

# NEWS FROM THE PIT

Arizona Poison and Drug Information Center



1

## Down with the Serum Sickness

By Bryan Wilson, MD

While there may be differing opinions on what is the best way to treat snake envenomations, one thing we can all agree on is the importance of antivenom. As of right now, it truly is the golden standard for the treatment of venomous snakes. That said, like any drug on the market, there are side effects to be aware of. In the case of antivenoms, we are most concerned about hypersensitivity reactions caused by interactions between components in the antivenom and the patient's immune system. The chance of these reactions occurring can depend on a myriad of things such as the type of antivenom used, previous exposures to antivenom, how much antivenom a person receives, and much more. In this month's NEWS FROM THE PIT, we'll briefly discuss hypersensitivity reactions and go into more depth on the most common hypersensitivity reaction we see in rattlesnake bites: serum sickness.

### NEWSLETTER HIGHLIGHTS

Causes, clinical presentation, and treatment for serum sickness

**Image 1: Mohave Rattlesnake**  
(*Crotalus scutulatus*)

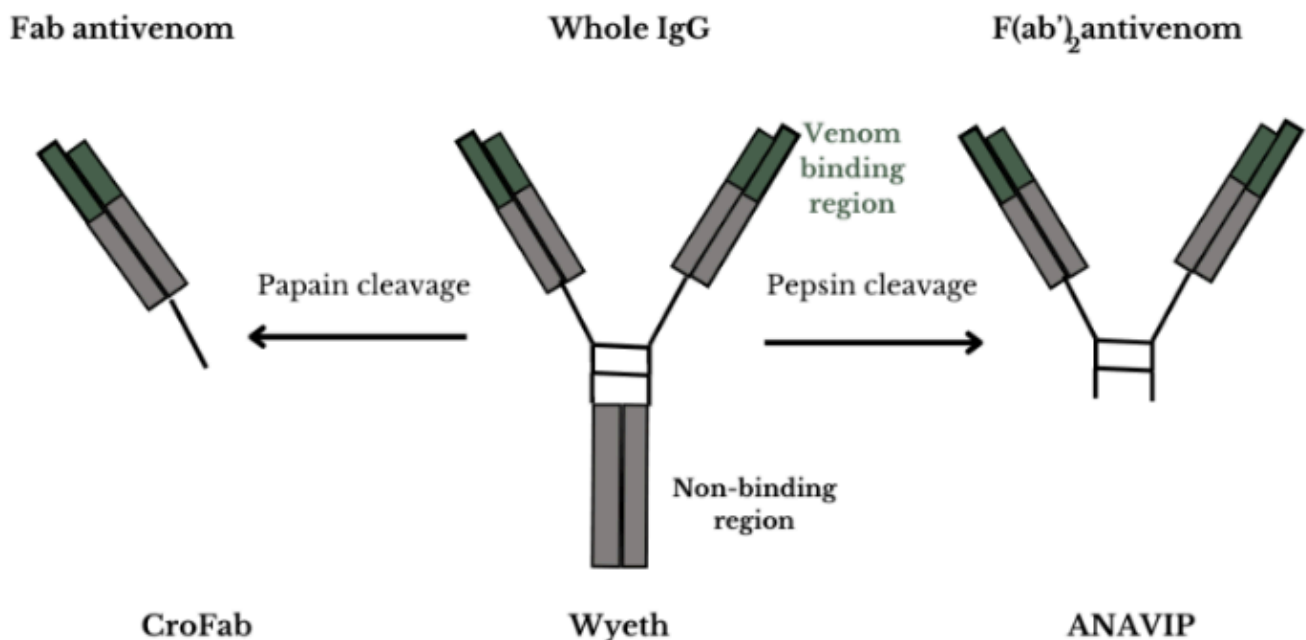
# Down with the Serum Sickness

Continued from page 1

## Acute Hypersensitivity Reactions

Hypersensitivity reactions can be divided into acute and delayed reactions. The one that causes the most fear in the minds of both patients and providers is most likely going to fall into the category of acute reactions. Specifically, we are talking about causing a Type I hypersensitivity reaction (also known as an IgE-mediated hypersensitivity) within minutes to an hour of antivenom being administered. While most times symptoms present as what people normally think of when they hear “allergic reaction,” we also see more severe symptoms such as confusion, low blood pressure, and airway swelling.

Our older antivenom Wyeth, was well known for having these types of reactions whereas our newer antivenoms CroFab and ANAVIP do not happen quite as often. This can largely be attributed to how these antivenoms are made. Antivenom comes from antibodies collected from animals who have been injected with venom that are then concentrated and purified into the antivenom we use in people. Since antivenom is derived from animals, sometimes our bodies recognize the antivenom as “not human” and mount an immune response to get rid of it. While Wyeth used the whole IgG antibody both Crofab and ANAVIP only use fragments of it which is why we tend to see fewer of these acute reactions with them.



# Down with the Serum Sickness

Continued from page 2

While acute hypersensitivity reactions present similar to allergic reactions and anaphylaxis, it is not clear all acute reactions are due to an allergic response and there may be other mechanisms involved. Regardless of the mechanism, the primary treatment for acute hypersensitivity reactions is intramuscular epinephrine. Most of the time treatment with antivenom can be continued (usually at a slower rate) despite the acute hypersensitivity reaction, nonetheless, expert consultation with a toxicologist or poison control center is advised.

## **Serum Sickness: Delayed Hypersensitivity Reaction**

While acute hypersensitivity reactions present similar to allergic reactions and anaphylaxis, it is not clear all acute reactions are due to an allergic response and there may be other mechanisms involved. Regardless of the mechanism, the primary treatment for acute hypersensitivity reactions is intramuscular epinephrine. Most of the time treatment with antivenom can be continued (usually at a slower rate) despite the acute hypersensitivity reaction, nonetheless, expert consultation with a toxicologist or poison control center is advised.

## **Serum Sickness: Classic Presentation**

Almost half of our patients experience some type of serum sickness with the onset of symptoms occurring between 3-18 days with patients who have prior exposure to antivenom or other immunoglobulin-based products (IVIg, rituximab, etc.) symptoms potentially occurring sooner. About 40% of our patients only complain of having a rash with or without itching that typically occurs on the torso or extremities. We also see a lot of complaints of no visible change in the skin but feeling like their entire body is itching. In about 10% of our patients, serum sickness presents with a flu-like syndrome. We will often see complaints of fever pain, arthralgias, and just “feeling under the weather”. While these are the most common ways serum sickness presents in our patients, there are some uncommon symptoms to still be on the lookout for.

Some uncommon symptoms include lymph nodes that can become swollen and painful, particularly in the axilla or groin, and enlargement of the spleen has also been described. Swelling of the face or extremities, kidney injury, and vascular injury have also been reported, but once again this is a rare finding. Finally, non-specific symptoms such as headache, blurry vision, and abdominal discomfort (nausea, diarrhea, bloating/cramps) have been reported by patients experiencing serum sickness.



# Down with the Serum Sickness

Continued from page 3

## Serum Sickness: Evaluation

Serum sickness is primarily a clinical diagnosis made based on the patient's history, signs, and symptoms. Patients who develop serum sickness have mild symptoms and can be treated with over-the-counter medications and do not typically require diagnostic testing. Diagnostic tests of blood and urine can be helpful in patients with more severe symptoms or where there is some doubt over the diagnosis; typical laboratory studies and their expected abnormalities are summarized in the table below.

### Laboratory findings in moderate to severe serum sickness.

Lab Test Ordered	Findings on Test
Complete blood count	Neutropenia Eosinophilia Thrombocytopenia
Erythrocyte sedimentation rate or C-reactive protein	Elevated; acute phase reactants
Complete metabolic panel	Elevated serum creatinine Elevated AST/ALT
Complement panel (CH50, C3, C4)	Low; depletion of complement components
Urinalysis	Proteinuria Hematuria

## Serum Sickness: Treatments

For many patients who develop serum sickness, symptoms will improve without specific treatment and so treatment is aimed at improving patient comfort. Over-the-counter antihistamines such as Benadryl or cetirizine can be used to reduce the rash, while ibuprofen or acetaminophen are helpful to improve pain and fever. If patients are complaining of itching something like hydrocortisone cream may be beneficial.

Moderate to severe cases such as those with fever > 101.3F (38.5C), difficult to control pain, an extensive rash, and/or signs of internal organ dysfunction can be treated with corticosteroids. Commonly, these patients are treated with oral prednisone (0.5 - 1 mg/kg/day for 5 days). In very rare cases, admission for intravenous methylprednisolone and close monitoring may be needed.

## Summary

Whether it be an acute or delayed hypersensitivity reaction, knowing the symptoms to look for and how to respond are of the utmost importance to patients and providers alike. In weighing the pros and cons of treatment, for now, providing antivenom still comes out on top despite some of the reactions one may get. As always, if you're caring for an envenomated patient or are one yourself, don't hesitate to contact your regional poison control center at 1-800-222-1222 to speak with experts who are available 24/7 and free of charge. Whether it be a closed throat or an itch you cannot get to stop, we can help you navigate it all.