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Ultrasonographic Findings of Most Common Surgical Disorders of Gastrointestinal Tract in Dogs and Cats

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Abstract

Objective: To evaluate the efficiency of ultrasound for diagnosis of different gastro-intestinal surgical affections in dogs and cats.
Design: Clinical study.
Animals: 36 dogs and 20 cats.
Procedures: Ultrasonography was performed using two real-time ultrasound machines. The entire abdomen was examined ultrasonographically while the animal was in dorsal recumbency. Percutaneous ultrasound-guided aspiration and microcore automated biopsy were performed.
Results: Twelve dogs suffered from Ileus due to parasitic infestations and obstructed foreign bodies, full stomach wall thickening in 3 dogs, 7 cases with intestinal tumors, 3 cases were ultrasonographically examined for assessing gastropexy site. 2 cases with suspected stomach foreign bodies, 2 cases with necrosed intestine, 2 cases suffered focal stomach lesion of which 1 case suffered gastritis and the other demonstrated ulcer with mild thickening of the stomach wall. 1 case suffered intestinal intussusceptions, 2 cases with perforated intestine. 1 case suffered volvulus nodosus and 1 case was ultrasonographically normal and suffered melena. Exploratory laparotomy showed blackish colouration of the caecum. **In cats**, 10 out of 20 cases were with intestinal lymphoma, 2 cases were diagnosed with ileus. 1 case demonstrated stomach wall thickness, 1 case suffered intestinal abscess, 1 case suffered intussusceptions, 2 cases suffered intestinal perforation, 1 case suffered megacolon following operation for anastomosis. The last 2 cases suffered intestinal foreign body and parasitic infestation.
Conclusions and Clinical Relevance: The incidence of ileus or obstruction of the intestine with different foreign bodies constituted 33% from all cases. While cases with foreign bodies in the stomach and intestine were 14 out of 36 dogs with a rate of 38.8%.

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In cats lymphoma (10 cases) constituted the mostly encountered affection with an incidence rate of 50%.
Key words: Ultrasonography, Surgical Disorders, Gastrointestinal, Dogs, Cats.

Introduction

Abdominal ultrasonography provides us valuable information that lead to a definitive diagnosis or to narrow the list of differential diagnosis obtained with other diagnostic techniques.

Ultrasonography is more sensitive than radiographic survey for the identification of gastric lesions in dogs. [1] The main ultrasonographic feature of an intussusception is the appearance of multilayered wall, concentric rings or ring sign representing the superimposed wall layers of the intussusceptum and intussuscipiens. A very rare case of gastrogastric intussusception has been recorded in a three-year old, intact male, Rottweiler which was ultrasonographically revealed as gastric mass, although the accurate diagnosis was made during surgical interference. [2] GI foreign bodies greatly vary in size, shape, and echogenicity. Segmental fluid or gas accumulation within the stomach or part of the intestinal tract is an indicator of mechanical ileus (or obstruction). Balls are easily identified because of their characteristic curvilinear interface. Linear foreign bodies present as bright linear interfaces, commonly associated with shadowing and the affected bowel segment often appears plicated [3], however for complete exploration, laparotomy was performed.[4]

The presence of GI parasites can mimic the appearance of linear foreign bodies.[5] Wall thickening is the most common finding in inflammatory diseases. Fluid accumulation can often be seen near the perforation or dehiscence sites. GI neoplasia is often associated with motility disturbances that produce luminal fluid accumulation, which optimizes visualization of the lesion.[4]

The ultrasonographic appearance of intestinal entrapment is similar to that of intestinal perforation or infarction by other causes.[7] Therefore the aim of the present study was to evaluate the efficiency of ultrasound for diagnosis of different gastro-intestinal surgical affection as well as to survey such affections as the ultrasonographic pictures results are sometimes controversial.

Materials and Methods

This study was carried out on 36 dogs and 20 cats admitted to the Small Animal Clinic Justus-Liebig University, Giessen, Germany during the period from 2008 to 2010. They were examined ultrasonographically for diagnosis of different gastro-intestinal surgical affections.

Twenty three different breeds were recorded among the 36 diagnosed dogs, 15 (41.6%) were females of which 7 (46.6%) were castrated, 21 (58.3%) were males of which 10 (47.6%) were castrated. They differ in age and ranged between 5 months to 16 years old. They differ also in weight, ranged between 1.7 to 45 kg. Regarding the cats, fourteen (70%) out of 20 were of the European shorthair, seven (35%) were castrated females and the rest (65%) were castrated males. The age was between 2 and 15 years old, while the body weight was between 2.1 and 9.4 Kg BW.

Ultrasonography was performed using two real-time ultrasound machine Powervision 8000, SSA-390A; Toshiba with an 8 to 12 MHz linear transducer and 5-7 MHz convex transducer and LOGIQ 9 General Electric (GE) – USA, equipped with M7C (4-7 MHz) convex

transducer and M12 L (9-12 MHz) linear array transducer. The ventral abdominal wall was clipped and acoustic gel (Sonogel; Bad Camberg) was applied. The entire abdomen was examined ultrasonographically while the animal was in dorsal recumbency.
Percutaneous ultrasound-guided aspiration biopsies were performed using either a 22 gauge spinal needle or a 20 gauge needle. The microcore automated biopsy was performed using a 18 gauge Tru-Cut-like needle, assisted by an automated biopsy gun and also fine-needle aspiration biopsies (FNAB) were performed.

Results

Through study and analysis of the breed, sex, age and weight of the affected dogs and cats, it was found that they did not play any role in the incidence of these surgical affections.
Twelve cases (33.3%) were suffered ileus or obstruction of the intestinal tract which was dilated in the longitudinal and cross sections, also it was filled with fluids and double laminae hyperechoic structure. In one cases the regional lymph node was enlarged and the peristaltic movement was increased. In this case biopsy of the intestinal wall revealed parasitic infestation with Toxocara canis (Fig.1A, B & C).
Most cases were characterized with fluid-filled loops and hyperechoic structures with clear distal acoustic shadowing which confirmed presence of foreign bodies. When it is in the left cranial abdomen, it is in the duodenum and while in the right side, it is in the jejunum or in the right caudal abdomen in the cecum (Fig.2 A, B& C).
Cases suffered from foreign bodies underwent surgery for their removal through enterotomy or end- to- end intestinal resection and anastomosis.
Sandy materials, stones, clothes, pieces of wood from a tree, peach pit and plastic were the most detectable foreign bodies. The main ultrasonographic picture of the natural objects (sandy materials, stones, clothes, pieces of wood from a tree, peach pit as foreign bodies) appeared as smooth or rough hyperechoic structure with clear distal acoustic shadowing. While synthetic objects like plastic foreign body appeared as smooth hyperechoic structures without distal acoustic shadowing (Fig. 3 A & B).
Of the encountered cases, 3 dogs were with full stomach wall thickening. The ultrasonographic finding revealed focal hypoechoic swelling in stomach wall, sometimes thick stomach wall with flattened hyperechoic rugae. In one case it was inhomogenous without demarcation of its layers and in another, the muscular layer was moderately thickened. In all of these cases no surgical interference was undertaken. Cytological examination demonstrated chronic fibrous gastritis in one case and the other 2 cases were not subjected to further examination.
Seven dogs suffered gastrointestinal tumors characterized by round thick hypoechoic mass with central hyperechoic part in the intestine. This phenomena is called target lesion, 3 of them were with mixed echogenicity. Histopathology demonstrated carcinoma in the stomach (Fig.4), lymphosarcoma, lymphoma (Fig.5 & 6) and sarcoma in the intestines. No surgery was undertaken.

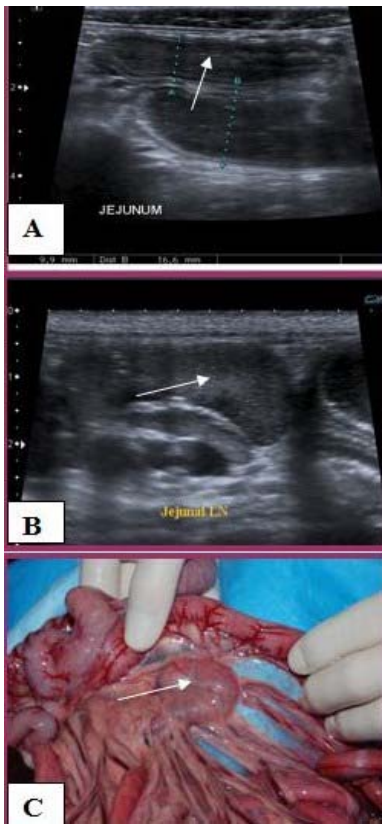

Figure 1 A: Ultrasound longitudinal scan in a 7months old Germanshepherd dog, jejunum dilated (1.6 cm in width) and fluid filled with double laminae hyperechoic structure (arrow) parasitic infestation (Toxocara canis).

Figure 1 B: Ultrasound longitudinal scan in the same dog showing enlarged hypoechoic mesenteric lymph node (arrow).

Figure 1 C: Laparotomy: enlarged jejunal lymph nodes are seen (arrow). The mesenteric vessels are prominent. (Parasitic infestation).

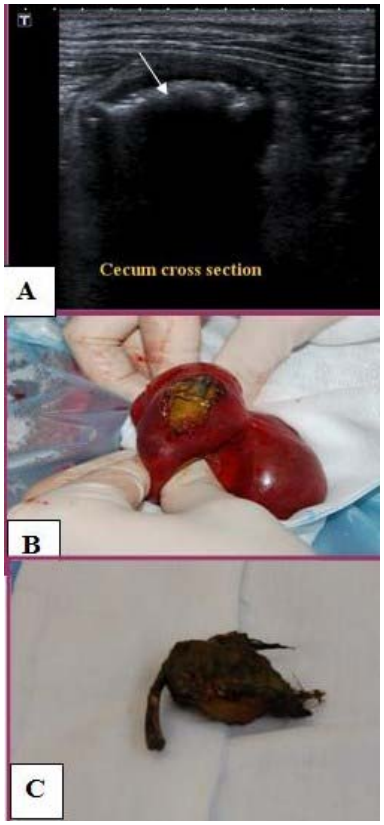

Fig. 2 A: Ultrasound cross scan in 3 years old Dalmatian dog in the right caudal abdomen: cecal foreign body appears as hyperechoic structure with sharp distal acoustic shadowing (arrow).

Fig. 2 B: Surgery shows the foreign body in the cecum after enterotomy.

Fig. 2 C: Surgery: foreign body (piece of wood from a tree).

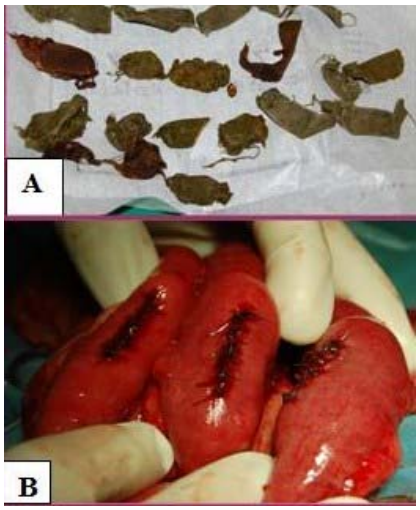

Figure 3A: A collection of Textile foreign bodies removed from the GIT of a 6 years old Doberman dog**.**

Figure 3B: Surgery enterotomy closure in 3 parts of the jejunum of the same dog**.**

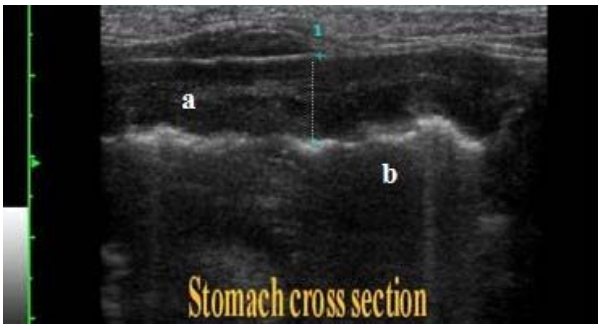

Figure 4: Ultrasound cross scan over the stomach in a 5 years old dog. The stomach wall is hypoechoic with hyperechoic line (a) at the middle and rugal folds (b) are flattened and mildly hyperechoic. The total wall thickness in this dog is 1.7 cm. (Histopathology: Carcinoma)

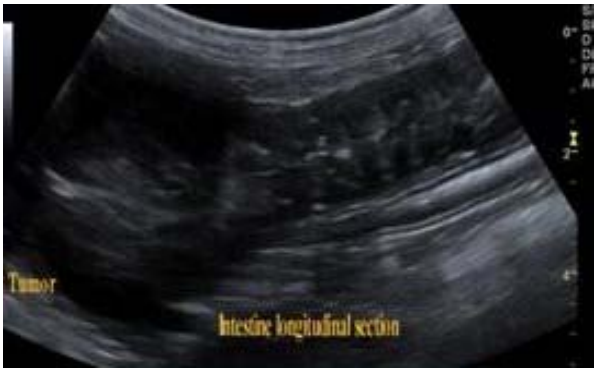

Figure 5: Ultrasound longitudinal scan in a 16 years old Dachshund dog showing a round hypoechoic mass with central hyperechoic part was seen on the left side. Histopathology: Lymphosarcoma**.**

Figure 6: ultrasound longitudinal scan in 3 years old Pug dog with a thickened hypoechoic muscular layer of both sides (1.1 and 1.8 cm) is seen. Lumen is represented with a hyperechoic line (mucous pattern). Histopathology: Lymphoma.

Three cases were ultrasonographically examined for assessing gastropexy site, showed hypoechoic irregular area seen between linea alba and stomach wall. Suture materials appeared hyperechoic and different layers of stomach wall were recognized. In one case free gas and mild postoperative hyperechoic swollen fat in the mesentery was clear, while the 3rd case demonstrated moderate hypoechoic thickened and irregular area representing the inflamed gastropexy site (Fig.7).

Two dogs with suspected stomach foreign bodies revealed hyperechoic structure in the stomach with clear distal acoustic shadowing and gastrotomy was undertaken for removal of the foreign bodies (pieces of wood).

Two cases with necrosed and abscessated intestine. In the 1st case, there was no blood supply in the small intestine without differentiation of the intestinal layers that appeared with mixed echogenicity. The other case was with abscessation of the intestine, revealed hypoechoic

round structure with central hyperechoic area in the right cranial abdomen. Both cases were operated by resection and anastomosis of the intestine.
Two cases suffered focal stomach lesion (ulcer, gastritis) revealed focal hypoechoic swelling in stomach wall. Cytology revealed allergic or parasitic gastritis in one case and the other one demonstrated mild thickening of the stomach wall (Fig.8).
One case suffered intestinal intussusception manifested multilayered series of concentric rings representing wall layers of the intussusceptum and intussuscepiens. Hypoechoic mesenteric fat was included. Intestinal resection and anastomosis was undertaken (Fig.9).

Figure 7: Ultrasound cross scan in the left cranial abdomen in a 7 years old Mix dog showing the gastropexy site (arrow) 2 days after surgery. It appears hypoechoic, irregular and thickened.

Figure 8: Ultrasound cross scan of stomach wall in a 12 years old dog: a focal hypoechoic swelling in the mucosa (1) (5 mm) is visible.
Histopathology: Ulcerative, allergic or parasitic gastritis.

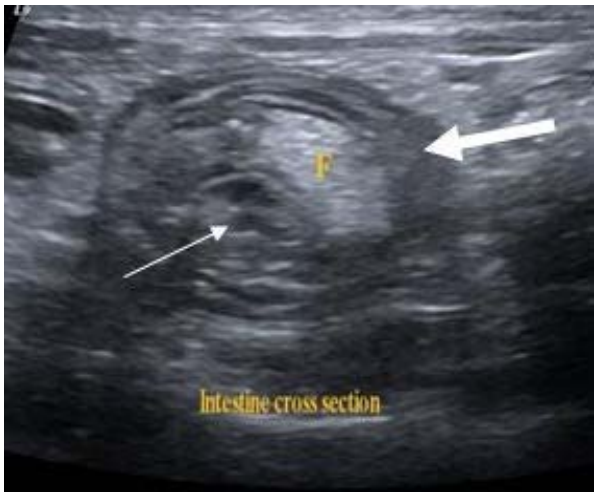

Figure 9: Ultrasound cross section in the right mid abdomen: intussusception in a 1 year old Jack Russel Terrier dog. (F) is hyperechoic mesenteric fat, multilayered series of concentric rings representing wall layers of the intussusceptum (thin arrow) and intussuscipiens (thick arrow)

Two cases with perforated intestine showed hyperechoic free gas shadowing in right cranial abdomen with reverberation artifact. Filamentary threads were removed from the gastrointestinal tract, the other case showed in combination, anechoic fluid in the middle

abdomen with mixed echogenicity of the mesentery. Surgery demonstrated perforated intestine with presence of tree leaf and the abdominal fluid was of purulent material. Clostridium perfringens and E coli were isolated from the pus (Fig.10 A, B &C).

Figure 10 A: Ultrasound longitudinal scan in a 2 years old dog showing the free abdominal gas (arrow) in right cranial abdomen with hyperechoic shadowing (arrow) and reverberation artifact. Perforated intestinal loop caused by a foreign body

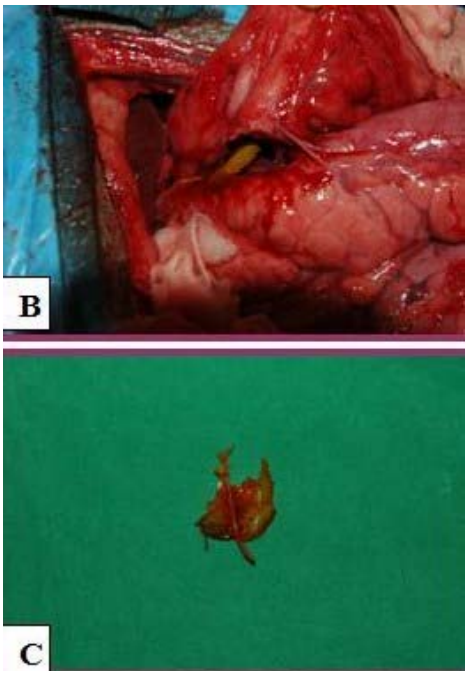

Figure 10 B&C: Perforated intestinal loop in the same dog with leaf foreign body (A). Foreign body itself (B)

One case suffered volvulus nodosus demonstrated dilated intestinal tract with anechoic fluid and an enlarged and necrosed pattern intestinal wall which appeared hyperechoic. Therefore paralytic ileus was suspected. Surgery revealed red to dark intestinal tract with a hole in the mesentery, this patient was euthanized (Fig.11 A &B).

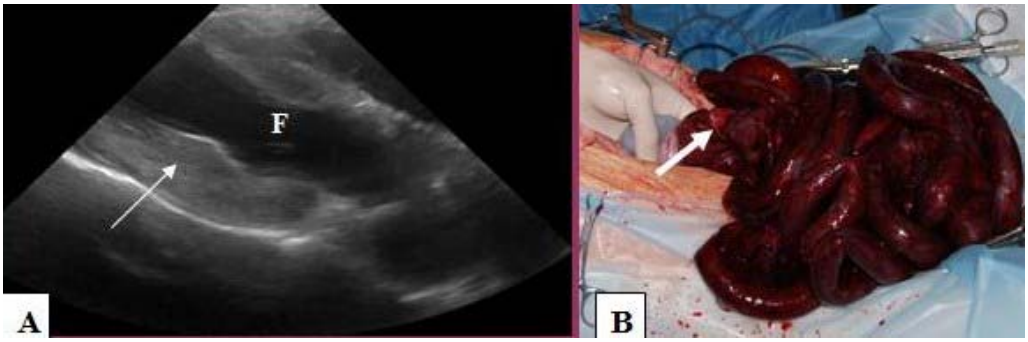

Figure 11 A: Ultrasound longitudinal scan in a 9 years old dog showing a dilated intestine with anechoic fluid (F). Intestinal wall is thickened and hyperechoic (arrow). Volvulus nodosus. **B:** Surgery in the same dog showing dilated dark red intestinal loops. A hole in the mesentery was diagnosed which facilitate the entrapment of the intestine followed with volvulus (arrow). Dog is euthanized.

One case was ultrasonographically normal and suffered melena. During exploratory laparotomy it showed changes in caecal colour. Typhlectomy was done. Histopathological examination showed moderate to severe granulomatous inflammation of the jejunum, ileum and colon.

The mostly encountered cases in cats were:

Ten cases with intestinal lymphoma as the most common clinical findings were vomiting, anorexia and weight loss. Hematemesis and melena were uncommon findings. It is manifested sonographically as thickened muscular layer of intestine without fully disruption of the wall layering and reduced wall echogenicity (Fig. 12). One case was accompanied with ascites. No surgery was adopted. Cytological examination revealed inflammatory bowel disease, esinophilic enteritis and lack of nucleated cells. Regional mesenteric lymphadenopathy was recorded in all cases.

Figure 12: Ultrasound longitudinal scan in 15 years old cat showing a thickened hypoechoic to anechoic intestinal wall (6mm). Cytology: purulent inflammation with increasing lymphoid blast cells suspicion of lymphoma**.**

Two cases out of 20 were diagnosed with ileus demonstrated dilated intestinal loop with hypoechoic material and with hyperechoic structure or linear foreign body with distal acoustic shadowing. Surgery was performed for removal of thread materials from the jejunum in one case and the trichobezoar (hair ball) from the other case.

One case demonstrated stomach wall thickness, (about 8 mm) and loss of normal layering, the enlarged mucosa is hypoechoic with a mixed echogenicity and mild gas bubbles around this area. The condition was cytologically diagnosed as chronic gastritis (Fig.13).

Figure 13: Ultrasound cross scan in a 7 years old cat showing a thickened wall of the stomach (8mm) and loss of normal layering. The enlarged inner layer is hypoechoic with a mixed echogenicity. Gas bubbles in the lumen are visible (a). Histopathology: Chronic gastritis**.**

One case suffered intestinal abscess manifested thick hypoechoic wall corrugated with undifferentiated layers. Surgical finding demonstrated intestinal tumour with thickening of intestinal wall and necrosis with abscessation of jejunum. Cytology revealed lymphoma with

inflammatory cells as neutrophils, granulocytes, necrosis with bacterial infection. The case is diagnosed as intestinal abscess caused by lymphoma.
One case suffered intussusception showed the same ultrasonographic picture as described in dogs. Also enterectomy of the involved area was performed.
Two cases suffered intestinal perforation demonstrated also free hypoehoic abdominal fluid. Abdominal exploration revealed purulent materials with adhesions between intestine and abdominal wall. Also perforation of the pylorus without foreign body was clear. Microbiological examination revealed E coli, Klebsiella, Enterococcus sp. While ascitic fluid demonstrated cytologically septic pyogranulomatous inflammation (Fig.14 A & B).

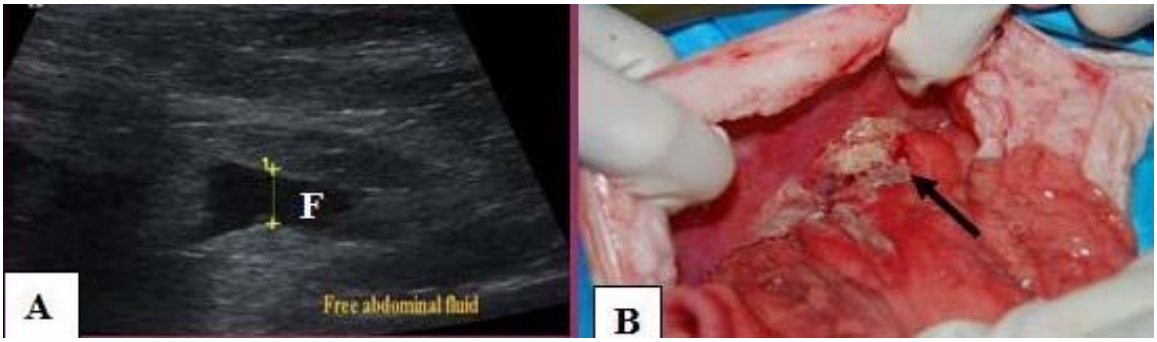

Figure 14 A: Ultrasound longitudinal scan in a 6 years old cat at the right mid abdomen showing perforated intestinal loop, showing hypoechoic free abdominal fluid (F). **B:** at surgery an abscess with purulent materials was diagnosed.

One case suffered megacolon following operation for anastomosis as the operation site demonstrated thickened hypoechoic area with hyperechoic suture material observed without free gas and without free abdominal fluid. Subtotal colectomy was performed (Fig.15 A, B &C).

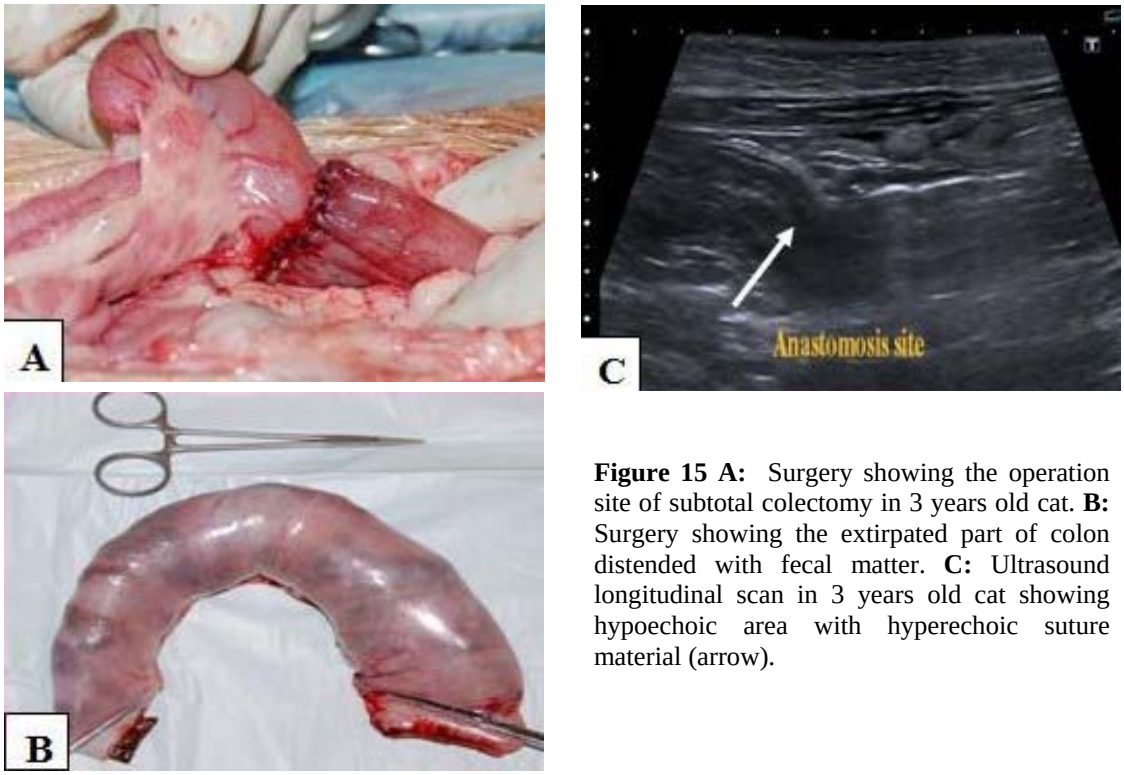

Figure 15 A: Surgery showing the operation site of subtotal colectomy in 3 years old cat. **B:** Surgery showing the extirpated part of colon distended with fecal matter. **C:** Ultrasound longitudinal scan in 3 years old cat showing hypoechoic area with hyperechoic suture material (arrow).

The last 2 cases suffered intestinal foreign body with double hyperechoic laminae without distal shadowing indicating parasitic infestation. No further examination was performed (Fig.16).

Figure 16: Ultrasound longitudinal scan of the intestine of a 14 years old cat. Intestinal parasites (arrow) have double lined hyperechoic laminae without distal shadowing in the fluid filled intestinal tract.

Discussion

Ultrasound is an important part of modern imaging protocols and can aid greatly in the diagnosis of most GIT disorders, of which ileus or obstruction of the intestine, functional disorders, detection of infiltrative disease, regional lymphadenomegaly and complications such as perforations. However, interpretation of images is highly user dependent and requires experience. Ultrasonographic findings should be interpreted with respect to case history, clinical signs and radiographic findings.[8,9]

Through study and analysis of breed, sex, age and weight of the affected dogs and cats, it was found that they did not play any role in the incidence of such surgical affections. Twenty three different breeds were recorded among 36 affected dogs, 15 out of 36 dogs were females of which 7 were castrated and 21 were males of which 10 were castrated. They differ in age and ranged between 5 months and 16 years old. They differ also in body weight and ranged between 1.7 to 45 kg. The same was also recorded in cats except the breed, as 14 out of 20 cats were of the European shorthair and this is referred to the increased population of this breed in Germany than the other breeds.

Concerning the incidence of the different GIT affections in dogs it was found that ileus or obstruction of the intestine with different foreign bodies constituted the most of such affections with an incidence rate of 33% from all cases. While cases with foreign bodies in the stomach and intestine were 14 out of 36 dogs with a rate of 38.8%. On the other hand intestinal tumours (7 cases) and diffused stomach wall thickness (3 cases), constituted 27.7% of all surgical affections. Moreover, cases suffered intestinal obstruction were 14 (12 with ileus, 1 intussusception and 1 volvulus nodosus) with a rate of 38.8%. Other affections as focal stomach lesions (2), necrosed or abscessiated intestine (2), intussusception (1), volvulus nodosus (1) and perforated intestine (2) were solitary and rare. These findings are in accordance with those reported by Tidwell and Penninck (10). In cats lymphoma (10 cases) constituted the mostly encountered affection with an incidence rate of 50%. Other cases as ileus (2), stomach foreign bodies (2), perforated small intestine (2), stomach wall thickness (1), abscessation of intestine (1), intussusception (1) and colonic impaction (1) are considered solitary and rare. Similar findings were previously observed.[11]

Obstructive ileus may be partial or complete. Common causes are foreign bodies mostly located in the jejunum and ileum. In cats hair balls are most common causes of intestinal

obstruction. Strictures could also be the cause. Clinical findings include anorexia, vomiting, abdominal pain, dehydration and no defecation. The intestine in such cases were mildly dilated reaching to 1.6 cm diameter proximal to the obstruction or may even be of normal diameter. These compact foreign bodies appeared as irregular bright interfaces with a strong, uniform, clean distal acoustic shadowing, which has been previously observed in cases of intestinal foreign bodies in cats and dogs.[12,13]

In complete obstruction, the dilatation of intestine is more severe with gases. The location of the obstruction can be either intraluminal (foreign bodies), extraluminal adhesions, herniation, intussusception or intramural (neoplastic wall infiltration, granulomas). More severe dilatation of intestine is seen proximal to site of obstruction. The segment distal to the obstruction usually appears empty and contracted due to continued peristaltic activity in the distal segments. On the other hand, functional (adynamic or paralytic) ileus can be detected as generalized and uniform mild intestinal dilatation due to lack of vascular or neuromuscular abnormalities in bowel wall with inhibition of bowel motility. The obstruction is occurred due to pooling of intestinal contents in the dependent areas of gastrointestinal tract. Ultrasonography, the condition is characterized by decreased intestinal motility together with generalized dilatation of the small intestine with its filling with fluids and sometimes with gases. [13]

Sandy materials, stones, clothes, pieces of wood from a tree, peach pit and plastic were the most detectable foreign bodies, and the main ultrasonographic picture of the natural objects (sandy materials, stones, clothes, pieces of wood from a tree, peach pit as a foreign bodies) appeared as smooth or rough hyperechoic structure with clear distal acoustic shadowing while synthetic objects like plastic foreign body appeared as smooth hyperechoic structures without distal acoustic shadowing. These findings are in consistent with previous observations. [10]

Also ultrasonographic observation of peristaltic activity may also be an important indicator of obstruction[14] as in acute stage of mechanical ileus which is characterized by generalized increased intestinal motility while in chronic stage and in functional ileus showed generalized decrease in intestinal motility.

On the other hand, the presence of intraluminal gas is considered to be one of the major limitations of gastrointestinal ultrasonography as gases masks the underlying structures by the reverberation artifact and shadowing.[15,16]

Abdominal radiographic survey is advised in vomiting animals suspected of having ileus, as ultrasound alone in such instance does not allow global view of the abdomen, it is much more time consuming and nothing of secondary abnormalities could be overlooked.[17]

In this respect, the mostly asked question by clinicians is whether one imaging test such as survey radiography or ultrasonography is sufficient to make the diagnosis of suspected GIT foreign bodies. Foreign bodies were detected by ultrasonography in all of 16 examined animals, [18] the same as manifested in our 14 cases with small intestine and stomach foreign bodies, which were identified by their clear distal acoustic shadowing and variable degrees of surface reflection. The consequence of foreign body ingestion depends on the size and shape of the object. Small foreign body may cause partial obstruction, where as complete obstruction is usually caused by large circular bodies. Fluid and gas retention proximal to the obstruction leads to luminal distention.

Seven dogs suffered gastrointestinal tumors or neoplasia were often associated with motility disturbances that often produce luminal fluid accumulation which optimizes visualization of the lesion. The primary ultrasonographic sign is the marked wall thickening with complete loss of layering. Others were characterized with round thick hypoechoic part in the intestine,

sometimes with mixed echogenicity. The same was also in small animals as the most common ultrasonographic findings of intestinal lymphoma are transmural thickening associated with the diffuse loss of normal wall layering, reduced wall echogenicity, reduced localized motility and regional lymphadenopathy.[6] In carcinoma the most common ultrasonographic findings are transmural thickening with a complete loss of layering. Other tumors such as histiocytoma/ histiocytic sarcoma, mast cell tumor, hemangiosarcoma have been reported. The lesions tend to appear as poorly echogenic masses or focal thickening with loss of layering. No specific ultrasonographic features help in differentiating amongst the different types of tumors. Histopathology demonstrated lymphosarcoma, lymphoma and carcinoma. Intestinal carcinomas have been documented in dogs and cats.[11,19] It shares some of ultrasonographic features seen in intestinal lymphoma and mechanical ileus is more common in carcinoma than in lymphoma.

On the other hand, three cases with stomach wall thickening revealed focal hypoechoic swelling in stomach wall and sometimes thick stomach wall with flattened hyperechoic rouge. Similar findings have been described in previous studies.[6, 20]

Ultrasonographic examination for assessing the gastropexy site was chosen because it has distinct advantages compared to radiological or histological methods. As it is fast, simple and non invasive technique without radiation hazard and it can be carried out repeatedly on live animals. A firm and permanent adhesions has been manifested between stomach and linea alba two months post operation.[21,22]

Our ultrasonography demonstrated hypoechoic irregular area seen between linea alba and stomach wall. Suture materials appeared hyperechoic and different layers of stomach wall were recognized.

The case with necrosed intestine was characterized by absence of blood supply in the small intestine by Doppler without differentiation of the intestinal layers that appeared with mixed echogenicity or inhomogenous. While the other case with abscessiation of the intestine revealed hypoechoic round structure with central hyperechoic area. These findings are considered to be pathognomonic.[23]

Intestinal perforation was detected only ultrasonographically but not radiographically, therefore ultrasonography alone could be used for the diagnosis as recommended by Tyrrell and Beck.[18] Foreign body and filamentary perforation may be due to precipitation of salts on the foreign body or threads with its longstanding time with pressure atrophy and perforation of the intestinal wall. Ultrasonographically, perforation showed hyperechoic free gas shadowing in right cranial abdomen with reverberation artifact, while in the other case and in combination an anechoic fluid in the middle abdomen with mixed echogenicity of the mesentery was demonstrated which confirms ultrasonographic findings in dogs and cats with gastrointestinal perforation.[24]

Cases suffered focal stomach lesions which may be ulcer, tumour, gastritis or parasitic infestation revealed focal hypoechoic swelling in the stomach wall in one case and the other demonstrated mild thickening of stomach wall due to gastritis as also described in previous investigations.[19,25]

Intestinal intussusception was diagnosed only by ultrasonography in one dog and is characterized ultrasonographically by multilayered series of cocentric rings representing wall layers of the intussusceptum and intussuscepiens which is considered pathognomonic of the condition in dogs.[26,27]

In cases with intestinal volvulus, the intestine rotates around the mesenteric axis causing vascular compromise with degenerative changes and necrosis of the intestine. It revealed dilated intestinal tract with anechoic fluid and an enlarged and necrosed intestinal wall which

appeared hyperechoic. Therefore ileus was diagnosed and confirmed through exploratory laparotomy. The intestinal wall was of dark blue colour, thickened and reached more than 5 mm, treatment was very difficult and the animal was euthanized. The same signs and prognosis were recorded in four clinical cases of intestinal volvulus in dogs.[28]

Intestinal lymphoma in cats is considered to be the most encountered GIT affection with an incidence rate of 50%. The ultrasonographic findings are generalized thickening of the muscular layer, associated with slight diffuse loss of normal wall layering, reduced wall echogenicity, reduced localized motility and regional lymphadenopathy. The thickening of the intestinal wall can widely range from 1.5- 2mm to over 4 mm. mesenteric lymphadenopathy is a common finding of intestinal lymphoma in dogs and cats. These findings are the same as described by several authors.[19,25] Moreover, they advised ultrasound guided biopsy for histopathological examination and accurate diagnosis.

Other demonstrated GIT surgical affections in cats as ileus, foreign bodies, stomach wall thickening, intussusception, perforated small intestine showed the same ultrasonographic picture as described in dogs.

However, the case suffered intestinal foreign body with double hyperechoic laminae without distal shadowing indicated parasitic infestation and is considered to be pathognomonic.

Moreover, the cat which suffered Megacolon following operation for anastomosis, the operation site demonstrated thickened hypoechoic area with hyperechoic suture material, the same findings was described by Nick et al.[29]

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چکیده

یافته‌های اولتراسونوگرافی معمولترین اختلالات معده-روده‌ای منجر به جراحی در سگ‌ها و گربه‌ها

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هدف- ارزیابی کارایی اولتراسونوگرافی برای تشخیص اخلالات معده-روده‌ای منجربه جراحی در سگ‌ها و گربه‌ها

طرح مطالعه- مطالعه بالینی

حیوانات- ۳۶ قلاده سگ و ۱۰ قلاده گربه

روش کار- اولتراسونوگرافی با استفاده از روش دوبعدی انجام شد. در حالیکه حیوان به پشت خوابیده بود کل شکم با اولتراسونوگرافی ارزیابی شد. آسپیراسیون با هدایت اولتراسوند انجام گردید.

نتایج- ۱۲ قلاده سگ از ایلئوس بدلیل تهاجم انگل‌ها رنج می‌بردند و انسداد ایجاد شده بود. جسم خارجی و افزایش ضخامت معده در ۳ قلاده سگ مشاهده شد، در ۷ مورد تومور روده وجود داشت و ۳ مورد برای ارزیابی محل گاستروپکسی سونوگرافی شدند. ۲ موردمشکوک به جسم خارجی در معده، در دو مورد نکروز روده، ۲ مورد ضایعه موضعی معده که یک مورد از گاستریت رنج می‌برد و دیگری زخم معده همراه با افزایش ضخامت دیواره معده را نشان داد. ۱ مورد درگیر توهم رفتگی روده‌ها شده بود و در دو مورد سوراخ شدگی روده مشاهده گردید. ۱ مورد دچار چرخش و یک مورد با وجود ملنا اولتراسونوگرافی نرمال داشت. در گربه، ۱۰ قلاده از تا ۲۰ لنفوسارکوم روده داشتند، یک مورد آبسه روده، ۱مورد توهم رفتگی روده‌ها، ۲مورد سوراخ شدگی روده‌ها و ۱ مورد مگاکولون متعاقب عمل آناستوموز داشتند. ۲ قلاده هم درگیر جسم خارجی و تهاجم انگلی بودند.

نتیجه‌گیری و کاربرد بالینی- وقوع ایلئوس یا انسداد روده با جسم خارجی شامل ۳۳ درصد از کل موارد بود. در حالیکه موارد جسم خارجی در معده و روده ۱۴ مورد از ۳۶ قلاده سگ با میزان وقوع ۳۸/۸ درصد بود. در گربه‌ها لنفوسارکوما (۱۰ مورد) با میزان وقوع ۵۰ درصد بیشترین مورد را به خود اختصاص داد.

کلید واژگان- اولتراسونوگرافی، اختلالات جراحی، معده- روده ای، سگ‌ها،گربه‌ها