Imaging of the serotonin transporter before and after citalopram administration in canine brain with 123I-betaCIT SPECT.

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The serotonergic system has been implicated in mood and anxiety disorders, schizophrenia and eating and impulsive disorders. Selective serotonine reuptake inhibitors (SSRI) are used to elevate the synaptic serotine by blocking the serotonine transporter (SERT), mainly located in the raphe nuclei in the midbrain. A dog model has been proposd to investigate disorders concerning the serotonergic system in previous studies.

Aim:
(1) To investigate the feasibility to image the serotonine transporter with 123I-beta-CIT SPECT in the dog and (2) to determine the feasibility to block this SERT with citalopram HCl, a frequently used SSRI.

Materials and methods:
Two female dogs, aged 2 and 6 years, a german shepherd and a bull mastiff, were included.
Two investigations were performed in each dog, one control study and one blocking study with citalopram, administered by IV infusion (spread over 30 minutes), 10 minutes prior to injection of the tracer. Acquisition was performed under general anaesthesia (including detomidine as a sedative, induction of the general anaesthesia with propofol and maintenance with halothane) 3 hours after injection of the tracer. The acquisition for both investigations was performed with a Toshiba triple head gamma camera, equipped with fan-beam collimators. A 153-Gadolinium transmission scan was acquired before the emission scans.
The images were reconstructed with filtered back projection after rebinning to parallel data and applying a Butterworth-filter (cut-off 0.16 cycli/pixel, order 8). Uniform Sorensen attenuation correction with an attenuation coefficient of 0.12 /cm and triple-energy window scatter correction were applied.
Co-registration with MRI images, obtained from both dogs on a separate occasion, facilitated recognition of the raphe nuclei.

Results:
SERT were identified in the brain of the dog with 123I-betaCIT. Administration of citalopram prior to the tracer, effectively blocked the SERT.

Conclusion:
Recognition of the SERT in the dog brain paves the way to further evaluate the serotonergic system as a model for human disease and to monitor interactions with commonly used medication.