

## Case Report

### Role of Plastic Surgery in a Venomous Snake Bite: A Case Report

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#### Abstract:

Snake bite is one of the major cause of accidental morbidity & mortality worldwide. In riverine Bangladesh people of rural areas are mostly affected by snake bite. Majority of bites are caused by non-venomous snake and usually no casualty occurs but in case of venomous snake bite it can cause physical disability even death. Venom can cause local and systemic effect. Acute management is done by medical specialist but some patient develop surgical complication that need to be addressed by a plastic surgeon.

A 43 years old male presented with a wound over dorsum of right hand and right middle finger with exposed MP joint (Metacarpophalangeal). He had history of snake bite 25 days back. Reconstruction done with flap and skin graft. Patient of venomous snake bite need a multidisciplinary team approach including plastic surgeon who take responsibility to restore both form and function.

**Key words:** snake bite, reconstruction

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#### Introduction:

Snake bite envenomation remains a worldwide health hazard. The World Health Organization estimates that of the 5.4 million snake bites occur annually, 2.7 million are venomous with a 5% fatality rate (137,880 deaths per year)<sup>1</sup>. In Bangladesh adequate data is not available due to lack of systemic record keeping system, lack of information and awareness at community level. An epidemiology study estimates the incidence of snake bites in Bangladesh about 8000 per year with 22% mortality which has been identified to be one of the highest in the world<sup>2</sup>. In Bangladesh there are about 80 species of snakes<sup>3,4</sup>, among them only few are venomous. These are Cobra, Krait, Russell's Viper, Saw scaled Viper, Green snakes.

Cobra belongs to venomous group of snakes called Elapids. Most bites are occurred by non-venomous snakes and as many as 40% bites inflicted by venomous snakes do not produce signs of envenoming<sup>5</sup>. Although mortality following envenomation is low compared to secondary complications, ranging from 10% to 44%<sup>6</sup>. Among the mortalities tissue pain, swelling, cellulitis, infection, skin necrosis, coagulopathy, compartment syndrome, muscle contracture are common with various range of physical deformities<sup>7</sup>. Venom cause proteolysis, lipolysis, blisters, compartment syndrome, necrosis and gangrene. Plastic Surgeon mainly work on late sequelae and permanent disability due to snake bite wounds. Surgical intervention such as fasciotomy, wound debridement, skin grafts and tissue flaps may be necessary to minimize functional loss and maximize rehabilitation. For adequate care of snake bites patients, plastic surgeons must gain accomplishment in both acute and long term management<sup>8,9</sup>.

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#### Case report

A 43 years old man, hailing from gazipur was reported with snake bite on 27/5/18. By occupation a snake charmer, when he was handling snakes accidentally one Cobra (venomous snake) bit him in his right middle finger. After the incident he tied up his right wrist by his towel and came to Dhaka Medical College Hospital (DMCH). It took three hours

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for arrival. In DMCH treatment started under medicine specialist. Snake antivenom was started after four hour of snake bite and one hour later patient developed slurring of speech, blurring of vision, vomiting and respiratory distress, in next fifteen minutes patient became unconscious. Patient was shifted to ICU and treatment was given accordingly. Next day patient noticed redness, blister and swelling over bite area. Swelling extended and gradually involved the right forearm. Meanwhile they consulted with surgery department, dressing was done and another two dose of snake antivenom was given. In the fourth day patient was referred to orthopedics department to exclude compartment syndrome. Fasciotomy was done by orthopedic surgeon on 2/6/18. On 22/6/18 patient referred to plastic surgery department. We found wound over dorsum of right middle finger and right hand with exposed MP joint (metacarpophalangeal). We prepared the wound for operation. We decided to do posterior interosseous artery perforator flap for coverage of wound and coverage was done but unfortunately the flap was lost, maybe there was chance of micro vessel thrombosis for venom. Later chest flap was done for dorsum of middle finger and split thickness skin graft was done for dorsum of hand. After chest flap division gradual physiotherapy was started. With proper advice and guideline patient was discharged.

**Discussion**

Snake bite is a neglected public health issue in our country. According to World Health Organization in Asia up to 2 million people are envenomed and mostly affects rural communities in low and middle income countries like this report<sup>1</sup>. In this case patient also came from low socioeconomic status. Surgical intervention are common for certain envenomation such as cobra. Tissue necrosis<sup>11</sup> rate is high in cobra venom. The toxic component of snake venom include enzymes, polypeptides, glycoproteins and several low molecular compound<sup>12</sup>. The chemical effect of the compound and the inflammatory response elicited result of the toxic effects of snake venom<sup>13,14</sup> in victim's body. The main components of snake venom and their toxic effects in body shows in table 1

**Table 1**

| Snake venom components  | Toxic effects  |
|---|--|
| Proteolytics<br>Enzymes – Hydrolases,<br>Metalloproteases,<br>Hyaluronidase | Oedema, Blistering,<br>Necrosis<br>Spread toxins in tissue planes                    |
| Haemorrhagins   | Damage vascular endothelium  |
| Phospholipase A2  | Cytochrome c level mitochondrial inhibition, cell damage                             |
| Neurotoxins<br>-Alpha polysynaptic (Cobra )<br>-Presynaptic (Krait)         | Binds to motor end plates<br>Release and deplete Acetyl choline                      |
| Other components<br>Peptides, Nucleotides,<br>Amines, Lipids                | Systemic toxicity  |
| Procoagulants   | Activate & deplete clotting → consumption coagulopathies (Viperidae & some Elapidae) |

Salient clinical feature of Cobra:

| Cobra  |
|--|
| Neurotoxic<br>Marked local pain & swelling<br>Ecchymosis , Necrosis<br>No coagulopathy |

In snake bite wound management practice of faulty techniques can cause misleading clinical feature with or without envenomation. Tourniquets cause excessive local pain, swelling and congestion leading to diagnostic dilemma<sup>13</sup>. The venom induce compartment syndrome because of deep tissue edema, edema may compress blood vessels and prevent the vascularization of the extremities, which is exacerbated by constricting tourniquet.

Necrosis and tissue destruction is more common in Cobra bite. Surgical intervention include fasciotomy, wound debridement, tissue graft, local and free tissue flaps and rarely amputation<sup>8</sup> are commonly done. Plastic surgeons are frequently consulted regarding wounds where restoration of form and function are desired<sup>14</sup>. Complex reconstruction like flap, skin graft often requires after envenomation of the upper extremity & hand to allow the return of form and function.<sup>10</sup> Soft tissue dysfunction within the hand can be debilitating, as many people rely on their function to perform activities of daily living as well as occupations.<sup>10</sup> Grafts and flaps

must be utilized to reduce contracture of the affected area and maintaining mobility and function.<sup>10</sup>Dorsal hand has little subcutaneous and adipose tissue that easily exposes tendon and bone upon envenomation induced tissue necrosis.<sup>14</sup>A variety of flaps can also be used in reconstruction of upper extremity that closely matches the missing tissue defect.<sup>15,16</sup>While selecting a flap, it is important to consider like tissue like such as skin, bulk, composition and size of vessels, to the recipient defect.<sup>16</sup>In this principle here select the first flap with a backup plan. This fundamental principle of having a series of sensible backup plans guides the plastic surgeon to prepare for any number of potential setbacks during the reconstruction process and serves to optimize the chances of successful surgical outcomes.<sup>17</sup>

Plastic surgeons are pertinent for the acute and chronic management of snake bite victims through reconstruction procedures. These procedures are required for patients to restore regular function of affected part and pursue their normal life.



Picture 1



Picture 2



Picture 3



Picture 4



Picture 5

Picture 1: 1<sup>st</sup> POD of posterior interosseous artery perforator flap (PIAPF)

2: loss of PIAPF

3: 1<sup>st</sup> POD of skin graft and chest flap (postoperative day)

4: skin graft taken

5: after chest flap division.

## Conclusion:

Multidisciplinary team management is important to improve patient prognosis. Plastic surgery has an important role in snake bite management. Plastic surgery intervention can vary in timing as immediate (fasciotomy) to days, week, or years (debridement, scar contracture release and flap) it depends on patient's situation, geographic location and timing of presentation. Victims of snake bite envenomation should be handled by multidisciplinary team and it is crucial for plastic surgeons to help these patients to regain both form and function.

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