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PITFALLS, PROBLEMS AND PERFECTION OF BLOOD PRESSURE MEASUREMENT

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A diagnosis of systemic hypertension is based upon determination of systemic arterial blood pressure. Therefore, reliable measurement of blood pressure is required to establish a diagnosis of systemic hypertension and the efficacy of antihypertensive therapy must be judged upon the basis of blood pressure measurements.

IN WHICH PATIENTS SHOULD BLOOD PRESSURE BE MEASURED?

While it is possible to measure BP in all clinical patients, currently there is not sufficient rationale to do so in veterinary medicine. It is appropriate to measure BP in animals with metabolic diseases associated with hypertension, such as chronic kidney or cardiac disease, hyperthyroidism, hyperadrenocorticism, diabetes mellitus.

WHAT DEVICE SHOULD I USE?

Indirect methods of blood pressure measurement include auscultatory, ultrasonic Doppler, oscillometric, and plethysmographic devices. All of these indirect techniques employ an inflatable cuff wrapped around an extremity. The pressure in the cuff is measured with the aid of a manometer or a pressure transducer. A squeeze bulb or automated device is utilized to inflate the cuff to a pressure in excess of systolic blood pressure, thereby occluding the underlying artery. As the cuff is gradually deflated, changes in arterial flow are detected by one of several means; the value for cuff pressure at various levels of deflation is then correlated with systolic, diastolic, and/or mean blood pressure. This detection method varies among the different indirect methods, which include Doppler ultrasonography, oscillometry, and plethysmography. Any of these devices may work. Specific needs of the practice will dictate which is best and trial evaluation of devices using different detection methods is recommended.

WHERE SHOULD I PLACE THE CUFF?

The cuff may be placed around the brachial, median, cranial tibial or medial coccygeal arteries. For the Doppler technique the cuff is usually placed over the median artery and the transducer is placed ventrally between the carpal and metacarpal pad. For the oscillometric technique, the brachial or coccygeal arteries in cats; either the median or coccygeal artery in dogs seems to provide the most reliable values.

HOW SHOULD THE PATIENT BE POSITIONED?

The best position will generally be determined by the comfort level of the animal. Lying in a relaxed and immobile position is preferred. However, some animals will prefer to sit on the examination table or in their owner’s lap. In the final analysis, you need to adjust your technique to the animal: The extremity being cuffed must be readily accessible, relaxed in a natural position and immobile, and the animal should have a stress-free attitude and be in a sustainable, comfortable position.

You should provide an environment that is quiet, away from other animals and (generally) have the owner present and allow a quiet equilibration time for the animal in this room of 5-15 minutes. Obtain at least 5 consistent measurements (<20% variation in systolic readings) Average the values obtained (it may be preferred to discard the first, highest and lowest pressure readings and average the remaining values). The overall average is then taken as the final value. If in doubt, repeat measurement session on another day or later the same day. A diagnosis of systemic hypertension should never be based solely on a single BP measurement session.

All results, including results of all measurements, indication of how averages were determined, cuff size and site, position of animal, device used, name of individual making measurements, and attitude of patient during measurement should be recorded for future reference.

HOW DO I INTERPRET MY RESULTS?

This is actually a very difficult question. The Veterinary Blood Pressure Society has suggested BP values should be interpreted in light of clinical and laboratory findings. A systolic/diastolic BP (mmHg) that exceeds 150/95 pose some risk for hypertensive end-organ injury and intervention should be considered in light of other findings in the animal; values above 180/120 pose a high risk and intervention (e.g., administration of a pharmacological antihypertensive agent) is clearly indicated. Similarly systolic/diastolic BP (mmHg) below 100/60 poses some risk for reduced organ perfusion; values below 70/40 pose a high risk and intervention is indicated (e.g., IV fluid therapy and/or reduction of dosage of anesthetic agent).

REFERENCES