Blood collection & injection techniques in snakes

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Two techniques for collecting blood from snakes are described. In the first procedure, the snake is anesthetized and an incision made approximately 3 cm, posterior to the heart. Either the posterior vena cava or the aorta is exteriorized and the blood sample is taken. Repetitive blood samples for comparative studies may be obtained by this method. The exposed vena cava may also be used for intravenous injections.

Anesthesia is optional in the second procedure. The blood sample is collected from the ventral aspect of the tail approximately 5 cm posterior to the vent. Withdrawal is slow and only a small volume is obtained. The sample is suitable for selected clinical pathology procedures.

A SUMMARY of methods for collecting blood from reptiles has been published.[1] In that summary, four ways to collect blood from snakes are mentioned: cardiac puncture; bleeding from the palatine vein on the roof of the mouth; an orbital bleeding technique in which a capillary tube is used to pierce the conjunctival membrane between the eyeball and orbit; and blood collected by cutting off the tip of the tail.

Some of these techniques are inconvenient and disfiguring, and their effectiveness may depend upon the size of the snake. Often little or no blood is collected. In the cardiac-puncture technique, the heart is difficult to stabilize. In some cases, this method can lead to cardiac tamponade.

Alternate methods of bleeding snakes have been sought in an effort to obtain clinical data for continuing studies in reptilian medicine. In this paper we discuss two methods of blood collection and one injection technique for snakes. One method is feasible for snakes requiring multiple bleedings or intravenous injections. The other method is useful when only small volumes of blood are needed.

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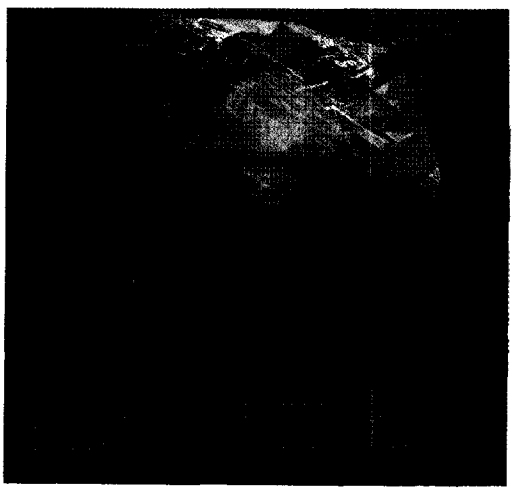


Figure 1—A gopher snake has been placed in a plastic bag filled with a mixture of halothane and nitrous oxide.

Materials and Methods

For the first bleeding procedure, anesthesia was induced and maintained by placing the snake in an environment with 5% halothane (Fluothane®—Ayerst) and nitrous oxide/oxygen at a ratio of 2:1. Halothane is reportedly a safe and rapid inhalation anesthetic for snakes.[2]

We have used two devices to anesthetize snakes for blood collecting. The first was a clear, 14-gallon plastic bag. The snake was placed in the bag and the air was evacuated from the bag. Then the bag was filled with the mixture of halothane and nitrous oxide (*Figure 1).* The bag was sealed and left on a table until the snake was anesthetized, which required 10 to 15 minutes. Surgical anesthesia was determined by turning the snake onto its back while it was still in the bag. If the snake did not right itself, showed loss of muscle tone, and did not move when manipulated, it was considered anesthetized.

The second apparatus was a plastic tube about 100 cm long and 6 cm in diameter connected to an anesthesia machine (*Figure 2).* Usually the snake readily entered the tube. Then the anesthetic gases were turned on and the plastic tube was flushed. The end was sealed with a rubber glove and the anesthetic circuit, including the reservoir bag, was filled. Criteria used to determine anesthesia were the same as when the plastic bag was used.

When the snake was anesthetized in the plastic bag, the tail was pulled through an opening in the bag until an area around the heart was exposed. The bag was then resealed with the snake's head still in the bag *(Figure 3).* When the tube was used, the snake was withdrawn from the tube until the area

Figure 2—A gopher snake is being anesthetized in a plastic tube. Note the full reservoir bag and the surgical glove used to help maintain an environment of constant anesthetic gases.

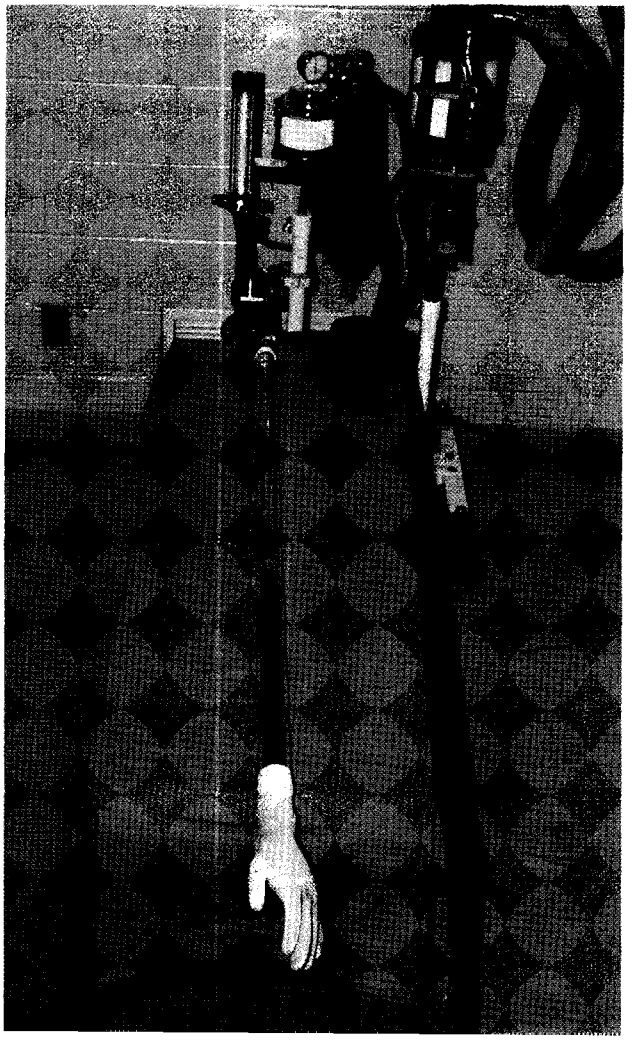
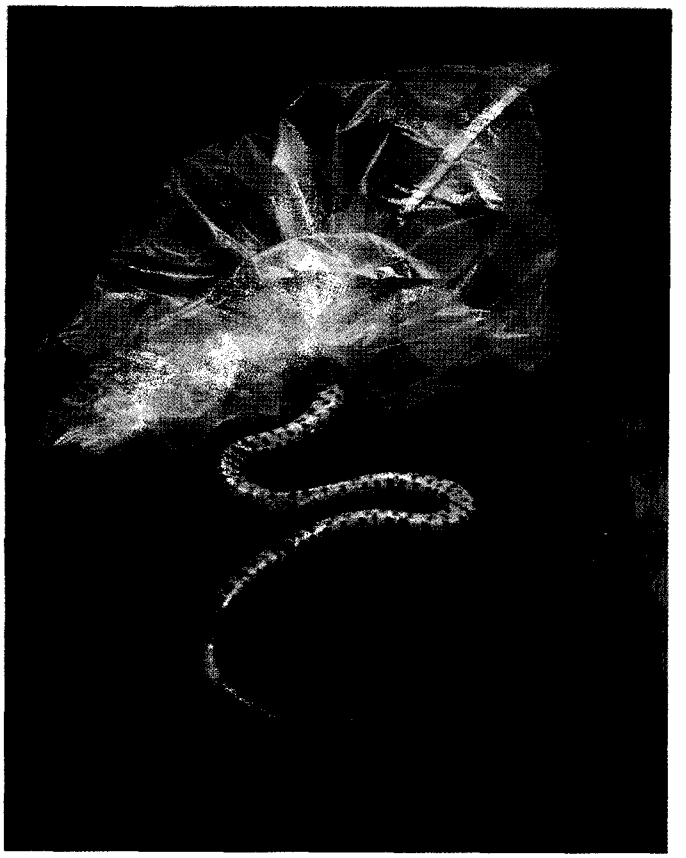


Figure 3—Anesthetized snake with its head in a gas-filled plastic bag. The tail and an area around the heart are exposed.



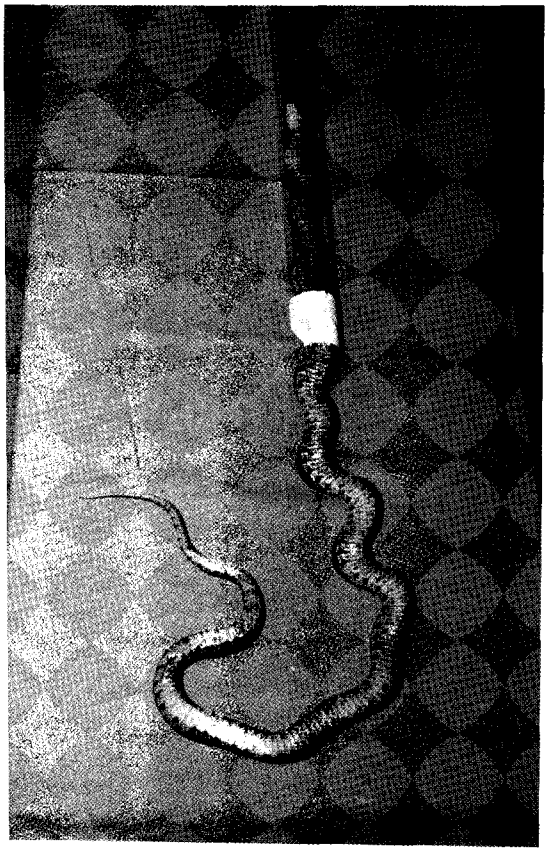
around the heart was exposed. Tape was placed around the body and the tube to form a seal so that the snake's head was still exposed to the anesthetic gases (*Figure 4*). The snake should not be left in the bag or sealed tube for more than one hour because respiratory depression occurs.

The heart was located by palpation and an incision was made transversely through the scales approximately 3 cm posterior to the heart. This incision was then extended into the coelomic cavity to expose the posterior vena cava and the aorta. A silk tie was placed around the vessel to be exteriorized (*Figure 5*). The blood sample could be obtained from either vessel with a 3-cc heparinized syringe and a 26-gauge needle (*Figure 6*). Generally, 0.5 cc to 1.5 cc of blood was obtained. However, much larger quantities were obtained from larger snakes.

Immediately after blood was collected, pressure was maintained with a sterile cotton-tipped swab

Figure 5—Surgical exposure of the posterior vena cava and aorta. The silk ties are used to exteriorize the vessels.

Figure 4—Anesthetized snake with its head in a gas-filled tube. Note the tape that forms a seal to maintain anesthesia.



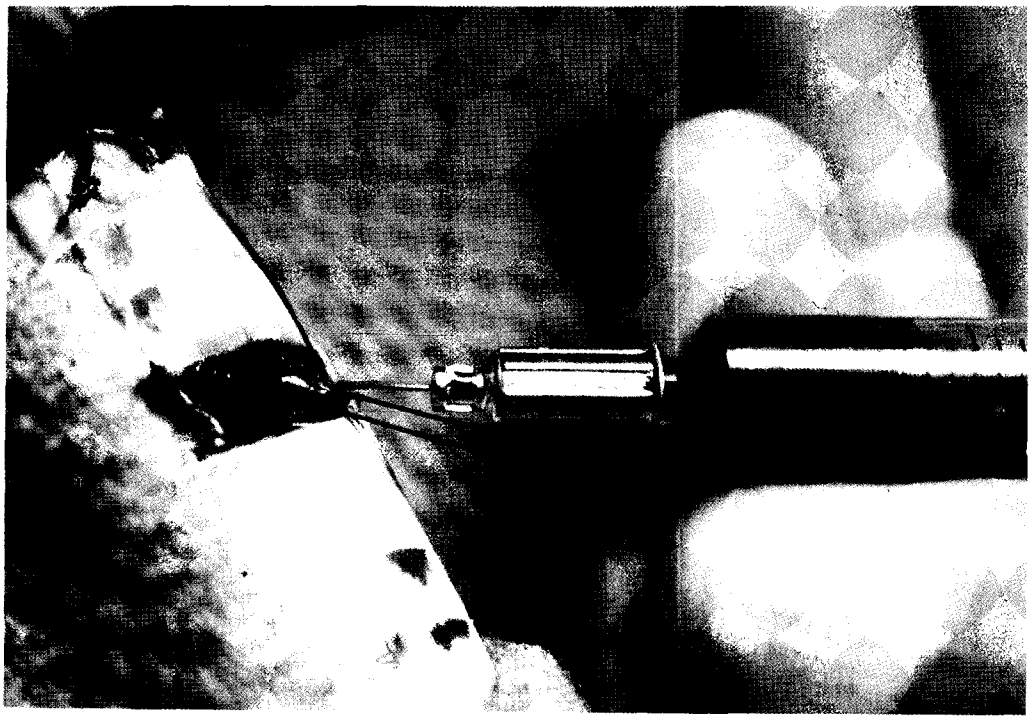


Figure 6—Blood sample being collected from an exteriorized aorta.

Figure 7—Blood sample being collected from the ventral midline on the tail of a nonanesthetized gopher snake restrained in a plastic tube.

until the hemorrhage had subsided (5 to 8 minutes). The incision was closed with horizontal mattress sutures through the scales.

Blood samples may be collected repeatedly from the same incision site. Repetitive blood samples were obtained in this manner from 24 gopher snakes (*Pituophis melanoleucus catenifer)* and 7 black rat snakes (*Elaphe obsoleta)* weighing between 200 and 1200 gm and measuring between 90 to 170 cm from the backs of their heads to their vents. No fatalities have occurred after more than 150 bleedings.

In the second technique for collecting blood, the blood sample was obtained from the snake's tail. Blood collection from the ventral vessels of the tail in the lizard is an established method.[3,4] This procedure does not require anesthesia, but it can be used if desired *(Figure 7).*

The snake was anesthetized using the tube method previously described. The blood sample was withdrawn from the ventral midline of the tail, approximately 5 cm posterior to the vent, with a 20-gauge needle. Withdrawal of the blood sample was slow and only about 0.5 cc was obtained.

Discussion

The surgical technique of collecting blood described here has several advantages. Usually large volumes of blood may be obtained and blood samples can be collected repeatedly. The incision exposes both the artery and the vein. This can be useful for comparative sampling. The vena cava may also be used for intravenous injections.

Some disadvantages of this method are: the snakes must be anesthetized, the technique is more time-consuming than conventional methods, and the technique requires surgery.

The method of collecting blood via the tail is simple and relatively fast and anesthesia is not necessary. However, this technique is not suitable for repetitive sampling. Also, a hemolyzed sample may be obtained. A problem can arise if a male snake is not bled posterior to the hemipenis. The hemipenis may prolapse if it is traumatized by the needle.

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