Spider Envenomations Therapeutics and Antivenom Accessibility: A Systematic Review

Avinash N. Mukkala,1,* Christian Lecce,2,* Aisha Khatib,3,4 Michael Klowak,5 Priyanka Challia,6 Tianna Chong-Kit,7 Eric Shao,8 Jason Kwan,9 Emma Hagopian,10 Mofe Adeosun,11 Dylan Kain,4 Jamie Sookhoo,12 Apira Ariya, Andrea K. Boggild1,3,4,13,**

1Institute of Medical Science, University of Toronto, Toronto, ON, Canada; 2Faculty of Engineering & Architectural Science, Ryerson University, Toronto, ON, Canada; 3Tropical Disease Unit, UHN-Toronto General Hospital, Toronto, ON, Canada; 4Department of Medicine, University of Toronto, Toronto, ON, Canada; 5Faculty of Science, McMaster University, Hamilton, ON, Canada; 6Faculty of Arts and Science, University of Toronto, Toronto, ON, Canada; 7Department of Biochemistry, University of Waterloo, Waterloo, ON, Canada; 8Department of Microbiology and Immunology, University of Western Ontario, London, ON, Canada; 9Faculty of Health Science, McMaster University, Hamilton, ON, Canada; 10Faculty of Arts and Science, University of Toronto, Toronto, ON, Canada; 11Dalla Lana School of Public Health, University of Toronto, Toronto, ON, Canada; 12University of the West Indies, St. Augustine, Trinidad and Tobago; 13Public Health Ontario Laboratories, Toronto, ON, Canada. *Both authors contributed equally to this work.

Introduction:

• Spiders are a group of arthropods in the order Araneae and class Arachnida which have eight legs and fangs.
• Modern advancements in transportation allow increased human travel to areas which are endemic to spiders, increasing the possibility of envenomation.
• Physicians could select the optimal envenomation treatment using a clinical resource that compares efficacy statistics of antivenom versus other therapeutics.
• Our goal is to compile existing prevention and treatment data in the literature in order to synthesize this clinical resource.

Methods:

1. PubMed (NCBI), MEDLINE (OVID), EMBASE (OVID), Cochrane Database of Systematic Reviews (CIDR) and TOXLINE (TOXNET) were searched from inception to June 2018 using combinations of the search terms “spider”, and “envenomation”.

• We included: observational studies, case reports, case series, and cohort studies, as well as clinical trials, and antivenom safety, tolerability, and efficacy.
• We excluded: Molecular epidemiology and purely mechanistic pathogenesis studies.

2. Abstracts underwent double reviewer screening and only titles about spiders that had double inclusion responses were included for the full-text review.

3. A different pair of authors screened the subsequent full-texts and only double inclusion responses were included in the systematic review.

Future: A tertiary arbitrator will mitigate any inclusion/exclusion discrepancies experienced during both abstract screening and full-text screening. The GRADE approach will be used to assess quality of studies reporting therapeutic interventions. Data will be grouped and summarized by prevention, therapeutic strategies, geographic location and species. The recommended mode of treatment and management will be provided on an evidence-based, per-species basis. Meta-analysis will be planned if sufficient efficacy measures exist.

Results:

1. 961 MEDLINE articles, 1053 PubMed, 1486 EMBASE, 0 CIDR and 149 TOXLINE records were retrieved for title and abstract screening; after a multi-step de-duplication pipeline, 1928 remained.

2. Following the abstract screening protocol, 282 titles advanced to full-text review.

3. Full-text screening resulted in the inclusion of 24 titles to the systematic review.

Discussion:

Increased transcontinental movement of people and tropical produce has facilitated importation of arachnids to non-endemic regions where clinicians lack familiarity with envenomation syndromes and appropriate therapeutics. Synthesizing the current evidence around therapeutic strategies for arachnid envenomations can inform the development of appropriate treatment and prevention protocols.

Table 1: Antivenom Adverse Reactions and Pharmacological Treatments

<table>
<thead>
<tr>
<th>Species</th>
<th>Antivenom Adverse Reactions</th>
<th>Pharmacological Treatments</th>
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<tbody>
<tr>
<td>Latrodectus hasseltii (Redback Spider)</td>
<td>The adverse reaction rates were similar between IV and IM administration. There were no severe cases of anaphylaxis.</td>
<td>Pre-medication before antivenin administration: • Antihistamines • Adrenaline and antihistamine</td>
</tr>
<tr>
<td>Latrodectus mactans (Black Widow Spider)</td>
<td>Symptoms: • Urticarial rash • Fatal bronchospastic event • Myalgia • Fatigue • Generalized paroxysm • Generalized flushing Antivenom was avoided in patients who tested positive for a skin test or had a history of asthma or allergies</td>
<td>• Morphine • Meprobamate • Meperidine • Calcium gluconate • Diazepam • Analgesics • Diphenhydramine • Benzodiazepines • Ceftriaxone • Nebulized albuterol • Opioids • Antihistamines • Antibiotics • Nonsteroidal anti-inflammatories • Skeletal muscle relaxants Inefficacious: • Morphine and lorazepam • Hydromorphone, ketorolac, metoclopramide and lorazepam • Morphine and dazepam • Calcium gluconate</td>
</tr>
<tr>
<td>Lobosceles reclusa (Brown Recluse Spider)</td>
<td></td>
<td>• Eculizumab • Steroids • Antihistamines • Dapsone • Topical antibiotics • Nitroglycerine patch • Dapsone • IV Antibiotics • PRBC Transfusion • FFP Transfusion • Oral erythromycin • IM dexamethasone</td>
</tr>
<tr>
<td>Latrodectus spp. (Widow Spider)</td>
<td>Various adverse drug reactions.</td>
<td>• Benzodiazepines • Calcium • Intravenous fluids</td>
</tr>
<tr>
<td>Phoneutria spp. (Armed Spider)</td>
<td>No adverse drug reactions.</td>
<td>• Local anesthesia alone • Local anesthesia plus analgesics • Oral analgesics alone</td>
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