*, *Enterobacter aerogenes*, *Escherichia coli*, *Klebsiella oxytoca*, *Micrococcus rosenes*, and *Pseudomonas* sp. *Pseudomonas* sp. (33 %) were more frequently found in oral cultures followed by *Acinetobacter* sp. (28 %). All oral isolates were opportunistic pathogens of humans except for *Acinetobacter* sp. We are currently performing bacterial culture and sensitivity from oral swabs of freshly caught wild reticulated pythons with the assistance of the ACRES veterinarian. Preliminary results indicate that there are multiple organisms comprising the oral flora with *Pseudomonas* and *Staphylococcus* sp. isolated most frequently.

Previous reports in literature have suggested that antibiotic prophylaxis may not be required for the bite of non-venomous snakes. Weed HG did a prospective clinical study in 72 consecutive patients with bites from pet non-venomous snakes [5]. The study included four pythons, all of which were more than 5 ft long. In his conclusion, Weed HG mentions that 'most nonvenomous snakebites do not require prophylactic antibiotics because the wound is not penetrating and does not contain a foreign body'. However, in the article, he mentions that bites by snakes longer than 5 ft produced wounds that apparently penetrated the subcutaneous tissue. One of the python bites resulted in a tooth fragment getting embedded in the hypothenar soft tissue. This was detected radiologically and the patient required surgical debridement and antibiotic therapy. Three other patients were prescribed antibiotics, but the reasons for antibiotic prophylaxis are not mentioned.

We were unable to find any studies that have reported culture and sensitivity of tissue samples obtained from a python bite wound. The cultures obtained from the wound in our patient did not grow any organisms. From the limited data available, it appears that the risk of infection in cutaneous non-venomous snakebites is low and most bites rarely require antibiotic prophylaxis. However, we feel that a python bite cannot be equated with a non-venomous snakebite. In the evaluation of a patient with a python bite, it is important to consider the length of the snake and the nature of the bite. Superficial bites from small pythons may be managed conservatively with wound toilet and dressing. A prolonged bite in a large python should be considered a more severe injury in spite of an innocuous appearance on initial examination. We recommend prophylactic antibiotic cover, surgical wound exploration, and debridement in such bites.

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