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Case Report

Bite wound and mauling of a zookeeper by a gorilla

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ABSTRACT

The majority of bite wounds that we encounter in the emergency department are caused by dogs, cats and humans, but bite injuries can be caused by a variety of animals. Here, we describe a case of bite wound and trauma caused by a large gorilla (Western lowland gorilla) weighing over 170 kg. Gorilla bites are rare, and the patient had an open fracture of the right distal radioulna in addition to multiple bite wounds. Treatment required careful consideration of gorilla antigenicity and a literature review to guide the selection of appropriate antimicrobial agents. Furthermore, trauma inflicted by large animals tends to require systemic traumatological screening, and patients can develop acute stress disorder because of a fear of being attacked again; therefore, early psychiatric intervention is important.

Introduction

We often experience bites from small animals and insects. There have been reports of injuries in large animals such as horses and cattle, but there are few reports of large animals such as gorillas. We experienced trauma and bites from gorillas. We report what points should be paid attention to during treatment.

Case

The patient was a 52-year-old woman zookeeper without any medical history. She had been vaccinated against tetanus every 3 years. While moving a 170-kg female gorilla in the zoo, it became excited and bit the patient on her right forearm and swung her around. In addition, a 200-kg male gorilla became excited and charged at the patient. Despite being rescued by another staff member, the patient's right forearm had multiple bite wounds and appeared out of alignment; therefore, an ambulance was called, which transported her to the emergency department.

Her vital signs were stable and she was fully conscious, but we screened her whole body. There were no abnormal laboratory

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findings, and she was negative for hepatitis B surface antigen and hepatitis C, human immunodeficiency virus (HIV), and human T-lymphotropic virus (HTLV) antibodies on blood testing. There were two bite wounds on the dorsal ulnar area of her right forearm, with a palpable ulnar fracture under the muscle layer, and two bite wounds on the palmar side of her forearm (Fig. 1-A). However, she was able to flex and extend all her fingers, and her gross tactile sensation was intact. These findings, combined with the forearm X-ray findings (Fig. 1-B), led her to be diagnosed with a Gustilo Grade IIIA open fracture of the right distal radioulna. We also noted a subcutaneous hematoma of the right occipital region, an abrasion of the left ear, and bruising beneath the right clavicle, both shoulder blades, and the left chest.

The wounds were washed with 5000 mL of physiological saline, and external skeletal fixation was performed on the shaft of the radius to the second metacarpal bone to stabilize the fracture (Fig. 2-A). The patient was treated with sulbactam/ampicillin (3 g, four times/day), amikacin (200 mg, twice/day) for prophylaxis of the bacteria, and valaciclovir (1000 mg three times/day) for prophylaxis of the B-virus. On Day 2, we reviewed the gorilla's medical chart. Based on this, we decided that hepatitis, HIV, and HTLV prophylaxis was not required (Table 1). Furthermore, as the genus *Gorilla* is not a natural host of *Macacine alphaherpesvirus* (B-virus), we discontinued the valaciclovir treatment. On Day 3, we performed debridement and pinning of necrotic muscle tissue and on Day 9, the patient underwent open reduction and internal fixation and bone grafting (Fig. 2-B). She developed acute stress disorder and required tranquilizers but her mental state stabilized after psychiatric intervention. She completed antibiotic treatment on Day 14 and was discharged on Day 24.

Outpatient follow-up after 1 year showed a good course of treatment (Fig. 2-C).

Discussion

This case taught us three lessons about the emergency treatment of gorilla-inflicted wounds and trauma: The patient should be provided with infection control, taking the animal's bacterial flora into consideration; traumatological screening; and psychiatric care to mitigate acute stress disorder.

Although the majority of bite wounds are caused by dogs, cats and humans [1], there have been some reports of monkey bites. B-virus can be transmitted by monkeys of the genus *Macaque*, including the Japanese macaque [2]. It has been reported that 80–100 % of macaques are carriers of the B-virus. The B-virus causes severe disease in humans, including fatal encephalitis, and acyclovir should be used for post-exposure prophylaxis and treatment of infection [3]. Our patient was bitten by a Western lowland gorilla, and even though she was initially treated with valaciclovir due to concern about possible B-virus infection, we discontinued the valaciclovir because there had been no reports of B-virus infection from non-macaque apes [3]. On the other hand, there have been reports from Central Africa that gorilla bites carry the risk of HTLV and HIV infection [4–6]. Serological tests of the patient and the gorilla for HTLV and HIV, were negative.

Unlike small animals such as dogs and cats, trauma and injuries inflicted by large animals such as gorillas tend to cause severe trauma involving the torso and head; therefore, traumatological guidelines advise systemic traumatological screening. With our patient, the injuries to her torso and head comprised mild bruises and hematomas, but there was severe contusion of her right forearm, with an open fracture of the right radioulnar joint. Furthermore, the patient developed acute stress disorder despite receiving psychiatric care on admission. However, her mental state stabilized with tranquilizers and psychiatric intervention. The risk of developing acute stress disorder is high after being in a life-threatening situation; therefore, early psychiatric care should be considered for such



(A)



(B)

Fig. 1. Trauma inflicted by the gorilla. (A) Bite wounds on the right forearm; (B) Radiograph of the right forearm. There are two bite wounds on the dorsal ulnar area of the right forearm and two bite wounds on the palm side of the forearm. The radiograph shows an open fracture of the right distal radioulna.

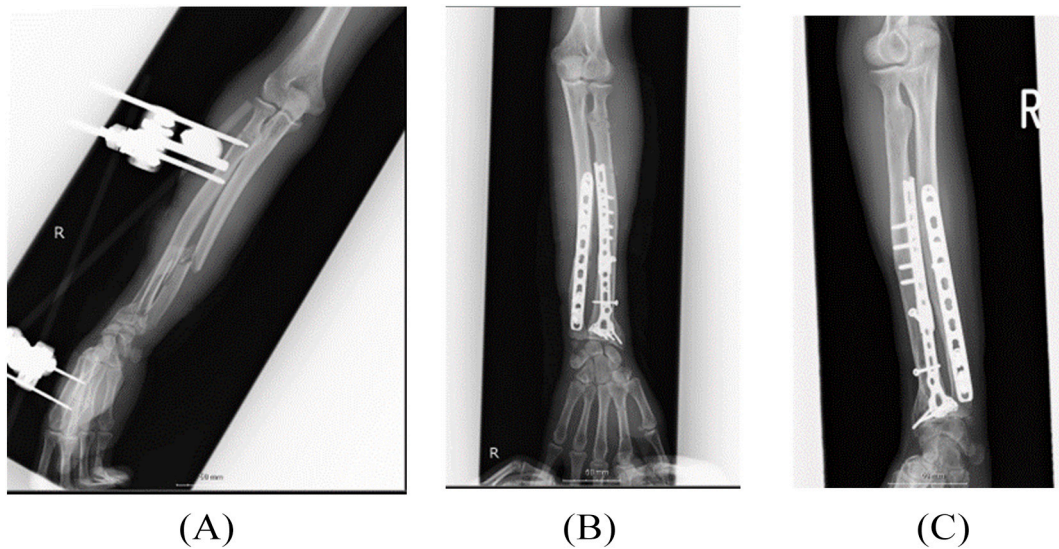


Fig. 2. Course of treatment for open fractures. External skeletal fixation was performed on the shaft of the radius to the second metacarpal bone to stabilize the fracture (A) and internal fixation and bone grafting were undertaken on Day 9 (B). Outpatient follow-up after 1 year showed a good course of treatment (C).

Table 1
Results of antigen/antibody screening for various infections in the gorillas.

	Gorilla (female)	Gorilla (male)
HBs antigen	Negative	Negative
HBs antibody	Negative	Negative
HBc antibody	Negative	Negative
HCV antibody	Negative	Negative
HSV1-IgG	Negative	Negative
HSV2-IgG	Negative	Negative
HIV antibody	Negative	Negative
HTLV antibody	Negative	Negative

We had the results of various antigen and antibody screening tests performed on the female and male gorillas from the zoo, but all were negative.

situations.

Gorilla bites require special infection control measures, and in addition to systemic whole-body screening for multiple trauma, patients should be given early psychotherapy.

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Declaration of competing interest

In connection with this paper, there are no conflicts of interest to be disclosed. This article has never been presented.

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