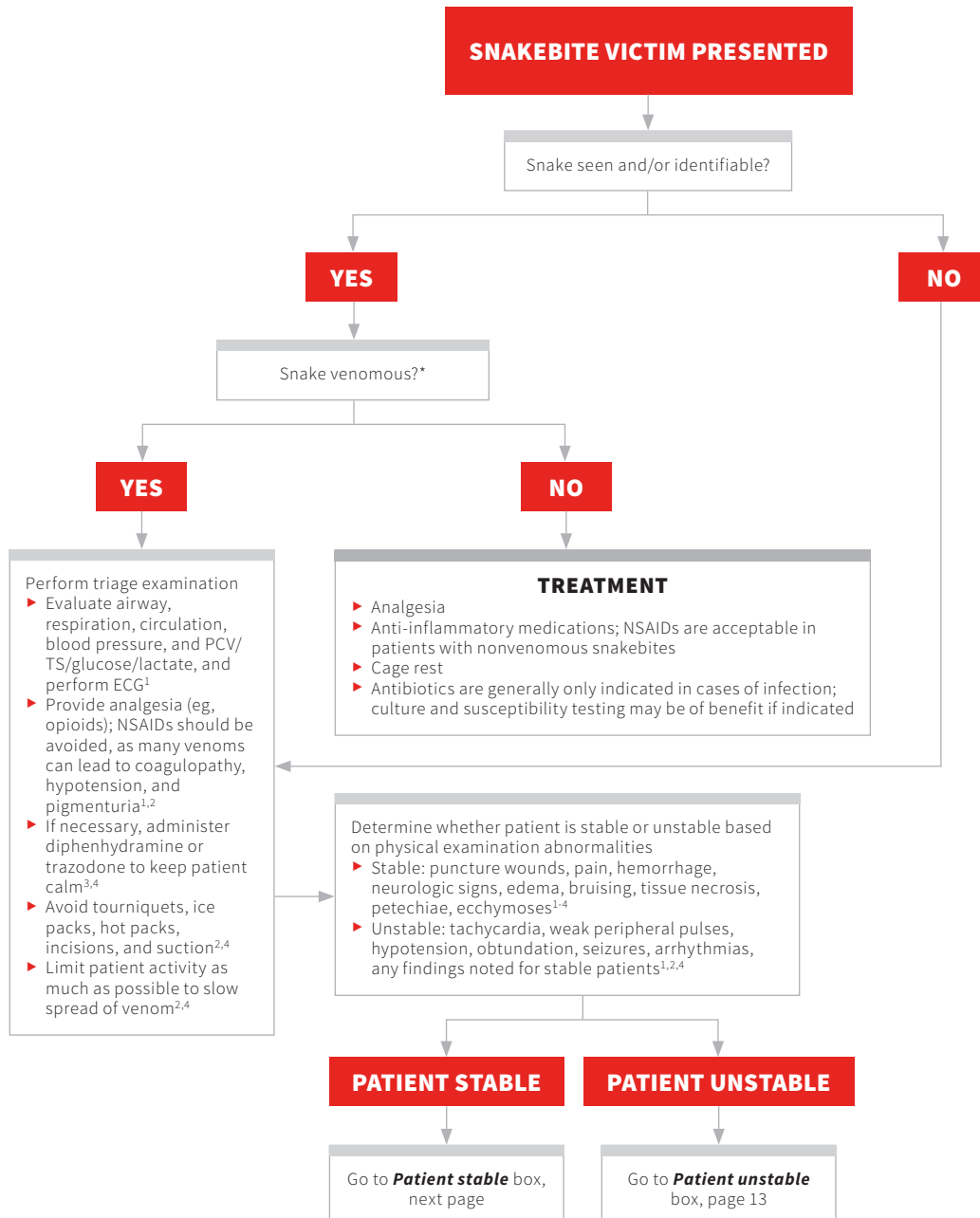


# SNAKE ENVENOMATION

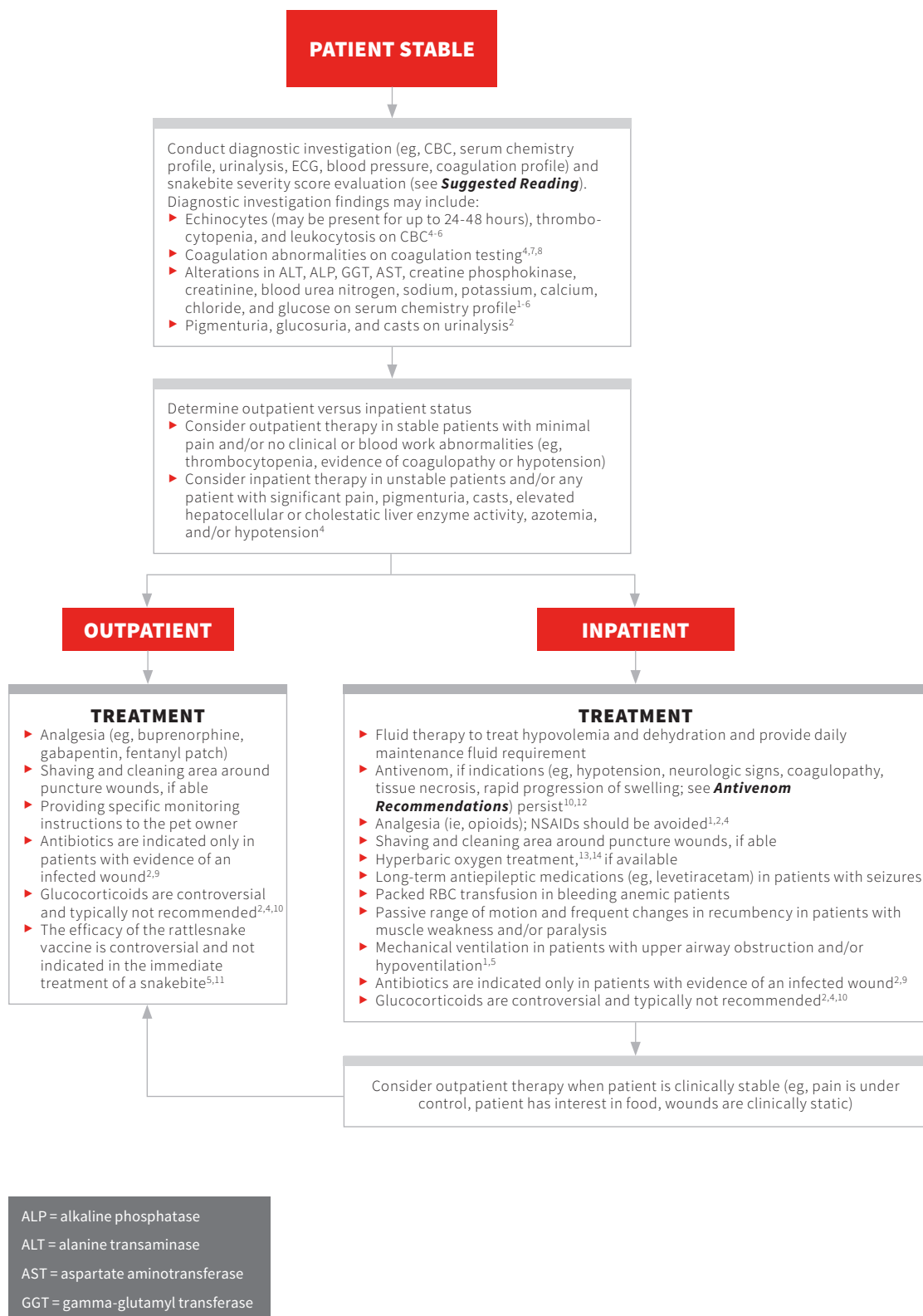
Adesola Odunayo, DVM, MS, DACVECC

University of Tennessee



\*Coral snakes and pit vipers (eg, rattlesnakes, copperheads, water moccasins, cottonmouths) are among the venomous snakes found in the United States.<sup>2,4</sup>

PCV = packed cell volume  
TS = total solids



## PATIENT UNSTABLE

### TREATMENT

Address life-threatening abnormalities

- ▶ Fluid bolus of isotonic crystalloids (10-25 mL/kg over 15 minutes) in patients with hypotension, then reassessment of patient.<sup>15</sup> Vasopressors may be required in certain patients
- ▶ Benzodiazepines in patients with active seizures
- ▶ Analgesia (ie, opioids); NSAIDs should be avoided<sup>1,2,4</sup>
- ▶ Antivenom (see **Antivenom Recommendations**)<sup>2,11</sup>
- ▶ Antiarrhythmics (eg, lidocaine, procainamide, amiodarone) as needed
- ▶ Oxygen supplementation as needed<sup>10</sup>
- ▶ Intubation and mechanical ventilation in patients with airway obstruction and/or hypoventilation<sup>1,5</sup>
- ▶ Vasopressors in patients with hypotension unresponsive to fluid therapy

After patient is stable, go to **Patient stable** box

## ANTIVENOM RECOMMENDATIONS

- ▶ Clinicians should start with one vial of antivenom per patient; however, patients with a lower body weight may require more antivenom,<sup>1-5</sup> as smaller patients tend to receive a larger amount of venom per kg of body weight when bitten (eg, a Chihuahua vs a Great Dane injected with the same amount of venom).<sup>5</sup>
- ▶ If the antivenom is lyophilized, one vial should be reconstituted with crystalloid fluids (100-250 mL).<sup>5</sup>
- ▶ Antivenom should be administered intravenously over 1 to 2 hours.<sup>2,3</sup>
- ▶ Patients should be monitored for signs of anaphylactoid/anaphylactic reactions.
- ▶ Diphenhydramine may be considered if anaphylaxis or a mild anaphylactoid reaction to the antivenom is suspected, whereas epinephrine and intravenous fluids should be administered for severe anaphylaxis/anaphylactoid reactions.<sup>2</sup> Administration of antivenom should be stopped in both instances.<sup>4</sup> However, if the reaction is not severe, administration of antivenom should be slowly resumed after approximately 20 to 60 minutes.<sup>4</sup> Additional support in patients with hypotension (eg, vasopressors) and/or respiratory signs (eg, mechanical ventilation) may be required.<sup>1</sup>

## References

1. McAlees TJ, Abraham LA. Australian elapid snake envenomation in cats: clinical priorities and approach. *J Feline Med Surg*. 2017;19(11):1131-1147.
2. Armentano RA, Schaer M. Overview and controversies in the medical management of pit viper envenomation in the dog. *J Vet Emerg Crit Care (San Antonio)*. 2011;21(5):461-470.
3. McCown JL, Cooke KL, Hanel RM, Jones GL, Hill RC. Effect of antivenin dose on outcome from crotalid envenomation: 218 dogs (1988-2006). *J Vet Emerg Crit Care (San Antonio)*. 2009;19(6):603-610.
4. Gilliam LL, Brunker J. North American snake envenomation in the dog and cat. *Vet Clin North Am Small Anim Pract*. 2011;41(6):1239-1259.
5. Wells RJ, Hopper K. Management of clinical snake bite in dogs and cats. In: Gopalakrishnakone P, Vogel CW, Seifert SA, Tambourgi DV, eds. *Clinical Toxinology in Australia, Europe, and Americas*. Springer; 2018:487-503.
6. Goddard A, Schoeman JP, Leisewitz AL, Nagel SS, Aroch I. Clinicopathologic abnormalities associated with snake envenomation in domestic animals. *Vet Clin Pathol*. 2011;40(3):282-292.
7. Stanley MK. *Viscoelastic Coagulation Changes in Dogs with Tiger Snake Envenomation* [master's thesis]. Melbourne: University of Melbourne; 2018.
8. Lieblick BA, Bergman PJ, Peterson NW. Thromboelastographic evaluation of dogs bitten by rattlesnakes native to southern California. *Am J Vet Res*. 2018;79(5):532-537.
9. Carr A, Schultz J. Prospective evaluation of the incidence of wound infection in rattlesnake envenomation in dogs. *J Vet Emerg Crit Care (San Antonio)*. 2015;25(4):546-551.
10. Hoose JA, Carr A. Retrospective analysis of clinical findings and outcome of cats with suspected rattlesnake envenomation in southern California: 18 cases (2007-2010). *J Vet Emerg Crit Care (San Antonio)*. 2013;23(3):314-320.
11. Witsil AJ, Wells RJ, Woods C, Rao S. 272 cases of rattlesnake envenomation in dogs: demographics and treatment including safety of F(ab')<sub>2</sub> antivenom use in 236 patients. *Toxicon*. 2015;105:19-26.
12. Pashmakova MB, Bishop MA, Black DM, et al. Multicenter evaluation of the administration of crotalid antivenom in cats: 115 cases (2000-2011). *J Am Vet Med Assoc*. 2013;243(4):520-525.
13. Birnie GL, Fry DR, Best MP. Safety and tolerability of hyperbaric oxygen therapy in cats and dogs. *J Am Anim Hosp Assoc*. 2018;54(4):188-194.
14. Korambayil PM, Ambookan PV, Abraham SV, Ambalakat A. A multidisciplinary approach with hyperbaric oxygen therapy improve outcome in snake bite injuries. *Toxicol Int*. 2015;22(1):104-109.
15. Odunayo A. Fluid therapy. *Clinician's Brief*. 2018;16(10):71-75.

## Suggested Reading

Peterson ME, Matz M, Seibold K, Plunkett S, Johnson S, Fitzgerald K. A randomized multicenter trial of Crotalidae polyvalent immune F(ab) antivenom for the treatment of rattlesnake envenomation in dogs. *J Vet Emerg Crit Care (San Antonio)*. 2011;21(4):335-345.