MANAGEMENT OF NORTH AMERICAN PIT VIPER ENVENOMATION

Includes rattlesnakes, copperheads, and cottonmouths (water moccasins)

1. Assess Patient
   - Mark leading edge of swelling and tenderness every 15-30 minutes
   - Immobilize and elevate extremity
   - Treat pain (IV opioids preferred)
   - Obtain initial lab studies (protime, Hgb, platelets, fibrinogen)
   - Update tetanus vaccine
   - Contact poison control center (1-800-222-1222)

2. Check for Signs of Envenomation
   - Swelling, tenderness, redness, ecchymosis, or blebs at the bite site, or
   - Elevated pretitme; decreased fibrinogen or platelets, or
   - Any systemic signs
   - Present
   - Not present

3. Check for Progression of Clinical Effects
   - Swelling is that more than minimal and that is progressing, or
   - Elevated pretitme; decreased fibrinogen or platelets, or
   - Any systemic signs
   - Present
   - Not present

4. Administer CroFab®
   - Establish IV access and give IV fluids
   - Pediatric CroFab® dose = adult dose
   - Mix 4-12 vials of CroFab® in 250 ml NS and infuse IV over 1 hour
   - The starting dose may vary from a minimum of 4 vials to a maximum of 1.2 vials based on clinical judgment and severity of envenomation
   - For patients in shock or with serious active bleeding, increase initial dose of antivenom to 9-12 vials and call physician-expert (see Box 12)
   - Initiate first dose of CroFab® in ED or ICU
   - For suspected adverse reaction hold infusion, treat accordingly, and call physician-expert
   - Re-examine patient for treatment response within 1 hour of completion of CroFab® infusion

5. Determine if Initial Control of Envenomation Has Been Achieved
   - Swelling and tenderness not progressing
   - Pretitme, fibrinogen, and platelets normal or clearly improving
   - Clinically stable (not hypotensive, etc)
   - Neurotoxicity resolved or clearly improving
   - Yes
   - No

6. Monitor Patient
   - Perform serial examinations
   - Maintenance CroFab® therapy may be indicated
   - Read Box 13 (Maintenance CroFab® Therapy)
   - Observe patient 18-24 hours after initial control for progression of any venom effect
   - Follow-up labs 6-12 hours after initial control and prior to discharge
   - If patient develops new or worsening signs of envenomation, administer additional doses of CroFab® or Box 4

7. Determine if Patient Meets Discharge Criteria
   - No progression of any venom effect during the specified observation period
   - No unfavorable laboratory trends in pretitme, fibrinogen, or platelets
   - Yes
   - No

8. See Post-Discharge Planning (Box 14)

When to Call a Physician-Expert

- Direct consultation with a physician-expert is recommended in certain high-risk clinical situations:
  - Life-threatening envenomation
    - Shock
    - Severe active bleeding
    - Facial or airway swelling
  - Hard-to-control envenomation
    - Envenomation that requires more than 2 doses of CroFab® for initial control
  - Recurrence or delayed onset of venom effects
    - Worsening swelling or abnormal labs (pretitme, fibrinogen, platelets, or hemorrhage) on follow-up visits
  - Allergic reactions to CroFab®
  - If transfusion is considered
  - Uncommon clinical situations
    - Bites to the head and neck
    - Suspected compartment syndrome
    - Rhematoid vasculitis
    - Uncontrolled pain and angioedema
  - Complicated wound issues
    - If no local expert is available, a physician-expert can be reached through a certified poison center (8-1-800-222-1222) or the BTG Specialty Solutions Center™ (1-844-293-0007)

Maintenance CroFab® Therapy

- Maintenance therapy is additional CroFab® given after initial control to prevent recurrence of symptoms
- Maintenance therapy is 2 vials of CroFab® (2 x 3 vials in 12 and 18 hours after initial control)
- Maintenance therapy may not be indicated in certain situations, such as:
  - Minor envenomations
  - Facilitate close observation by a physician-expert is available
  - Refer local protocol or contact a regional poison center or physician-expert for advice

Post-Discharge Planning

- Instruct patient to return for:
  - Worsening swelling that is not relieved by elevation
  - Abnormal bleeding (gums, easy bruising, melena, etc)
  - Instruct patient where to seek care if symptoms of venom cleavage (fever, rash, muscle/pain) develop
  - Bleeding precautions (no contact sports, elective surgery, or dental work, etc) for 2 weeks in patients with:
    - Rattlesnake envenomation
    - Arrows, fibrinogen, or platelet count at any time
  - Follow-up visits:
    - CroFab® not given:
      - PRN only
      - PRN given
    - Copperhead victims: PRN only
    - Other snakes: follow up with labs (pretitme, fibrinogen, platelets, hemoglobin) twice (2-3 days and 5-7 days), then PRN

Treatments Not Proven to Be Beneficial in the Management of Pit Viper Envenomation

- Cutting and/or succioning of the wound
  - Ice
  - NIMDAs
  - Prophylactic antibiotics
  - Prophylactic fasciotomy
- Routine use of blood products
- Shock therapy
  - Steroids (except for allergic phenomena)
- Tourniquets

Notes

- This worksheet is adapted from general advice from a panel of US snakebite experts convened in May 2010. No algorithm can anticipate all clinical situations. Other valid approaches exist, and deviations from this worksheet based on individual patient needs, local resources, local treatment guidelines, and patient preferences are expected.
- This document is not intended to represent a standard of care. For more information, please see the accompanying manuscript, available at www.biomedcentral.com.

The SnakeBite911 App provides access to useful information, from snake safety and basic pit-viper bite first aid, to bite management and treatment in the ER.

In the case of poisoning, please call Poison Help at 800-222-1222 immediately, while the American Association of Poison Control Centers and its members do not endorse any antivenom product over any other, the nation’s poison experts stand ready to assist all in need of help.

24-hour Medical Information: BTG Specialty Solutions Center™
  - 1-877-377-3784
  - 1-844-293-0007 (Wox)
  - 1-877-636-9930 (Fee)

Please see accompanying full prescribing information, including events, precautions, and warnings.

www.CroFab.com

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Coppers and cottonmouths/marsh vipers.