Sonographic assessment of caudal vena cava for volume estimation in cats during blood donation

**Introduction**

Sonography of the caudal vena cava (CVC) is an established tool to assess fluid status in dogs, but is not studied in cats. Aim of this study was to evaluate the diameter changes of the caudal vena cava during blood donation in healthy cats.

**Methods**

Twenty-one client-owned, healthy cats were evaluated during blood donation anesthetized with butorphanol, alfalfalone and isoflurane. CVC was assessed at the subxiphoid area in longitudinal view (SV), the right hepatic intercostal area, transverse view (HV) and at the right paralumbar area behind the right kidney, longitudinal view (PV) during blood donation. Measurements were performed before (T0) and after a blood donation of 10 ml/kg (T1) and after volume resuscitation of 30 ml/kg lactated Ringer’s solution (T2). Minimal and maximal CVC diameters were measured for each position. CVC collapsibility index was calculated.

To evaluate inter-observer and intra-observer variability minimal and maximal diameters of CVC were measured in 11 client-owned, hospitalized cats at the same locations by two observers.

**Results**

Complete measurement could not be obtained in 3 cats at position HV and in 5 cats at position PV. At SV minimal diameter was significantly different between T1 and T2 (P < 0.0001). Maximal diameter was significantly different between T0 and T1 and between T1 and T2 (P < 0.0001).

At HV minimal vertical diameter, maximal vertical diameter and minimal horizontal diameter were significantly different between all three time points (P < 0.0001). Maximal horizontal diameter was significantly different between T1 and T2 (P = 0.0024).

At PV minimal and maximal diameter were significantly different between all 3 time points (P < 0.0001). CVC index was not significantly different at any location.

Vertical diameters had a better intra-observer variability compared to horizontal diameters at all positions, which was also true for inter-observer variability. Lowest inter-observer variability was detected at position PV. Intra-observer variability was considered acceptable, whereas inter-observer variability was considered non-acceptable.

![Figure 2: Measurement of the CVC diameter in subxiphoid view](image)

**Conclusion**

Sonographic assessment of CVC in cats is challenging and should be performed by the same observer. Most changes in diameter were observed between hypovolemic status and after fluid bolus. CVC index seems to not be useful in cats.