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Histopathological evaluation of intra-abdominal conditions: A study of 12 cases

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Abstract
This paper presents 12 cases of intra-abdominal disorders regarding different organs like prostrate, liver, spleen, uterus, cryptorchid testicle and mesentery. Ultrasonography and laparoscopy guided biopsy samples were collected from the patients. Histopathological evaluation of all the samples was performed to determine the origin of the tumour and to help formulate a suitable treatment protocol for all the patients. This paper discusses the different types of tumours found in the aforementioned organs.

Keywords: Prostate, spleen, histopathological evaluation

Introduction
Affections of the abdomen and pelvis are very common in companion animals and it is critical to use the best diagnostic and surgical modality available to ensure accurate diagnosis and efficient management of the condition.
Some of the conditions that can be sampled and diagnosed using laparoscopy or ultrasound-guided methods include cytological evaluation, fatty changes, neoplastic changes, inflammatory, dysplastic, or hyperplastic conditions, cultures from abscesses, infiltrative disorders and cysts. 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].
Many features are assessed on a biopsy in order to determine the presence of neoplastic cells, including architectural features (*e.g.*, type/origin of neoplasia, presence of vascular or stromal invasion, and biopsy margins) and potential criteria of malignancy (abnormal cell morphologies such as anisocytosis, anisokaryosis, multinucleation, abnormal nuclei; increased mitotic rate; and presence of necrosis) (Kamstock DA *et al*., 2020) [2].
Clinical cases of 12 dogs with intra-abdominal disorders were evaluated in this study using haematology tests, biochemical analysis, radiography, ultrasonography, and diagnostic laparoscopy, including ultrasound and laparoscopic guided biopsy for cytology and histopathology. The affections included the following organs: Prostate (01), liver (03), spleen (02), mesentery (2), uterus (02), ovary (1) and cryptorchid testicle (01).

Materials and Methods
Ultrasonography and laparoscopy guided biopsy samples were taken from the all the patients.
For the ultrasonography guided biopsy procedures, relevant skin areas were prepared for ultrasound examination by clipping and disinfecting the site and the abdo-pelvic region was scanned before aseptic sampling. Ultrasound guided biopsy procedures were undertaken on the day of presentation. The transducer was placed on the affected or diseased region, and the biopsy gun was inserted inside the animal's body through the side of the transducer without causing much pain to the animal. The biopsy gun's tip could be seen over the ultrasonographic image or monitor, and thus the biopsy samples were taken from the animal. The sample was collected in a container containing 10% buffered formalin.
For the laparoscopic assisted methods, the ventral abdominal area from xiphoid to pubis and each inguinal fold was shaved and aseptically prepared. For the examination of the abdominal

cavity, all of the dogs were placed in the Trendelenburg position. Three ports were used for the procedures. The relevant intra-abdominal lesion was identified. The affection was carefully visualised and grasped with atraumatic grasping forceps. The origin of the lesion was determined using diagnostic laparoscopy.

Histopathological findings

Splenic samples from 2 different dogs were collected. The first sample collected consisted of a tumour composed of dense sheets of variable numbers of neoplastic histiocytes mixed with spindle-shaped pleomorphic cells. Neoplastic histiocytic cells were large round neoplastic cells with indistinct borders and moderate pale eosinophilic cytoplasm with vesicular nuclei. These findings were consistent with that of high-grade Histiocytic Sarcoma (Fig 1). The second sample section revealed numerous degenerated neutrophils and fewer lymphocytes and macrophages, indicative of a splenic abscess (Fig 2).

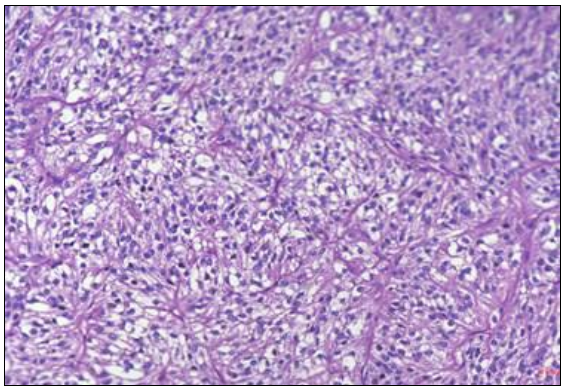

Fig 1: Histiocytic sarcoma of spleen: Laparoscopic sample (H&E, 20X)

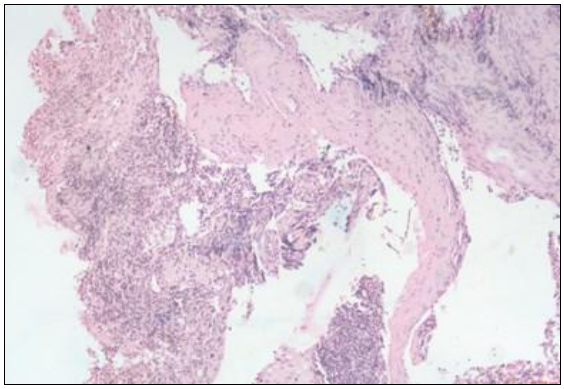

Fig 2: Splenic abscess. Laparoscopic sample: Degenerated neutrophils (H&E, 20X

Hepatic samples of 3 different dogs were collected. The first section revealed severe proliferation of fibrous connective tissue and moderate infiltration of lymphocytes, indicative of chronic hepatitis. (Fig 3). In the second sample, a mixture of normal-appearing adipocytes intermixed with atypical adipocytes was present. These atypical adipocytes were hyperchromatic and pleomorphic, indicative of a liposarcoma (Fig 4).

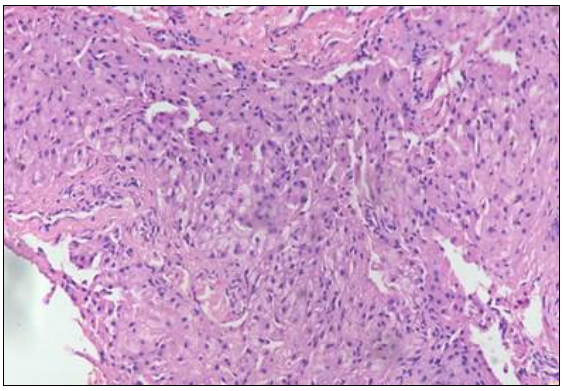

Fig 3: Chronic hepatitis: Laparoscopic sample (H&E, 20X)

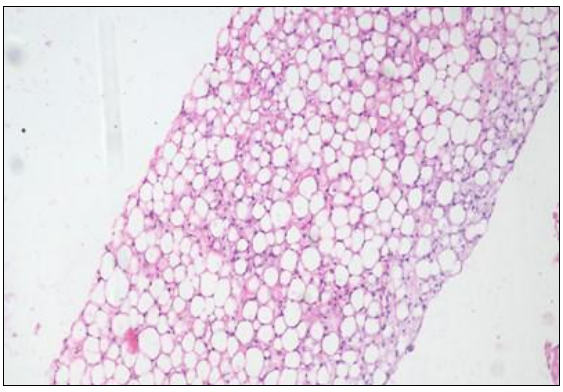

Fig 4: Liposarcoma on liver tissue: USG sample (H&E, 10X)

The third tissue section revealed fibroblastic spindle cell proliferation, abundant hyalinized collagen and scattered areas of calcification. A variable degree of lymphoplasmacytic inflammation was seen, leading to the diagnosis of a calcifying fibrous tumour (Fig 5).

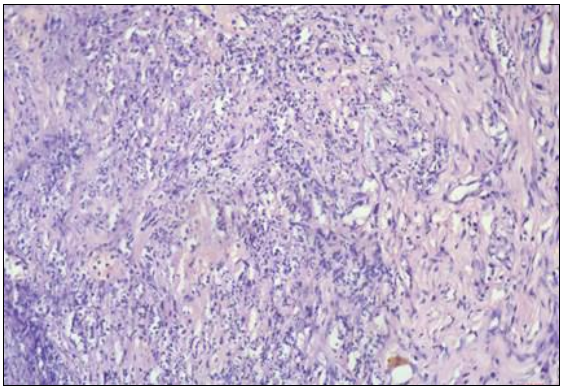

Fig 5: Calcifying Fibrous Tumour. Laparoscopic sample (H&E, 10X)

Uterine samples were collected from 2 different dogs. The first section revealed a tumour composed of well-differentiated smooth muscle cells arranged in streams. The neoplastic cells were moderately pleomorphic and had oval, large and vesicular nuclei. Few endometrial glands were distended and cystic, containing non-inflammatory material. Multiple foci of cartilaginous metaplasia were present, indicative of uterine leiomyoma with cartilaginous metaplasia (Fig 6).

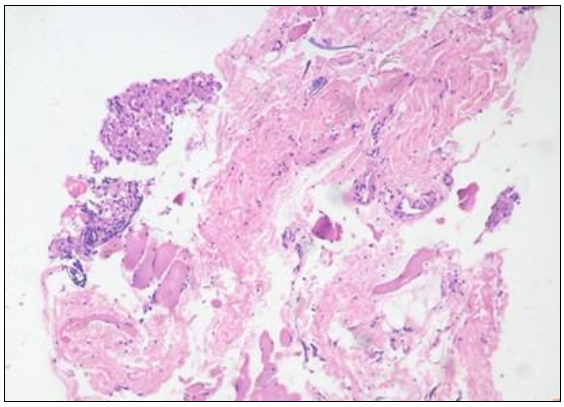

Fig 6: Laparoscopic sample: Uterine Leiomyoma with cartilaginous metaplasia (H&E, 20X)

The second section revealed dense infiltration of neutrophils throughout the section, indicative of suppurative endometritis. In gross appearance, the uterus showed thickened wall along the uterine horn when viewed during the laparoscopic procedure. The gross and histopathological findings correlated with one another and indicated suppurative endometritis (Fig 7).

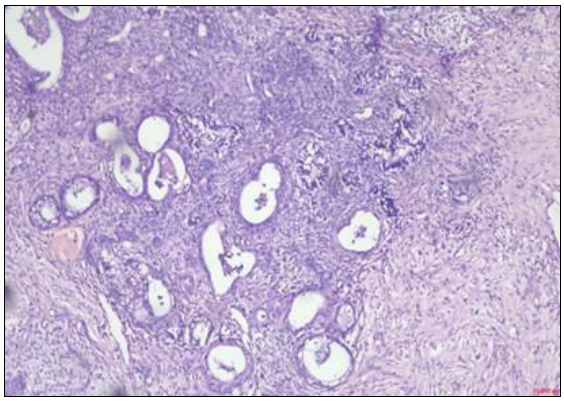

Fig 7: Suppurative endometritis: Laparoscopic sample (H&E, 10X)

A single ovarian sample was collected. The sample collected consisted of polygonal neoplastic granulosa cells arranged in sheets with fine fibrous stroma and hyperchromatic nuclei (Fig 8). This was indicative of a granulosa cell tumour.

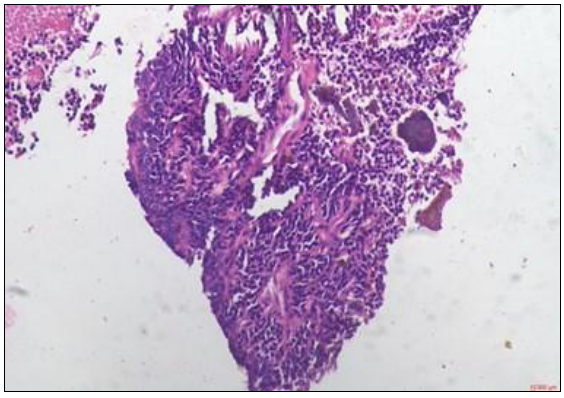

Fig 8: USG guide sample of ovarian tissue (H&E, 10X)

A single prostrate sample was collected. Hyperplasia of glandular and stromal tissue was observed. Glands were found to be lined by double-layered epithelium- inner columnar and outer cuboidal leading up to a diagnosis of prostate gland hyperplasia (Fig 9).

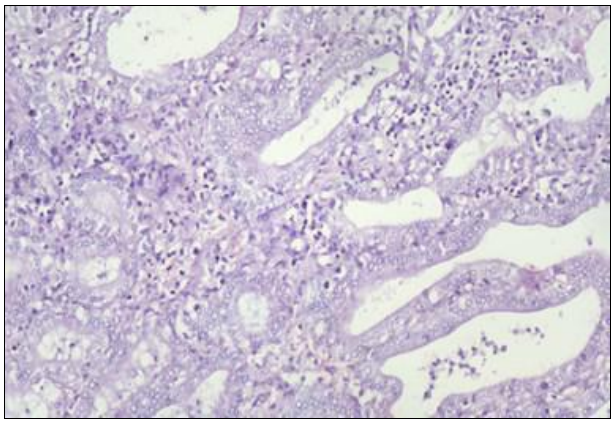

Fig 9: Prostate gland hyperplasia: Laparoscopic sample (H&E, 20X)

A single sample of cryptorchid intra-abdominal testicle was collected. The tissue section revealed aggregates of germ cells that fill the lumen of affected seminiferous tubules, replacing the normal lining of spermatogenic and Sertoli cells. Focal aggregates of lymphocytes were also present. Distorted seminiferous tubules were circumvented by proliferating connective tissue. Neoplastic cells having oval nuclei and scanty cytoplasm were identified along with fewer mitoses 2/HPF. These findings led to a confirmatory diagnosis of intratubular seminoma (Fig 10).

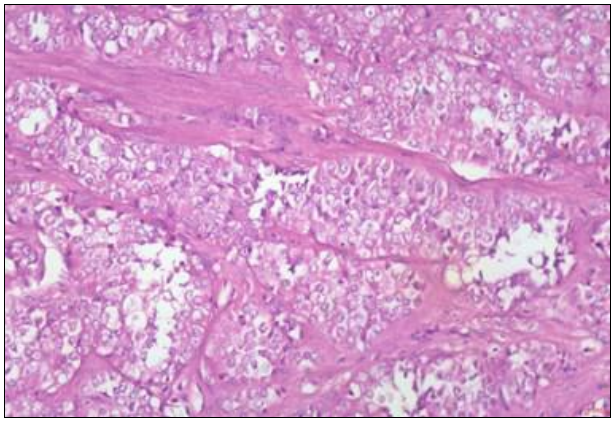

Fig 10: Intratubular seminoma: Laparoscopic sample (H&E, 20X)

Mesenteric samples from 2 different dogs were collected. The samples collected indicated an abnormal proliferation of fibroblasts producing collagen. Fibroblasts were arranged in fascicles, resulting in a diagnosis of mesenteric fibromatosis in both the patients (Fig 11, 12).

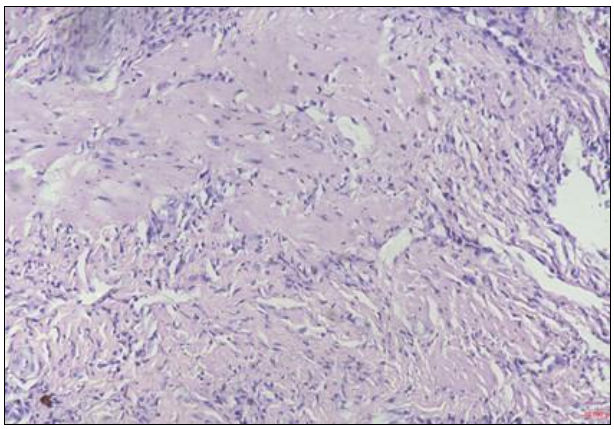

Fig 11: Laparoscopic sample: Mesenteric Fibromatosis (H&E, 20X)

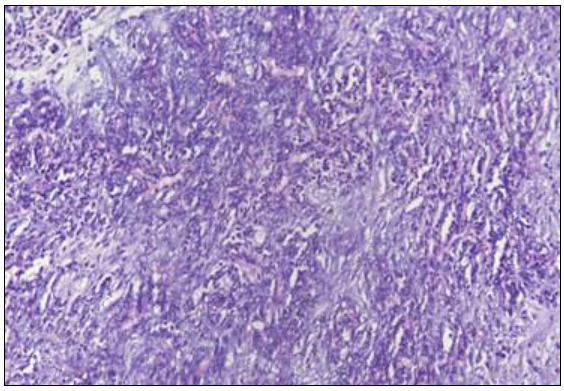

Fig 12: Laparoscopic sample: Mesenteric Fibromatosis (H&E, 20X

Conclusion

Biopsy and histopathology is an important diagnostic tool used for diagnosis of various conditions. It is generally recognized as the gold standard for the diagnosis of neoplasia. (Tseng LJ *et al*., 2023) [3]. Pathologists examine tissue samples to determine the type, grade, and extent of tumors, helping veterinarians make informed decisions regarding treatment options (Li *et al*., 2017) [4].

Accurate treatment can be commenced only after a definitive diagnosis is obtained and biopsy and histopathological examinations enable the same.

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