

Effects of Sedation and Measurement of Ovarian Artery Blood Flow in Dogs

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DESCRIPTION

Alpha-2 agonists are commonly utilized as sedatives and pre-anesthetic medications in dogs. These medications have been used in a variety of dog reproductive surgical procedures, including Ovariectomy (OV) and Ovariohysterectomy (OVH). The fundamental issue with the usage of alpha-2 is their dose-dependent cardiovascular effects and the alterations in organ perfusion. Because it is a non-invasive approach, Doppler ultrasonography is now the most regularly used method in veterinary medicine to measure normal and pathological organ perfusion.

Doppler ultrasonography has been found to be beneficial in assessing placental, ovarian, and uterine blood flow during normal and abnormal pregnancy in female dogs. Duplex Doppler ultrasound was utilized to compare ovarian artery flow velocity before and after sedation with two regularly used methods. The administration of medetomidine or dexmedetomidine induced an important decrease in blood flow velocities in the ovarian artery. Hence, their use could be indicated in surgeries to avoid excessive bleeding of the ovarian pedicle.

In veterinary medicine, their analgesic characteristics makes them dependable medicament to use as part of a balanced anaesthetic regimen to avoid using other anaesthetic drugs. Alpha-2 agonists also have the benefit of being easily counteracted by atipamezole in the event of a problem. Dexmedetomidine and levomedetomidine are the two optical enantiomers of medetomidine. The active molecule is the dextro-rotary isomer (dexmedetomidine), which produces identical effects to medetomidine when delivered at half the dose.

Although the levo-isomer (levomedetomidine) has traditionally been thought to have no pharmacological activity, it has been

demonstrated that high doses of levomedetomidine increase bradycardia while reducing the sedative and analgesic effects associated with dexmedetomidine administration. Due to this, the administration of dexmedetomidine alone may have some benefits over the administration of medetomidine. Both drugs have been used in many different reproductive surgical procedures in dogs including (OV) and (OVH).

The fundamental issue with alpha-2 agonists is that they have dose-dependent cardiovascular effects. Furthermore, alterations in organ perfusion might occur, affecting various organs in different ways. In dogs, medetomidine has been demonstrated to reduce perfusion in the subcortical region of the brain, the abdominal aorta, the renal arteries, and the cranial mesenteric, and the celiac arteries.

Dexmedetomidine, on the other hand, has been demonstrated to reduce blood flow through arteriovenous anastomoses and impair skin, kidney, and brain perfusion. Because it is a non-invasive technique, Doppler ultrasonography is now the most routinely utilized tool in veterinary medicine to examine organ perfusion and diseases associated to their blood supply.

In cardio-circulatory diagnostics and reproductive medicine, this approach is also commonly employed. Doppler ultrasonography has previously been used in cattle to evaluate corpus luteum function, ovarian and uterine blood flow, and to differentiate between luteal and follicular cysts.

Doppler ultrasonography has been shown to be beneficial in assessing placental, uterine, and embryonic blood flow during normal and abnormal pregnancy in female dogs, as well as ovarian flow.

A real-time scanner (Model HDI 5000, Philips Medical Systems, Bothell, WA, USA) equipped with an ATL 5-12 MHz linear transducer was used to perform a duplex Doppler ultrasonography examination of the ovarian artery before

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sedation to determine the baseline blood flow velocity of each ovarian artery.

The operator in each dog changed some specific settings for the spectral Doppler component (angle correction, spectral gain, and gate size) and others related to the color Doppler component (color gain and color velocity scale) to maximize the performance and interpretation of Doppler images.

To avoid extraneous stimuli, all ultrasound tests were performed by the same trained operator in a darkened room. Before the abdomen scan, a generous amount of ultrasonic gel was administered to the dogs in dorsal recumbence, without trimming their hair to reduce stress. The left kidney was discovered initially, followed by the ovary, which was discovered caudally to the kidney. The ovarian artery was located using the color-coded Doppler mode after the ovary was recognized.

The best spectrum graph of velocities during a cardiac cycle was obtained in duplex Doppler mode by modifying the flow velocity detection setting for each test. The sample cursor's width was changed to match the diameter of the scanned vessel's lumen.

When medetomidine or dexmedetomidine are given in equal amounts, blood flow velocity in the ovarian artery is reduced. When removing the ovaries to limit the danger of bleeding, a lowered perfusion could be useful. When these medicines are used to sedate breeding or pregnant animals, it is unknown, if they decrease in ovarian perfusion. The ovarian blood flow is affected by sedation with medetomidine or dexmedetomidine.