



Clinical, laboratory, ultrasonographic, and anatomopathological aspects of 30 cases of traumatic reticulospinitis in cattle¹

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ABSTRACT.- Silva T.V., Cajueiro J.F.P., Silva N.A.A., Souto R.J.C., Coutinho L.T., Mendonça C.L., Afonso J.A.B. & Miranda Neto E.G. 2020 **Clinical, laboratory, ultrasonographic, and anatomopathological aspects of 30 cases of traumatic reticulospinitis in cattle.** *Pesquisa Veterinária Brasileira* 40(9):669-676. Clínica de Bovinos de Garanhuns, Universidade Federal Rural de Pernambuco, Avenida Bom Pastor s/n, Boa Vista, Garanhuns, Cx. Postal 152, Pernambuco, PE 55292-272, Brazil. E-mail: ta_ty_vitor@hotmail.com

Ingestion of metallic and/or sharp foreign bodies triggers cases of traumatic reticuloperitonitis and its sequelae in cattle. Among these sequelae, we can highlight traumatic reticulospinitis, that has high mortality, although its frequency in the ruminant medicine is low. Therefore, based on the scarcity of information on this disease, the current study aimed to evaluate the clinical, laboratory, ultrasonographic, and pathological findings of 30 adult cattle diagnosed with traumatic reticulospinitis. Clinical, ultrasound, and anatomopathological findings were analyzed using descriptive statistics and laboratory data were evaluated using measures of central tendency. Clinically the animals presented dehydration and alterations in behavior, appetite, and ruminal motility. Hematological findings revealed neutrophilic leukocytosis (37077.17 ± 25004.59 cell/ μ L) with regenerative left shift and hyperfibrinogenemia (1130 ± 364.98 mg/dL). The ultrasound examination enabled visualization of mobile and echogenic filaments that corresponded to the presence of fibrin adhesions. Displacement of the reticulum and irregularity in its contour, as well as alterations in the quantity, pattern, and amplitude of reticular contractions were also observed. Splenic alterations such as abscesses were found, characterized as circular structures of varying sizes delimited by capsules containing variable echogenicity. Splenic vein thrombosis and spleen folding were also observed. The results obtained in the current study indicated that traumatic reticulospinitis causes nonspecific clinical signs, severe laboratory alterations and, mainly, that ultrasound is an efficient method for the diagnosis of this disease, since the anatomopathological lesions confirmed the ultrasound findings.

INDEX TERMS: Clinics, laboratory, ultrasonography, anatomopathology, traumatic reticulospinitis, cattle, diagnostic imaging, foreign body syndrome, spleen, traumatic reticulospinitis.

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RESUMO.- [Aspectos clínicos, laboratoriais, ultrassonográficos e anatomopatológicos de 30 casos de retículo-esplenite traumática em bovinos.] A ingestão de corpos estranho de origem metálica e/ou pontiagudos desencadeia em bovinos, quadros de Reticuloperitonite Traumática e suas sequelas. Dentre as quais podemos destacar a retículo esplenite traumática cuja letalidade é elevada, embora a mesma apresente uma baixa frequência na clínica de ruminantes. Portanto, baseado na escassez de informações sobre esta enfermidade, este trabalho teve por objetivo avaliar os achados clínicos, laboratoriais, ultrassonográficos

e anatomopatológicos de 30 bovinos adultos diagnosticados com retículo esplênite traumática. Os achados clínicos, ultrassonográfico e anatomopatológico foram analisados por meio de estatística descritiva, e os dados laboratoriais foram avaliados utilizando-se as medidas de tendência central. Clinicamente os animais apresentaram desidratação e alterações no comportamento, apetite e na motilidade ruminal. Os achados hematológicos revelaram leucocitose ($37077.17 \pm 25004.59 \text{ cell}/\mu\text{L}$) por neutrofilia com desvio à esquerda regenerativo e hiperfibrinogenemia ($1130 \pm 364.98 \text{ mg}/\text{dL}$). O exame ultrassonográfico possibilitou a visualização de filamentos móveis e ecogênicos que corresponderam à presença de aderências fibrinosas, observou-se também, deslocamento do retículo e irregularidade no seu contorno além das alterações na quantidade, padrão e amplitude das contrações reticulares. Permitiu ainda, a constatação de alterações esplênicas como abscessos que foram caracterizados como estruturas circulares de variados tamanhos delimitada por capsula contendo no seu interior conteúdo de ecogenicidade variável. Trombose da veia esplênica e dobramento do baço. Os resultados obtidos nesse trabalho, indicaram que a retículo esplênite traumática causa sinais clínicos inespecíficos, severas alterações laboratoriais e principalmente que a ultrassonografia é um método eficiente para o diagnóstico dessa enfermidade uma vez que as lesões anatomopatológicas confirmaram os achados ultrassonográficos.

TERMOS DE INDEXAÇÃO: Clínica, laboratório, ultrassonografia, anatomopatologia, bovinos, diagnóstico por imagem, síndrome do corpo estranho, baço, retículo-esplênite traumática.

INTRODUCTION

The feeding habit of cattle combined with low sensitivity of its taste organs, nutritional deficiencies, permanence in pastures containing sharp objects and the supply of agro-industry residues as feeding in regions where food is scarce are considered the main factors responsible for ingestion of foreign bodies (Anteneh & Ramswamy 2015, Mulatu et al. 2018).

Among these, it is worth mentioning metallic and sharp objects which, when ingested, tend in most cases to stick to the reticulum mucosa where they initiate cases of traumatic reticuloperitonitis (TRP) and its sequelae (Braun et al. 2018).

These objects may remain loose in the reticulum or transfix its wall and move in various directions causing focal or diffuse peritonitis, traumatic pericarditis, diaphragmatic hernia, traumatic hepatitis and splenitis (Silva 2011, Balasundara et al. 2012, Assis 2019).

It is estimated that only 2 to 14% of animals diagnosed with TRP develop splenitis as a sequelae (Dirksen 2005). Its clinical presentation is characterized by fever, tachycardia, decreased appetite and milk production, and increased pain sensitivity to palpation of the spleen (Constable et al. 2017). However, due to the scarcity of reports of splenic disease diagnosed in live cattle, these clinical signs may be attributed to TRP.

In addition to the clinical signs above, the affected animals also present significant laboratory alterations such as expressive leukocytosis with neutrophilia, and hyperfibrinogenemia due to the formation of abscesses in the spleen (Silva et al. 2017).

Although this disease presents itself with low frequency in the ruminant clinic, its lethality is 100% and its economic

losses start with the impairment of the productive life of the animal (Silva et al. 2017).

Therefore, due to the lack of information about this disease, especially regarding early diagnosis and its relevance to cattle ranching given the economic losses generated, the current study aimed to address the main clinical and laboratory findings, as well as sonographic and anatomopathological observations and to evaluate the effectiveness of ultrasonography in the diagnosis of traumatic reticulospinitis.

MATERIALS AND METHODS

The study was conducted in the “Clínica de Bovinos de Garanhuns” (CBG) of the “Universidade Federal Rural de Pernambuco” (UFRPE) by analyzing the clinical follow-up records (including laboratory information) of the ultrasound and necropsy reports of animals attended in the period from May 2009 to May 2019 diagnosed with traumatic reticulospinitis. Thirty purebred or crossbred dairy cattle, male and female, from dairy farms located in the Southern Agreste region of Pernambuco were studied.

All animals were clinically examined following the recommendations of Dirksen (1993). Blood samples were collected from all animals by venipuncture of the jugular, using a 21G needle, into siliconized vacutainer tubes containing EDTA anticoagulant (10%) to determine hematological variables (hemogram, total plasma protein, and plasma fibrinogen) according to the methodology proposed by Jain (1993).

Ultrasonography was performed using two Mode B devices (Logic 100 Pro, GE Medical Systems Co. Ltd., Wuxi China and Z6 Vet, Mindray Bio-Medical Electronics Co. Ltd., Shenzhen China) and convex transducers with frequencies of 3.5MHz (Logic 100 Pro) and 5.0MHz (Z6 Vet) according to the methodology used by Braun & Götz (1994) for the reticulum examination and Braun & Sicher (2006) for the spleen evaluation.

Due to the severity of the clinical condition, some animals died or were euthanized, following the recommendations of Luna & Teixeira (2007), and submitted to anatomopathological examination.

Results obtained from the clinical, ultrasonography and anatomopathological exams were analyzed using descriptive statistics. Laboratory data were evaluated using measures of central tendency, mean, and standard deviation (Curi 1997). For evaluating the correspondence between the ultrasonographic findings and the pathological lesions, reports of 20 necropsied animals were used.

This study was approved by the Ethics Commission for Animal Use (CEUA) of UFRPE under no. 105/2018 according to the rules of the Brazilian College of Animal Experimentation (COBEA) and National Institute of Health Guide for Care and Use of Laboratory Animals.

RESULTS

Epidemiology

During the study period, 7353 cattle were treated in the CBG of the UFRPE, of which 1361 (18.50%) were diagnosed with digestive problems. Of these, 229 (16.82%) corresponded to cases of TRP and 30 (13.10%) of those presented cases of traumatic reticulospinitis.

Of the cattle in this study, six were raised in intensive systems (20%) and 24 in semi-intensive systems (80%), and all aged between two and 15 years. Eight of the animals were Holstein, one was Girolando, and 21 were crossbred Holstein-Zebu cattle. There were two males and 28 females,

among which six were pregnant, one was nulliparous, 12 had calved more than 100 days previously, and in nine cases the owner did not know whether the animal was pregnant.

History

The main complaints reported by the owners were that the animals had reduced appetite, weight loss and decreased milk production. In some cases, information was given on the introduction of agribusiness residues such as poultry litter and cassava bark in the animal feed.

Clinical findings

Clinically the animals exhibited alterations in appetite, varying degrees of dehydration and ruminal hypomotility. Table 1 presents the absolute (n) and relative (%) frequency of the main clinical findings of cattle with traumatic reticulospinitis.

Laboratory findings

The results of the hematological exams demonstrated neutrophilic leukocytosis, regenerative left shift, and hyperfibrinogenemia (Table 2).

Ultrasonographic findings

The ultrasound findings in the ventral cranial region of the abdomen were characterized by the presence of heterogeneous echogenic filamentous material on the surface of the organs, suggesting fibrin and/or adhesions (Fig.1A). In addition, circular structures of varying sizes delimited by capsules with content of variable echogenicity, indicating abscesses or fibrin accumulation were also observed.

Visualization of the reticulum was possible in all cases, however, in three animals it was not clearly observed due to the presence of a large amount of inflammatory reaction. Table 3 shows the absolute and relative frequencies of the

Table 1. Absolute (n) and relative (%) frequency of clinical signs in 30 cattle with traumatic reticulospinitis

Characteristics	Clinical findings	Absolute frequency (n)	Relative frequency (%)
Posture	Standing	27	90
	Decubitus	3	10
Appetite	Present	15	50
	Absent	6	20
Behavior	Capricious	9	30
	Calm	15	50
Rectal temperature (°C)	Apathetic	15	50
	Normal (37-39°C)	19	63.33
Dehydration	Fever (>40°C)	11	36.67
	Absent	2	6.67
	Mild (5-8%)	10	33.33
Heart rate	Moderate (9-12%)	11	36.67
	Severe (>12%)	7	23.33
	Normal (60-80)	18	60
Respiratory frequency	Low (<60)	1	3.33
	Accelerated (>80)	11	36.66
	Normal (24-36)	15	50
Venous stasis	Low (<24)	6	20
	Accelerated (>40)	9	30
	Positive	3	10
Ruminal motility	Negative	25	83.33
	Not informed	2	6.67
	Physiological	2	6.67
Ruminal tympany	Hypermotility	5	16.67
	Hypomotility	22	73.33
	Atony	1	3.33
Ruminal stratifications	Present	4	13.33
	Absent	26	86.67
Evidence of pain	Defined extracts	20	66.67
	Undefined extracts	8	26.67
	Not informed	2	6.67
Abdominal tension	Positive (in a test)	4	13.33
	Negative	24	80
	Not informed	2	6.66
	Physiological	21	70
	Increased	8	26.66
	Not informed	1	3.33

main reticulum-related ultrasound findings as well as the frequency, amplitude, and pattern of reticular contractions in cattle affected by traumatic splenitis.

The ultrasonographic examination of the splenic region revealed marked alterations in all animals. The images commonly observed in the spleen were characterized by two thin or thick hyperechoic lines delimiting a parenchyma of heterogeneous echotexture (Fig.2A). In all cases, circular and capsule-bounded structures were visualized. These alterations sometimes extended throughout the organ, while in other cases part of the splenic parenchyma maintained its normal echotexture (Fig.3A). It is worth mentioning the presence of echogenic images partially filling the lumen of the splenic vein, indicating the existence of thrombosis (Fig.4A). One case of spleen folding was characterized by the visualization of two thin and hyperechoic lines in the center of the image of the spleen (Fig.5A).

Necropsy findings

Of the 30 cattle with traumatic reticulospinitis, 19 were euthanized and one died naturally. Thus, 20 necropsy reports were available for analysis.

The lesions found in the abdominal cavity, in all cases, were characterized by the presence of fibrin and adhesions between the organs (rumen, reticulum, diaphragm, spleen, liver) and increased peritoneal fluid. The main anatomopathological findings of the abdominal cavity, reticulum, and spleen, as well as the correspondence between these findings and the ultrasound observations of the lesions are described in Table 4 and in Figure 1-5.

As for the presence of foreign bodies, 20 metal objects with perforating characteristics (wires) were recovered from 16 animals, with lengths ranging from 4-15cm. These were free, attached to the mucosa of reticulum, rumen, and abomasum, or inside fistulas and splenic parenchyma.

Table 2. Hemogram, total plasma protein, and plasma fibrinogen of 30 cattle with traumatic reticulospinitis

Parameters	Maximum value	Minimum value	Mean±SD	Reference ^a
Hematocrit (%)	31	9	23.10±4.51	24-46
Erythrocytes (10 ⁶)	6.8	1.68	4.99±1.04	5-10
Hemoglobin (g/dL)	11.2	2.66	7.44±1.81	8-15
MCV (fL)	58	36.48	46.69±4.92	40-60
MCHC (%)	44	22.47	32.12±4.06	30-36
Total leukocytes (cell/μL)	123150	6900	37077.17±25004.59	4000-12000
Lymphocytes (cell/μL)	24486	1800	6022.69±4639.85	2500-7500
Neutrophils (mature) (cell/μL)	103446	4209	30137.52±22060.54	600-4000
Neutrophils (band cell) (cell/μL)	7339	0	788.52±1484.43	0-120
Eosinophils (cell/μL)	567	0	89.03±167.58	0-2400
Monocytes (cell/μL)	2735	0	353.38±541.98	25-840
Basophils (cell/μL)	253	0	25.66±69.74	0-200
TPP (g/dL)	11.6	6.3	9.33±1.19	7-8.5
PF (mg/dL)	1800	600	1130±364.98	300-700

MCV = Mean corpuscular volume, MCHC = mean corpuscular hemoglobin concentration, TPP = total plasma protein, PF = plasma fibrinogen; ^a Jain (1993).

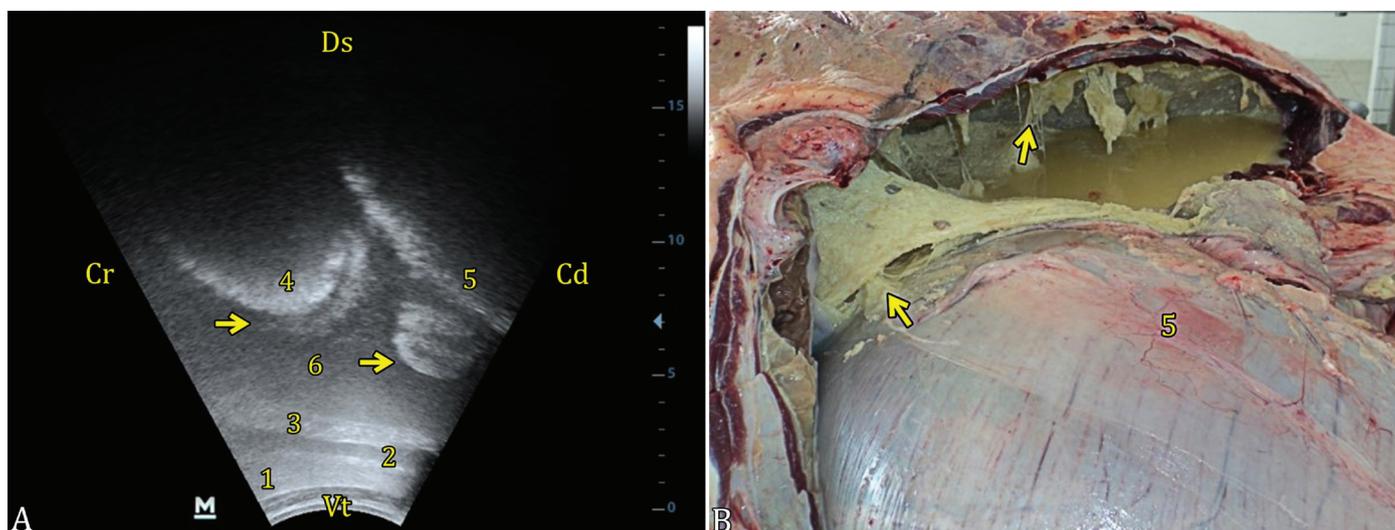


Fig.1 Traumatic reticulospinitis in bovine. **(A)** Ultrasound image of the cranioventral abdominal region with reticulum not supported on the diaphragm, displaced dorsally by hypoechoic effusion and deposits of echogenic material, which was also adhered to the reticular and ruminal serosa. **(B)** Serofibrinous peritonitis with adhesions between the organs of the abdominal cavity (corresponding to Fig.1A). Abdominal wall (1), muscle-phrenic vein (2), diaphragm (3), reticulum (4), anterior dorsal blind sac of the rumen (5), hypoechoic effusion (6), fibrinous material (arrows), cranial (Cr), caudal (Cd), central (Vt), dorsal (Ds).

DISCUSSION

The higher occurrence of cases of traumatic reticulospinitis in adult crossbred females observed in this study is attributed to the predominance of dairy cattle farming in the region, where the Pernambuco dairy basin is located (Silva 2011). A contributing factor to the development of this disease is the supply of feed in troughs that are highly manipulated by man in intensive and semi-intensive rearing systems, causing the accidental addition of metallic objects during the processing

and/or storage stages (Fubini & Divers 2008). In the region studied, mainly on dry period season it is common to offer animals by-products from the local agro-industry, such as poultry litter and cassava bark, which in some situations may contain perforating materials that contribute to the appearance of splenitis and other sequelae of TRP (Assis 2019).

The clinical expression of this disease in pregnant and recently calved animals occurs due to the expansion of the uterus and the effort generated at calving, which causes the

Table 3. Main findings of the ultrasound examination of the reticulum of 30 cattle with traumatic reticulospinitis

Characteristics	Ultrasound findings	Absolute frequency (n)	Relative frequency (%)
Reticular Contour	Smooth	4	13.33
	Irregular	20	66.67
	Not informed	6	20
Reticular Positioning	Supported by diaphragm	0	-
	Dorsally displaced	28	93.33
	Not informed	2	6.66
No. of contractions in 3 minutes	3-4 (normal)	7	23.33
	1-2 (reduced)	4	13.33
	5-9 (hypermotile)	1	3.33
	0 (atonic)	6	20
	Attempt at contraction ^a	10	33.33
	Not informed	2	6.66
Contraction pattern	Biphasic	7	23.33
	Triphasic	1	3.33
	Atony	6	20
	Attempt at contraction ^a	10	33.33
	Not informed	6	20
Contraction range	Normal	6	20
	Reduced	14	46.66
	Atony	6	20
	Not informed	4	13.33

^a Contraction attempts were considered when there was a very small reticular displacement (<3cm) due to the adhesions of the organ wall.

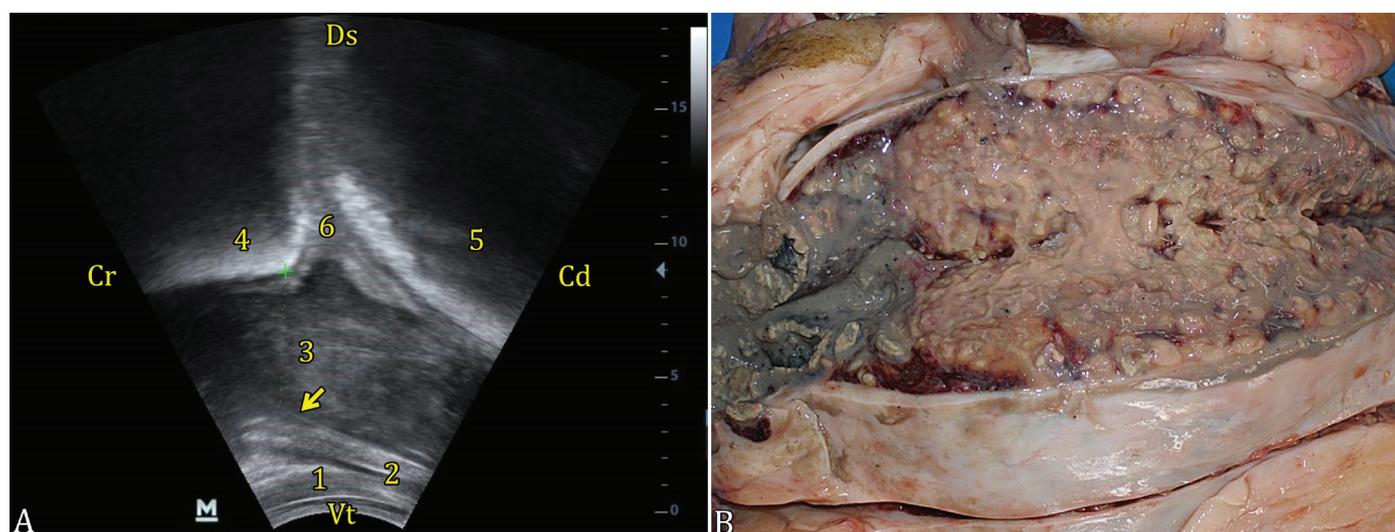


Fig.2 Traumatic reticulospinitis in bovine. **(A)** Ultrasound image of the cranioventral abdominal region with reticulum not supported on the diaphragm, dorsally displaced by the spleen. Spleen with hypoechoic and heterogeneous parenchyma. Heterogeneous material adhered to the reticular and ruminal serosa. **(B)** Spleen with lesion (corresponding to Fig.2A). Abdominal wall (1), diaphragm (2), spleen (3), reticulum (4), anterior dorsal blind sac of the rumen (5), fibrous material (6), splenic capsule (arrow), cranial (Cr), caudal (Cd), central (Vt), dorsal (Ds).

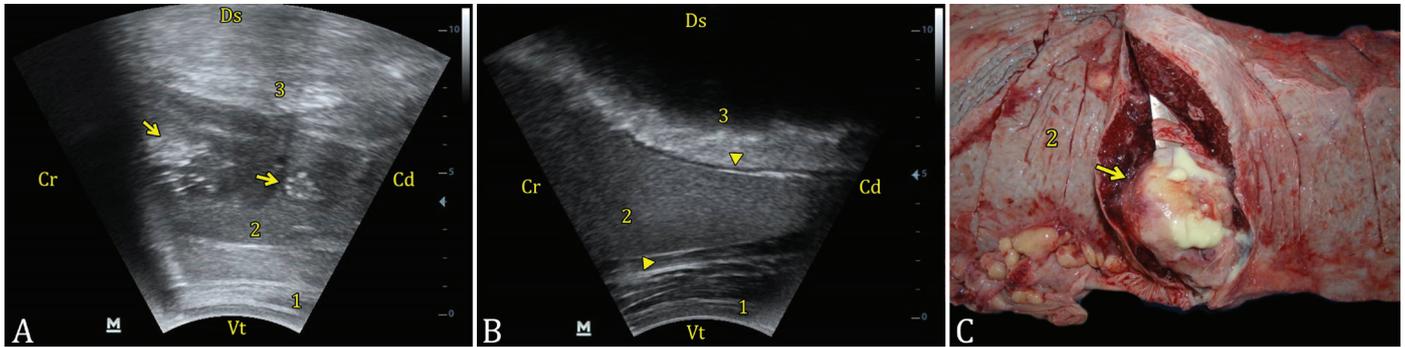


Fig.3 Traumatic reticulospinitis in bovine. (A) Ultrasound image of abdominal region at eighth left intercostal space with rumen supported on the spleen whose parenchyma is heterogeneous, suggesting the presence of abscesses. (B) Ultrasound image of abdominal region at eighth left intercostal space with part of the spleen without alterations, with homogeneous parenchyma well delimited by a thin and hyperechoic capsule. (C) Spleen with a normal part and an injured part with an abscess (corresponding to Fig.3A and 3B). Abdominal wall (1), spleen (2), anterior dorsal blind sac of the rumen (3), splenic abscess (arrows), splenic capsule (arrowhead), cranial (Cr), caudal (Cd), central (Vt), dorsal (Ds).

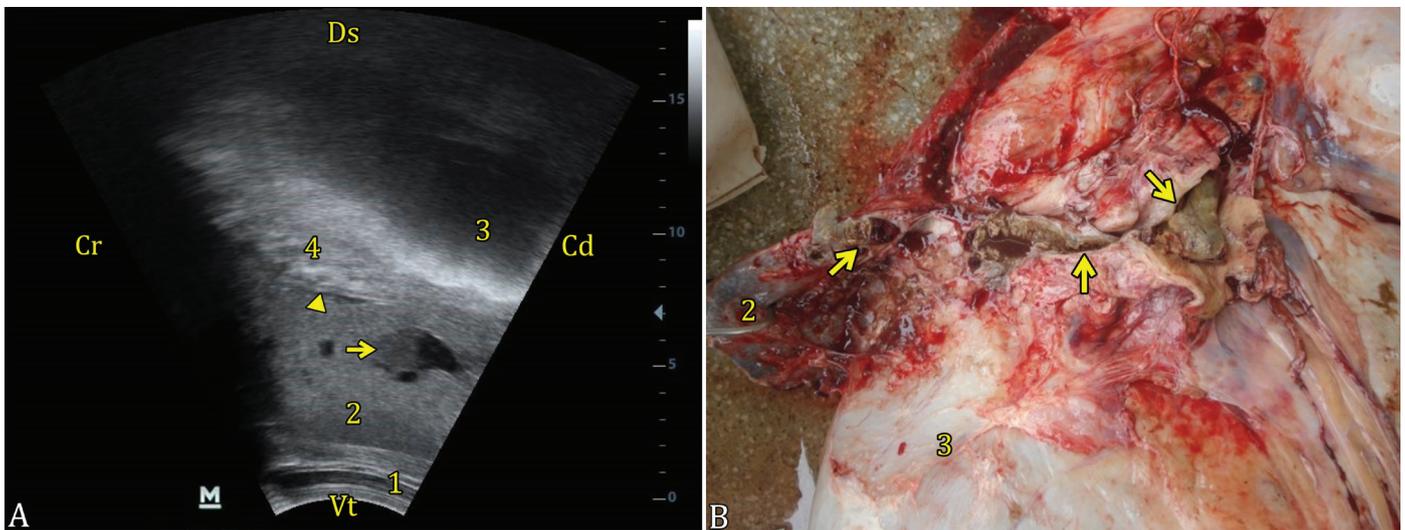


Fig.4 Traumatic reticulospinitis in bovine. (A) Ultrasound image of abdominal region at eighth left intercostal space with splenic vein lumen partially filled by echogenic structure, suggesting thrombosis. Deposition of echogenic and heterogeneous material adhering the rumen serosa to the splenic capsule. (B) Splenic thrombosis (corresponding to Fig.4A). Abdominal wall (1), spleen (2), rumen (3), echogenic material (4), splenic vein thrombus (arrow), thickened splenic capsule (arrowhead), cranial (Cr), caudal (Cd), central (Vt), dorsal (Ds).

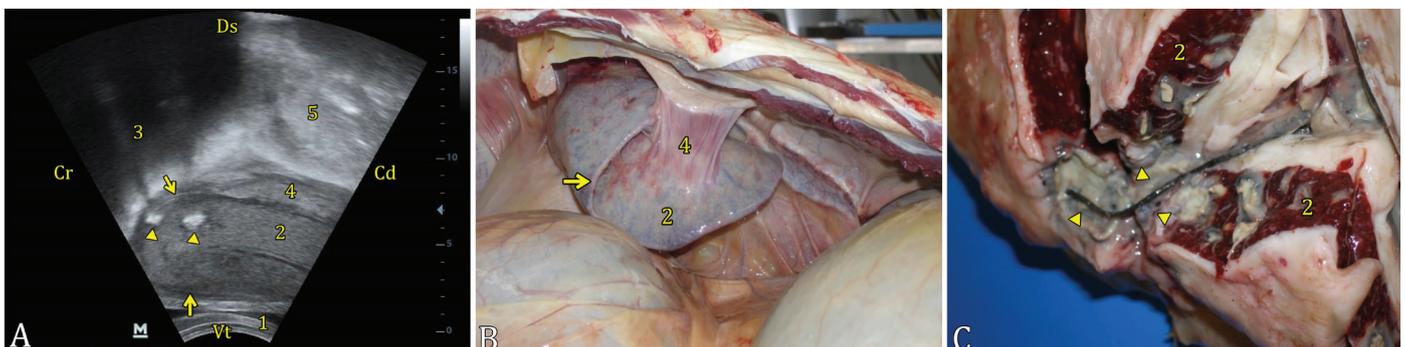


Fig.5 Traumatic reticulospinitis in bovine. (A) Ultrasound image of the cranioventral abdominal region with reticulum supported on the spleen and thus displaced dorsally. Spleen folded with circular hyperechoic areas corresponding to the sites of injury by the metallic foreign body (MFB). (B) Spleen folded (corresponding to Fig.5A). (C) Abscessed splenic lesion caused by MFB (corresponding to Fig.5A). Abdominal wall (1), spleen (2), irregularly contoured reticulum (3), echogenic deposits (4), omentum (5), hyperechoic lines indicating spleen torsion (arrow), abscesses (arrowhead), cranial (Cr), caudal (Cd), central (Vt), dorsal (Ds).

uterus to exert physical pressure on the reticulum. With the existence of a metallic foreign body, perforation of this organ can occur and result in TRP sequelae (Fubini & Divers 2008, Silva 2011, Anteneh & Ramswamy 2015, Assis 2019). Clinical signs characterized by apathy, appetite alteration, varying degrees of dehydration, and ruminal hypomotility were also reported by Trecenti et al. (2015). However, due to the scarcity of reports on splenic disease diagnosed in live cattle, clinical signs resembled those observed by Assis (2019) in cases of TRP.

Regarding hematological alterations, the neutrophilic leukocytosis with regenerative left shift found in the animals of this study characterizes the severity of the inflammatory process. This condition was similar to those observed by Nuss et al. (2009) and Trecenti et al. (2015) in cattle affected by traumatic splenitis. This type of response occurs through the presence of abscesses and chronic lesions that continue to stimulate the bone marrow to produce neutrophils. On the other hand, even in prolonged inflammatory processes the acute inflammatory pattern may be present and maintain activation of neutrophil demand (Jain 1993, Weiser 2015). Hyperfibrinogenemia was also present in the current and other studies involving traumatic digestive disorders in cattle and buffaloes (Athar et al. 2010, Silva 2011, 2018, Assis 2019). Although fibrinogen is a positive acute phase protein, its concentration also remains high in chronic disease as long as liver synthesis capacity is not affected and there is an antigenic stimulus for its production (Allison 2015). The chronicity of the inflammatory process also results in an increase in total plasma protein concentration due to dehydration (Allison 2015, Braun et al. 2018, Assis 2019).

The ultrasound results demonstrated impairment in the reticular activity, which may occur due to stimuli of inhibitory mechanisms caused by pain or fever which affect the gastric center of the vagus nerve, generating a decrease in rumen-reticulum motility due to the formation of fibrin adhesions (Braun et al. 1993a). In a more recent study Braun et al. (2018) attributed this decrease in reticular motility to mechanical factors associated with peritonitis, since cattle with or without discrete lesions presented normal reticular contractions.

In addition to alterations in the motility pattern of the reticulum, due to adhesions, the organ was distanced from the diaphragm and had an irregular contour, corroborating with other authors who also observed these lesions when evaluating cattle and buffaloes affected with TRP (Braun et al. 1993a, 2018, Abdelaal et al. 2009, Khalphallah et al. 2015).

This finding opposes that found in healthy animals, whose ultrasonographic aspect of the reticulum appears as a half-moon-shaped structure with a smooth contour supported by the diaphragm or ventral abdominal wall (Braun et al. 1993a, Braun 2009, Braun & Götz 1994).

The ultrasound images that defined the presence of traumatic splenitis in the animals of this study were similar to those observed by Nuss et al. (2009) and Silva et al. (2017), who reported alterations in the echogenicity pattern of the splenic parenchyma as a consequence of abscesses. These were characterized as circular structures delimited by a hyperechogenic capsule with content of variable echogenicity, similar to that described by Braun et al. (1993a). In healthy cattle, the splenic parenchyma presents a homogeneous echogenicity pattern and its capsule can be seen as a thin and echogenic line (Braun & Sicher 2006).

In addition to the alterations observed in the spleen parenchyma, the ultrasound was also efficient for identifying the splenic folding that occurred in one of the animals in this study, whose cause is not clear, but may be related to the rupture of the ligaments responsible for the spleen fixation due to the inflammatory process. This type of injury is widely reported in dogs, with the main reason being gastric dilation in this species (Ortiz et al. 2016, Gomes et al. 2017).

The majority of the ultrasound findings observed in the current study were confirmed in the *postmortem* examination of the animals, similar to that verified by Silva (2011) and Assis (2019). However, the non-visualization of adhesions by ultrasound in some cases is due to the internal location of these lesions, making it impossible to access them due to the absorption of the ultrasound waves (Braun & Götz 1994).

The inflammatory lesions of the peritoneum observed in the ventral cranial region of the abdomen indicate foreign body perforation of the reticular wall (Braun et al. 2018). However, these objects were not visualized by ultrasound, since this diagnostic method enables evaluation of the scale and location of inflammatory alterations to the peritoneum while radiography provides visualization of metallic foreign bodies (Braun et al. 1993a, 1993b, 2002, 2018, Athar et al. 2010).

The metallic foreign bodies recovered during necropsy resembled those observed by Braun et al. (2018) in radiographic surveys and by Mulatu et al. (2018) in slaughterhouse cattle. However, the oxidation process suffered by the metallic objects as well as the extent of inflammatory lesions may have contributed to the non-visualization of MFB in some of the animals, which was also observed by Braun et al. (2018).

Table 4. Correspondence between sonographic findings and anatomopathological lesions of cattle with traumatic reticulospinitis

Lesions site	Ultrasound findings	(n)	Anatomopathological findings	(n)	Correspondence (%)
Abdominal cavity	Large quantity of anechoic content	1	Increased peritoneal fluid	1	100%
	Filamentous content of hyperechoic/hypoechoic echogenicity	11	Fibrin/adhesions between organs	17	60%
	Impaired motility	16	Adhesions	16	100%
Reticulum	Fistulas	0	Fistulas	9	0
	Presence of MFB	0	Presence of MFB	16	0
Spleen	Circular structures of varying sizes enclosed by capsules containing variable echogenicity content	20	Abscesses	20	100%
	Thin, hyperechoic lines in the center of the spleen image	1	Spleen folded	1	100%
	Echogenic image filling the lumen of the splenic vein	1	Splenic vein thrombosis	2	50%

MFB = Metallic foreign body.

CONCLUSIONS

Clinical examination alone did not allow the definitive diagnosis of traumatic reticulospinitis since the clinical signs seen in the animals of this study resemble those observed in cattle with other sequelae of TRP. However, the complementary laboratory exams demonstrated severe alterations, which may indicate the possibility of a suppurative disease to the clinician. Laboratory findings combined with ultrasonography contributed to the establishment of definitive diagnosis and prognosis, since splenic abscesses seen through ultrasound and confirmed at necropsy ratified the significant leukocytosis of the animals.

The results of the current study indicated that ultrasonography proved to be an efficient method for the diagnosis of traumatic reticulospinitis.

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