

Evaluation of an indirect oscillometric blood pressure monitor in anaesthetised dogs at three different anatomical locations

Abstract

AIMS: To evaluate the agreement between invasive and non-invasive measurements of blood pressure (BP) using an oscillometer (PetTrust) at three different anatomical locations in anaesthetised dogs under different haemodynamic conditions.

METHODS: Eight adult Greyhounds weighing 23.5–36.5 kg were anaesthetised with isoflurane and positioned in dorsal recumbency. Systolic arterial pressure (SAP), diastolic arterial pressure (DAP) and mean arterial pressure (MAP) were measured invasively via a dorsal pedal artery and non-invasively using the oscillometer with cuffs placed above the carpus, above the tarsus and around the tail base. Phenylephrine was administered to induce vasoconstriction, dobutamine was used to increase cardiac output and increased end-tidal concentrations of isoflurane were used to induce vasodilation. Correlation between measurements was analysed by linear regression and agreement was analysed using Bland-Altman plots.

RESULTS: Seventy two representative measurements were obtained. Mean differences (bias) between invasive and non-invasive measurements were <5 mmHg except for DAP measured on the tail, and SD (precision) were <15 mm Hg except for SAP measured at the pelvic limb. Correlation coefficients were >0.9 except for SAP on the pelvic limb and DAP on the tail. More than 50 and 80% of values measured using oscillometry lay within 10 and 20 mmHg, respectively, of values measured invasively except for SAP on the tail. SAP tended to be overestimated when measured non-invasively at low BP, and be underestimated at high BP. DAP was underestimated during low BP and overestimated during high BP. Hypotension (MAP <60 mmHg) was detected by the oscillometer with a sensitivity $\geq 83\%$ and specificity $\geq 98\%$ at all locations.

CONCLUSIONS: This oscillometric device met the 2007 American College of Veterinary Internal Medicine guidelines for measurement of BP on the thoracic limb. There was good agreement between the oscillometer and invasive measurement of MAP at all locations.

CLINICAL RELEVANCE: MAP is the driving pressure for tissue perfusion, thus MAP measurement is clinically essential. This oscillometric device yields reliable MAP measurements at three anatomical locations over a wide range of BP and can identify hypotension with high sensitivity and specificity.

KEY WORDS: Blood pressure, non-invasive blood pressure measurement, oscillometry, anaesthesia, dogs