Eficacia ecográfica en el diagnóstico de pancreatitis en perros de la consulta clínica diaria

Ultrasound effectiveness in the diagnosis of pancreas inflammation in dogs in daily clinical consultation

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Palabras claves:
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Resumen

Introducción: la ecografía es una técnica asequible y no invasiva que proporciona información importante sobre el parénquima de los órganos y las estructuras adyacentes. Es una herramienta esencial en el diagnóstico de los trastornos pancreáticos y proporciona un pronóstico rápido. Cada vez se estudian nuevas técnicas para complementar la información obtenida por el ultrasonido convencional y contribuir a una mejor calidad diagnóstica. La pancreatitis es una condición inflamatoria del páncreas, cuyas causas y fisiopatología siguen siendo poco conocidas. **Objetivo:** evaluar la efectividad ecográfica en el diagnóstico de pancreatitis en perros de la consulta clínica diaria. **Metodología:** la investigación es de carácter No Experimental / Descriptiva de tipo transversal, utilizando análisis estadístico chi2, para dos variables con escalas de medición de 31 caninos, con métodos de diagnóstico ecográficos y test de cPL. **Resultados:** los resultados de este análisis de 31 muestras indican que tanto la evaluación ecográfica de la rama derecha, como la de la rama izquierda del páncreas han demostrado ser efectivas en la detección de pancreatitis, con porcentajes de positividad del 58,83% y 61,29%, respectivamente. **Conclusión:** en resumen, los resultados de este estudio con 31 muestras sugieren que tanto la evaluación ecográfica de la rama derecha como la de la rama izquierda del páncreas son eficaces en la detección de pancreatitis. Es destacable que existe una fuerte concordancia entre las muestras positivas identificadas mediante la evaluación ecográfica de ambas ramas y los resultados positivos obtenidos mediante el test cPL. **Área de la ciencia:** Medicina Veterinaria.

Keywords:
Echography
Clinic
Canis lupus
familiaris
Pancreas
LPC

Abstract

Introduction: Ultrasound is an affordable and non-invasive technique that provides essential information about the parenchyma of organs and adjacent structures. It is an essential tool in the diagnosis of pancreatic disorders and provides a rapid prognosis. New techniques are being studied to complement the information obtained by conventional ultrasound and contribute to better diagnostic quality. Pancreatitis is an inflammatory condition of the pancreas, the causes and pathophysiology of which remain poorly understood. Objective: To evaluate the ultrasound effectiveness in the diagnosis of pancreatitis in dogs during daily clinical consultation. Methodology: The research is of a non-experimental / descriptive

cross-sectional nature, using chi2 statistical analysis, for two variables with measuring scales of 31 canines, with ultrasound diagnostic methods and cPL test. Results: The results of this analysis of 31 samples indicate that both the ultrasound evaluation of the right and left branch of the pancreas have been shown to be effective in the detection of pancreatitis, with positivity rates of 58.83% and 61.29%, respectively. Conclusion: In summary, the results of this study with 31 samples suggest that both ultrasound evaluation of the right and left branch of the pancreas are effective in the detection of pancreatitis. It is noteworthy that there is a strong concordance between the positive samples identified by the ultrasound evaluation of both branches and the positive results obtained by the cPL test. Area of science: Veterinary Medicine.

Introduction

Pancreatic anatomy

The pancreas has an anatomical structure that includes a right lobe surrounded by the mesoduodenum, a short distance from the cranial flexure of the duodenum is the accessory pancreatic duct. The left lobe and the body of the pancreas are located transversely, towards the caudal part of the stomach and dorsal to the transverse colon. It is surrounded by the deep layer of the greater omentum, while the celiac artery is located in a cranial position and the cranial mesenteric artery is located caudal to the pancreas. The body of the pancreas shows an angle of union between the right and left lobes, and is surrounded by the fold of peritoneum that connects the descending mesoduodenum with the hepatoduodenal ligament.(Gil et al., 2012).|

"It is an organ that is elongated in a transverse direction and much more voluminous at its right end than at the left. Its size ranges from 16 to 20 centimeters in length and between 4 and 5 centimeters in height; it has a thickness of 2 to 3 centimeters and its average weight is about 100 grams, although pancreases of 356 grams and 180 grams have been reported."(Garcia, 2018).

"The pancreas, located behind the stomach and parallel to it, is a large composite gland. The pancreatic acini secrete pancreatic digestive enzymes and both the small and larger ducts release large amounts of sodium bicarbonate."(Arthur, 2016)The pancreas is a mixed gland composed of 2 types of tissue, endocrine and exocrine, which are grouped together forming macroscopically visible lobes and separated from each other by

connective tissue septa containing blood vessels, lymphatic vessels and nerves. Approximately 80-85% of the pancreatic volume is composed of the main portion of tissue, which is exocrine in nature, 10-15% corresponds to the extracellular matrix and vessels, while the endocrine portion constitutes about 2%.(Garcia, 2018).

"The pancreas is an accessory gland to the digestive system located between the lesser curvature of the stomach and the spleen. Its exocrine secretion is formed by the enzymes amylase and lipase that break down carbohydrates and fats, respectively, as well as trypsin and chymotrypsin that act on proteins and are secreted in an inactive manner to protect the glandular tissue itself from proteolytic action. Therefore, they must be activated by enteric enzymes."(Wheat, 2011).

Pancreatitis

"Acute pancreatic lesions may go unnoticed in their first stage, and the sensitivity of the ultrasound technique in their diagnosis may be reduced by around 68%, which is why a serial examination of these patients (after 24-48 hours) may be definitive in obtaining a more accurate diagnosis; the predominant ultrasound finding is a moderate to severe increase in pancreatic volume associated with a diffuse decrease in the echogenicity of the gland due to edema and necrosis processes. These processes will produce a better definition of the pancreas by contrasting more clearly with the surrounding fat; generally, in the most acute processes, one of the main associated signs can be seen: the presence of pain on examination with the transducer in the cranial abdomen, defined as echopalpation."(Fominaya, 2010).

Acute and chronic pancreatitis are difficult to differentiate clinically and may present in mild or severe forms. However, chronic cases tend to be milder, while acute cases are often more severe. Mild pancreatitis is characterized by few systemic effects, minimal pancreatic necrosis, and a low mortality rate. On the other hand, severe pancreatitis is characterized by extensive pancreatic necrosis, multiple organ involvement, and a poor prognosis. Another way of classification is based on the presence or absence of pancreatic complications, such as acute fluid accumulation around the inflamed pancreas (known as pancreatic phlegmon), infected necrosis, pancreatic pseudocysts, and pancreatic abscesses.(Ettinger & Feldman, 2021).

Pancreatitis is an inflammatory disease that affects the pancreas, but little is known about its causes and pathophysiology. Through histological studies, it is possible to distinguish between acute and chronic forms of the disease, one of the main differences being the presence or absence of multisystem abnormalities in the body.(Quiguango, 2021).

Anamnesis and clinical signs

Pancreatitis can affect dogs of all ages and physical states, but is generally seen most often in older or middle-aged dogs that are overweight. Common symptoms of acute pancreatitis in dogs include vomiting, weight loss, abdominal pain, depression, and diarrhea. Compared to humans, abdominal pain is a consistent clinical sign in over 90% of cases, but in one study in dogs it was demonstrated in only 59% of cases. This may indicate the difficulty in detecting abdominal pain in some cases. Occasionally, an anterior abdominal mass may also be felt, and mild ascites may be present.(Ettinger & Feldman, 2021).

Clinical signs of pancreatitis in dogs range from mild abdominal pain and anorexia to acute abdomen, potential multiorgan failure, and disseminated intravascular coagulation (DIC).(Puccini et al., 2020).

Typical clinical signs include chronic small intestinal diarrhea that is characterized by being bulky and pasty, mild to extreme weight loss may also be evident, often accompanied by a famished appetite, poor coat quality and pronounced muscle depletion, intestinal borborygmi, poor coat quality and dry seborrhea.(Patarroyo, 2013).

Acute pancreatitis is an increasingly common and recognized disease in dogs, however, diagnosis in dogs can be challenging, as can establishing prognostic information. Abdominal ultrasonography is the most commonly used noninvasive imaging method for diagnosing pancreatitis in dogs, although other diagnostic methods exist. The use of abdominal ultrasonography is also useful to rule out diseases that may mimic the clinical signs of pancreatitis or potentially related diseases (foreign bodies in the duodenum, septic peritonitis, or biliary tract obstruction).(Richard & Couto, 2020).

Ultrasound diagnosis

Pancreatic disorders are common in small animals; however, they can be difficult to diagnose due to the anatomical inaccessibility of the pancreas, nonspecific clinical signs, and inconsistent laboratory findings. Therefore, ultrasound evaluation has become increasingly used and is currently the preferred method in pancreatic evaluation.(Avante et al., 2018).

When the criteria are strictly applied, abdominal ultrasound is highly specific for detecting pancreatitis in dogs, with a sensitivity of approximately 70%. The presence of pancreatic dilatation or localized peritoneal effusion alone is not sufficient to make a definitive diagnosis. Changes in echogenicity of the pancreas are very helpful in diagnosis, as a decrease in echogenicity suggests the presence of pancreatic necrosis, which is often accompanied by an increase in echogenicity in the peripancreatic region.(Ettinger & Feldman, 2021). In ultrasound diagnosis, an increase in the size of the

pancreas, a decrease in echogenicity (hypoechoic) and an increase in vascularization are observed. Reactivity of the peripancreatic fat and spasms in the duodenum may also be observed. In addition, there may be the presence of free fluid in the abdominal cavity.(Muñoz & Morgaz, 2021).

In dogs weighing more than 15 kg, medium frequency probes (5-7.5 MHz) are generally considered the most appropriate choice for performing ultrasound of the pancreas, especially for examining the body and left lobe. On the other hand, the more superficially located right lobe can be evaluated with higher frequency probes. For lighter weight patients, examination with high frequency probes (10 MHz) may be more appropriate due to their ability to provide better image resolution.(Fominaya, 2010).

Exocrine pancreatic function tests

Exocrine pancreatic insufficiency (EPI) can develop in dogs and cats as a result of chronic pancreatitis and in the dog with APA. The diagnosis of EPI in dogs and cats is based on the presence of consistent clinical signs (weight loss and steatorrhea) combined with the demonstration of decreased pancreatic enzyme production. The most sensitive and specific way to do this is through measurement of reduced circulating enzyme activity. This is accomplished by using the TLI immunoassay, which measures both trypsin and trypsinogen. Measurement of decreased TLI in blood has a high sensitivity and specificity for the diagnosis of EPI in dogs and cats, and is currently the only test of choice for diagnosis in small animals. It is important to perform this test on a fasting sample because the release of pancreatic enzymes associated with feeding may increase their activity in blood serum. It is not necessary to stop exogenous pancreatic supplementation before measuring TLI because exogenous enzymes cannot be absorbed in the gut and so will not appear in the circulation; and even if they were, the test is an immunoassay that does not cross-react with trypsin or trypsinogen from other species contained in the supplement. However, there may be some problems in interpreting the results. In particular, in a dog with chronic pancreatitis and EPI, TLI may be unpredictable because episodes of pancreatic inflammation may elevate it into the normal range.(Richard & Couto, 2020).

"Immunoreactive canine pancreatic lipase (cPL) is a highly specific test because it measures canine serum pancreatic lipase originating from pancreatic acinar cells, without cross-activity with lipase of other origin or related proteins; the commonly used test is Spec cPL Idexx, a quantitative method based on Elisa; specific cPLI results with a value <200 µg/L are considered normal, results >400 µg/L are highly suggestive of pancreatitis; values of 200 – 400 µg /L are in a grey zone, so it is advisable to re-analyze the patient at a later stage or use other diagnostic methods"(Quiguango, 2021).

The canine pancreatic lipase (cPL) immunofluorescence assay is a rapid test used to quantitatively detect the level of cPL in serum samples by immunochromatography. In

this assay, the test sample is mixed with a diluent and then combined with a fluorescently labeled signature specific for cPL, forming an immunocomplex. The stream of immunocomplexes reacts with the cPL requisites in the test area through the test zone, signaling a fluorescent signal in the reaction zone when excited with a specific wavelength. The intensity of the signal is proportional to the cPL content in the sample, allowing quantitative detection of the cPL concentration using a fluorescence detector.(Baywellbio, 2023).

The use of appropriate clinical testing in dogs and cats with characteristic symptoms may aid in the diagnosis of pancreatitis, but some form of imaging is recommended for confirmation. Although secondary causes of enzyme elevation are less common in the pancreas than in the liver, pancreatitis may not be the most clinically relevant disease in a sick animal, so imaging is important to rule out other causes of acute abdominal pain with secondary pancreatic involvement, such as gastrointestinal obstruction or gallbladder rupture. In addition, more extensive clinical testing can assess the degree of systemic inflammatory response and evidence of multiorgan failure in severe acute pancreatitis. In chronic pancreatitis, there may be both exocrine and endocrine functional impairment, which can be determined along with clinical symptoms. It is important to perform fecal analysis in dogs with diarrhea associated with pancreatic disease to rule out infectious causes, especially in cases of pancreatic acinar atrophy, since these animals are usually young and have a greater predisposition to intestinal parasites.(Richard & Couto, 2020).

Methodology

Type of study

Non-Experimental / Descriptive

The research is of a non-experimental/descriptive nature and is prospective, since no variable is modified. The ultrasound effectiveness in the diagnosis of pancreatitis and the direct relationship with cPL tests are being evaluated.

Similarly, this is a correlational investigation in an attempt to investigate the relationship between two variables: ultrasound of the branches (right and left) of the pancreas vs. the diagnosis of pancreatitis using the cPL test.

Cross

Data related to the diagnosis of pancreatitis by ultrasound and cPL test were evaluated at a specific time point.

Design

Non-experimental

Since no variable is modified, only the diagnosis of pancreatitis is being evaluated by ultrasound and cPL test.

For data evaluation, the following were used: Pearson coefficient, variable categorization, contingency tables and chi2 statistical analysis.

1. Population

The population was taken from canine patients with enteric processes and possible pancreatitis who attend consultations at the UTC Veterinary Clinic.

2. Sample

31 canines of different ages, breeds, sexes and weights were evaluated in the months of November and December 2023, January 2024.

Table 1

Canine patients evaluated

No.	Date	Patient name	Sex	Age	Weight kg
1	27-11-2023	New	H	1 year	12
2	11-30-2023	Susana	H	3 months	2.16
3	01-12-2023	Grey	H	1 year	5
4	04-12-2023	Moon	H	8 years	23.8
5	05-12-2023	Luly	H	2 years	12.3
6	05-12-2023	Pretty	H	4 years	12
7	05-12-2023	Nick	H	5 years	14
8	06-12-2023	Cronos	M	4 months	5
9	08-12-2023	Coby	M	3 years	12
10	10-12-2023	Jade	H	9 years	5
11	11-12-2023	Bold type	H	6 months	4.6
12	11-12-2023	Chick	H	3 years	6.8
13	12-12-2023	Bamby	M	2 years	12
14	20-12-2023	Toby	M	3 years	7.2
15	12/20/2023	Fat	H	4 years	6
16	12/22/2023	Princess	H	7 years	18.8
17	12/25/2023	Nalhita	H	8 years	28
18	12/26/2023	Suca	H	14 years	22.2
19	12/26/2023	Bear	M	11 years	10.4
20	12/27/2023	Pepe	M	2 years	9
21	12/28/2023	Odin	M	8 years	28
22	12/30/2023	Rough	M	1 year	8.6

Table 1

Canine patients evaluated (continued)

No.	Date	Patient name	Sex	Age	Weight kg
23	2/1/2024	Scotch	M	7 years	5.2
24	03/01/2024	Chomy	M	3 years	2
25	03/01/2024	Sapphire	H	3 years	15
26	03/01/2024	Luke	M	8 years	6.2
27	04/12/2024	Cody	M	12 years	15
28	05/12/2024	Simura	H	12 years	5
29	06/12/2024	Capuli	H	9 years	7.4
30	08/12/2024	Luke	M	8 years	9.1
31	01/17/2024	Toby	M	1.2 years	4.5

3. Study variables

- Ultrasound of the right branch of the pancreas
- Ultrasound of the left branch of the pancreas
- cLP tests

Table 2

Operationalization of variables

Independent variable:	Operationalization of variables		Measuring scale
	Dimensions	Indicators	
Pancreatic Ultrasound	Left branch	cm	Positive
	Right branch		Negative
Independent variable	Serum levels of pancreatic lipase	ug/l	Normal
			Abnormal
cPL tests			High
			Positive

4. Data collection techniques and instruments

4.1 Methods for diagnosing pancreatitis:

- *Ultrasound*

For ultrasound diagnosis, the features of the Apogee 3300V veterinary ultrasound scanner were used, with measuring scales in cm of the right and left branches of the pancreas.

The normal value of the left branch of the pancreas is 0.61 cm and that of the right branch is 0.81 cm, determining that above both values the pancreas is considered reactive.

- *cPL*

Baywellbio cPL tests were performed, with the following reference values:

Table 3

CPL reference values (ug/l)

| Normal	Abnormal	High	Positive
<150	150-200	200-400	> 400

Results

Ultrasound

Evaluation of the right branch of the pancreas vs cPL

To evaluate the right branch of the pancreas, the patient should be kept in the left lateral decubitus position with the right subcostal portion as the ultrasound window, making longitudinal and transverse cuts that distinguish the medial or dorsal location of the descending duodenum, allowing observation of the right pancreatic branch to subsequently locate the pancreaticoduodenal artery in a longitudinal cut.

Figure 1

Abdominal ultrasonography of the canine pancreas, the arrow indicates the right branch
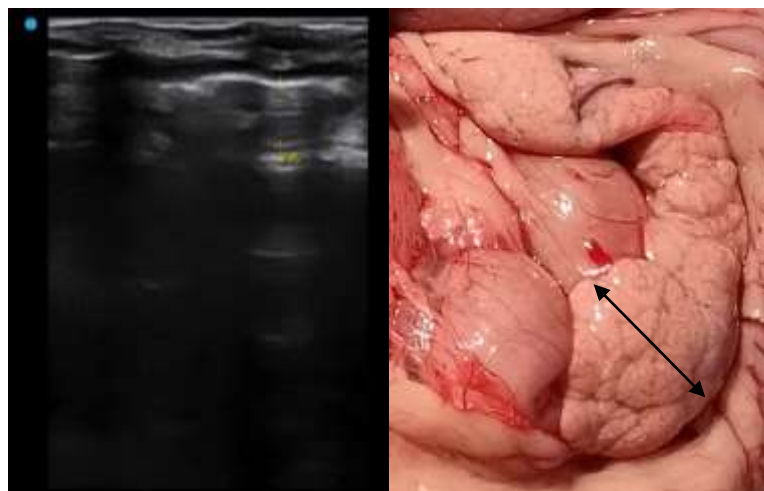
Table 4

Ultrasound measurements of the right pancreas. (normal value 0.81 cm)

No. (patients)	CM MEASUREMENT	RESULT	cPL (ug/l)	RESULT
1	0.95	POSITIVE	580	POSITIVE **
2	0.51	NEGATIVE	56.8	NORMAL
3	0.64	NEGATIVE	201.85	HIGH
4	1.03	POSITIVE	1500	POSITIVE**
5	0.95	POSITIVE	410	POSITIVE**
6	0.58	NEGATIVE	1500	POSITIVE**
7	0.72	NEGATIVE	97.21	NORMAL
8	0.44	NEGATIVE	310.7	HIGH
9	0.84	POSITIVE	50	NORMAL*
10	0.87	POSITIVE	1326.91	POSITIVE**
11	0.79	NEGATIVE	69.14	NORMAL
12	0.63	NEGATIVE	146.79	NORMAL**
13	0.81	NEGATIVE	60	NORMAL
14	0.73	NEGATIVE	50	NORMAL
15	0.63	NEGATIVE	159.62	ABNORMAL
16	1.06	POSITIVE	1128.26	POSITIVE**
17	0.97	POSITIVE	240.62	HIGH*
18	1	POSITIVE	251.2	HIGH*
19	0.84	POSITIVE	425.18	POSITIVE**
20	0.43	NEGATIVE	59.48	NORMAL
21	1.06	POSITIVE	562.7	POSITIVE**
22	0.56	NEGATIVE	106.95	NORMAL
23	0.96	POSITIVE	1200	POSITIVE**
24	0.84	POSITIVE	50	NORMAL*
25	0.50	NEGATIVE	55.98	NORMAL
26	1.04	POSITIVE	445.3	POSITIVE**
27	1.12	POSITIVE	2514	POSITIVE**
28	0.86	POSITIVE	478.7	POSITIVE**
29	0.93	POSITIVE	1500	POSITIVE**
30	0.79	NEGATIVE	332.7	HIGH
31	0.66	NEGATIVE	332.7	HIGH

Where:

- (**) represents the direct relationship between cm of right branch of the pancreas vs the amount of ug/l, positive for pancreatitis
- (*) represents the indirect relationship between the measurement in cm of the right branch of the pancreas and positivity, since one value is outside normal ranges and the other is normal.

Of the total of 31 samples analyzed, 16 samples with measurements in the right branch are positive for pancreatitis, which means 58.83% and 13 samples with cPL values are positive, that is, 41.93%.

Table 5

Right branch of pancreas vs Clp relationship

Right branch cm	cPL reference values (ug/l)				
	normal	abnormal	high	positive	Grand total
negative	8	1	4	1	14
positive	3		2	12	17
Grand total	11	1	6	13	31

Note: Data obtained from ultrasound and testscPLat the UTC Veterinary Clinic

Of the 16 positive samples by ultrasound evaluation of the right branch of the pancreas, 14 are directly related to the positivity for pancreatitis by cPL test, which determines 87.5% ultrasound effectiveness.

Figure 2

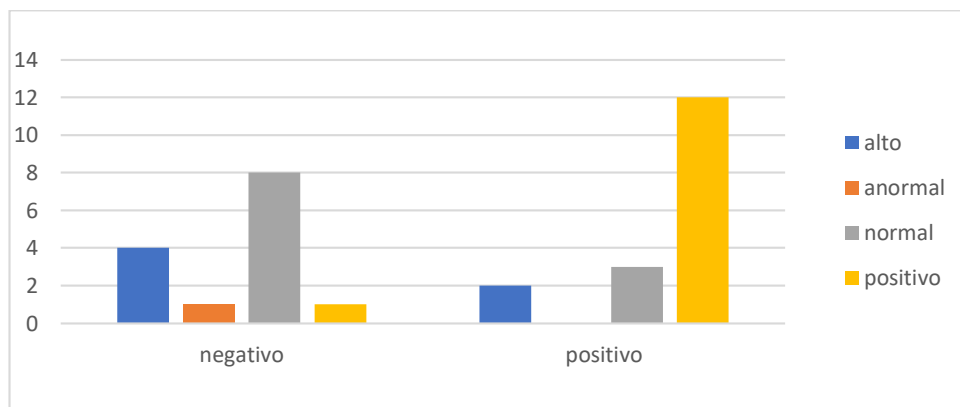*Right branch of pancreas vs cLP relationship*

Figure 1 indicates the relationship between the ultrasound evaluation measured in cm of the right pancreas and the amount of cPL in each sample.

- *Chi square for right branch of pancreas*

The P value for the right pancreas is2,13E-37, less than the level of significance, concluding that there is a statistically significant association between the values.

1.1 Evaluation of left branch of the pancreas vs cPL

The evaluation of the left branch is performed with the patient in the dorsal decubitus position using the left epigastrium as the ultrasound window, located between the cranial pole of the left kidney and the greater gastric curvature, cranial to the splenic vein as an anatomical reference.

Figure 3

Abdominal ultrasonography of the canine pancreas, the arrow indicates the left branch
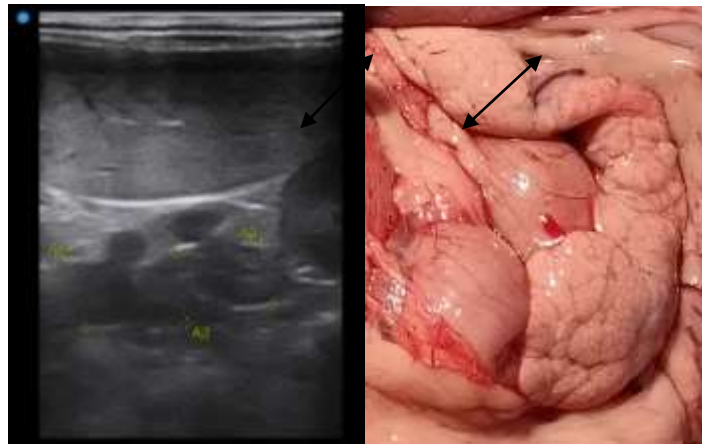
Table 6

Ultrasound measurements of the right pancreas. (normal value 0.61 cm)

No. (patients)	CM MEASUREMENT	RESULT	cPL (ug/l)	RESULT
1	0.78	POSITIVE	580.0	POSITIVE**
2	0.56	NEGATIVE	56.8	NORMAL
3	0.63	POSITIVE	201.9	HIGH*
4	0.93	POSITIVE	1500.0	POSITIVE**
5	0.74	POSITIVE	410.0	POSITIVE**
6	0.59	NEGATIVE	1500.0	POSITIVE*
7	0.51	NEGATIVE	97.2	NORMAL
8	0.76	POSITIVE	310.7	HIGH*
9	0.74	POSITIVE	50.0	NORMAL*
10	1.01	POSITIVE	1326.9	POSITIVE**
11	0.70	POSITIVE	69.1	NORMAL*
12	0.60	NEGATIVE	146.8	NORMAL
13	0.49	NEGATIVE	60.0	NORMAL
14	0.55	NEGATIVE	50.0	NORMAL
15	0.60	NEGATIVE	159.6	ABNORMAL
16	0.84	POSITIVE	1128.3	POSITIVE**
17	0.53	NEGATIVE	240.6	HIGH
18	0.68	POSITIVE	251.2	HIGH*
19	0.66	POSITIVE	425.2	POSITIVE**
20	0.30	NEGATIVE	59.5	NORMAL

21	0.70	POSITIVE	562.7	POSITIVE**
22	0.72	POSITIVE	107.0	NORMAL*
23	0.76	POSITIVE	1200.0	POSITIVE**
24	0.57	NEGATIVE	50.0	NORMAL
25	0.43	NEGATIVE	56.0	NORMAL
26	0.70	POSITIVE	445.3	POSITIVE**
27	0.77	POSITIVE	2514.0	POSITIVE**
28	0.70	POSITIVE	478.7	POSITIVE**
29	1.26	POSITIVE	1500.0	POSITIVE**
30	0.54	NEGATIVE	332.7	HIGH
31	0.69	POSITIVE	332.7	HIGH*

Where:

- (**) represents the direct relationship between cm of left branch of the pancreas vs the amount of ug/l, positive for pancreatitis
- (*) represents the indirect relationship between the measurement in cm of the left branch of the pancreas and the positivity, since one value is outside the normal ranges and the other is normal.

Of the total of 31 samples analyzed, 19 samples with measurements in the left branch are positive for pancreatitis, which means 61.29% and 13 samples with cPL values are positive, that is, 41.93%.

**Table 7**

Left branch of pancreas vs. cLP relationship

Left branch cm	cPL REFERENCE VALUES ug/l				
	normal	abnormal	high	positive	Grand total
negative	8	1	2	1	12
positive	3		4	12	19
Grand total	11	1	6	13	31

Of the 19 positive samples by ultrasound evaluation of the left branch of the pancreas, 12 are directly related to the positivity for pancreatitis by cPL test, which determines 63.15% ultrasound effectiveness.

Figure 4

Left branch of pancreas vs. cLP relationship
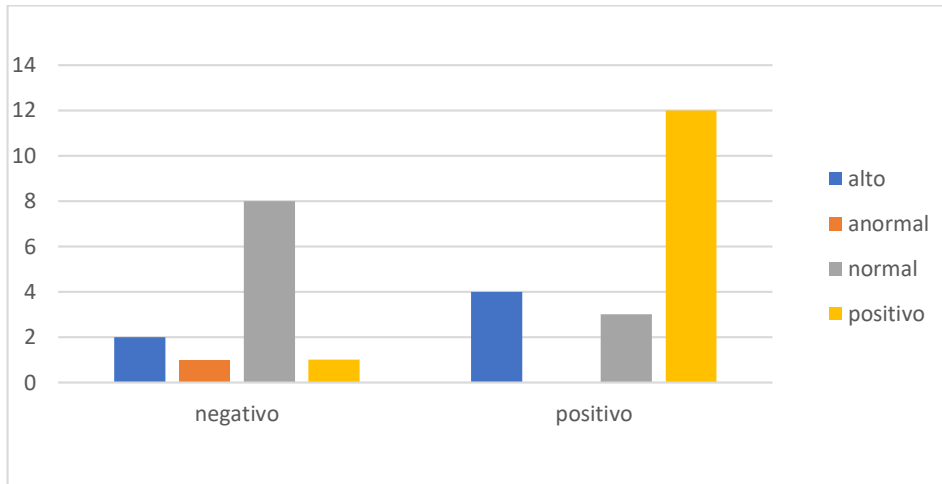
Graph 2 indicates the relationship between the ultrasound evaluation measured in cm of the right pancreas and the amount of cPL in each sample.

- *Chi square for left branch of pancreas*

The P value for the right pancreas is 2.42E-37, less than the significance level, concluding that there is a statistically significant association between the values.

Conclusions

- In conclusion, the results of this analysis of 31 samples indicate that ultrasound evaluation of the right branch of the pancreas has proven to be effective in detecting pancreatitis, with a positivity rate of 58.83%. In addition, cPL values have also shown a significant percentage of positivity, reaching 41.93%. It is notable that of the samples positive in the ultrasound evaluation of the right branch, 87.5% were also positive by the cPL test, underlining the concordance between both measures.
- The statistically significant association between the values, supported by a P value of 2.13E-37 less than the significance level, reinforces the validity of the relationship between ultrasound evaluation of the right bundle branch and positivity to pancreatitis measured by cPL. These findings suggest that ultrasound evaluation of the right bundle branch of the pancreas may be an effective and statistically significant tool in the diagnosis of pancreatitis, supported by the correlation with cPL values.
- The ultrasound evaluation of the left branch of the pancreas has proven to be effective in detecting pancreatitis, with a positivity rate of 61.29%. On the other

hand, cPL values have also shown a significant percentage of positivity, reaching 41.93%. It is relevant to highlight that, of the positive samples in the ultrasound evaluation of the left branch, 63.15% were also positive by the cPL test, underlining the usefulness of both measures together.

- The statistically significant association between the values, supported by a P value of 2.42E-37 less than the significance level, suggests that there is a strong correlation between ultrasound assessment of the left bundle branch and positivity for pancreatitis as measured by cPL. These findings support the effectiveness of ultrasound assessment of the left bundle branch of the pancreas as a valuable diagnostic tool, with a statistically significant relationship with cPL values. Nevertheless, it is essential to consider the limitations of the study and the need for further research for a more complete understanding of the clinical utility of these measures.

Conflict of interest

The authors declare that there is no conflict of interest in relation to the submitted article.

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