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BLOOD COLLECTION IN THE SEA LION

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INTRODUCTION

When new animals to be used in research are brought to our campus from other laboratories, from commercial breeders, or from the wild, routine specific quarantine procedures are followed for each species, including the collection of blood and the determination of certain hematologic and clinical chemical parameters. Animals with values which do not fall within accepted normal ranges are withheld temporarily or excluded from research.

The collection of venous blood from our sea lions was a particular challenge, since no one in our group had any practical experience but we had observed three sea lions being bled during a visit at Point Mugu a few years ago. The technique involved capture of the animal and when satisfactorily immobilized it was placed on its back and precaval or right atrial puncture was performed. This technique has been subsequently replaced because it required the use of intramuscular anesthetic agents which often induced respiratory failure. The current method, which does not require anesthesia, utilizes a vein lateral to the vertebral column at the thoracolumbar level. This technique was successfully demonstrated at the 1970 IAAAM meeting in Miami by John Simpson. Attempts in our laboratory to collect samples by this method were unsatisfactory and alternate sites were considered.

Essential for selection of a site for blood collection was the knowledge of where the blood vessels lie under the skin and subcutis. During the two years we have had sea lions, only one death has occurred and even this death has permitted only limited opportunity for anatomic exploration. On this one occasion we did, however, demonstrate that a large vein analogous to the external jugular was located so that it could be reached with a 1½ - 2 inch 18-21 gauge needle through the lateral aspect of the neck. It was further shown that the carotid arteries are in the juxtratracheal position, and that a sufficient length is available to permit an external carotid loop to be surgically prepared. A cross section of the neck (Figure 1) illustrates the relationship of peripheral veins and arteries to the mouth, neck, and larynx; the jugular vein and carotid artery are identified, their depth stated, and external landmarks are labelled, which should allow one to successfully collect venous or arterial blood samples.

METHOD

The sea lions are individually herded into the “Simpson-Ridgeway” restraining device previously described. The animal is allowed to move forward until its head and neck are extended through the stanchion. In this position, dorsal compression of its body prevents rearward movement and a small gate is used to move its head to one side, exposing the neck for jugular or carotid puncture. An imaginary line is drawn parallel to the lips and extending from the lateral commissure of the mouth back along the neck. The jugular underlies this line. Venipuncture is attempted 10-12 inches from the commissure to provide a safe distance from the mouth. To reach the carotid, one penetrates through the vein until the artery is reached, which is indicated by the arterial blood which pulsates out of the needle. This requires insertion up to the needle hub when using a 2 inch needle in a 90 pound sea lion.
FIGURE 1. X = Puncture site for blood collection from the jugular and carotid vessels in the California sea lion.

DISCUSSION

With the development of a technique for obtaining peripheral blood samples from sea lions, it can be expected that rapid progress will be made in the definition of hematologic and clinical chemical parameters of animals used on our campus. Successful venipuncture has been performed in all nine animals in which it was attempted. Additional avenues opened include the possible use of intravenous medications or material such as radio-opaque substances, and the possible expanded use of ultra-short-acting anesthetic agents.

In addition, the accessibility of the carotid artery indicates that the exteriorization of this vessel would be a simple surgical procedure which would allow multiple arterial sampling.

LITERATURE CITED


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