



Right Laparoscopic Adrenalectomy in a Bitch

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ABSTRACT

Background: The medical procedure of Laparoscopic adrenalectomy is common in human medicine; however, this is not true in veterinary medicine, where it is performed rarely. The current treatment of choice for adrenal neoplasms is total adrenalectomy, unless there is a pre-operative diagnosis of metastasis that precludes surgery. The laparoscopic approach option becomes an interesting alternative because, through this technique, it has shown good results. In this report, we demonstrate the experience of a case in which we performed unilateral laparoscopic right adrenalectomy, without caudal vena cava invasion, in a dog suffering from hyperadrenocorticism caused by adrenocortical carcinoma.

Case: A 9-year-old beagle bitch, 12 kg in weight, showed polyphagia, polydipsia, polyuria, pendular abdomen, thin and dark skin, lumbar alopecic areas and lethargy. The team carried out Complete Blood Count (CBC), blood chemistry (liver and renal functions) and urine sampling by cystocentesis for urinalysis and bacterial culture. All exams had normal results, except for ALP, which reached levels higher than 150 UI L⁻¹. On abdominal radiographic examination, we noted mild adrenal enlargement, and by ultrasonography, it was possible to identify adrenal asymmetry and right adrenal enlargement (2.8x2x2.15 cm) in relation to the left gland (2x1x1.5 cm). As a treatment for adrenal neoplasm-dependent HAC, we recommended the execution of total right adrenalectomy. The videosurgery used four accesses arranged in the right hypogastric region; the diameters were 10 (two), 5, and 3mm. The adrenal gland was carefully dissected with the aid of laparoscopic forceps; during the intraoperative period, there was a small laceration of the abdominal phrenic vein that resulted in bleeding, which was overcome with two titanium clips. The dog had an excellent recovery, and the team discharged it 48 h after the procedure. The signs of hyperadrenocorticism disappeared about two weeks after surgery. One year after having the procedure, the animal remains well and has no signs of tumor recurrence or Cushing's syndrome.

Discussion: The choice laparoscopic approach provided less invasiveness in surgical access, reduced animal convalescence, and provided image magnification for the more accurate dissection of the adrenal gland. Some reports that middle-aged to older bitches were the most predisposed to present adrenal neoplasm-dependent HAC, and generally, in unilateral form, characteristics which are presented in this report. Among the clinical signs and observed in this report, are polydipsia, polyphagia, tachypnea, alopecia, and skin hyperpigmentation. That recommended the low-dose dexamethasone suppression test to diagnose Cushing's syndrome and the endogenous ACTH test to distinguish hypophysary from adrenocorticotrophic HAC. The same tests were performed in the case reported here, as these are also important to establish the final diagnosis and refer the total adrenalectomy realization. In the current case report, access to the right hypogastric region using four videosurgery portals provided good surgical access. Towards the hospital convalescence time, the animal was discharged early, just 48 h post-operatively; remission of HAC clinical signs occurred within three weeks, and the survival already reached 12 months. To the best of the authors' knowledge, this is the first successful case of total right adrenalectomy without caudal vena cava invasion via the laparoscopic route as treatment for adrenocortical carcinoma in the national literature.

Keywords: adrenal gland, neoplasm, videosurgery, dogs.

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INTRODUCTION

The current treatment of choice for adrenal neoplasms is total adrenalectomy, unless there is a pre-operativediagnosis of metastasis that precludes surgery [3,4,9].

The laparoscopic approach option becomes an interesting alternative because, through this technique, it has shown good results. Fewer surgical wound complications, lower morbidity, higher comfort and esthetic appeal, bleeding reduction, better abdominal organ observation, lesser hospitalization time, and faster recovery are some of the related advantages of the technique [5,8,10].

Peláez *et al.* [8] performed seven unilateral laparoscopic adrenalectomies in dogs with adrenocortical carcinoma, three of them on the right side and four on the left, without caudal vena cava invasion, and using 4 access portals for all procedures. Two of these animals died in the first 48 h after surgery, due to respiratory complications. Five of them were discharged 72 h post-operation, and showed remission of the clinical signs. There were no reports of trans-operative major complications, and the paralumbar fossa allowed satisfactory surgical access. Survival of these animals varied between 7 and 24 months.

Due to the promissory results of right unilateral adrenalectomy by laparoscopy in dogs [8], we report our experience in a successful case of laparoscopic adrenalectomy realized through 4 abdominal access portals to treat a right adrenal adenocarcinoma without caudal vena cava invasion in a bitch.

CASE

A 9-year-old beagle bitch, 12 kg in weight, showed polyphagia, polydipsia, polyuria, pendular abdomen, thin and dark skin, lumbar alopecic areas and lethargy. The team carried out Complete Blood Count (CBC), blood chemistry (liver and renal functions) and urine sampling by cystocentesis for urinalysis and bacterial culture. All exams had normal results, except for ALP, which reached levels higher than 150 U/L. Low-dose dexamethasone test (Decadron®) [0.01 mg kg⁻¹ IV] was carried out and showed cortisol concentrations higher than 1.5 µg dL⁻¹, which were 50% lower than basal concentration, 4 h after dexamethasone application,

and again after 8 h of application. The team also performed Endogenous ACTH dosing, obtaining values higher than 10 pgmL⁻¹. The first test, low-dose dexamethasone suppression, confirmed the HAC, and the second, endogenous ACTH, was important to distinguish whether the disease was hypophysial-dependent or adrenal tumor-dependent, confirming the second condition. On abdominal radiographic examination, we noted mild adrenal enlargement, and by ultrasonography, it was possible to identify adrenal asymmetry and right adrenal enlargement (2.8x2x2.15cm) in relation to the left gland (2x1x1.5 cm). As a treatment for adrenal neoplasm-dependent HAC, we recommended the execution of total right adrenalectomy execution.

The pre-anesthetic medication used in the patient consisted of 0.2% acepromazine (Aceprom®) [0.05 mg kg⁻¹, IM] and 50 mg mL⁻¹ tramadol chloride (Tramal®) [3 mg kg⁻¹, IM]. As antimicrobial prophylaxis, 200 mg mL⁻¹ sodic ampicillin (Ampicilina®) [20 mg kg⁻¹, IV] was used. After 20 min, we performed anesthetic induction with propofol (Diprivan®) [4 mg kg⁻¹ IV], followed by orotracheal intubation using a 7.5 mm probe. The anesthetic maintenance was 1% isoflurane in (Isoflurine®) 100% oxygen, which was carried by a universal vaporizer with a flow of 1 L min⁻¹. The fluid therapy comprised a 10 mL kg⁻¹h⁻¹ standard with 0.9% NaCl saline solution.

Each animal was positioned in left lateral recumbence, to get access to the right adrenal region. After abdominal operatory field antisepsis, the surgeon made a paramedian incision of approximately 11 mm in the hypogastric region using an open technique, and a 10 mm portal was introduced into the abdominal cavity. Insulation of the abdominal cavity with medicinal CO₂ (1.5 L min⁻¹) was done until 12 mmHg was reached. Then, with the 10 mm endoscope, direct visualization and 0°, 2 other portals were inserted, one of 5 mm (left hand) and another of 10 mm (right hand), in triangulation with the first one. After that, we inspected the abdominal cavity, and identified the enlarged right adrenal (Figura 1A), but it was misshapen. A fourth 3mm portal was needed (just above the 5 mm portal) to move the kidney. Initially, we transected the hepatorenal ligament using a videolaparoscopy and metzembaum forceps to improve the operatory field. Then, the

right adrenal was removed from the retroperitoneal space along with the adjacent vessels with the aid of mixer forceps and metzembaum scissors, all of them using videosurgery. In this step, a small laceration of the phrenicoabdominal vein occurred (Figura 1B), because of the adrenal enlargement due to the neoplasm. The hemorrhage was controlled through clipping of the vein using 2 medium titanium clips, and 2 other clips were positioned to occlude the 2 branches originating from the renal artery. After complete liberation of the adrenal gland, we inserted a homemade retrieval bag, made of a surgical glove finger, into the peritoneal cavity through the right hand 10 mm portal and retrieved the gland along this portal. We performed manual morcellation using conventional Kelly forceps inside the retrieval bag to ensure the complete removal of the gland. The absence of hemorrhages was then confirmed, the cavity deflated and the access wounds were sutured using a sultan pattern and 2-0 910 polyglactin (Vicryl®)⁵ in the musculature. To provide closure of the surgical wound borders and dead-space reduction, another sultan pattern suture was performed using 3-0 910 polyglactin (Vicryl®)⁵. The skin closure was achieved using 4-0 monofilament náilon (Nylon®)⁵ in a simple interrupted pattern. Histopathological analysis of the right adrenal gland (Figura 1C) confirmed the diagnosis of adrenocortical carcinoma. We recommended the administration of meloxicam (Meloxicam®)⁴ [0.2 mg kg⁻¹, IM s.i.d.] and tramadol chlorhydrate (Tramal®)³ [3 mg kg⁻¹, SC, t.i.d.], for 3 and 5 days respectively, after anesthetic recovery. Then, 48 h after the end of the surgical procedure, the patient was discharged from hospital, and the

HAC clinical signs disappeared about three weeks after surgery. A year after the surgical procedure, the animal did not present signs suggesting Cushing's syndrome or tumor reappearance at the adrenal gland extirpation site.

DISCUSSION

Birchard [2] reports that middle-aged to older bitches were the most predisposed to present adrenal neoplasm-dependent HAC, and generally, in unilateral form, characteristics which are presented in this report. Among the clinical signs cited by Reusch [11] and observed in this report, are polydipsia, polyphagia, tachypnea, alopecia, and skin hyperpigmentation.

Nelson [6] and Arenas *et al.* [1] recommended the low-dose dexamethasone suppression test to diagnose Cushing's syndrome and the endogenous ACTH test to distinguish hypophysary from adrenocorticotrophic HAC. The same tests were performed in the case reported here, as these are also important to establish the final diagnosis and refer the total adrenalectomy realization.

In the current case report, access to the right hypogastric region using four videosurgery portals provided good surgical access. Towards the hospital convalescence time, the animal was discharged early, just 48 h post-operatively; remission of HAC clinical signs occurred within three weeks, and the survival already reached 12 months. All of these data corroborate the observations of Peláez *et al.* [8] when in 2008, promoted the laparoscopic modality as a viable option for total right adrenalectomy.

To the best of the authors' knowledge, this is the first successful case of total right adrenalectomy without caudal vena cava invasion via the laparoscopic route as treatment for adrenocortical carcinoma in the national literature.

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Declaration of interest. The authors report no conflicts of interest. The authors alone are responsible for the content and writing of the paper.

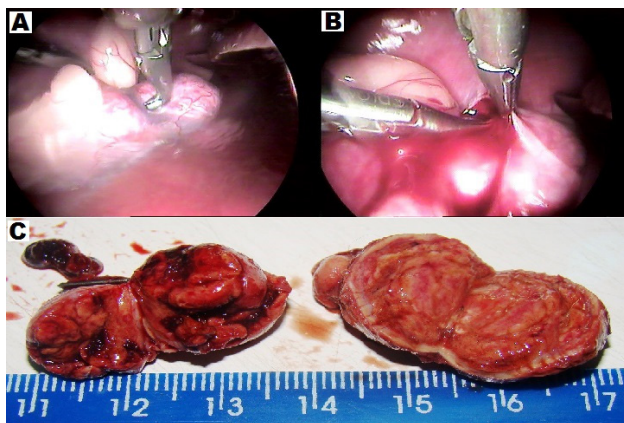


Figure 1. A- enlarged right adrenal located after inspection of the abdominal cavity. B- time of laceration of the phrenicoabdominal. C- right adrenal gland removed by laparoscopy access.

REFERENCES

- 1 Arenas C., Pérez-alenza D. & Melián C. 2013. Clinical features, outcome and prognostic factors in dogs diagnosed with non-cortisol-secreting adrenal tumors without adrenalectomy: 20 cases (1994-2009). *Veterinary Record*. 173:501.
- 2 Birchard S.J. 2003. Adrenalectomy. In: Slatter D.H. (Ed). *Small Animal Surgery*. v.2. 3rd edn. Philadelphia: Saunders, pp.1694-1699.
- 3 Fossum T.W. & Caplan E.R. 2013. Surgery of the Adrenal and Pituitary Glands. In: Fossum T.W. (Ed). *Small Animal Surgery*. 4th edn. St. Louis: Elsevier, pp.637-646.
- 4 Caplan R.H., Strutt P.J & Wickus G.G. 2013. Subclinical hormone secretion by incidentally discovered adrenal masses. *Archivos Surgery*. 129: 291-296.
- 5 Lal G. & Duh Q.Y. 2003. Laparoscopic Adrenalectomy - indications and technique. *Surgery Oncology*. 12: 105-123.
- 6 Nelson R.W. 2010. Distúrbios da Glândula Adrenal. In: Nelson R.W. & Couto C.G. (Eds). *Medicina Interna de Pequenos Animais*. 4.ed. Rio de Janeiro: Elsevier, pp.812-838.
- 7 Nichols R., Peterson M.E. & Muller H.S. 1998. Glândulas Adrenais. In: Birchard S.S. & Sherding R.G. (Eds). *Manual Saunders: Clínica de Pequenos Animais*. São Paulo: Roca, pp.270.
- 8 Peláez M.J., Bouvy B.M. & Dupré G.P. 2008. Laparoscopic Adrenalectomy for Treatment of Unilateral Adrenocortical Carcinomas: Technique, Complications, and Results in Seven Dogs. *Veterinary Surgery*. 37: 444-453.
- 9 Reusch C.E. 2005. Hyperadrenocorticism. In: Ettinger S.J. & Feldman E.C. (Eds). *Veterinary Internal Medicine*. 6th edn. v.2. St. Louis: Elsevier Saunders, pp.1592-1612.
- 10 Zografos G.N., Markou A. & Ageli C. 2006. Laparoscopic surgery for adrenal tumors: A retrospective analysis. *Hormones*. 5: 52-56.