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Diagnosis of intra-abdominal Affections in dog using laparoscopy: A clinical study

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Abstract

A clinical investigation was conducted at Veterinary Clinical Complex from the period of February 2022 to February 2024 involving 22 cases in dogs to assess the effectiveness of laparoscopic examination in diagnosing abdominopelvic disorders. Following initial assessments, laparoscopic examination was performed to evaluate liver, kidney, spleen, and urogenital organ disorders. This procedure confirmed diagnoses including hepatic malignancy, liver cirrhosis, liver fibrosis, renal neoplasm, splenic neoplasm, splenic abscess/cyst, cystic ovaries, uterine tumor, retained testicles, mesenteric tumors and cystic prostate. Laparoscopic biopsies were conducted to verify pathological findings, and complications such as haemorrhage were noted during the biopsy process. The study concluded that laparoscopy provided clear visualization of abdominopelvic organs and facilitated biopsy of these lesions, establishing its reliability as a diagnostic tool for identifying intra-abdominal abnormalities in dogs.

Keywords: Abdominal affections, laparoscopy

Introduction

The most common disorders encountered in small animal practise are abdominal affections, with varying clinical presentations. Treatment has to be started at the earliest to ensure a smooth uneventful recovery. For this, suitable tools are necessary which can help to visually inspect internal organs and form a conclusive diagnosis. Minimally invasive techniques make this possible without the need for large incisions. All endoscopic procedures performed in the abdominal cavity are classified as laparoscopy. Most abdominal organs can be thoroughly examined, with multiple organs sampled at the same time if necessary. Laparoscopy, which allows almost all abdominal structures to be seen and relies solely on the surgeon's experience, may be a combination of the benefits of both previous techniques. The method has also been shown to result in less postoperative pain and a quicker return to normal activity, as well as fewer and milder wound-healing complications. Importantly, high-quality diagnostic samples can be obtained from all necessary organs during the same procedure (Mayhew, 2009) [4]. However, laparoscopy is said to be contraindicated in ascites and in patients with diaphragmatic defects because carbon dioxide (CO₂) insufflation may leak into the thoracic space, compromising respiratory function (Milovancev and Townsend, 2015) [5]. Laparoscopy is easy to perform once the basic indications and the technique is learnt. Thus, laparoscopy is one of the most useful tools available for diagnosis in small animal medicine (Fantinatti *et al.*, 2003 and Lew *et al.*, 2003) [2,3]. A total of 22 patients were included in this study.

Material and Methods

In the present paper, various intra-abdominal affections in dogs presented at the Veterinary Clinical Complex, Nagpur Veterinary College were reported from the period of February 2022 to February 2024. A total of 22 patients were included in this study. The affections included the following organs: prostate, liver, gallbladder, spleen, uterus, cystic ovaries and cryptorchid testicle. An attempt to diagnose the conditions was made via laparoscopic visualisation. Laparoscopic examination was done with dogs under general anaesthesia, placed in ventro-dorsal recumbency. The dogs were positioned in the Trendelenburg position to visualise the prostate or cryptorchid testis, Reverse Trendelenburg for uterine and hepatic visualisation and

supine position for splenic affections. Standard dose of dissociative anaesthesia with Xylazine-Ketamine-Diazepam after premedication with Atropine and Meloxicam were used for all the dogs in this study. Following anaesthesia induction, with the help of laryngoscope, endotracheal intubation was performed using an appropriate size tube and connected to an anaesthetic machine equipped with an Isoflurane vaporizer.

Patient preparation

For the laparoscopic assisted methods, the ventral abdominal area from xiphoid to pubis and each inguinal fold was shaved and aseptically prepared. An intravenous catheter was fixed in the cephalic vein at one leg for the administration of premedication and the induction of anaesthesia. The abdomen was draped extensively in preparation for aseptic surgery. During the procedure, a multipara monitor was used to monitor the heart rate and electrical activity, as well as the respiratory rate and oxygen saturation.

Postoperative care and management

The dog was maintained on oral medications using Meloxicam @ 0.2 mg/kg BW PO for 3 days, Ranitidine @ 2 mg/kg BW PO and Amoxicillin and Clavulanic acid @ 22mg/kg BW PO for 5 days. If the dog became anorexic after surgery, supportive fluid therapy was administered. The owner was advised to keep the dog wearing an Elizabethan collar for at least 5 days.

Results and Discussion

Laparoscope provided a complete visual assessment of the organs of the abdomen and pelvis and as a result of this, the hepatic lesion, splenic lesions, uterine lesions, prostatic lesions and retained testicular mass could be located easily via this diagnostic modality. It also allowed a complete visual examination of the entire abdomen. laparoscopic exploration was useful for visually inspecting the different intra-abdominal organs by their external morphology, with the added benefit of identifying the different pathologies and changes in size, shape and colour of organs.

During this study, 22 dogs of different breeds underwent laparoscopic procedure related to the abdo- pelvic region. Amongst these, Labradors (27.27%) predominated followed by Mongrel dogs (22.7%), German Shepherd Dog (13.6%), Doberman, Spitz, and Golden Retriever, each comprising of 9.09% of total animals undergoing laparoscopic procedure. Belgian Malinois and Beagle having the least incidence of 4.54% each.

Among the total dog presented for laparoscopic procedure, male population comprised for 63.63% and females accounted for 36.36%.

In cases of dog with splenic affections, abscess-like lesions were observed on different surface including the cranial parietal surface of the spleen, along with a change in textural appearance when seen via laparoscopy (Fig. 1). In other dogs with a splenic affections, a circumscribed lesion on the visceral surface of the cranial third of the spleen was found (Fig. 2).

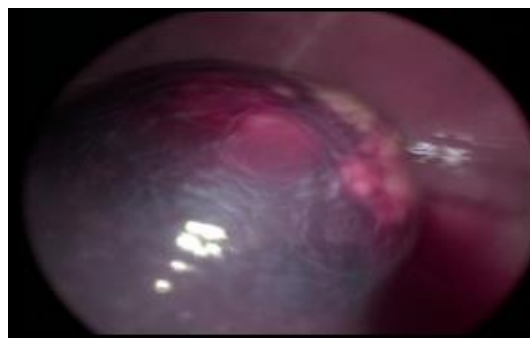


Fig 1: Abscess on splenic surface as seen on laparoscopy

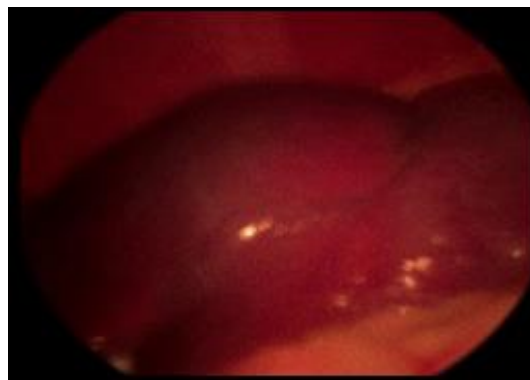


Fig 2: Tumour on splenic surface on laparoscopy

In case of dog with hepatic affection, visualizing the liver via the scope showed multiple shallow nodules i.e., nodules of large diameter, slightly protruding from the liver surface (Fig. 3). During the present investigation, the primary or secondary origin could not be ascertained.

In case of dog with uterine affection, laparoscopy effectively provided a very sharp image of the uterine lesion, which was located cranially on the left uterine horn and was grossly enlarged and deformed with multiple nodules, well-circumscribed, firm, white-greyish with a whorled appearance formed by the intersecting bundles of brown muscle fibres and white fibrous tissue (Fig. 4).



Fig 3: Lesions seen on hepatic parenchyma

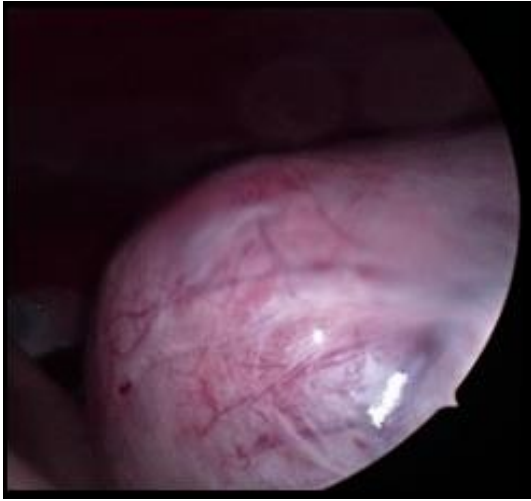


Fig 4: Intra-abdominal mass as seen via as seen on laparoscopy laparoscopy (uterine tumour)

In case of dog with prostatic affection, laparoscopy provided a clear image of the cystic lesion on the prostate (Fig. 5). In another dog with prostatic affection, Laparoscopic examination provided a very clear picture of the enlarged and hyperplastic prostate (Fig. 6).



Fig 5: Prostatic cyst seen on laparoscopy



Fig 6: Enlarged Prostate seen on laparoscopy

In cases with retained testicle, Laparoscopic examination of the lesion revealed a mass which was firm, nodular, grey-white and a well-demarcated lesion with variable foci of necrosis and haemorrhage (Fig.7). In case of dog with

abdominal pain, lethargy, frequent episodes of vomitions and diarrhoea revealed a distended gallbladder with choleliths. (Fig.8).



Fig 7: Retained testicular mass as seen Laparoscopy

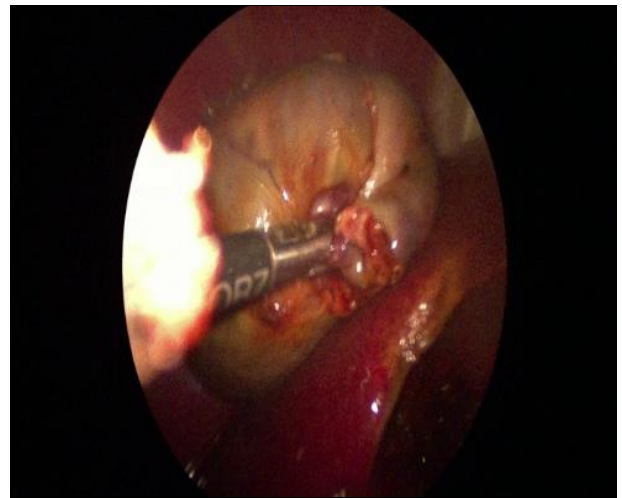


Fig 8: Cholecystic Gallbladder on Laparoscopy

Laparoscopic-assisted core ovarian biopsy samples were taken in the case of two Mongrels and a Doberman with ovarian lesions indicative of ovarian tumours. (Fig.9). Laparoscopy-assisted mesenteric core biopsy samples were taken in a Mongrel with fibrosed masses on their mesentery indicative of a tumour. (Fig.10).



Fig 9: Ovarian tumor via Laparoscopy

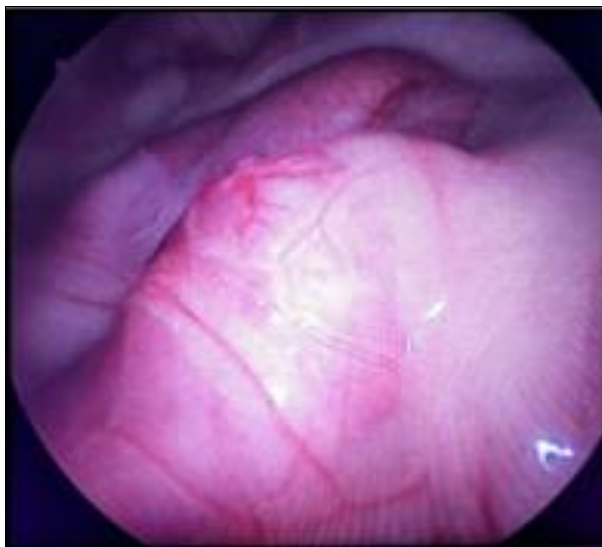


Fig 10: Mesenteric mass as seen via Laparoscopy

Table 1: Laparoscopic assisted biopsy - distribution based on procedure, age, breed and sex

Procedure	No. of dogs	Age	Breed	Sex
Splenic Biopsy	2	10.5 years (Mean Value)	Labrador Retriever(2),	Male (1) Female (1)
Hepatic Biopsy	4	10.3 years (Mean Value)	Mongrel (02), German Shepherd Dog (01), Belgian Malinois (1)	Male (03), Female (01)
Uterine Biopsy	2	7 years (Mean Value)	Labrador Retriever, Mongrel	Female
Ovarian Biopsy	4	9 years (Mean Value)	Doberman (01), Spitz (02), Mongrel (1)	Female
Prostatic Biopsy	3	10.3years (Mean Value)	Labrador Retriever (01), German Shepherd Dog (02)	Male
Retained Biopsy testicular	5	12 years (Mean Value)	Labrador Retriever (2), Golden Retriever (1), Beagle (1), Doberman (1)	Male
Gallbladder Biopsy	1	10 years	Golden Retriever	Male
Mesenteric mass Biopsy	1	4 years	Mongrel (1)	Male

Conclusion

The laparoscopic approach is thought to be best for lesions that are not deeply buried in organ parenchyma. Minimally invasive (MI) surgery often eliminates the need for a laparotomy (Chong and Ram, 2015) [1]. Laparoscopy provides a non-invasive three-dimensional evaluation of several abdominal organs with the added benefit of visual control over the laparoscopic instruments to collect tissue samples, if needed even from very small lesions. However, laparoscopy has the limitation of being unable to visualise the parenchyma of an organ. Laparoscopy is more effective at diagnosis of intra-abdominal affections as it provides a three dimensional image of the organ and provides real-time images of the changes on the organ surface and size, along with allowing handling of the organ with various laparoscopy instruments. In conclusion, laparoscopic visualisation provided sufficient clues for diagnosing and collecting samples for biopsy of tumours.

Complications

Haemorrhage during sample collection: The haemorrhage as a result of laparoscopic-assisted tissue biopsy was noticed in five cases. However, the haemorrhage could be easily identified on laparoscopic examination and was immediately controlled by using electrocautery. No complications of leakage of CO₂ was observed in the thoracic cavity compromising respiratory function.

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