Neurotoxic Manifestations Of Snake Bite In Bangladesh

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Background

Snake bite is a potentially life threatening and important emergency situation a physician has to encounter in rural areas of tropical countries in South-East Asia including Bangladesh.
Importance of Snake bite in Bangladesh

- The estimated incidence of snake bite 1988-1989, 10% areas of Bangladesh
  - 764 bites and 168 deaths
  - Postal survey in 1995 – 1996, 21 Districts, 4.3 per 100,000 populations
  - Mortality 20 %
  - Highest incidence Chittagong Division and Barisal Division (7 per 100,000).
  - Farmers (44.6%), House wives (23%).

*Bang J Zool 1995, 23, 61-54*
Importance of Snake bite in Bangladesh

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Venomous Snake of Medical Importance In Bangladesh

- Cobra, *Naja*, Gokhra
- Krait, *Bungarus*, Shakini, Kewtey
- Russels Viper, *Daboia Russelli*, Chondrobor}
- Green Snakes, *Trimerusurus*, Galtawa
- King cobra, *Ophiophagus*, Shankachur
- Sea Snakes
Fig 1 (A): Common Cobra - Monocellete cobra
(Naja kaouthia) - Copyright: Prof MA Faiz

Fig 1 (B): Common Cobra - Binocellete cobra
(Naja naja) Copyright: Dr. T S N Murthy

Fig 2: King Cobra (Ophiophagus hannah)
Copyright: Dr. D A Warrell
Fig 3: Black krait (*Bungarus wali*) and Common Krait (*Bungarus caeruleus*)
Copyright: Ulrich Kuch

Fig 4: *Bungarus niger*
Copyright: Ulrich Kuch

Fig 5: *Bungurus lividus*
Copyright: Ulrich Kuch
Fig 6 (A & B): Russell's viper (*Daboia russelii*)

*Copy right: Professor D A Warrell*
Fig 7 (A & B): Green snake (*Cryptelytrops spp*)
*Copy right: Professor M A Faiz*

Fig 8 (A & B): Sea snake (*Hydrophidae spp*)
*Copy right: Professor D A Warrell*
Clinical Feature

Local symptoms & sign
- Fang marks
- Local pain
- Local bleeding
- Bruising
- Lymphangitis
- Lymph node enlargement
- Inflammation
- Blistering
- Local infection, abscess
- Necrosis

Generalized symptoms & sign
- General
- Cardiovascular bleeding and clotting disorder
- Neurological
- Skeletal muscle breakdown
- Renal
OBJECTIVE(S) OF THE STUDY

Primary:
To identify the Neurological manifestation of snake bite.

Secondary:
To document the Antisnakevenom reaction and pyrogenic reaction following use of polyvalent ASV
To monitor outcome of neurotoxic snake bite after management with ASV according to WHO/SEARO guideline
Methods

Study subjects:

Inclusion: Any patient, who presented with one or more of the recognized neurotoxic features developed after snakebite of all ages and both sexes, was included in this study.
**Methods (study subjects)**

**Exclusion:**

1. Patients having history of pre-existing neurological disease were excluded from the study.

2. Venomous snake bite leading to cardiotoxicity, renal failure or coagulopathy were also excluded from the study.

3. The patients who received antihistamine, sedative or steroids in prehospital or primary care management were also not included in this study.
Study site: Snake bite study clinic (SBSC) under medicine unit-III in Chittagong Medical College Hospital.

Study period: May 1999-June 2001
Methods (Cont)

A detailed history was taken from each of the patient and/or attendant and relevant points for example: time and place of bite, sequence of occurrence of symptoms with progression, pre-hospital treatment history etc. was specially sought.

Simultaneously thorough physical examination especially detailed neurological examination was done. Local examination was also done minutely to note fang marks, swelling, tenderness, blistering, enlarged and tender lymph nodes etc.
Methods (cont)

Investigations:
1. Haemoglobin level
2. TC and DC of WBC
3. Serum CPK
4. ECG
5. 20 min whole blood clotting test (20 min WBCT).
6. Bed side peak expiratory flow rate (PEFR) was done in every patients except those presented with ventilatory failure or unconscious
Methods (cont)

All patients were observed for 5 days in hospital to see recovery, antisnake venom reaction and any early residual neurological deficit and local necrosis present or not. If the patients developed neurological deficit or local envenomation, further observation by neurologist and surgical specialist was done.
Methods (cont)

- ASV administration-IV infusion of reconstituted freeze-dried antivenom (10 vials, 100cc) 5-10 ml isotonic fluid/kg ~250-500 ml isotonic fluid
  Infusion time-1 hour

- Observation: Bed side observation during whole period of administration of ASV (60 min)

- Observation for pyrogenic reaction upto 180 min

- Standby preparation: Adrenaline, Chlorpheniramine, Hydrocortisone, Oxygen, Salbutamol nebulization, cardiac monitor, ambo bag, facility for mechanical ventilation
Polyvalent antivenoms from India raised against venom from:

- Bungarus caeruleus
- Naja naja
- Echis carinatus
- Daboia russelii
Results (incidence)

Graph-1: Incidence of snake bite during study period
Results (Age distribution)

Graph-2: Age distribution N-35
Results (Sex distribution)

Graph-3: Sex distribution

- Male: 54%
- Female: 46%
Results (Site of Bite)

Graph-4: site of bite n-35

- Upper limb: 1
- Lower limb: 26
- Head-neck: 8
- Trunk: 1
Results (Time of Bite)

Graph-5: Time of bite (in hours)

- Day time
- Night time
## Results (Prehospital treatment)

<table>
<thead>
<tr>
<th>Example</th>
<th>Number of patient</th>
<th>percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application of multiple ligature</td>
<td>35</td>
<td>100</td>
</tr>
<tr>
<td>Immobilization</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Suction of bitten limb</td>
<td>7</td>
<td>20</td>
</tr>
<tr>
<td>Application of stone/seed</td>
<td>6</td>
<td>17.14</td>
</tr>
<tr>
<td>Incision at bite vicinity</td>
<td>10</td>
<td>28.57</td>
</tr>
<tr>
<td>Attempt of induced vomiting</td>
<td>6</td>
<td>17.14</td>
</tr>
<tr>
<td>Recitation by Ozha</td>
<td>17</td>
<td>48.57</td>
</tr>
</tbody>
</table>
Results (Neurological Sign)

Graph-8: Neurological features

- Ptosis
- Ext. ophthalmoplegia
- Cannot open mouth
- Broken neck sign
- Dysphonia/nasal voice
- Weakness of grip
- Depressed reflexes
Ptosis and Ophthalmoplegia
Broken Neck Sign
Respiratory Failure & Ventilation
Results (Power of muscles)

Graph-9: Power of limbs

8 3 2 0 13

- Grade-0
- Grade-1
- Grade-2
- Grade-3
- Grade-4
- Grade-5
Results (Chest movements)

Graph-10: Chest movement
Results(Sensory)

Graph-11: Sensory function

Intact
Impaired
Results (Local findings)

Graph: Local findings -- N-35

- Normal temp.
- Warm
- Cold
- Blistering
- Bleeding
- Swelling of limb
- Tenderness
## Results (Investigation)

<table>
<thead>
<tr>
<th>Investigation</th>
<th>Number of patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polymorph leukocytosis</td>
<td>23</td>
<td>65.7</td>
</tr>
<tr>
<td>Urinary albumin</td>
<td>19</td>
<td>54.2</td>
</tr>
<tr>
<td>Abnormal ECG</td>
<td>2</td>
<td>5.7</td>
</tr>
<tr>
<td>20 min. WBCT abnormal</td>
<td>35</td>
<td>0</td>
</tr>
</tbody>
</table>
Results (Antivenom)

Graph-17: Dosage of antivenom

- Single
- Double
- Triple

Data points:
- Single: 31
- Double: 3
- Triple: 1
Results (Auxiliary Treatment)

<table>
<thead>
<tr>
<th>Type of treatment</th>
<th>Number of patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anticholinesterase</td>
<td>30</td>
</tr>
<tr>
<td>Ventilator Support</td>
<td>5</td>
</tr>
</tbody>
</table>

Bar chart showing auxiliary treatment with Anticholinesterase at 30 and Ventilator Support at 5.
Results (Antivenom Reaction)

Antivenom Reaction

Number of patient

Type of reaction

- Both
- Pyrogenic
- Anaphylactic
Results (Anaphylactoid features)

- **Clinical type**
  - Angioedema
  - Bronchospasm
  - Vomiting
  - Urticaria

- **Feature of anaphylaxis**
  - Number of patients
Onset of Anaphylactoid Reaction

Onset of anaphylactoid reactions

<table>
<thead>
<tr>
<th>Time in min</th>
<th>Average</th>
<th>Minimum</th>
<th>Maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>28</td>
<td>10</td>
<td>50</td>
</tr>
</tbody>
</table>

Onset of anaphylactoid reactions
Results (Time of Recovery)

Graph-19: Time of recovery (in hours) from neurological features after A/V therapy
Results (Anaphylaxis management)

Dose of Adrenaline
- Single: 90%
- Double: 10%

Pie chart showing the distribution of doses.
# Results (Outcome of Treatment)

<table>
<thead>
<tr>
<th>Out-come</th>
<th>Number of patient</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Full recovery</td>
<td>34</td>
<td>97.15</td>
</tr>
<tr>
<td>Recovered with sequela</td>
<td>1</td>
<td>2.85</td>
</tr>
<tr>
<td>Dead</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Summary

The Elapidae group of snakes are (especially cobra and krait) the neurotoxic with or without local envenoming in our country.

The common neurotoxic features are ptosis, external ophthalmoplegia, broken neck sign, dysphagia, dysphonia, weakness, depressed reflex.
Summary

- Groups of muscles paralysis is common rather than sequential paralysis.
- Higher function are usually remain intact.
- Focal neurological deficit are rare.
- Sensory dysfunction is uncommon.
- Peripheral nervous system are more affected than central nervous system.
Summary

- Death is due to respiratory failure with respiratory muscle paralysis.
- Neurological sequelae is rare.
- Antivenom is highly effective.
- Antivenom reaction including anaphylaxis is very common.
- Antivenom reaction are easy to control with appropriate measure.
- Outcome is excellent.
THANK YOU