



<b>PATIENT</b>	<b>PRESENTING CLINICAL SIGNS</b>
Tia Hetherington	<p>Patient has been drinking more, urinating more, and abdomen is distended.</p> <p>Abnormal PE/Chem/CBC/UA Results: BUN=29, GLOBULIN=4.0, ALT=185, ALK PHOSPHATASE=185, GGTP=30, CHOLESTROL=526, PRECISION PSL=619, NEUTROPHILS=80, LYMPHOCYTES=5, MONOCYTES=12, EOSINOPHILS=0, ABSOLUTE NEUTROPHILS=14480, ABSOLUTE BANDS=543, ABSOLUTE MONOCYTES=2172, WBC=18.1, PLATELET=942, MCHC=29, T4=0.5</p>
<b>SPECIES</b>	
Canine	
<b>BREED</b>	<b>ULTRASONOGRAPHIC EXAMINATION OF THE ABDOMEN</b>
Shih Tzu	<b>Urinary System</b>
<b>SEX</b>	<p>The <b>urinary bladder</b> is very well distended and its size is consistent with Tia's polydipsia. The lumen is filled with anechoic contents. The wall is smooth and regular. No abnormalities are noted with the trigone. An in-depth evaluation of the proximal urethra is not possible due to gas in the surrounding colon and interference caused by the pelvis. There is no evidence of sediment, cystoliths, polyps or a mass.</p>
Female	
<b>AGE</b>	<p>The <b>left kidney</b> measures 4.24 cm. The capsule is smooth, however, the cortex is mildly hyperechoic and a mild loss of the normal definition of the cortico-medullary junction is present. Mineralizations and small nephroliths of the diverticulae and pelvis are present, without evidence of pyelectasia. The surrounding mesentery is mildly hyperechoic.</p>
13 years	
<b>WEIGHT</b>	<p>The <b>right kidney</b> measures 4.49 cm. The capsule is smooth, however, the kidney is slightly rounder or more "plump". The cortex is mildly to moderately hyperechoic and a moderate loss of the normal definition of the cortico-medullary junction is present. Both mineralizations and small nephroliths of the diverticulae and pelvis are present. There is no evidence of pyelectasia. An accumulation of intrapelvic fat is also noted. The surrounding mesentery is moderately hyperechoic.</p>
14.6 lbs	
<b>INTERPRETED BY</b>	<b>Adrenal Glands</b>
Lisa Carioto, DVM, DVSc, Diplomate ACVIM	<p>Bilateral adrenomegaly is present.</p> <p>The <b>left adrenal gland</b> has lost its normal shape and is elliptical to globoid, depending on the angle of the probe. It is diffusely hypoechoic and severely enlarged, measuring 1.07 cm in diameter and 1.76 cm in length. No obvious abnormalities are observed with the phrenico-abdominal vein or the surrounding vasculature that was visualized. The surrounding mesentery is mildly to moderately hyperechoic.</p> <p>The <b>right adrenal gland</b> measures 0.74 cm at the cranial pole, 0.95 at the caudal pole and 2.22 cm in length. The gland is enlarged overall, but maintains its normal shape. The caudal pole rounded and "plump". A discrete nodule or mass is not visualized. It is mildly, but diffusely hypoechoic. No obvious abnormalities are observed with the phrenico-abdominal vein or the surrounding vasculature that was visualized. The surrounding mesentery is also mildly to moderately hyperechoic.</p>
<b>IMAGING PERFORMED BY</b>	
Dr. Logas	
<b>HOSPITAL NAME</b>	
Bradenton VH	
<b>REFERRING VET</b>	
Dr. Logas	
<b>INVOICE</b>	<b>Spleen</b>
99254	<p>The spleen is within normal limits in size, architecture, echotexture, and echogenicity. The capsule is smooth. No obvious abnormalities are with its vasculature.</p>
<b>DATE</b>	
4/12/22	



<b>PATIENT</b>	<b>Liver</b>
Tia Hetherington	Subjectively, the liver appears mildly enlarged with smooth, but rounded borders. It is diffusely hyperechoic, i.e. it is isoechoic to the spleen. A moderate heterogeneous echotexture is observed, which is caused by occasional hyperechoic nodules of variable size scattered throughout the parenchyma. One of the hyperechoic nodules measures 7.7 mm in diameter x 9.6 mm in length. Multiple, small, hypoechoic nodules are also observed. In addition to the hyper and hypoechoic nodules, ill-defined hyperechoic “patches” are present, particularly dorsally. There are no lesions suggestive of cysts or target lesions, i.e. neoplasia is not evident.
<b>SPECIES</b>	
Canine	
<b>BREED</b>	
Shih Tzu	The gallbladder is moderately distended with echogenic material (sludge) within the lumen. The sludge is free floating, gravity-dependent, and adhered to the wall. Some of the contents has collected at the entrance of the cystic duct. The wall is within normal limits in thickness and echogenicity, and there are no signs of surrounding edema or free fluid. There are no obvious signs of an obstruction based on the appearance of the biliary tree, however, an in-depth evaluation of the cystic and common bile ducts is not available due to the gas present in the stomach and duodenum. There are no signs of a mucocoele.
<b>SEX</b>	
Female	
<b>AGE</b>	<b>Gastrointestinal</b>
13 years	The stomach is void of contents, but appears dilated. No obvious abnormalities are noted with the pylorus. There is no loss of definition of the normal architecture of the layers of the stomach wall. Although the stomach appears flaccid and dilated in certain views, peristalsis appears normal throughout the ultrasound study. Obvious erosions and ulcerations are not observed.
<b>WEIGHT</b>	
14.6 lbs	The duodenum is mildly thickened, measuring 0.63 cm. Mild mucosal fogging is present and it appears more prominent than usual. Fluid and gas are present within its lumen, however, peristalsis is considered normal. The small intestinal wall thickness is within normal limits. Gas, fluid and ingesta are noted within the lumen, but abnormally dilated loops of bowel are not observed. Although some loops of jejunum are mildly corrugated, peristalsis is considered within normal limits.
<b>INTERPRETED BY</b>	
Lisa Carioto, DVM, DVSc, Diplomate ACVIM	The mesentery surrounding the duodenum is moderately hyperechoic, however, it is unremarkable elsewhere (except for what is mentioned regarding the adrenal glands, kidneys and pancreas).
<b>IMAGING PERFORMED BY</b>	
Dr. Logas	The colonic wall is not thickened and mural detail is considered normal. Formed fecal matter and gas are present within the lumen.
<b>HOSPITAL NAME</b>	<b>Pancreas</b>
Bradenton VH	The <b>left limb</b> is moderately enlarged and diffusely hypoechoic, with irregular contours. Pinpoint and small punctate, hyperechoic foci are noted in the parenchyma, which are most likely due to fibrosis secondary to age-related changes and possible previous episodes of pancreatitis. The surrounding mesenteric fat is mildly hyperechoic. These findings are suggestive of active pancreatitis. Overt signs of neoplasia are not noted.
<b>REFERRING VET</b>	
Dr. Logas	A smaller portion of the <b>right limb</b> is visualized, however, similar changes are observed.
<b>INVOICE</b>	
99254	Despite the moderately hyperechoic mesentery, the right limb is not as hypoechoic compared to the left. Obvious signs of neoplasia are not appreciated.
<b>DATE</b>	
4/12/22	



**PATIENT**

Tia Hetherington

**Other:**

Lymph nodes: No abnormalities are observed.

Abdominal effusion is not visualized.

**SPECIES**

Canine

**ULTRASONOGRAPHIC FINDINGS**

**BREED**

Shih Tzu

**SEX**

Female

**AGE**

13 years

**WEIGHT**

14.6 lbs

- Mild to moderate degenerative changes of both kidneys are observed, which are suggestive of age related degeneration. Mild mineralizations and nephroliths are also present, however, there are no signs of an obstruction. Although obvious signs of pyelonephritis are not appreciated, the latter cannot be excluded based on the absence of sonographic abnormalities. One cannot rule out the possibility of glomerulonephritis (GN) or interstitial nephritis (IN) contributing to the above changes, as GN and IN may occur with hyperadrenocorticism.
- The ultrasound findings are suggestive of adrenal hyperplasia secondary to pituitary dependent hyperadrenocorticism. These findings are consistent with Tia's clinical signs of pu/pd, elevated hepatic enzyme activities, and thrombocytosis.
- The diffuse hyperechogenicity of the liver is highly suggestive of a vacuolar hepatopathy, which may occur due to stress (chronic illness) and hyperadrenocorticism. Differential diagnoses, such as hepatitis, is considered less likely, however, cholestasis and cholangitis/cholangiohepatitis with a secondary bacterial infection cannot be excluded. The hyperechoic nodules observed are most likely due to the deposition of fat, mineralization and/or nodular regeneration. The hypoechoic nodules are attributed to nodular hyperplasia, which is a benign, age-related change. There are no obvious signs of neoplasia.
- The appearance of Tia's gall bladder is not consistent with a mucocoele. Although the presence of gall bladder sludge is often clinically insignificant, dogs with hyperadrenocorticism are more predisposed to gall bladder sludge and developing mucocoeles. Also, some dogs may show clinical signs of gastroesophageal reflux disease as a result of the sludge, therefore, obtaining a history regarding signs of GERD from the client is suggested. Treatment with ursodeoxycholic acid may be required depending on the patient's history. Furthermore, the degree of elevation of the GGT may be due to cholecystitis and a secondary bacterial infection of the bile.
- Active pancreatitis is suspected based on the abnormalities observed, particularly the left limb and the surrounding mesentery. Ascending inflammation of the liver and biliary tree cannot be excluded, as discussed, above.
- The gastroduodenal changes observed may be due to a low-grade gastritis and mild inflammation of the duodenum, as well as secondary to pancreatitis. Although there are no obvious signs of erosions or ulcers, gastrointestinal blood loss may be contributing to the elevated urea noted on Tia's serum biochemical profile. The elevated urea may also be due to a protein rich diet.

**INTERPRETED BY**

Lisa Carioto, DVM,  
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ACVIM

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Dr. Logas

**HOSPITAL NAME**

Bradenton VH

**REFERRING VET**

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**INTERPRETATION OF THE FINDINGS & FURTHER RECOMMENDATIONS**

Treatment for pancreatitis is recommended, including analgesics, such as buprenorphine.

A low fat, easily digestible diet that is mildly to moderately restricted in fibre is recommended to help decrease gas and bloating.



**PATIENT**

Tia Hetherington

A urinalysis and urine culture and sensitivity are recommended to exclude pyelonephritis.

**SPECIES**

Canine

An arterial blood pressure is recommended to rule out hypertension associated with hyperadrenocorticism.

**BREED**

Shih Tzu

Cholestasis, cholangitis/cholangiohepatitis and cholecystitis cannot be excluded and secondary ascending bacterial infections are common. Although indiscriminate use of antibiotics is not normally recommended, one could start treatment with a broad-spectrum antibiotic and reassess liver enzyme activities, including a GGT, in a few weeks.

**SEX**

Female

A low-dose dexamethasone suppression test or ACTH stimulation test is suggested once signs of systemic inflammation has resolved, to avoid false positive results.

**AGE**

13 years

**WEIGHT**

14.6 lbs

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PERFORMED BY**

Dr. Logas

**HOSPITAL NAME**

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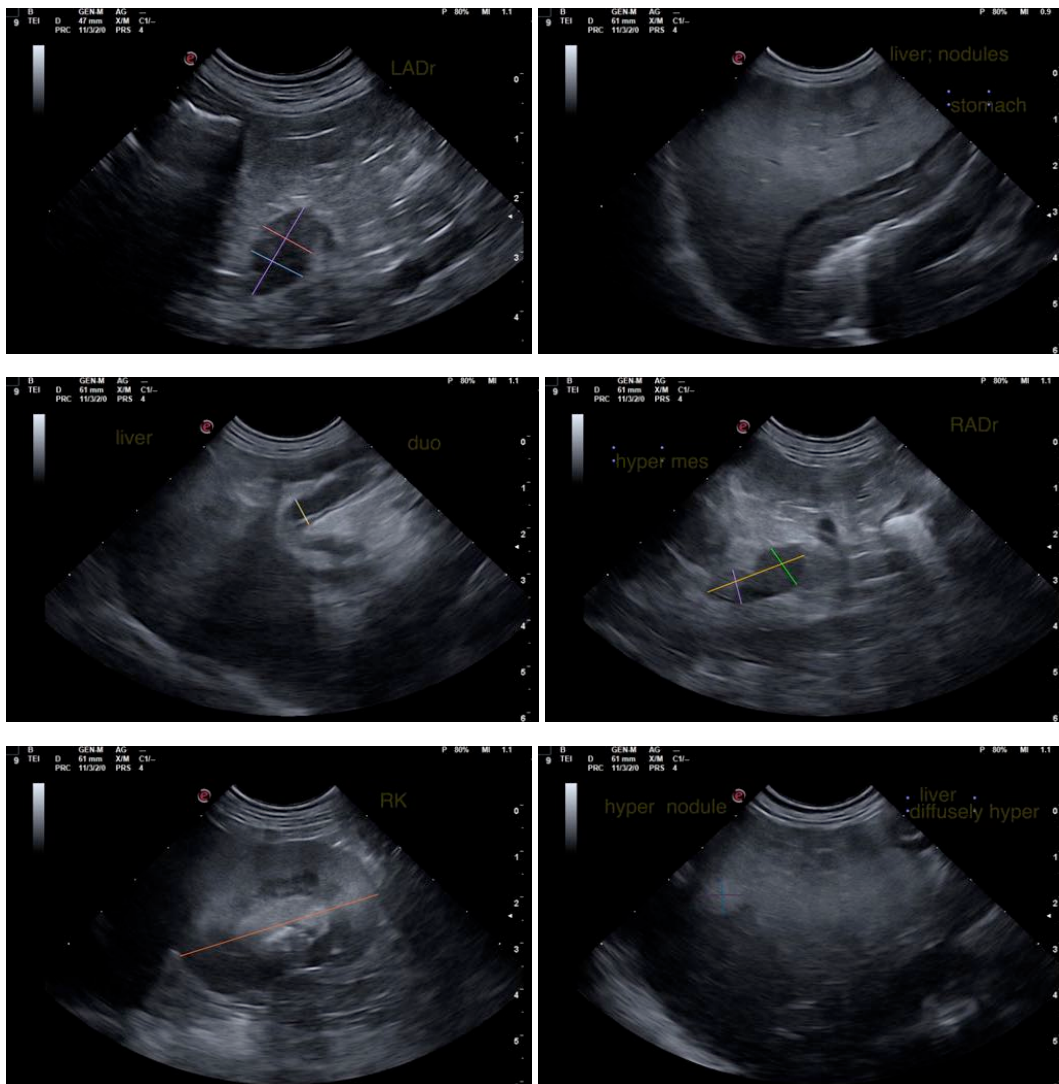
Dr. Logas

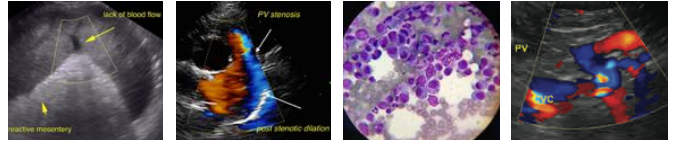
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**DATE**

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**PATIENT**

Tia Hetherington

**SPECIES**

Canine

**BREED**

Shih Tzu

**SEX**

Female

**AGE**

13 years

**WEIGHT**

14.6 lbs

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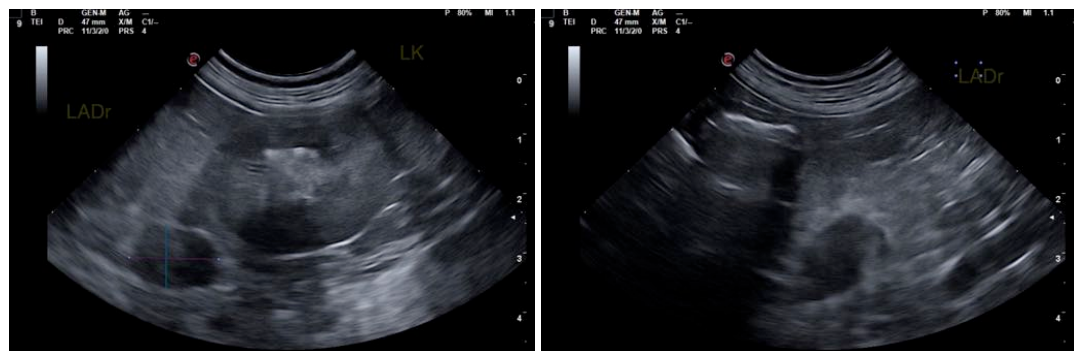
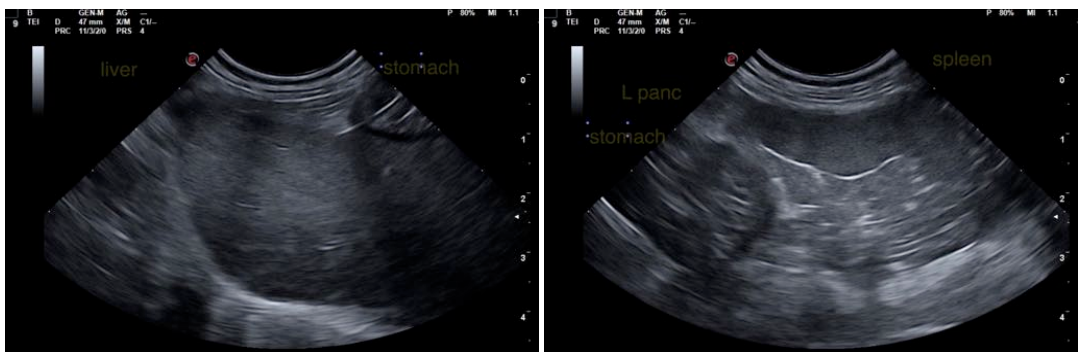
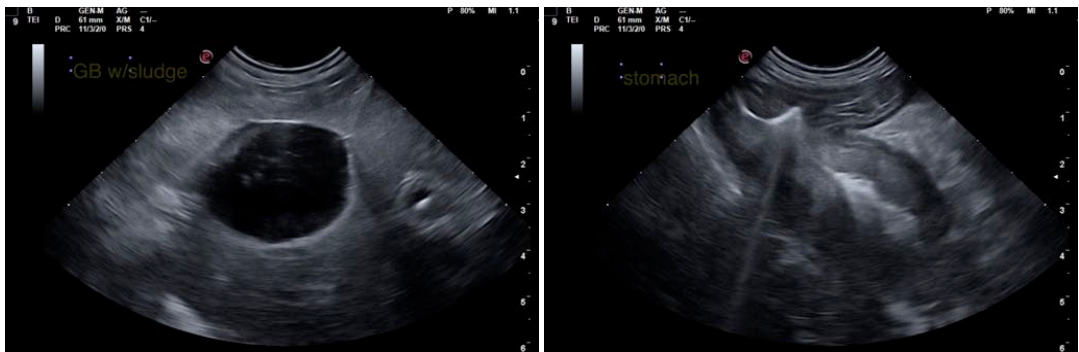
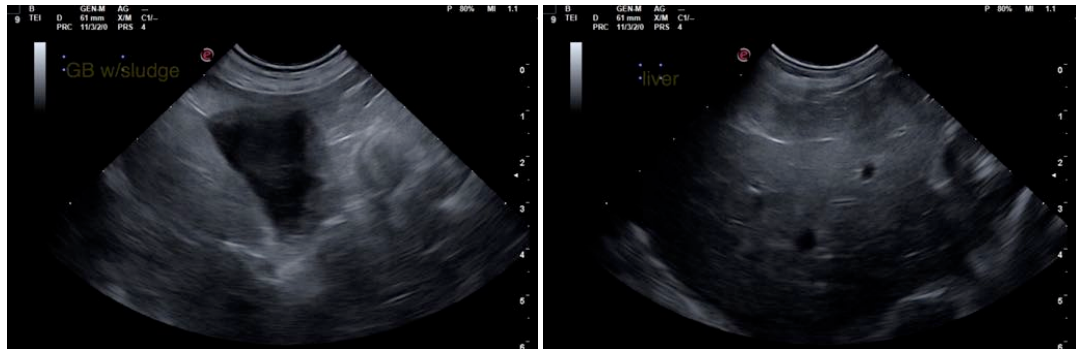
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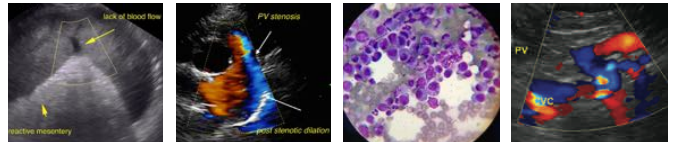
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**PATIENT**

Tia Hetherington

**SPECIES**

Canine

**BREED**

Shih Tzu

**SEX**

Female

**AGE**

13 years

**WEIGHT**

14.6 lbs

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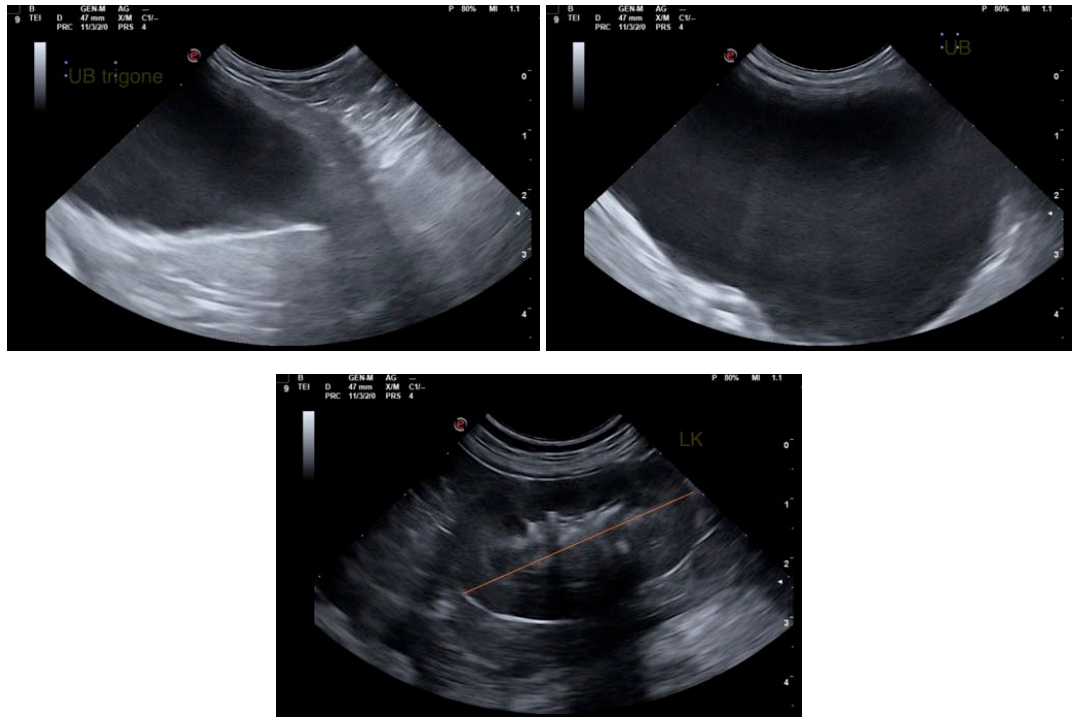
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The information and recommendations provided are based on the images presented by the referring veterinarian/sonographer. No evaluation can be communicated regarding pathology that was not visible in the image/video clips provided.

Thank you for this referral. If the clinical or image interpretation does not parallel your findings or if I can be of any further assistance please contact me.

Lisa Carioto, DVM, DVSc, Diplomate ACVIM

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