

ISSN 2394 - 6822

Volume : 05 Number : 02 July-Dec 2019 Publication : Half Yearly

INTERNATIONAL JOURNAL OF ETHICS, TRAUMA & VICTIMOLOGY



SUPPORTED BY SPIC & INPAFNUS

Editor-in-Chief:
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A peer-reviewed journal Indexed with
CiteFactor & Ulrichsweb & Index Copernicus

Volume 5

Number 2

July-Dec, 2019

Pages 1-60

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Citation: Gorea RK. Identification of venomous bites and stings. *Int J Eth Trauma Victimology* 2019;5(2):6-10. doi.org/10.18099/ijetv.v3i02.1

Abstract

Bites and stings on human beings are causing a lot of morbidity and mortality in human beings. Sometimes this is due to venom or allergic effects and at other times it is simply due to the fear that this may be venomous. The aim of this study is to identify the stings or bites on human beings. Bites by different animals and insects produce different kinds of wounds and identification of stings from the wound may be possible. Some of these also produce systemic effects too. These symptoms may help too in the identification of the biter or stinger and it can be found that the same is venomous or non-venomous. Examination of the agent causing these bites or stings too can help in its identification. Literature is reviewed to find out local findings, systemic findings due to toxicity or allergic reactions and examination of the venomous agents if available for examination. Identification of the causative agent will help to allay the fears if it can be identified that bite or sting is non-venomous. If it is venomous proper treatment can be initiated at the earliest. This will help to reduce mortality and morbidity.

Keywords: Stings; bites; venomous; anaphylactic reaction; identification.

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Introduction

Incidence of snake bite is probably 421,000 cases of snake envenomation all over the world each year and out of these cases 20,000 deaths are reported (1) but this may be underreporting as all cases are not reported. Most commonly envenomation occurs in South Asia, South East Asia and sub-Saharan Africa and in India it is very common (1). There are about 3000 species of snakes all over the world (2).

All snakes have teeth but fangs are present in the venomous snakes (3). Fangs are of three types in the snakes. First variety is of rear fangs type in which teeth have a midline groove on the back which is leading to the back of the upper jaw e.g. Hognose and Boomslangs snakes. Secondly there is variety of Front Fangs which are movable which are hollowed out and kept folded in mouth e.g. Rattlesnake and Gaboon viper and these are brought out when the venom is to be injected and are most advanced types of fangs. Third variety is of front fixed fangs and attached by a duct to the venom glands e.g. Cobra and coral snakes (2). Poisonous rattle snakes have rattle on their tails (3).

Different creatures cause bites and stings. Stings and bites to the humans may occur in water as well as on the land (4). Some dangerous ants of the Victoria Region of Australia are: Jumper ant, green head ant, bulldog ant, blue ant (5). Bees in Victoria region of Australia are European honey bee and native Australian bee (5). Insects like mosquitoes, centipedes and ear wigs may also be venomous (5).

In the Hymenoptera group stings may be caused by ants, bees, wasps, hornets and yellow jackets (6). Bees are in Apoidea group, ants are in Formicidae group and wasps, hornets and yellow jackets are in Vespoidea group (7).

Bites can also be from leeches and these bites are non-poisonous any doctors may come across it due to infected bite mark, fear or allergy to leeches (5).

Fishes too can cause toxicity by their venomous spines (5) and these may vary in different parts of the world and in the Victorian region of Australia are goblin fish, cat fish, gurnard scorpion fish, Fortescue, cobbler fish, rabbit fish, zebra fish, stingrays, rat fish and red rock cod (5).

Bites by blue ringed octopus may not be felt immediately but numbness of tongue or lips may be the first symptom and unable to see or speak (5).

Sting by a jelly fish may look like a small puncture wound or contact dermatitis which is minor (8) but painful (9). Tentacles may be adhering to the skin (5). Venom containing Nematocysts are the organelles through which

jelly fish causes envenomation (8). Sting by Stingray will look like a deep jagged wound which will be quite painful (8). In sea urchins sting may break in the wound (8). Corals may cause lacerations (8).

Itchy and inflamed skin may be caused by Caterpillars too and hairs of the creature can get embedded in the skin (5). Scorpion bites may just be red and itchy in Australian region but may be poisonous in south America region (5). Spiders usually causes local reaction and only some may cause widespread reaction (5). Ticks may also cause bites (4)

Skin lesions may help in identification of the stings. Lesion may vary from itchy papule (4) to localized swelling (6). Pin prick marks of sea snake are difficult to see (4). Spiders have two horny fangs which can inject poison or venom (4). Scorpion has a sting which is needle sharp and is curved and is located on the terminal part of the tail which is distal segment of the abdomen (4). Centipedes have two claws through which they inject the venom (4). Honey bee a sting which is barbed and is left behind at the sting site along with the poisonous sac. It a small black with white poisonous sac attached at its free end. Wasps sting is not left behind and similarly sting of the hornet is not left behind (4). Caterpillars have sharp spines or hairs which have venom and moths also have similar structures and multiple spines or hairs can damage the skin. Blister beetles can cause blisters when rubbed on the skin (4).

Fangs of the elapids are short and fixed covered by mucous membrane whereas fangs of the vipers are long and erectile. In viper bite local swelling is there if poison is injected and same is true with cobra bites but swelling is delayed for one to two hours and is associated with local pain but this pain is not diagnostic. Presence of two puncture marks or blisters and local necrosis around the site of envenomation indicates bites by elapids and vipers (4). Systemic features do come to our help in diagnosing stings. Spit which is blood stained and local hemorrhages due to non-clotting blood indicates viper and whereas ptosis and palsy of the glossopharyngeal indicates bite by elapids (4).

Bites and stings do not cause poisoning always but only in some cases (4). Stings by insects rarely cause death (6). Toxic effects of stings and bites are usually vasculo-toxic, neurotoxic, cardio-toxic or myo-toxic (4). If vasculotoxic then stings are from viper family, if neurotoxic then usually these are elapids, sea snakes are usually myotoxic (4). Hemolytic activity of venom of stinging insects varies from low to very high and in the wasps it is very high where as it is low in ants (10). LD 50 (24 hours) of stinging insects may vary from 0.25mg/kg to 71mb/kg (11). In bee and wasp venoms there can be cross reactivity too (12).

If stings are from other than snakes then usually locally these are vasculotoxic, or automic neurotoxic and rarely cardiotoxic and amount of venom also changes the picture clinically (4).

Ticks have a saliva which is neurotoxic and cause paralysis (4). Bee venoms have mainly Mellitin which can change the permeability of the capillaries (4).

There are about 350 species of spiders around the world but 5 out of these are more toxic and produce lethal results and are usually in south America, USA, Africa and Middle East and Asia (4). Disulfide-rich insecticidal peptides are present in the venom of the spiders which act on the nervous system and paralyzes the victim insect usually (13).

In one of the studies in south India though 1000 cases are reported but no death from scorpion has been reported (14).

There are no absolute differences between venomous snakes and non-venomous snakes but one can learn to differentiate these two varieties in their own regions by the knowledge. Nonvenomous snakes have teeth but venomous too can have teeth and can cause bite marks and usually teeth are used for defensive bites and Boas and Pythons can cause lacerations which can be very large which are otherwise non venomous and in the similar category are Bull snakes and King snakes(15). Head of the Venomous snake is triangular roughly and wedge shaped (3) whereas in non-venomous snakes it is roughly slender but sea snakes and coral snakes have a special delivery system of venoms and most deadly snakes rarely bite people and the deadliest snake The Inland Taipan never killed any person on record because snakes may have slender head and some nonpoisonous snakes may look like poisonous snakes (16). Venomous snakes are very docile (17).

Eyes of the nonvenomous snakes are round where as in venomous snakes' eyes have vertical cat eye slits with the exception of coral snake. Vipers have a pit or smooth cap between their eye and nose and undivided scales on the under surface of their tails but in the nonvenomous snakes these may be divided (3) .

Asian Cobra and saw scaled vipers have killed most persons(1).

“Rhymes Red to Yellow kill a fellow and Red to Black Friend of Jack; Red on Black Venom Lack and Red on Yellow Deadly Fellow” (16).

Some species of Cobra can damage the eyes of the victim by spitting venom from a distance up to 2 meters (16). Gaboon Viper has the longest fangs about 2 inches (1).

Dogs and bats also causes bites and may cause systemic diseases like rabies (4) but are not causing poisoning. Bees sting once only and bees die after stinging and losing barbed stings. Whereas wasps, yellow jackets and hornets can sting multiple times (7)

Deaths due to insect bites in H group are mostly due to anaphylaxis. Though deaths can occur due to massive envenomation (20 stings/Kg in majority of mammals) by insects (7).

Major part of the venom of wasps and bees is protein, whereas in ants it is alkaloids in nature. Reaction can be local, regional, systemic anaphylactic or delayed type hypersensitivity. As death can occur due to anaphylaxis so cases of stings should be kept under observation (7).

Insect skin allergy code is 989.5 according to ICD-9 CM coding (18).

Insects have been used in the arousal of sexual activity and ants too have been used to increase the sexual enjoyment (19).

Scorpionblitz in 2nd Century against Roman emperor has been used by Mesopotamians to halt his march (20). It is said that Entomological wars have been fought by the USA against Koreans to spread disease and destroy crops (21). History of use of insects in wars are not new but used in wars against Crimean for minor plague, bees to attack directly, and Japanese also used it world war 2. Rat fleas, screw worm larvae, house flies, Colorado potato beetle, and ticks have been used as biological weapons (22).Scorpion bombs too have been used against the enemies in wars Bug pits have been used to torture prisoners (20).

Death caused by Honey bee stings have been reported when person known to be allergic to honey bee was found dead with approximately 50 sting marks and similar number of dead bees on the body (23).

Death from stings and bites is 17 times more in Rhodesia than roadside accidents stings and bites can cause local trauma, systemic disease, and envenomation along with local skin lesion (4).

So we are out to kill these insects but these may be future for the food security and these may be produced in farms to have the edible insects(24).

Identification from the local lesion is very poor and in one of the studies only 3.1% of the participant volunteers could identify correctly from the local lesion photograph and honey bee is most correctly identified insect (6).

Material and methods

Search was done on google and google scholar and using the authentic information from the websites of educational, institutional or government medical organization in this paper.

Discussion

Fear is a great factor when somebody gets sting or a bite and to ally the fear it is very important to identify the type of sting or bite. Envenomation do occur but it may not be with all the bites. To reduce the morbidity and mortality we need to know that death can occur by fear, allergic reaction or anaphylaxis. So awareness and prompt treatment will help in reducing this morbidity and mortality. Identification of the bite of the insect will help in the proper management of the treatment.

Conclusion

Stings and bites are caused by a variety of creatures. Some of the stings and bites are venomous and other are non-venomous. Some bites and stings produce local effects and some produce local as well as systemic effects. Study of these effects will help in the diagnosis and accurate management of the cases so that ill effects from the stings and bites can be reduced. More studies and tests need to be developed to identify the sting and bite marks.

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Conflict of Interest

None

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