Prognostic Factors and Management of the Scorpion Envenomation in Morocco: Multivariate Analysis about 240 Cases


Poison control Center of Morocco
University Hospital of Fez, Morocco
Introduction

- Scorpion envenomation is a factual public health problem
- Approximately 5000 deaths occur each year in the world
- In Morocco:
  - scorpion stings are the first cause of poisoning (30%)
  - 40,000 scorpion stings are reported each year
  - South and Central South provinces of the country (Beni Mellal, khouribka, Marrakech…).
Introduction

- **El Kelaa des Sraghnas**
  - is one of the provinces most affected
  - due to its dry and arid climate, rocky relief and the presence of dangerous scorpion species
    - *Androctonus mauritanicus*,
    - *Hottentotta franzwerneri gentili*
    - and *Buthus malhommei*
  - high incidence (2.5 %) and high mortality rate (8.1 %)

- 2000: PCCPM was elaborated a National Strategy against scorpion sting
Dangerous scorpion species

- *Hottentotta franzwernerii*
- *Androctonus mauritanicus*
- *Buthus malhommei*
Aim of study

- Describe, from hospitalization data, socio-demographic, clinical and therapeutic characteristics of the scorpion envenomation in this province received during 2009

- Identify clinical risk factors associated with death

- Management of the Scorpion Envenomation in Morocco
Methods: Site of study

- This province represents 4.5% of National territory area
- 800,000 inhabitants in 2009
- *Androctonus mauritanicus* is endemic in this region
Methods

Subjects and data collection
- This transversal analytical study was conducted in the adult and paediatric intensive care unit of the regional hospital.
- This included all patients consulting for scorpion stings and having compatible clinical signs.

Clinical Classification
- Class I: local symptoms
- Class II: general symptoms
- Class III: life threatening symptoms
Methods

- Descriptive analysis
  - Socio-demographic characteristics of stung patients (sex, age, PSD..)
  - Clinical characteristics (symptoms and vital distress)
  - Treatment (symptomatic treatment of pain, vomiting and fever, fluid resuscitation, administration of dobutamine, oxygen, intubation, assisted ventilation...)

- Statistical analysis
  - The qualitative variables were compared with the chi2 test or the Fisher exact test if the numbers were low.
  - Results were declared significant when the p value was less than 0.05.
  - Multivariate analysis by logistic regression: clinical risk factors
## Results

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of patients</td>
<td>240</td>
</tr>
<tr>
<td>Hospital Incidence</td>
<td>3 for 10,000 patients</td>
</tr>
<tr>
<td>Median age</td>
<td>12 years [1 – 86 years]</td>
</tr>
<tr>
<td>Child ≤15 years</td>
<td>63.5 %</td>
</tr>
<tr>
<td>Sex-ratio</td>
<td>1.2</td>
</tr>
<tr>
<td>Median delay (PSD)</td>
<td>2h [10 min to 53 h]</td>
</tr>
<tr>
<td>Admission class</td>
<td></td>
</tr>
<tr>
<td>I</td>
<td>57 (23.8 %)</td>
</tr>
<tr>
<td>II</td>
<td>156 (65 %)</td>
</tr>
<tr>
<td>III</td>
<td>27 (11.3 %)</td>
</tr>
<tr>
<td>Envenomation rate</td>
<td>76.3%</td>
</tr>
<tr>
<td>Average duration of hospitalisation</td>
<td>34h ± 31h</td>
</tr>
<tr>
<td>Hospital lethality</td>
<td>8.1%</td>
</tr>
</tbody>
</table>
## Class according to the age

<table>
<thead>
<tr>
<th>Class</th>
<th>0 - 4</th>
<th>5 - 9</th>
<th>10 - 15</th>
<th>&gt; 15</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Number</td>
<td>%</td>
<td>Number</td>
<td>%</td>
</tr>
<tr>
<td>I</td>
<td>14</td>
<td>24.6</td>
<td>15</td>
<td>26.3</td>
</tr>
<tr>
<td>II</td>
<td>21</td>
<td>13.5</td>
<td>35</td>
<td>22.6</td>
</tr>
<tr>
<td>III</td>
<td>12</td>
<td>46.2</td>
<td>5</td>
<td>19.2</td>
</tr>
</tbody>
</table>

\[ p < 0.0001 \]
## Systemic symptoms

<table>
<thead>
<tr>
<th>Systemic signs</th>
<th>Number</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Class II</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Restlessness</td>
<td>12</td>
<td>1.9</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>31</td>
<td>4.9</td>
</tr>
<tr>
<td>Fever</td>
<td>50</td>
<td>7.9</td>
</tr>
<tr>
<td>Hypertension</td>
<td>19</td>
<td>3.1</td>
</tr>
<tr>
<td>Sweating</td>
<td>141</td>
<td>22.1</td>
</tr>
<tr>
<td>Priapism</td>
<td>26</td>
<td>4.1</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>155</td>
<td>24.5</td>
</tr>
<tr>
<td>Vomiting</td>
<td>145</td>
<td>22.9</td>
</tr>
<tr>
<td><strong>Class III</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cardiovascular distress</td>
<td>15</td>
<td>2.3</td>
</tr>
<tr>
<td>Respiratory distress</td>
<td>15</td>
<td>2.3</td>
</tr>
<tr>
<td>Neurologic distress</td>
<td>25</td>
<td>4</td>
</tr>
</tbody>
</table>
Specific fatality rate according to age and severity class

<table>
<thead>
<tr>
<th>Admission classes</th>
<th>Age groups (years)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&lt; 15</td>
</tr>
<tr>
<td>Number of deaths</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>15</td>
</tr>
<tr>
<td>11</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td></td>
</tr>
<tr>
<td>Specific fatality rate (%)</td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>9.6</td>
</tr>
<tr>
<td>7</td>
<td></td>
</tr>
<tr>
<td>33.3</td>
<td></td>
</tr>
<tr>
<td>Number of patients (n)</td>
<td></td>
</tr>
<tr>
<td>57</td>
<td>155</td>
</tr>
<tr>
<td>156</td>
<td></td>
</tr>
<tr>
<td>27</td>
<td></td>
</tr>
</tbody>
</table>
Treatment

- Antitetanus serotherapy
- Dopamine
- Corticoids
- Benzodiazepines
- Diuretics
- Ventilation
- Adrenaline
- Physical means
- Dobutrex
- Paracetamol
- Antibiotic
- Anthemetic
- Vascular filling
- Oxygen

Effective
Clinical signs statistically associated with death

<table>
<thead>
<tr>
<th>Clinical signs</th>
<th>Death n=20</th>
<th>Survivors n=220</th>
<th>P</th>
<th>OR (95% confidence limits)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Restlessness</td>
<td>3 (25)</td>
<td>9 (75)</td>
<td>NS</td>
<td>-----</td>
</tr>
<tr>
<td>Abdominal pain</td>
<td>4 (13)</td>
<td>27 (87)</td>
<td>NS</td>
<td>-----</td>
</tr>
<tr>
<td>Fever</td>
<td>14 (28)</td>
<td>36 (72)</td>
<td>1.3 10-6</td>
<td>11.93 [3.94-37.64]</td>
</tr>
<tr>
<td>Hypertension</td>
<td>3 (16)</td>
<td>16 (84)</td>
<td>NS</td>
<td>-----</td>
</tr>
<tr>
<td>Sweating</td>
<td>17 (12)</td>
<td>124 (88)</td>
<td>0,005</td>
<td>4.3871 [1.25-5.4]</td>
</tr>
<tr>
<td>Priapism</td>
<td>3 (12)</td>
<td>23 (88)</td>
<td>NS</td>
<td>-----</td>
</tr>
<tr>
<td>Tachycardia</td>
<td>19 (12.5)</td>
<td>136 (87.5)</td>
<td>0.0007</td>
<td>11.73 [1.54-89.28]</td>
</tr>
<tr>
<td>Vomiting</td>
<td>17 (11.7)</td>
<td>128 (88.3)</td>
<td>0.008</td>
<td>4.07 [1.15-14.3]</td>
</tr>
<tr>
<td>Cardiovascular</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>distress</td>
<td>7 (46.7)</td>
<td>8 (53.3)</td>
<td>3.9 10-5</td>
<td>13.9 [3.69-52.25]</td>
</tr>
<tr>
<td>Neurologic</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>distress</td>
<td>12 (48)</td>
<td>13 (52)</td>
<td>0.0001</td>
<td>12.72 [3.09-51.42]</td>
</tr>
<tr>
<td>Respiratory</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>distress</td>
<td>5 (33.3)</td>
<td>10 (66.7)</td>
<td>0.004</td>
<td>6.89 [1.63-25.88]</td>
</tr>
</tbody>
</table>
Discussion

- Scorpion envenomation represents a frequent medical emergency in this area essentially in summer.

- In the present study, children younger than 15 years old presented a high mortality rate.

- According to the literature, this mortality can be explained by the immaturity of both physiological systems and body’s defenses.

- And by the ratio between venom dose injected and body weight.
The clinical manifestations of scorpion envenomation differs from one species to another.

The signs and symptoms observed in this study are similar to those described in the envenomation by America buthidae.

Clinical risk factors identified in our study (fever, tachycardia, sweating, vomiting, cardiovascular, neurologic, respiratory distress) concorde well with literature data.

The presence of these signs must advise the clinician on the severity of envenoming, requiring a prompt management in an intensive care unit.

Moreover, many studies have demonstrated that there is a correlation between priapism and death; this notion wasn’t found in our result.
Conduite à tenir devant une piqûre de SCORPION

Interrogatoire - Examen local - Examen général

Hiérarchiser

**Classe I**
Symptomatologie locale
Douleur, rougeur, edème, fourmillement...

**Classe II**
Signes généraux
modification des constantes vitales, hypersudation, douleur abdominale...

**Classe III**
Déséquilibre cardiaque, circulatoire, respiratoire, neurologique

Rechercher les symptômes

Sensibiliser Eduquer

Traiter les symptômes

Sans signes de gravité
Age ≤ 10 ans
Fièvre > 39° C
Hypersudation
Vomissements
Pnaptisme...

Au moins 1 signe de gravité

Traiter jusqu'à disparition des signes

Transférer vers un service de réanimation

Sensibiliser Eduquer

Surveiller jusqu'à un T.P.P=4h

Suivi du malade

Mise en condition

Lors du transfert
Position demi-assise et libérer des voies aériennes
Oxygénothérapie avec sonde ou masque 0.1 L/min
Piste d'une eau venimeuse pour le transport du scorpion

En milieu de réanimation
Maintenir la mise en condition du patient
Mise en place d'une sonde urinaire
Mise en place d'une sonde gastrique

Exams paracliniques

En milieu de réanimation

Blanc sanguin, gôndée, NFS, urinaire sanguin
Blanc sérul, urée et créatinine
Blanc radiologique : radi des poumons
E.C.G.

En milieu de réanimation

Surveiller tous les 30 minutes :
Constantes vitales : TA, FC, FR, P’
État de conscience (score de Glasgow)
Glycémie (bandelette de Dextrostix
Saturation en oxygène (SatO2) par l’oxymètre
Ponction veineuse centrale (PVC)
Entraînable à la voie veineuse
Adapté le traitement en fonction de l’évolution
Transmet tous les paraclin et gestes effectués.

Pour plus de précision consultez le livret CAT ou téléphonez au 037 68 64 64 24h/24 et 7j/7.

En extra hospitalier :
Désensivisation

- Désensivisation locale par un antihistaminique
- Désensivisation globale

Désensivisation globale

- Antihistaminiques : 25 mg/kg en dose unique puis 10 à 15 mg/kg toutes les 6 heures sans dépasser 100 mg/kg/24h
- Antidépresseurs : 3/4g/24h en 3 prises
- Chimiothérapie (EMEP) en application locale à 1 ouvrant d’un pansement

Fièvre :
- Mèfements (finysis du gosud)
- Palmaréole : 10 à 15 mg/kg toutes les 6 heures

Vomissements : méthode promissile

- Enfant : 150 mg/kg prise toutes les 6 heures
- Adulte : une ampoule de 10 mg 4 à 6 fois/24h en IV ou en IV

Douleurs abdominales : Antiparoxymiques non stéropique :
- Phénobarbital (enfants) :
  - Enfant : 1 ampoule en IV ou IM 3 fois/24h

En milieu de réanimation :

- Désensivisation : 1 ampoule (lyophilisé) :
  - Enfant : 0.5 mg/kg, en dose réitérée (10) sans dépasser 10 mg par injection
  - Adulte : 5 à 15 mg/IV en IM prolongée
- Agitation : Midazolam (Hypnovel) 0.1 IV toutes les 15 minutes si besoin
  - Enfant : 0 à 0.5 mg/kg
  - Adulte : 2 à 5 mg

Hypertension artérielle :
- Nitroprusside (Nitrate) : 1 à 2 mg/m²/IV toutes les 10 minutes si besoin.

EAPCCT Congress, London 2012

Mise au point

Conduite à tenir devant une piqûre de scorpion au Maroc

Management of scorpion sting in Morocco

R. Soulaymani Bencheikh\textsuperscript{a}, A. Khattabi\textsuperscript{a,\ast,b}, Z. Faraj\textsuperscript{c}, I. Semlali\textsuperscript{a}
Impact of Moroccan scorpion sting strategy
Discussion (suite)

- In the present study, 20 deaths have been registered with a fatality rate of 8.1%.

- Which is higher than the national rate (0.86%) and compared to the incidence recorded in other Moroccan endemic areas (Benimellel, Khouribga, Fez).

- The mortality rate is within the range found in areas of high lethality.

- In Mexico, Soker and all (2000) reported 12.5% lethality among 64 children stung with scorpions.
Conclusion

- Our study confirms that the incidence and lethality rate remain high in this province of Morocco.

- It is noteworthy that there was a considerable improvement after the establishment of Moroccan strategy against scorpion stings.

- Indeed, the lethality rate decreased from 13.5% in 1998 to 8.3% in our study (2009).

- Despite all efforts, this rate still remains unacceptably high.
Conclusion

- In Morocco, the PCC and the Pasteur Institute of Morocco is currently working with Bioclon Institute of Mexico,

- to manufacture an antivenom adapted to our scorpion species and especially safe for our patients Alacramyn NAMO

- A multicenter clinical trial controlled randomized is programmed this summer for testing the effectiveness of this serotherapy
Thank you for your attention