



TRANSPHENOIDAL HYPOPHYSECTOMY IN DOGS AND CATS: NEW TECHNIQUE FOR THE INTRAOPERATIVE DETECTION OF THE PITUITARY FOSSA

Objective

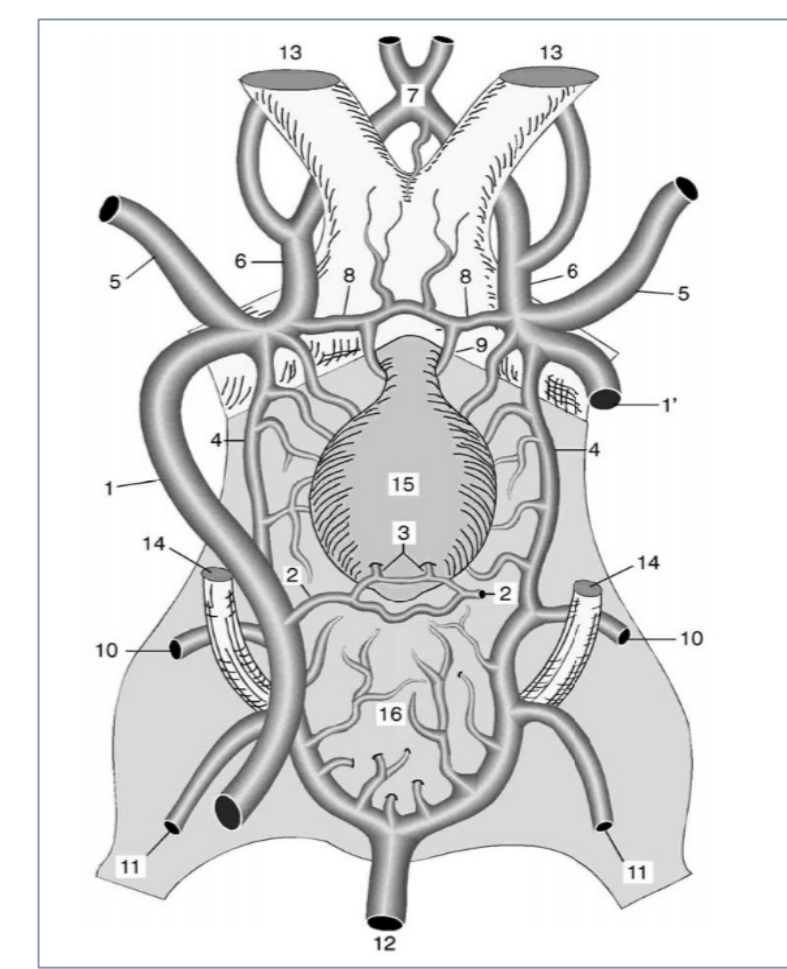
Pituitary tumors can be treated by transphenoidal hypophysectomy in dogs and cats. A limiting factor for the successful removal of pituitary tumor is the difficulty in accurately locating the pituitary fossa.



Img.2 The "pituitary locator"

The goal in approaching the pituitary fossa is to reach the pituitary gland, avoiding the optic chiasm and the arterial cerebral circle, in order to prevent life-threatening consequences.

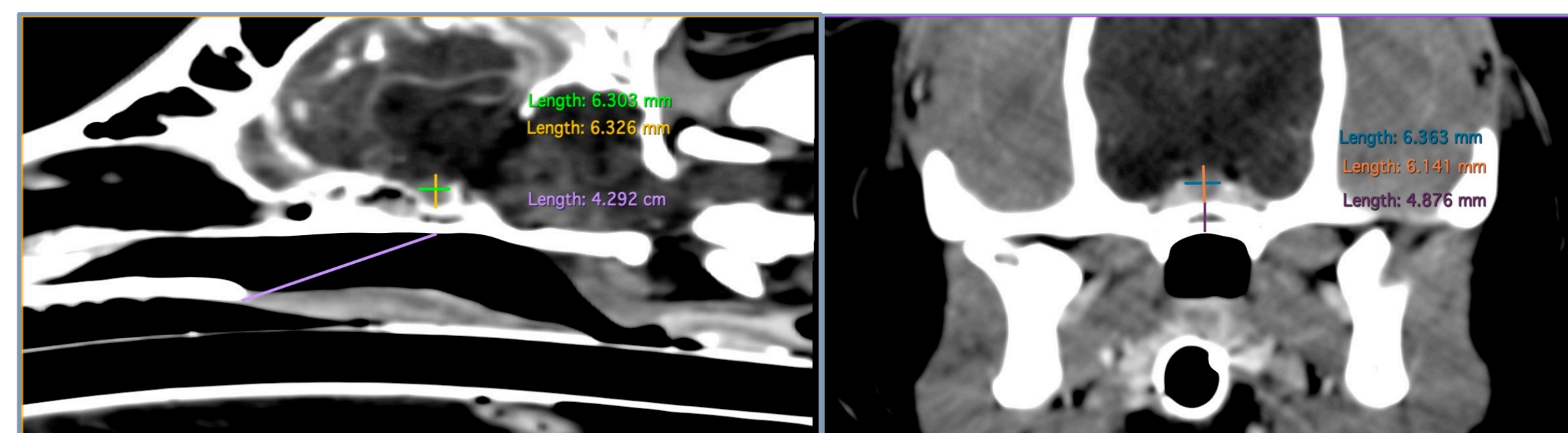
The aim of the study is to determine the accuracy of locating the pituitary fossa with a novel instrument the "pituitary locator", based on CT measurements. Our hypothesis is that the "pituitary locator" would accurately locate the pituitary fossa intraoperatively, regardless of breed differences, both in dogs and cats.



Img.1 Arterial vascularization of the hypophysis

Materials and Methods

The preliminary study is an experimental study on ex-vivo canine model, including dogs that had been euthanized for purposes unrelated to this study (Group 1 – ex-vivo). The second part of the study includes all patients, dogs and cats, referred for transphenoidal hypophysectomy (Group 2 – in-vivo). Head CT scans are required for both groups. On CT scans, the distance from the caudal margin of the palatine bones to the center of the pituitary fossa and the thickness of the sphenoid bone are measured. The first measurement is reported by the "pituitary locator" in both groups to identify the pituitary fossa, during transphenoidal hypophysectomy. The second one reports how much to drill.

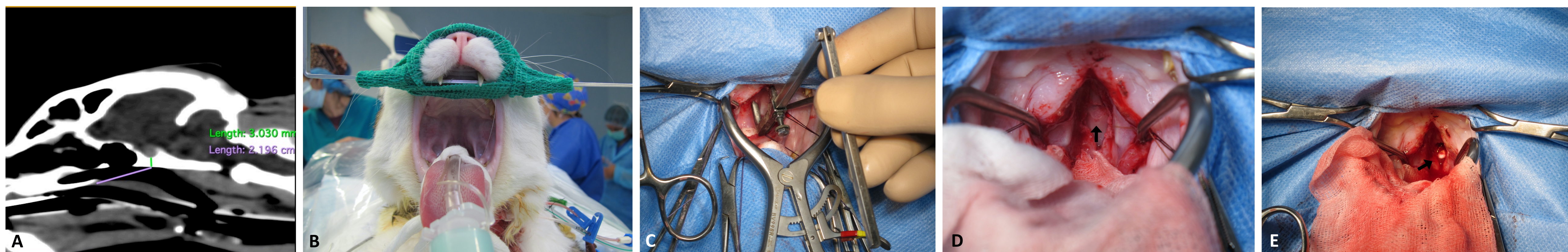


Img.3 CT scans in a dog with pituitary adenoma, affected by pituitary-dependent hyperadrenocorticism. Measurements of the distance from the caudal margin of the palatine bones to the center of the pituitary fossa and the thickness of the sphenoid bone

In Group 1 necropsy with craniotomy is performed to directly visualize the pituitary fossa and the pituitary gland. Extemporaneous cytology from an intraoperative biopsy and then histological examination are performed for Group 2 in order to confirm the correct identification of the pituitary gland and to obtain the diagnosis.

Results

To date, 16 subjects are included in the study (Group 1 n=7; Group 2 n=9): 12 dogs and 4 cats. Eight are females and 8 males. Ages varied between 4 months and 17 years, median 12 years. Dogs all belong to mesocephalic breeds; cats are all domestic short-hair. In Group 2 all pituitary tumors were functional: all dogs were diagnosed with pituitary-dependent hyperadrenocorticism; all cats were acromegalic (hypersomatotropism). On CT scans, median length of the distance between the caudal margin of the palatine bones to the center of the pituitary fossa is 3,3cm (min 1,54cm-max 4,2cm): in dogs 3,55cm (1,54-4,2cm), in cats 2,25cm (2,1-2,5cm). Median thickness measured is 5mm (min 2mm-max 7mm): dogs 5,25mm (3,3-7mm), cats 3,3mm (2-3,7mm). In Group 1 the drill hole has been performed in the pituitary fossa in 7/7 cases: in the middle of the pituitary fossa in 3/7, 2mm caudal to the middle in 2/7 and 2 mm cranial to the middle in 2/7 dogs. In Group 2 the drill hole allowed to identify the pituitary gland in 9/9 cases, confirmed by the extemporaneous cytology from an intraoperative biopsy. Histopathology confirmed in all 9 cases the diagnosis of pituitary adenoma. In 3/9 cases a CT has been also performed post-operatively, affirming the right localization of the drill hole.



Img.4 Case n.8. Acromegalic cat due to pituitary adenoma. A) Measurements on CT scan. B) Surgical positioning for transoral transphenoidal hypophysectomy. C) Pituitary locator to reach intraoperatively the pituitary fossa. D) Drill hole in the pituitary fossa of the sphenoid (arrow). E) Intraoperative appearance of the pituitary gland affected by adenoma (arrow).

Conclusions

The "pituitary locator" correctly identified the pituitary fossa in all the cases (both Group 1 and Group 2), and therefore allowed to remove the pituitary gland. This new localization technique improves the identification of the pituitary fossa with a low margin of error and could reduce surgical times. Despite the low number of subjects currently included, the results obtained appear promising.

Future proposal

This study includes the first 4 cases of acromegalic cats undergoing transphenoidal hypophysectomy at the University Veterinary Hospital «G. Gentile», but further cases are required for the validation of the technique in cats. Moreover, further cases need to be included to widen the population also in dogs, considering brachycephalic and dolicephalic breeds.

References

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