Spider Envenomations Therapeutics and Antivenom Accessibility: A Systematic Review

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Introduction:

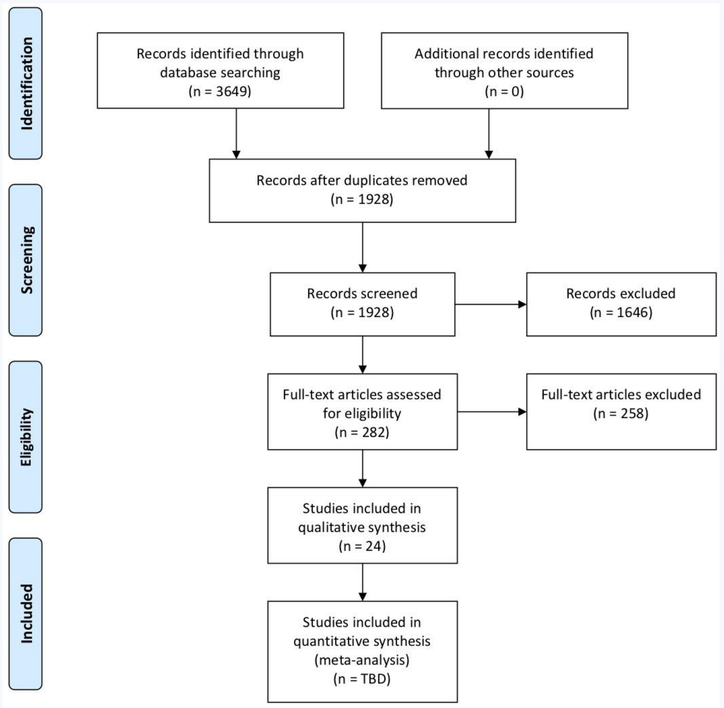
- Spiders are a group of arthropods in the order *Araneae* and class Arachnida which have eight legs and fangs
- Modern advancements in transportation allow increased human travel to areas which are endemic to spiders increasing the possibility of envenomation
- Physicians could select the optimal envenomation 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.

Figure 1. PRISMA Flowchart



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.

Figure 2. Preliminary qualitative data

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

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