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Snake Bite in Gezira Revision of 63 Envenomed Child

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Abstract:

Sixty three patients admitted to the Gezira National Center of Pediatric Surgery with snake bite were analyzed. All patients were envenomed and the snake was positively identified. In 39 patients (61.9%) the offending snake was (washash) (*Echis carinatus*) and in 24 patients (38.1%) (*Abdafan*) (*atractaspis microlepidata*) was identified. All patients were from rural Gezira where children are actively involved in agriculture and harvesting. The median age group was 9.3 years.

Females were equally involved as males. The mean time elapsed since the bite was 56 hours. Quicker arrival at hospital was seen in severe envenomation. Fifty patients had already received native remedies which was observed to increase the local wound complications. Most bites (79%) occurred in the leg .The majority of the bites occurs in the early rainy summer months. All patients presented initially with progressive painful swelling. Local necrosis was observed in seventeen patients (26.9%).

Fourteen patients (22.2%) developed compartment syndrome and three patients (4.76%) developed fingertip gangrene. one patient (1.6%) developed extensive bilateral common iliac vein thrombosis. DIC developed in 21 patients (33.3%). Two patients (3.2%) of theses developed intracranial haemorrhage. Four patients (6.3%) with local necrosis presented few month later with extensive chronic osteomyelitis. Treatment options included cardiovascular support, local wound debridement, fasciotomy and minor amputation. Patients with DIC were managed with fresh frozen plasma, blood transfusion and heparin. Antivenin was not administered to our patients. All patients eventually recovered except one child (1.6%) who succumbed of massive intracerebral haemorrhage.

ملخص:

تم تحليل البيانات لثلاث وستين طفلا تم تنويمهم بمركز الجزيرة القومي لجراحة الأطفال في الفترة من مارس 2001م الي ابريل 2010م بعد أن شخصت حالتهم بلدغة ثعبان سام. في كل المرضى تم التعرف على الثعبان. في 39 مريض كان الثعبان اللادغ من نوع و شاش (*ECHIS CARINATUS*) وفي 24 أبو دفان (*MICOLEPIDATA ATRACTASPIS*) كل المرضى كانوا أطفالا من أرياف الجزيرة وجميعهم يعمل في الزراعة والحصاد. بلغ متوسط العمر لديهم 9.3 سنة.

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كانت الإصابة متساوية لدي الذكور والإناث، متوسط الوقت المنصرم منذ اللدغة بالثعبان وحتى ألمجي للمستشفى كانت 56 ساعة، لوحظ إن ألمجي الباكر للمستشفى يكون في حالات التسسم الوخيم .

خمسون من المرضى كانوا قد تعاطوا علاجاً شعبياً قبل ألمجي للمستشفى، وقد لوحظ في هذه الفئة ازدياد معدل اخماج الجرح، معظم اللدغات (79%) حدثت في الطرف السفلي وقد حدثت معظم هذه اللدغات في بداية فصل الخريف، وقد كان ألمجي أسريري لكل المرضى تورم مؤلم متزايد، لوحظ النخر الموضعي في 17 مريض (26.9%) و 14 مريضاً (22.2%) عانوا من متلازمة الجوبة، و4.67% عانوا من موات في مقدمة الأصابع . مريض واحد (1.6%) عاني من تخثر متمد في الوريد الحرقفي المشترك بالجانبين. التخثر المنتشر داخل الأوعية لوحظ في 21 مريضاً (33.3%) . اثنان من هؤلاء حدث لهم نزف داخل القحفة. و4 مرضي (6.3%) حدث لهم التهاب العظم والنقي المزمن .

المعالجة لهؤلاء المرضى تضمنت مساعدة الجهاز الدوري وانضار الجرح الموضعي و بضع اللقافة وإجراء البتر البسيط، المرضى اللذين عانوا من التخثر المنتشر داخل الأوعية الدموية تمت معالجتهم بحقن المصورة المتجمدة الطازجة ونقل الدم الطازج واعطا الهبارين. لم يتم استخدام الترياق في أي من المرضى. كل المرضى تماثلوا للشفاء إلا مريضاً واحداً توفي بسبب نزف جسيم داخل القحف.

Key words: Snake bite, children, antivenin, disseminated Intravascular Coagulation (DIC)

Introduction:

In tropical countries where snake bite is a serious problem, reliable data are elusive. In these countries snake bite is an occupational disease of farmers huddlers and hunters. Most patients treated at hospitals in Nigeria had already taken local remedies. OF the more than 2500 speices of snake, about 500 belong to the four families of venomous snake, atractaspididae, elapidae hydrophide and viperidae⁽¹⁾. The most complex of all poisons, snake venoms may contain 20 or more components. The Variation of venoms composition from species to species explains the clinical diversity of snake bite. There is also considerable variation in the relative proportions of different venoms constituents within a single species throughout its geographical distribution at different seasons of the year and as result of aging⁽²⁾.

Final data was retrieved and tabulated. Envenomation was graded in to four

Scores (0 - 4)⁽³⁾:

Grade 0: Absence of signs and symptoms.

Grade 1: Mild local swelling, Pain and erythema, no systemic manifestation, normal laboratory findings.

Grade 2: Moderate progressive swelling around the bite site and one or more systemic manifestation, abnormal laboratory findings.

Grade 3: Marked systemic manifestation.

Venomous Snakes In Sudan:

Of the more than 2500 species of snakes, about 500 belong to four families of venomous snakes, but three of which are in Sudan.

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1: order squamata with family colubridae, this atypical snake, it is a back-fanged snake the famous one of which (psammophis schokari). Once considered non venomous, they have produced signs of envenoming in man and three species have caused fatal bites. These snakes are common in Blue Nile state and westerns Sudan.

2: order squamata, family atractaspidiae (African burrowing) snake and it has the following species:-

A: Atractaspis microlepidata with front moveable fangs. They are common in central Gezira state (figure 1).

B: Echis carinatus (the saw-scaled or carpet viper), produces a characteristic rasping sound by rubbing its coils together. They are common in gezira state (figure 2).

C: carpet viper or (mole viper) or adders false vipers, side – stabbing are stiletto snakes, have very long front fangs on which they impale their victims by side striking motion, the fang protruding from the corner of partially closed mouth.

D: puff adder (bitis arietans) this group is common in gezira state (figure 3).

3: family elapidae (cobras and mambas) kraits, shield – nosed snakes, coral snake and laticaudine sea snakes, have relatively short, fixed front fangs

A: naja annulifera (figure 4).

B: naja nigricollis black – necked spitting cobra this group is common in the south Sudan.

Role of anti-venom in snake bites;

It is the only specific treatment available and has proved effective against many of the lethal and damaging effects of venoms.

Anti-venom treatment may be complicated by three types of reaction early:

Anaphylactoid, pyrogenic and late (serum sickness type).

Indication for anti-venom:

1: haemostatic abnormalities.

2: cardiovascular abnormalities: hypertension, shock, abnormal E.C.G, arrhythmia, cardiac failure, pulmonary oedema.

3: neurotoxicity.

4: generalized rhabdomyolysis.

5: impaired consciousness.

6: in patient with definite signs of local envenoming.

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Anti-venom (anti – snake bite serum):

The most important clinical decision is whether or not to give anti venoms.

It may produce severe reaction and it is expensive and often in short supply.

Administration of anti venom:

If the biting species is known or can reliably be deduced, the appropriate mono specific anti-venom should be used.

Patients who fail to bring the dead snake must be treated with poly specific anti venom which will contain a lower concentration of specific anti-body to each species than the mono specific anti venom.

Anti venom should be given as soon as it is indicated, but it is almost never too late to give it as long as signs of systemic envenoming persist.

In contrast, local effects of venoms are probably not reversible by anti-venom, if delayed more than 1-2 hours after bite. Children must be given the same or larger doses of anti venom than adults. The response to anti venom will determine whether further doses should be given.

Patients and Methods:

This is a retrograde hospital based study. Data were obtained from the hospital clinical records of patients released after a diagnosis of snake bite envenomation between March 2001 and April 2010. Information on age, sex, geographical origin, anatomic side of the bite, envenomation grade, snake species, investigation, treatment offered, complications, length of hospitalization and the condition at the time of discharge were recorded. Data were also recorded for those children who were brought for follow up. Data was then processed in computer and analyzed using SPSS.

Results:

During the study period 75 patients were discharged with diagnosis of snake bite. 12 patients were rejected from the study because the snake was not positively identified.

Child age ranged from 3 years to 14 years the male to female ratio was 1.4: 1. Fourteen of the patients lived in the rim of towns and 49 in remote rural areas (Table 1).

The mean time elapsed since the bite was 56 hours. Forty three (68.3%) of the patients had already received local remedies. Pain and edema were the most common clinical signs at the time of hospitalization. The envenomation was moderate to severe.

Forty patients (63.5%) were bitten in the lower limbs; twenty two patients (34.9%) in the upper limbs and one patient (1.6%) on the face. In general 39 bites were caused by (*Echis Carinatus*) and 24 bites were caused by (*Atractaspis microlepidata*).

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Table (3) shows the complications observed in the 63 child bitten by venoms snakes. DIC is the most frequent complication (33.3%) followed by local wound necrosis and infection (54%) and compartment syndrome (20.6%). Four patients developed extensive osteomyelitis few months following the bite (figure 6). One child (1.6%) bitten on the face developed conjunctivitis and leucorrhoea . one female child presented with bilateral lower limb swelling following a bite on her left leg. Ultrasound (U\S) of the abdomen showed extensive bilateral common iliac vein thrombosis. Nine patients developed more than one complication.

Treatment options were individualized. Local wound debridement, minor amputation and faciotomy were options in local wound management and compartment syndrome. Patients with DIC were managed with fresh blood transfusion and heparin. Antivenin was not administered to our patients.

Discussion:

In Sudan data on snakes is scanty. The most frequent envenoming is caused by (*Echis carinatus*) and (*Atractaspis microlepidata*)⁽⁴⁾. To our knowledge the venoms of these snakes were not characterized .

On account of the clinical picture they produce, the venoms of these snakes must consist of myotoxins, anticoagulants and hyaluronidases⁽⁶⁾. Children are a major risk group because they frequently work in farms^(7, 8, 9). Children are usually more severely effected because of their smaller volume relative to venom dose¹. Snake bites occur mostly in the lower limbs, suggesting that many bites could be prevented by wearing boots⁵. The native people in Gezira believe that snake will retain their fangs on the victims body following a bite. This has led to the traditional practice of attempts of removal of snake fangs. Snake mouth is heavily colonized by many bacteria. Arroyo et al. found a high incidence of anaerobes including clostridium species in the oral cavities of venomous snakes. This fact coupled with the traditional practice of removing snake fangs led to the high incidence of local wound necroses and infection in our patients.

The severity of envenomation varies and clinical assessment of severity is an important tool in deciding appropriate treatment. Severity depend on several factors^(10, 11):

1. The amount of venom injected.
2. The anatomic bite site, the bite is more severe when it involves the head or the neck.

Pain and edema at the injection site are the most frequent findings. Local swelling results from the direct action of venom on the endothelium, which cause the release of inflammatory mediators. The increase in vascular permeability with subsequent increase in interstitial volume may result in a compartment syndrome.^(9, 10, 12)

In this study 21 of the patients (33.3%) developed hemorrhagic phenomena and DIC was the cause of death in one child (1.6%). Hemorrhage is a consequence of the direct action of the metalloproteinase present in the snake venom on the endothelium. There is also a thrombin- like enzyme in the venom that activates fibrinogen⁶. Our patients were effectively managed with fresh blood transfusion and heparin infusion .Agueno et al reported two deaths in series of 21 patients with DIC following snake bites although all his patients were offered antivenin.

D.A Wared stated that in the management of snake bite the most important clinical decision is whether or not to give antivenin for only a minority of snake bitten patients who need it, may produce severe reaction and it is expensive^(12, 13, 14) and often in short supply. In addition the local effects of venoms are

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probably not reversible by antivenin delayed more than 1-2 hours after the bite. Narvencar found a high rate of complications when the bite to needle time (time between the bite and the antivenin) is prolonged.

In Sudan snake venom is not characterized, the selection of a suitable antivenin is arbitrary, presentation is usually late and antivenin is usually in short supply and expensive. This led us to opt from using antivenin in our patients. Eventfully all our patients recovered except for one child (1.6%) who die of cerebral hemorrhage.

Our study suggests that snakes in Sudan need further characterization and that antivenin is not a corner stone in the management of snake bites. Aggressive early supportive treatment with timely surgical intervention improves the outcome in envenomed children.



Figure . 1 : Atractaspis microlepidota



Figure 2: Echis carinatus

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Figure 3: Bitis arietans

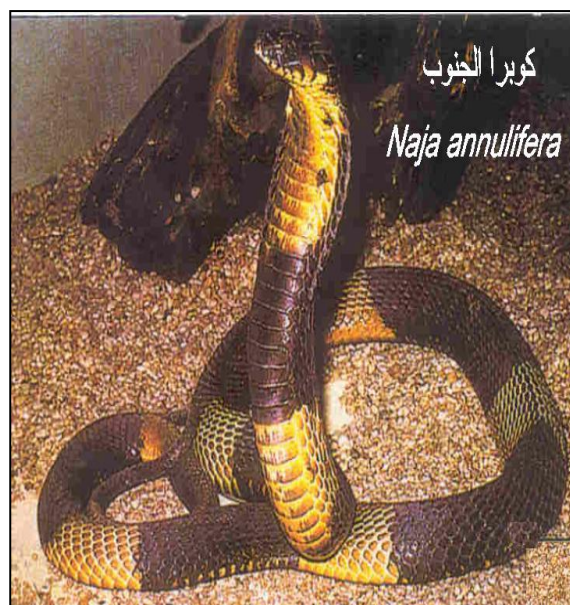


Figure 4: Naja annulifera

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Figure 5: Naja nigricollis



Figure 6: Chronic osteomyelitis

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Table(1): characteristics of the 63 children bitten by venous snake:

Characteristics	No.	Percentage
Sex : F*	26	41.3%
M*	37	58.7%
Age : <5 year	8	12.7 %
5-10	31	49.2%
>10	24	38.1 %
Total	63	100

F* = Female M* = Male

Table (2): Envenomation grade:

Grade	No.	Percentage
Grade 0	0	0%
Grade 1	13	20.6%
Grade 2	27	42.9%
Grade 3	23	36.5 %
Total	63	100%

Table (3): shows the complications observed in the 63 child bitten by venoms snakes:

Complications	No.	Percentage
No Complication	13	20.6%
DIC	21	33.3%
Local wound necroses	34	54%

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and infection		
Compartment Syndrome	13	20.6%
Chronic Osteomyelites	7	11.1%
DVT	1	1.6%
Conjunctivitis	1	1.6%

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