The Haryana Veterinarian (December, 2023) **62(2),** 154-156 ISSN 0033-4359 (P)

Clinical Article

COMPARISION OF INTRA-ABDOMINAL LESIONS USING ULTRASONOGRAPHY AND LAPAROSCOPY - A CLINICAL STUDY

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Received: 11.04.2023; Accepted: 23.05.2023

SUMMARY

Abdominal affections are the most common disorders encountered in small animal practise. They need to be diagnosed and treated promptly to reduce morbidity and mortality rates. The present study compares the diagnostic efficiency of intra-abdominal affections in dogs using two modalities: Ultrasonography and Laparoscopy. A total of seven patients were included in this study. The affections included the following organs: prostate (02), liver (01), spleen (02), uterus (01) and cryptorchid testicle (01). Ultrasonography was very helpful in diagnosing the parenchymatous lesions but was unable to detect the exact placement of lesion in abdominal cavity. Laparoscopy had a 100% success rate in locating the intra-abdominal lesion and was found to be an excellent diagnostic modality.

Keywords: Intra-abdominal affections, Dogs, Ultrasonography, Laparoscopy

How to cite: Kirpekar, K., Fiske, G.A., Akhare, S.B., Dhoot, V.M., Raghuwanshi, D.S. and Fani, F. (2023). Comparision of intra-abdominal lesions using ultrasonography and laparoscopy - A clinical study. *The Haryana Veterinarian* **62(2)**: 154-156.

Abdominal affections are the most common disorders encountered in small animal practise, with varying clinical presentations. Morbidity and mortality are high unless treatment is instituted quickly using simple, accurate, and safe diagnostic tools.Nothing compares to visually inspecting internal organs. 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 (Mayhew, 2009). 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). Ultrasonography is regarded as an excellent non-invasivemethod for diagnosing abdominal disorders (Richter, 2001). It is possible to determine the location and relationship of the lesions with nearby organs, as well as their origin and effect on related organs.Most veterinary hospitals have easy access to ultrasound as a diagnostic modality.

In the present paper, various intra-abdominal affections in dogs presented at the Veterinary Clinical Complex, Nagpur Veterinary College, were reported from May 2022 to January 2023. Atotal of 7 patients were included in this study. The affections included the following organs: prostate (02), liver (01), spleen (02), uterus (01) and cryptorchid testicle (01). The age group of 8-14 years was most affected by intra-abdominal lesions. Prostate lesions were found in two male dogs; hepatic lesions in one male dog; splenic lesion in two male dogs; uterine lesion in a female dog; and cryptorchid testicular lesion in a male dog. An attempt to diagnose the conditions was made via ultrasonography and laparoscopic visualisation. All cases were subjected to both the modalities.

All patients suspected of having intra-abdominal conditions were subjected to ultrasonography on the day of presentation and a laparoscopic examination two days later. The ultrasound examinations of different abdominal organs were undertaken by positioning the dog in dorsal or lateral recumbency depending on the organ to be examined. This modality was used to diagnose cirrhosis, splenic masses, splenic haematomas, cryptorchidism, prostatomegaly, prostate cysts, prostatitis and uterine masses. Laparoscopic examination was done with dogs under general anaesthesia, placed in ventrodorsal recumbency. The dogs were positioned in the Trendelenburg position to visualise the prostate or cryptorchid testis, Reverse Trendelenburg position for uterine and hepatic visualisation and supine position for splenic affections.

Laparoscopy 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. Although the inner parenchyma of the organ could not be visualised as in the case of ultrasound, 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. In case of

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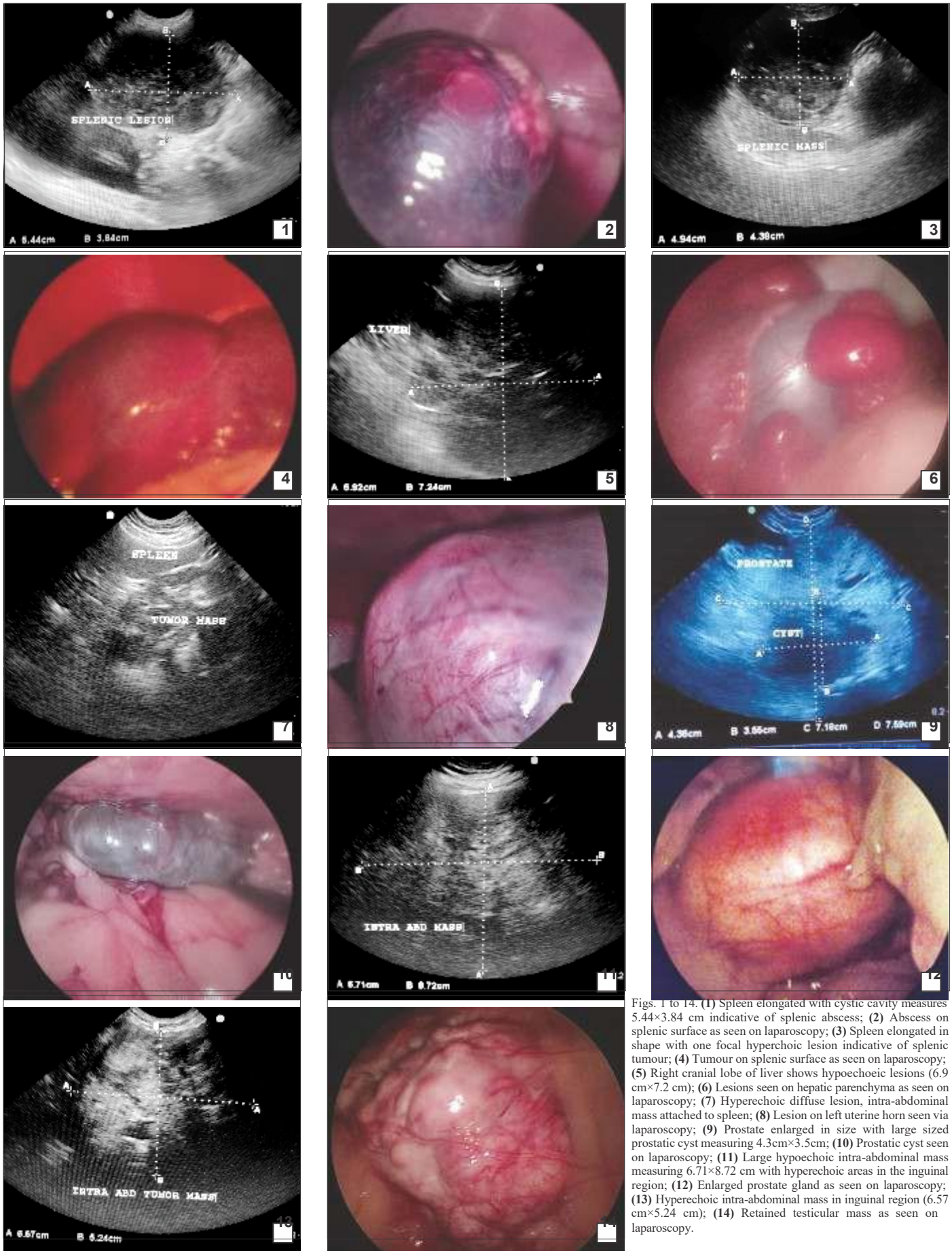

Figs. 1 to 14. **(1)** Spleen elongated with cystic cavity measures 5.44×3.84 cm indicative of splenic abscess; **(2)** Abscess on splenic surface as seen on laparoscopy; **(3)** Spleen elongated in shape with one focal hyperchoic lesion indicative of splenic tumour; **(4)** Tumour on splenic surface as seen on laparoscopy; **(5)** Right cranial lobe of liver shows hypoechoeic lesions (6.9 cm×7.2 cm); **(6)** Lesions seen on hepatic parenchyma as seen on laparoscopy; **(7)** Hyperechoic diffuse lesion, intra-abdominal mass attached to spleen; **(8)** Lesion on left uterine horn seen via laparoscopy; **(9)** Prostate enlarged in size with large sized prostatic cyst measuring 4.3cm×3.5cm; **(10)** Prostatic cyst seen on laparoscopy; **(11)** Large hypoechoic intra-abdominal mass measuring 6.71×8.72 cm with hyperechoic areas in the inguinal region; **(12)** Enlarged prostate gland as seen on laparoscopy; **(13)** Hyperechoic intra-abdominal mass in inguinal region (6.57 cm×5.24 cm); **(14)** Retained testicular mass as seen on laparoscopy.

the dog with splenic affection, ultrasound indicated the presence of cyst-like hypoechoic lesion with a well-defined border present on the surface of the splenic parenchyma (Fig. 1). This was observed as an abscess-like lesion on the cranial parietal surface of the spleen, along with a change in textural appearance when seen via laparoscopy (Fig. 2). In another dog with a splenic affection, ultrasound indicated of a well-defined, focal hyperechoic tumour-like lesion on the splenic surface (Fig. 3). When the same dog was subjected to laparoscopy, a circumscribed lesion on the visceral surface of the cranial third of the spleen was found (Fig. 4).

In case a dog with hepatic affection, ultrasound indicated the presence of anechoic and hypoechoic areas in the right cranial lobe (Fig. 5). Visualising the liver via the scope showed multiple shallow nodules i.e., nodules of large diameter, slightly protruding from the liver surface (Fig. 6). During the present investigation, the primary or secondary origin could not be ascertained.

In case of dog with uterine affection, a hyperechoic diffuse lesion indicative of an intra-abdominalmass attached to the spleen was found via ultrasonography (Fig. 7). 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. 8). In case of dog with prostatic affection, the prostate was found to be enlarged in shape and size, with a large prostatic cyst when seen on ultrasonography (Fig. 9). Laparoscopy provided a clear image of the cystic lesion on the prostate (Fig. 10). In another dog with prostatic affection, ultrasound examination revealed a large hypoechoic intra-abdominal mass measuring 6.71 × 8.72 cm with hyperechoic areas in the inguinal region (Fig. 11). Laparoscopic examination provided a very clear picture of the enlarged and hyperplastic prostate (Fig. 12).

In case of dog with retained testicle, ultrasonography revealed a hyperechoic intra-abdominal mass in the inguinal region measuring 6.57 cm × 5.24 cm (Fig. 13). Since the dog was bilaterally cryptorchid, the mass was suspected to be a Retained Testicular tumour. Laparoscopic examination of the lesion revealed a mass which was firm, nodular, grey-white and well-demarcated lesion with variable foci of necrosis and haemorrhage (Fig. 14).

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). Because ultrasound provides a two-dimensional image of a three-dimensional structure, interpretation must be made after reviewing the clinical history, physical and clinical findings and laboratory examination results, whereas 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, unlike ultrasonography, laparoscopy has the limitation of beingunabletovisualisethe parenchyma of an organ. Overall, it is observed that ultrasonography as a diagnosticmodality is more efficient than laparoscopy for diagnosing intra-parenchymal lesions, e.g. splenic mass, prostatic hyperplasia, prostatic cysts, hepatic lesions, retained testicular tumours etc, whereas laparoscopy is more effective at diagnosing 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 handling the organ with various laparoscopy instruments. Ultrasound examination could provide confirmative indications for diagnosis, however laparoscopic visualisation provided sufficient clues for diagnosing and collecting samples for biopsy of tumours.

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