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Trading name of SK Veterinary Services Ltd

Patient Data

Owner name	???	**Animal name**	MAISIE
Identification	??????????	**Exam Date**	??/???/2023
Exam Description	??????????		
Performing Physician	S KEIR	**Report Date**	??/???/2023

Observations

Abdominal remarks

Maisie was presented for abdominal ultrasound examination and possible ultrasound guided sampling due to the recent finding of increased liver enzymes on her bloods (alk phos at over 10 times URL). Maisie was reported to be otherwise well and had lost weight due to dieting but had a fractured tooth requiring a general anaesthetic and dental treatment. On examination, Maisie was overweight with a large abdomen and lumbar fat pads and had multiple cutaneous masses.

Maisie was scanned conscious and was very good for this and the subsequent FNAs. Good quality images of her entire abdomen were obtained - no free fluid was present.

The gall bladder was full but within normal limits. The wall was generally of normal thickness but there were multiple, hyperechoic luminal projections that were nonmobile when Maisie was rolled over. These are likely to represent benign polyps. The gall bladder contained some (about 25% volume) of moderate echogenicity sludge. Both the presence of gall bladder polyps and biliary sludge may indicate delayed gall bladder emptying as part of cholangiocystitis or chronic inflammation, disease processes that can lead to gall bladder mucocoele formation.
The liver was large, extending to mid-abdomen ventrally with moderately rounded caudal margins ventrally. The parenchyma had a patchy appearance with multiple indistinct hypoechoic areas throughout; some of these patches were more discrete and hypoechoic than the general appearance. Differential diagnoses for these changes include nodular hyperplasia, steroid hepatopathy, neoplasia (primary or metastases, lymphoma/necrosis/abscesses/haematoma. Biopsies are required to differentiate these disease processes.
The spleen was marked abnormal in appearance and subjectively moderately enlarged. There were multiple focal areas of strongly hyperechoic tissue with indistinct margins, concentrated on towards the tail of the spleen and the mesenteric border but not entirely and most were not associated with the splenic vessels as myeliolipomas are usually found. Some of the areas on the edge of the spleen caused the capsule to be deformed/pushed out around them. The rest of the splenic parenchyma was mottled with smaller and less hyperechoic patches and speckles throughout. Differential diagnoses for multifocal hyperechoic changes include myelolipoma, neolasia (primary, metastases), nodular hyperplasia, and mineral (dystrophic mineralisation). Some of the superficial changes could also be siderotic nodules, which are reactive changes found in older dogs. Biopsies are required to differentiate these processes.
Both kidneys were markedly abnormal in appearance, though size is top end of normal range for Maisie's body weight. Both kidneys appeared similarly - loss of corticomedullary definition due to an increase in medullary echogenicity, a faint corticomedullary rim sign, increased echogenicity of the renal papillae, focal

hyperechoic speckles throughout the cortex, multiple small anechoic cystic lesions within the cortex, capsule hyperechoic and slightly thicker than normal and irregular outline. There was no pyelectasis present. These changes could be caused by a number of diseases and processes - nephritis, nephrocalcinosis, renal dysplasia, chronic renal disease, lymphoma, amyloidosis.
The adrenal glands were bilaterally enlarged and homogenous echotexture - left adrenal 10-11mm diameter (normal for BW max 6.4mm), right adrenal 9.4-10.5mm (normal for BW max 7.5mm). This could be consistent with pituitary dependant hyperadrenocorticism.

The rest of the abdomen was visualised and unremarkable - stomach, pancreas, duodenum, jejunum, colon, lymph nodes. The urinary bladder was normal though there were some hyperechoic speckles in the contents which might represent cells or crystals; there was no sediment and these were mobile.

Ultrasound guided fine needle aspirates of the liver and spleen (including targeted at the hyperchoic focal lesions) were obtained.

Conclusions

Multiple abnormalities were found on Maisie's scan so it can be difficult to tell the significance of them all. There may also not be a unifying diagnosis that would cause all these changes seen though hyperadrenocorticism may do this. Diffuse

changes seen on ultrasound in organs are not specific for particular disease processes and therefore biopsies are required. Fine needle aspirates were opted for today as a low risk option but some times do not give a diagnosis.

The bilaterally enlarged adrenal glands along with very high alkaline phosphatase on the blood tests are highly suggestive of hyperadrenocorticism and I recommend testing for this (ACTH stim or LDDST). HAC could potentially cause the majority of the changes seen such as steroid hepatopathy causing liver patches, dystrophic mineralisation of the spleen and kidneys and gall bladder changes. However, we must be careful to not assume all the changes are due to HAC until proven otherwise and at the very least follow up and monitor these changes if HAC is confirmed. Further biopsies of the liver (transcutaneous core needle or surgical) and/or spleen (splenectomy) may be required to differentiate the disease processes. Biopsying the kidneys is possible; FNA are generally unrewarding, core needle biopsies carry not insignificant risks, surgical requires surgery and all biopsies need to be sent to specialist labs for analysis as general labs don't tend to have the knowledge on these samples to get a diagnosis.

The prescence of gall bladder polyps and biliary sludge are common findings and usually benign but they can indicate delayed gall bladder emptying, chronic inflammation as part of cholangiocystitis or secondary to endocrine disease such as hyperadrenocorticism. They can progress to gall bladder mucocoeles so regular monitoring is recommended such as by intermittent abdominal ultrasound and/or blood tests.

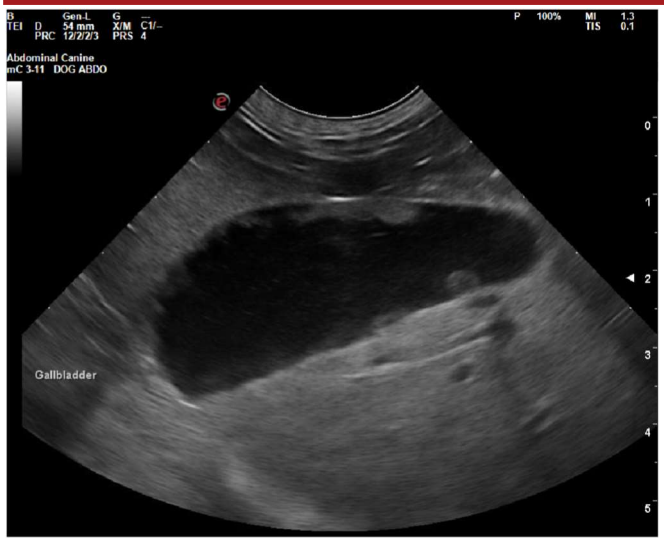
It will be difficult to tell if renal dysfunction is present if Maisie has HAC as this will cause dilute urine - SDMA may be useful. The increased urea may be due to prerenal or renal causes.

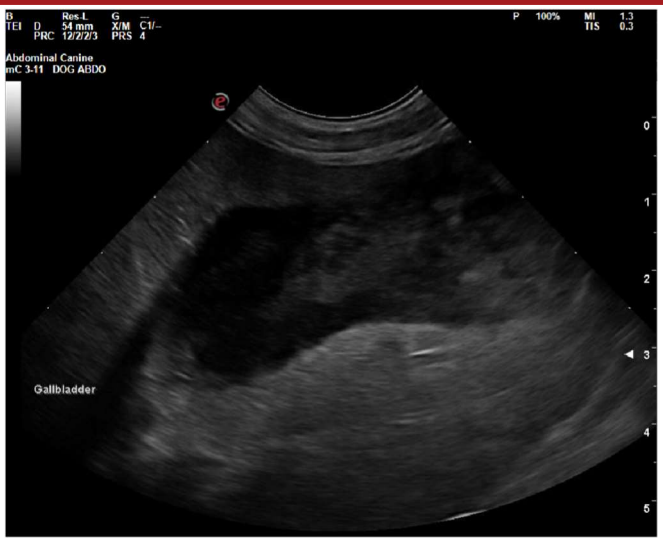
Dystrophic or metastatic calcification could explain some of the changes seen in the kidneys and spleen (hyperechoic speckles) and this is very concerning. Maisies blood has a high normal level of total calcium (2.72, range 2.36-2.84) and high phosphorus (1.78, normal 0.8-1.6) so the calcium-phosphorus product is moderate meaning a risk of tissue mineralisation. Possible causes include chronic renal failure and vitamin D toxicosis (psoriasis creams, rotenticides, supplements) which can cause hyperphosphataemia without necessarily having a high total calcium. Hyperadrenocortcism can cause dystrophic mineralisation (typically calcinosis cutis) but I would not expect the blood changes in phosphorus. I recommend a thorough history is taken to see if contact with these products is possible, xrays of abdomen and soft tissues to see if the hyperechoic speckles are tissue mineralisation and repeating caclium and phosphorus bloods to check the results are repeatable. If the results remain high or mineralisation is seen on xray then I

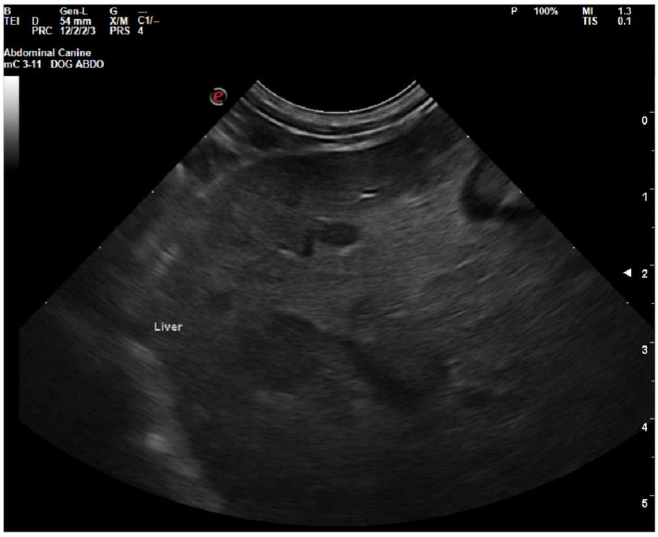
recommend a work up to include ionised calcium, PTH and PTHrp levels and vitamin D metabolites.

SIGNATURE Dr Sarah Keir BVMS PGCertSAM MRCVS
RCVS Advanced Practitioner in Small Animal Medicine

Attached images


Abdominal Canine
mC 3-11 DOG ABDO
Gallbladder


Abdominal Canine
mC 3-11 DOG ABDO
Gallbladder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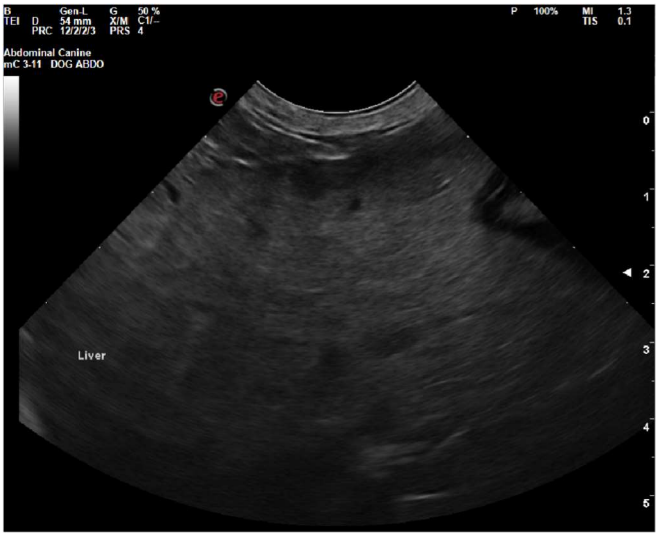
Liver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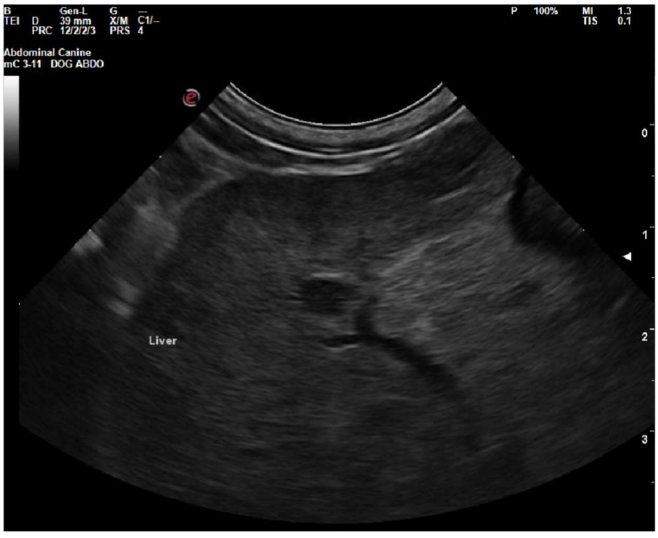
Liver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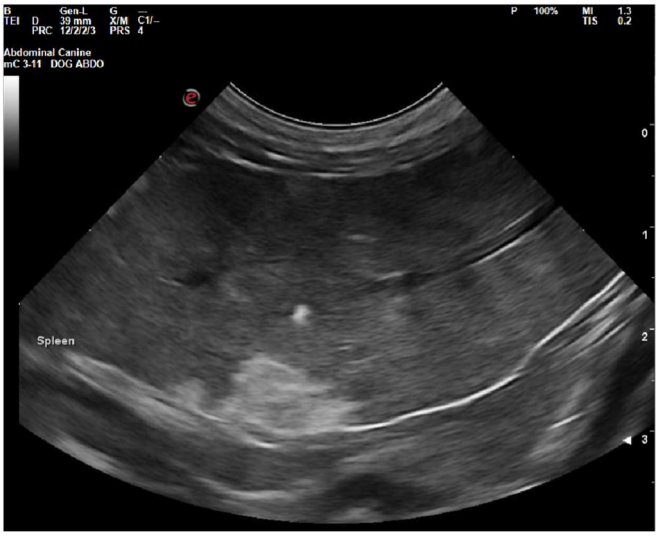
Liver


Abdominal Canine
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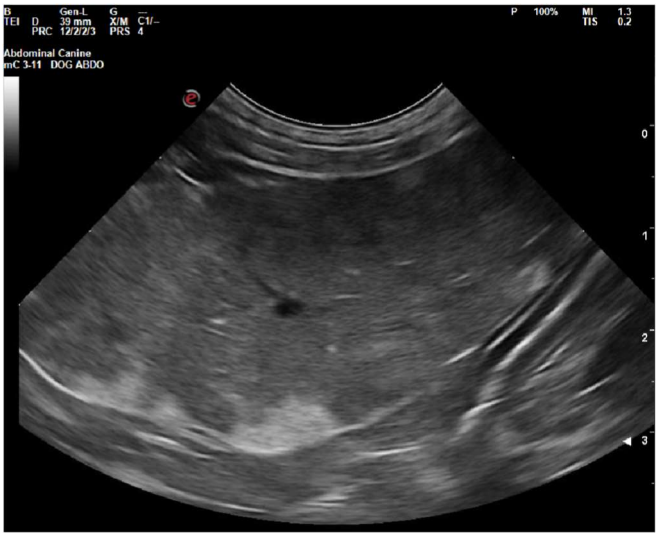
Spleen


Abdominal Canine
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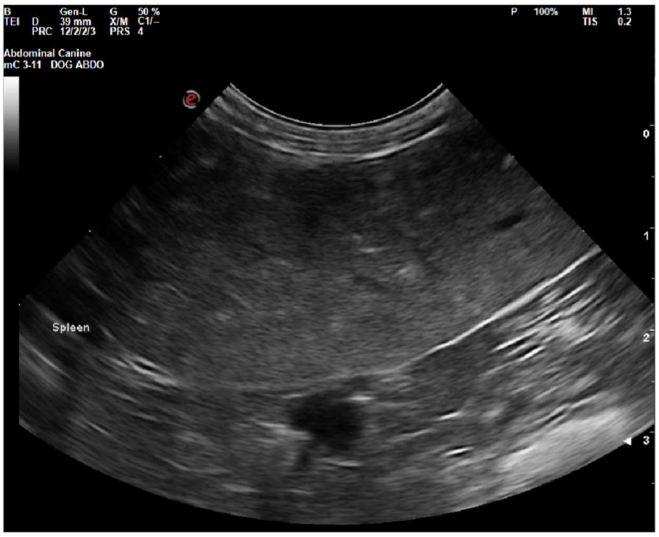
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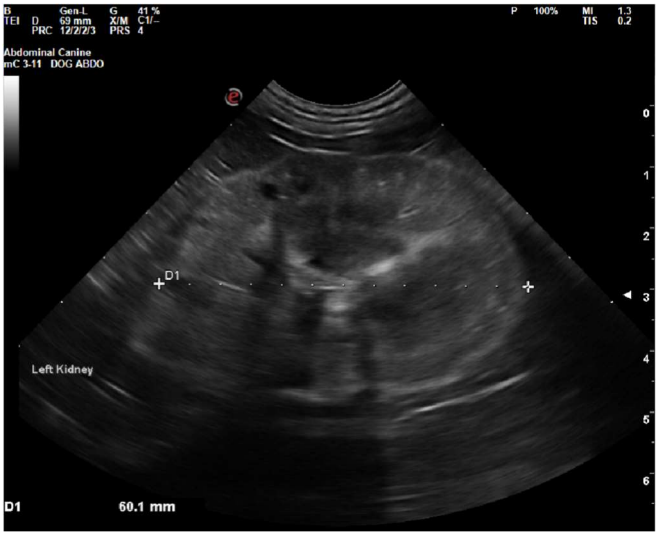
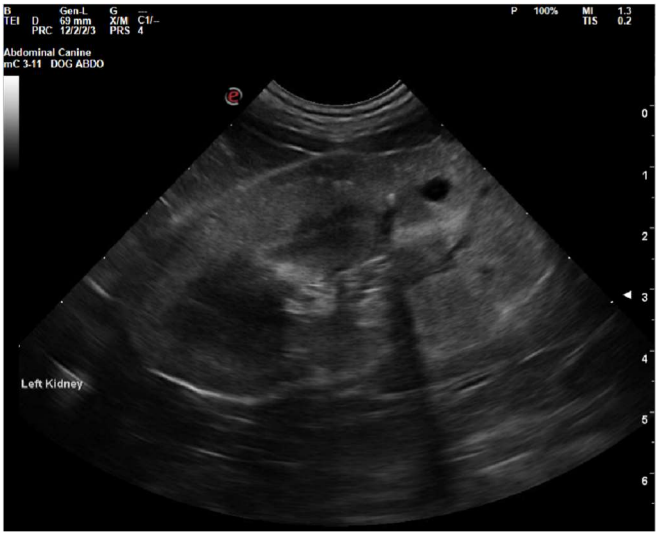
Spleen


Abdominal Canine
mC 3-11 DOG ABDO
D1
Left Kidney
D1 60.1 mm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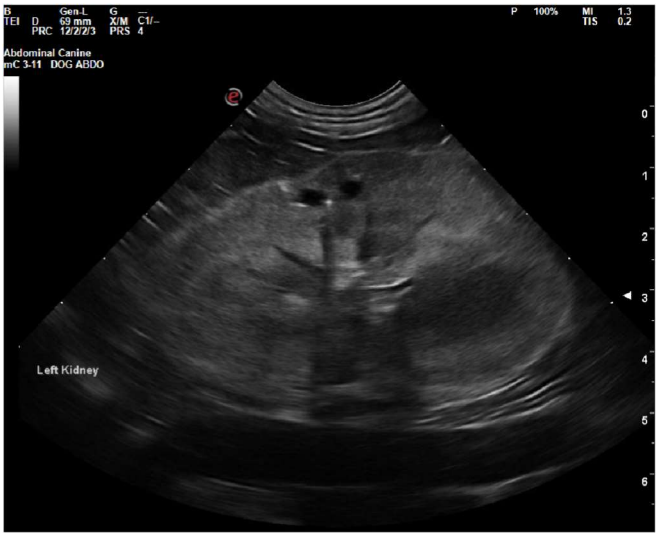
Left Kidney


Abdominal Canine
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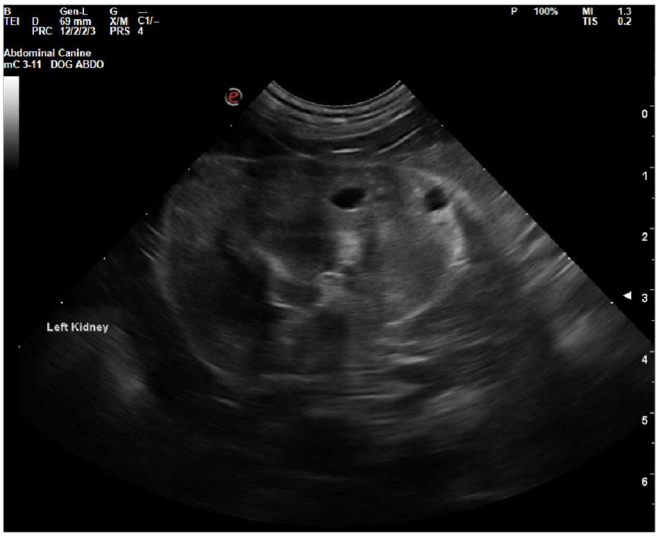
Left Kidney


Abdominal Canine
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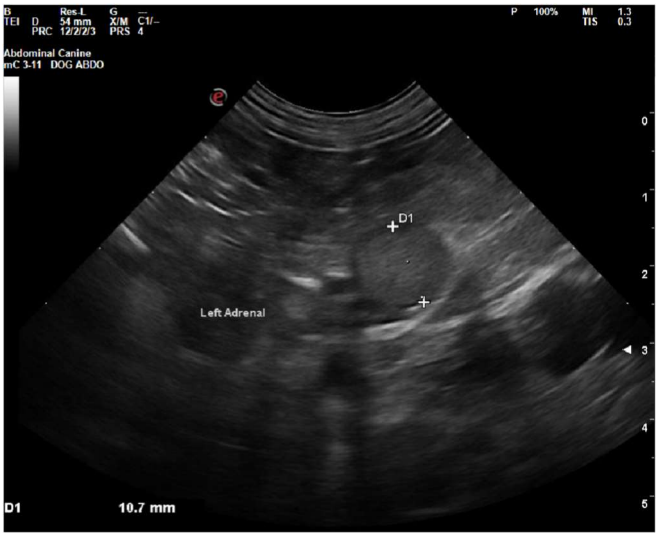
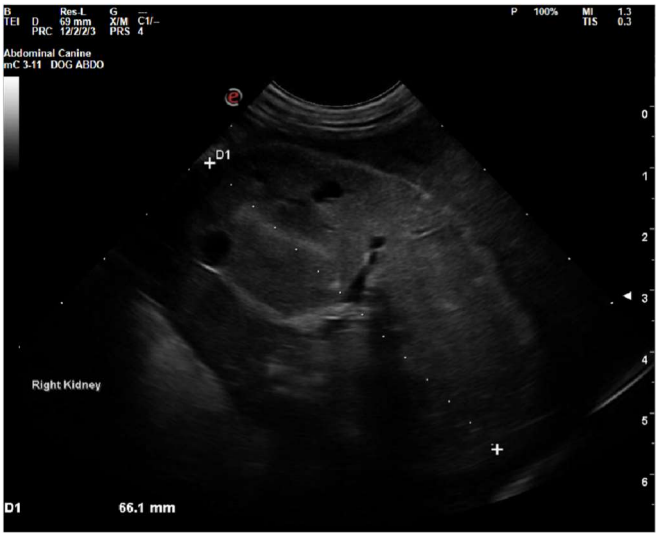
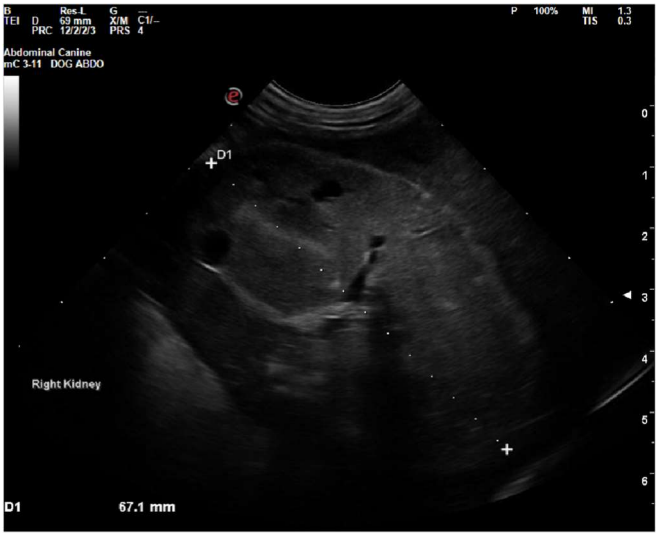
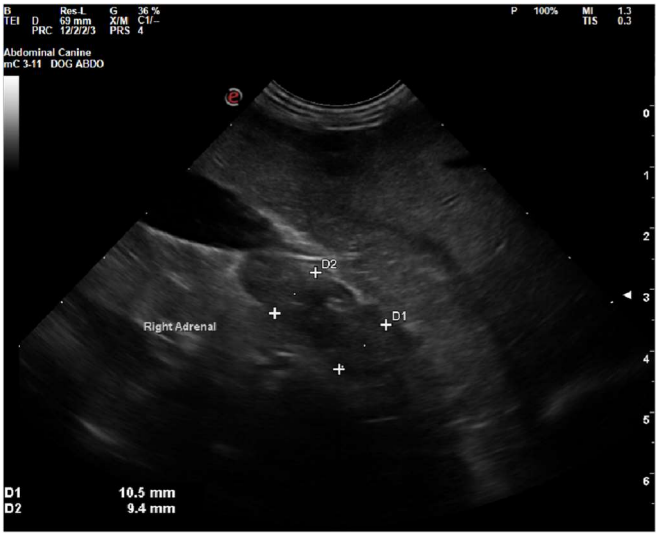
Left Kidney


Abdominal Canine
mC 3-11 DOG ABDO
D1
Left Adrenal
D1 10.7 mm


Abdominal Canine
mC 3-11 DOG ABDO
D1
Right Kidney
D1 66.1 mm


Abdominal Canine
mC 3-11 DOG ABDO
D1
Right Kidney
D1 67.1 mm


Abdominal Canine
mC 3-11 DOG ABDO
D2
D1
Right Adrenal
D1 10.5 mm
D2 9.4 mm