Gastrointestinal Colics In Horses: Clinical, Laboratory, Ultrasonographic And Postmortem Findings

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ABSTRACT

A total number of thirty-nine horses of both sexes with gastrointestinal colic were classified into four groups according to thorough clinical examination; ultrasonography and postmortem findings and each was compared to a control. Fourteen horses had spasmodic colic, eleven suffered from flatulent colic, ten showed signs of impactive colic and four horses had obstructive colic. The clinical findings of all types were recorded. Blood lactate level was significantly increased in cases exhibited severe abdominal pain. However, in horses with moderate abdominal pain there were no significant changes. The results of ultrasonography revealed that in spasmodic colic only increased peristaltic activity was detected and the wall thickness increased in five horses. In flatulent colic, the cecum showed thin wall with absence of sacculations, and hypomotility was observed. In impactive colic, there was a large circular hyperechoic mass in the cecum consistent with a dense material or an enteroliths. In obstructive colic, the small intestine especially the jejunum and the descending colon appeared distended with fluid containing ingesta that appeared of mixed echogenicity and there were no detectable peristaltic activity. It is concluded that ultrasonography of horses with gastrointestinal colic provides the clinician with a rapid, and noninvasive results that can aid in the diagnosis of many gastrointestinal disturbances causing acute abdominal pain, thereby improving the recognition of surgical lesion and improving the potential for successful treatment. In addition, blood lactate level can be used as a prognostic indicator in horses with gastrointestinal colic.

INTRODUCTION

Colic is defined as a nonspecific term used to describe the clinical manifestations of visceral abdominal pain, which may be acute, chronic, or recurrent *(1, 2)*. In addition, it includes any disorder of the stomach and intestine which causes abdominal pain *(3-6)*. However, diseases of other structures within or associated with the abdomen such as the kidneys, liver, uterus, and peritoneum may also result in signs of colic *(7)*. It is considered a major cause of mortality in horses representing 28% of overall horse deaths *(8)*. So, rapid, earlier and effective diagnosis of horses with gastrointestinal colic is necessary for prompt surgical intervention, thereby allowing for more successful outcomes *(9, 10)*.

In horses, the use of ultrasonography enables the immediate identification of a compromised bowel and allows a rapid decision for surgical intervention *(11)*. A quick and accurate assessment of the horse with gastrointestinal colic is very important and ultrasonography can readily satisfy this goal *(12)*. The purpose of the present study was to 1) emphasize the clinical status of the horses with gastrointestinal colic 2) investigate some biochemical and hematological changes in samples obtained from horses having gastrointestinal colic 3) evaluate the ultrasonographic picture of the abdominal organs in horses suffering from gastrointestinal colic and compare it with the postmortem findings.

MATERIALS and METHODS

Horses: Thirty-nine horses presented with signs of gastrointestinal colic at Zagazig Veterinary Teaching Hospital between September 2005 to March 2007 were examined. Animals with signs of colic were compared with ten clinically normal horses at the Military Veterinary Hospital, Cairo, Egypt.

Sample collection and processing: Fecal samples (about 20-30 g from each horse) were collected from all examined horses for physical and parasitological examination. Samples were obtained from the rectum, or at the time of defecation, in clean non-leak

container. Direct smear method was performed *(13)*. Fecal sand and blood was detected *(14)*. Two blood samples were collected from the jugular vein from all examined horses. The first sample, used for complete blood count and lactate level, was collected on evacuated glass tubes containing ethylene diaminetetraacetic acid *(15)*. The second blood sample, for biochemical examinations, was collected into a plain evacuated glass tubes then centrifugation was done at a speed of 3500 rpm for 10 min. Serum was then decanted into a clean tubes and stored at -30° C till future analysis *(14)*.

Packed cell volume was estimated using microhematocrit capillary tubes and centrifugation was done at 11000 rpm/10 min. Total erythrocytic and leucocytic count was counted using the improved neubaur chamber *(16)*. Differential leucocytic count was also performed *(14)*. Hemoglobin concentration was determined using a colorimetric method Serum glucose was determined using spectrophotometer with special test kits *(17)*. Blood lactate level was measured in plasma using special test kits and this was done within fifteen min. of plasma separation *(18)*. Serum sodium and potassium concentration was measured using flamephotometry *(19)*. Serum chloride was measured by a colorimetric procedure *(20)*. Total proteins were determined spectrophotometrically using special test kits *(21)*. Determination of the activities of gamma glutamyl transpeptidase (GGT) was performed by colorimetric method *(22)*.

Ultrasonographic examination: An ultrasound scanner (*Pie-medical 240 Parus, Switzerland*) equipped with 3.5 and 5 MHz convex and 6 and 8 MHz linear transducers was used for the ultrasonographic examination of the abdomen and the ultrasound images was printed out using special printer (*Sony UP-885 MD printer*). Two techniques for ultrasonographic examination were used. First: transabdominal ultrasonography which requires routine skin preparation, including clipping and shaving of the hair, cleaning of the skin and application of a coupling gel (*SGMOSCAN, SGMO Chemical Industry, Egypt*). Examination was performed in standing position using 3.5 and 5 MHz sector scanning transducer *(23, 24)*. Second: endorectal ultrasonography that requires little patient preparation, apart from suitable restraint of the animal, removal of all fecal contents and adequate lubrication with an obstetrical lubricant. Transrectal examination was performed using 6 and 8 MHz linear probe by placing the probe in rectal examination sleeve *(24)*.

The duodenum was examined along the right flank, accessible to transcutaneous ultrasonoghraphy at the 16^{th} and 17^{th} intercostal space immediately ventral to the kidney *(9)*. Jejunum was not usually imageable in horses owing to the interposed large colon *(25)*. The cecum was imaged along the right body wall in the dorsal and caudal portions of the abdomen *(26)*. Large colon was normally visible throughout the majority of the abdomen along both body walls and along the ventral abdomen *(27)*. The small colon was scanned dorsal to the urinary bladder from the ventral abdomen and adjacent to body wall *(28)*.

Statistical analysis: Comparisons were made using repeated measures of ANOVA between all mean values of obtained parameters in all groups. Significance was set at $P \leq 0.05$. Measurements are reported as the mean value ± the standard error.

RESULTS

Horses were classified into five groups according to thorough clinical examination; ultrasonography and post mortem examination. Fourteen had spasmodic colic, eleven suffered from flatulent colic, ten showed impactive colic and four horses had obstructive colic. In addition to ten horses used as control normal animals.

Clinical findings of horses with gastrointestinal colic are summarized in Table 1. There was significant increase in mean body temperature, pulse rate and respiration rate in all groups under investigation (Table 2). The mucous membrane, eye capillaries, intestinal sounds and rectal findings are summarized in

Table 2. Fecal examination revealed positive result (*Ascaris Spp.*) in horses with spasmodic and impactive colic while those with flatulent colic, obstructive colic revealed negative results. Fecal sand and fecal blood was negative in all groups.

Hematological findings (Table 3) revealed that there was significant increase in PCV% in all groups. Hemoglobin content and erythrocytic count showed no significant changes. There was moderate increase in leucocytic count in horses with impactive and obstructive colic while those with spasmodic and flatulent colic showed normal values. Differential leucocytic count was summerized in the same Table.

Biochemical findings (Table 4) revealed that there was significant decrease in serum glucose level and significant increase in lactate level. There was significant increase in total protein in all groups. The serum activities of GGT showed significant increases. There was significant decrease in serum chloride, sodium and potassium concentrations in all groups.

Abdominal and transrectal ultrasonography of control horses was carried out on the ten control horses. All internal organs were examined for obtaining the normal modeling of the healthy horses especially stomach, small and large intestines. The small intestinal echoes are recognized by their small tubular and circular appearance. The jejunum and ileum was imaged along the ventral abdomen or in the more ventral parts of the left paralumbar fossa in the 17^{th} intercostal space (Fig. 1A). The wall of the jejunum and ileum appears hypoechoic to echogenic. The large intestinal echoes are recognized by their large semicurved, circulated appearance. The cecum was identified by its location within the right caudo-dorsal part of the abdomen, its large diameter, sacculations and contractions (Fig. 1B). The right ventral colon was characterized by presence of sacculations, bright hyperechoic line and the inability to identify the entire circumference of its wall (Fig. 1C). The left dorsal colon appeared non sacculated (Fig. 1D). The left ventral colon revealed the presence of sacculations close to the spleen (Figs. 1E and 1A). The descending colon appeared sacculated (Fig. 1E). The liver was recognizable by its branching vasculature with the portal and hepatic veins (Fig.1C). The spleen was recognized by its more granular homogeneous texture with few visible splenic vessels coursing throughout (Figs. 1A;1D and 1E).

Ultrasonography of horses with signs of colic: In horses with spasmodic colic, the cecum appeared with echogenic wall and contents of variable echogenicities, the wall thickness was increased, the peristaltic activity of the cecum was detected as hypermotile on real time ultrasonography (Figs. 2B; 2C). The left ventral colon appeared with normal wall thickness and sacculations (Fig. 2D). The descending colon appeared with thin echogenic wall and contains isoechoic ingesta which appears in continuous motion (Fig. 2E). In horses with flatulent colic the cecum appeared thin walled with absence of sacculations, hypomotile on real time ultrasonography and the gases in the cecum prevent visualization of the ingesta inside the cecum (Fig. 3B). The left and right ventral colons appeared with thin echogenic wall, absence of sacculations and the gases inside it hindered the visualization of the ingesta inside it (Fig. 3C, 3D) and the diagnosis was confirmed at necropsy (Figs. 3E & 3F). In the group with impactive colic a large circular hyperechoic mass was imaged in the cecum (Figs. 4B and 4C) which casts an acoustic shadow consistent with a dense material or an enteroliths. Sacculations was absent and the wall may be increased or decreased thickness. The descending colon appear severely distended with isoechoic ingesta and reduced motility (Fig. 4D) which was confirmed postmortem (Figs. 4E & 4F). In horses with obstructive colic the small intestine especially the jejunum appeared distended with fluid containing ingesta that appear of mixed echogenicity. There were no detectable peristaltic activity (Figs. 5B and 5C). The descending colon was distended with fluid and ingesta, and the left ventral colon appears with no sacculations and no detectable motility (Fig. 5D). The pelvic flexure was distended with gas, fluid and ingesta with no detectable contractions (Fig. 5E).

Table 1. Clinical findings in horses suffered from gastrointestinal colic

Group	Type of colic	Clinical findings
1	Spasmodic (*n*=14)	Brief attack of abdominal pain which was intermittent and the horse rolling, pawing and kicking for a few minutes, then shaking itself and standing normally for a few minutes until the next bout of pain occurs (Fig. 2A).
2	Flatulent (*n*=11)	Abdominal distension was evident and the horse shows signs of severe pain which may be intermittent or continuous (Fig. 3A).
3	Impactive (*n*=10)	Signs of moderate abdominal pain being stretching out and lying down and the bouts of pain occurring at intervals up to a half-hour (Fig. 4A).
4	Obstructive (*n*=4)	Severe abdominal pain which may be continuous or intermittent according to the degree of intestinal obstruction. Dog-sitting position is a characteristic sign in this type of acute abdominal pain (Fig. 5A).

Table 2. Physical examination findings of horses with gastrointestinal colic

	Control (*n*=10)	**Spasmodic** (*n*=14)	**Flatulent** (*n*=11)	**Impactive** (*n*=10)	**Obstructive** (*n*=4)
Respiration rate (min.)	12.9 ± 0.69 ^{abc}	26.1 ± 1.88 ^{bc}	25.1 ± 1.70 ^{bc}	26.8 ± 2.85 ^{ab}	32.2 ± 4.38 ^{a}
Pulse rate (min.)	32.3 ± 1.11 ^{b}	44.8 ± 2.86 ^{ab}	40.6 ± 2.58 ^{ab}	53.6 ± 5.18 ^{a}	54.5 ± 4.94 ^{a}
Temperature (°C)	37.5 ± 0.11 ^{b}	38.3 ± 0.12 ^{a}	38.3 ± 0.14 ^{a}	38.3 ± 0.20 ^{a}	38.3 ± 0.34 ^{a}
Mucous membrane	Rosy red	Congested	Congested	Congested	Congested
Eye capillaries	Filled with blood +	Engorged with blood ++	Engorged with blood ++	Engorged with blood ++	Engorged with blood ++
Intestinal auscultation	Normal motility	Hypermotility	Decrease to complete absence	Complete absence	Complete absence
Rectal findings	No abnormal findings	Normal features except frequent defecation due to increased peristaltic activity	Showed gas distension of the bowel in the right and left dorsal quadrants	There was mass detected in the right and left dorsal quadrants	The rectum appears empty, sticky to touch and there is no fecal matter.

Means carrying different superscripts are significantly different at $p \leq 0.05$

Table 3. Hematological findings in 10 healthy horses and those suffering from gastrointestinal colic

Parameter	Control (n=10)	Spasmodic (n=14)	Flatulent (n=11)	Impactive (n=10)	Obstructive (n=4)
PCV (%)	39.0 ± 2.71 ^{c}	43.4 ± 1.18 ^{bc}	42.1 ± 2.12 ^{bc}	50.0 ± 3.16 ^{ab}	53.8 ± 2.17 ^{a}
Hb (g/dl)	14.9 ± 0.59 ^{a}	10.8 ± 0.40 ^{a}	11.8 ± 0.44 ^{a}	11.8 ± 1.01 ^{a}	12.5 ± 1.21 ^{a}
RBCs (x10^{6}/cumm)	6.43 ± 0.56 ^{a}	8.21 ± 0.89 ^{a}	7.79 ± 0.31 ^{a}	7.74 ± 1.23 ^{a}	5.89 ± 0.41 ^{a}
WBCs (x10^{3}/cumm)	10.0 ± 0.3 ^{b}	10.3 ± 0.7 ^{b}	10.1 ± 0.5 ^{b}	11.8 ± 0.9 ^{ab}	12.1 ± 0.9 ^{ab}
Neutrophils (%)	50.0 ± 1.7 ^{cd}	49.6 ± 0.9 ^{cd}	48.5 ± 0.4 ^{d}	64.5 ± 2.6 ^{a}	60.5 ± 3.3 ^{ab}
Lymphocytes (%)	45.7 ± 1.7 ^{a}	44.8 ± 0.7 ^{a}	44.4 ± 0.7 ^{a}	31.8 ± 2.5 ^{b}	35.3 ± 2.6 ^{b}
Monocytes (%)	2.6 ± 0.3 ^{ab}	2.6 ± 0.3 ^{ab}	3.7 ± 0.4 ^{a}	1.6 ± 0.4 ^{b}	2.3 ± 0.5 ^{b}
Eosinophils (%)	0.2 ± 0.2 ^{a}	1.2 ± 0.3 ^{a}	1.3 ± 0.7 ^{a}	0.8 ± 0.5 ^{a}	0.8 ± 0.8 ^{a}
Basophils (%)	1.5 ± 0.3 ^{ab}	1.8 ± 0.2 ^{a}	2.2 ± 0.2 ^{a}	1.3 ± 0.3 ^{ab}	1.3 ± 0.8 ^{ab}

Means carrying different superscripts are significantly different at $p \leq 0.05$

Table 4. Biochemical findings in the serum of horses with gastrointestinal colic and those of controls

Parameter	Control (n=10)	Spasmodic (n=14)	Flatulent (n=11)	Impactive (n=10)	Obstructive (n=4)
Glucose (mg/dl)	79.2 ± 4.7 ^{a}	62.9 ± 3.0 ^{b}	61.8 ± 2.9 ^{b}	56.8 ± 3.0 ^{b}	61.4 ± 7.9 ^{b}
Lactate (mg/dl)	11.2 ± 1.0 ^{c}	32.2 ± 4.7 ^{a}	36.9 ± 1.2 ^{a}	38.5 ± 6.2 ^{a}	42.8 ± 1.4 ^{a}
Total protein (g/dl)	6.6 ± 0.16 ^{b}	7.1 ± 0.44 ^{ab}	7.6 ± 0.93 ^{ab}	9.9 ± 1.05 ^{a}	7.4 ± 0.25 ^{ab}
GGT (U/l)	15.0± 1.18 ^{b}	24.5 ± 4.65 ^{ab}	16.4 ± 3.73 ^{ab}	18.8 ± 4.78 ^{ab}	38.4 ± 2.50 ^{a}
Chloride (mEq/L)	94.9 ± 1.5 ^{a}	85.3 ± 1.2 ^{b}	85.4 ± 1.8 ^{b}	86.2 ± 2.7 ^{b}	84.9 ± 2.7 ^{b}
Sodium (mEq/L)	138.0 ± 3.4 ^{a}	125.3 ± 2.0 ^{b}	128.8 ± 1.7 ^{b}	127.4 ± 1.8 ^{b}	125.7 ± 2.4 ^{b}
Potassium (mEq/L)	4.3 ± 0.09 ^{a}	3.8 ± 0.09 ^{b}	3.6 ± 0.14 ^{b}	3.6 ± 0.14 ^{b}	3.7 ± 0.23 ^{b}

Means carrying different superscripts are significantly different at $p \leq 0.05$
GGT, Gamma glutamyl transpeptidase.

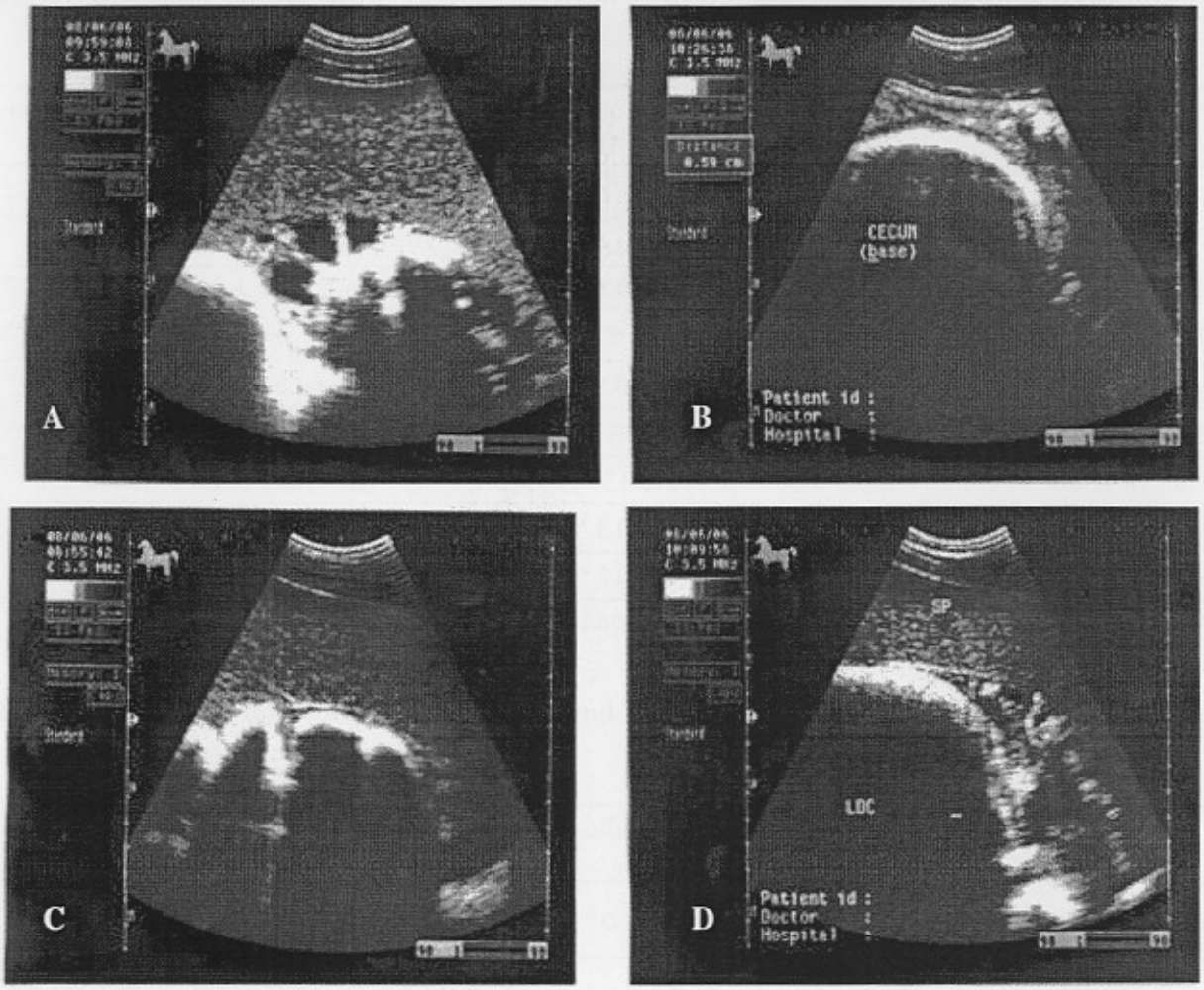

Fig. 1. Sonograms of the normal horses showing **(A)** jejunum, ileum and left ventral colon obtained from the left 17th Ics using 3.5 MHz transducer. The small intestine appeared circular with echogenic wall. **(B)** cecum obtained from the right flank region ventral to the sacrum using 3.5 MHz transducer. The cecum had hyperechoic wall with presence of sacculations. **(C)** liver and right ventral colon obtained from the 16th Ics using 3.5 MHz transducer. The right ventral colon appeared sacculated with peristaltic activity. **(D)** spleen and the left dorsal colon obtained from the 13th Ics in the left dorsal portion.

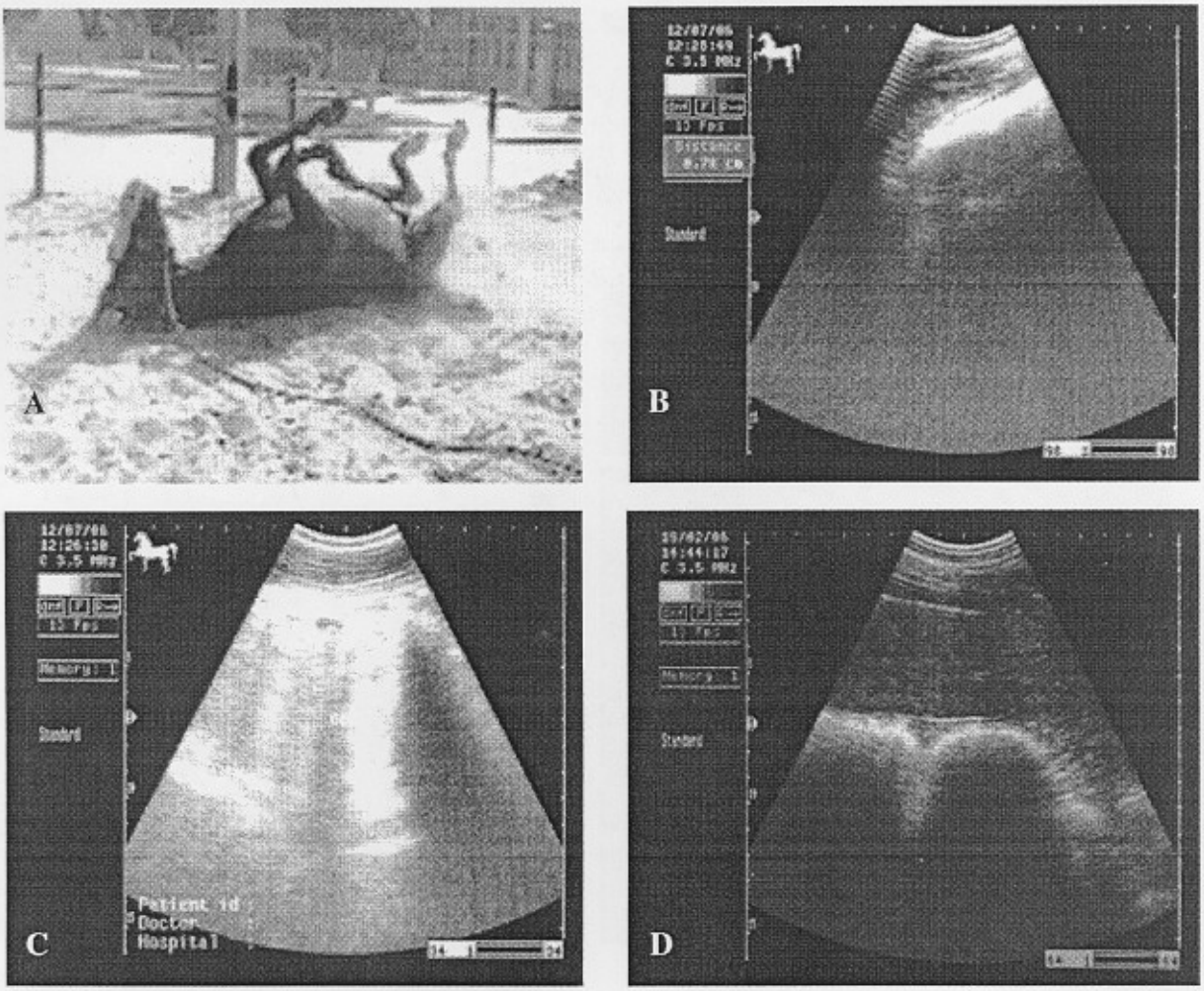

Fig. 2. **(A)** Horse suffering fits of abdominal pain which were intermittent and the horse rolling, pawing and kicking for a few minutes. Sonograms of horses with spasmodic colic showed **(B** and **C)** The cecal wall appear echogenic with contents of variable echogenicities and increase wall thickness. The peristaltic movement of the cecum was detected as hypermotile. This sonogram was obtained from the right flank region using 3.5 MHz transducer. **(D)** The spleen and left ventral colon were obtained from the left 13 Ics using 3.5 MHz transducer. The spleen appeared with normal echotexture. The left ventral colon also appeared with normal echogenic wall have sacculations, only hypermotility of the left ventral colon were observed. **(E)** The spleen, descending colon obtained using 3.5 MHz transducer. The descending colon appeared circular echogenic wall its fluid and ingesta contents appear with swirling motility more than expected.

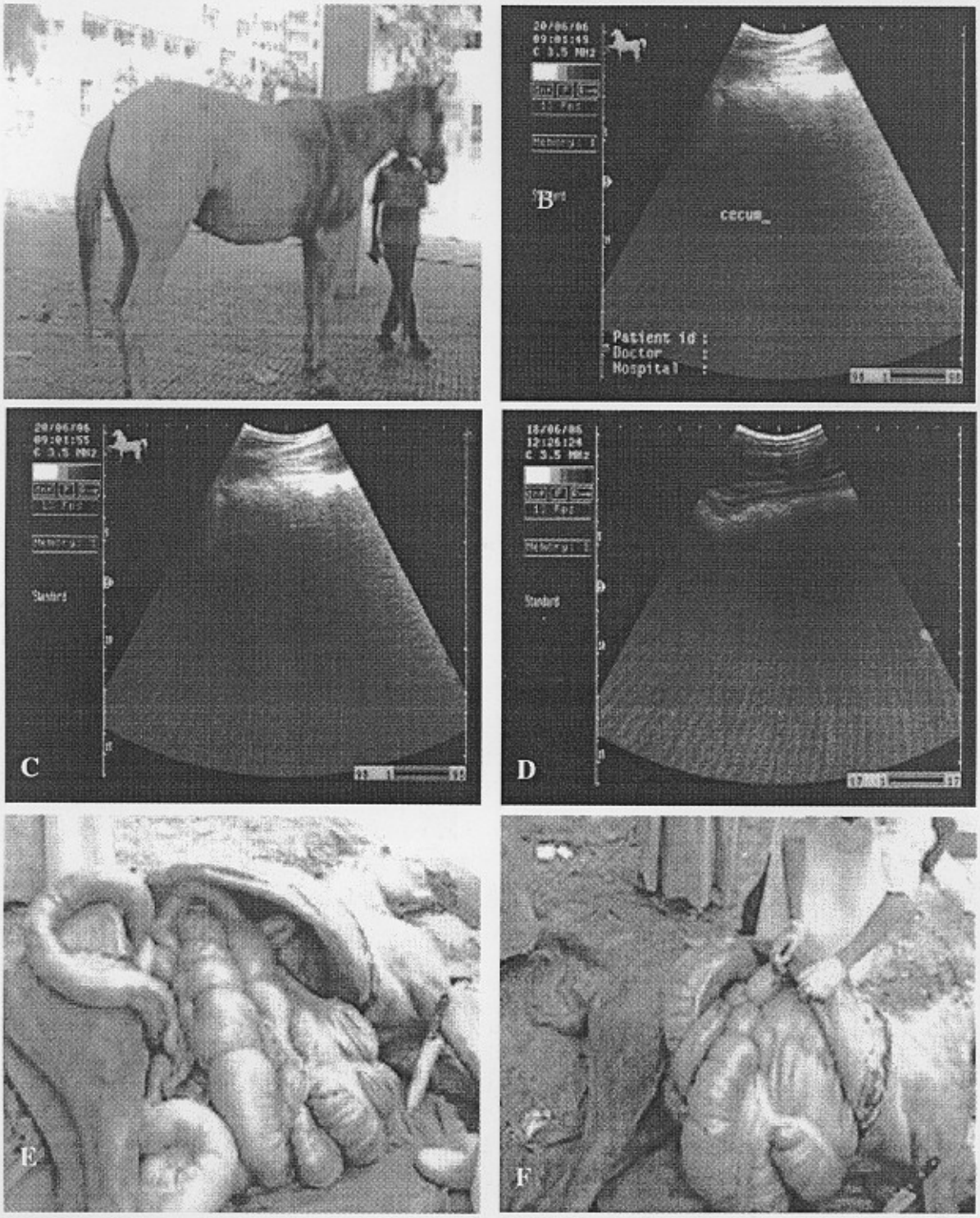

Fig. 3. (**A**) Horse suffering abdominal distension due to gas accumulation in the cecum. (**B**) The cecum obtained from the right flank region using 3.5 MHz transducer. The cecal wall appeared echogenic with absence of sacculations also it contained gases that hinder visualization of the ingesta inside the cecum. (**C**) The right ventral colon obtained from the 16th Ics using 3.5 MHz transducer. Its wall appeared thin echogenic with absence of sacculations also it contain gases that hinder visualization of the ingesta inside. (**D**) Sonogram of horses with flatulent colic showed the left ventral colon which appeared with thin echogenic wall, absence of sacculations and the gases inside it hinders the visualization of the ingesta inside it. (**E**) and (**F**) necropsy findings showed distended intestinal loops with gas.

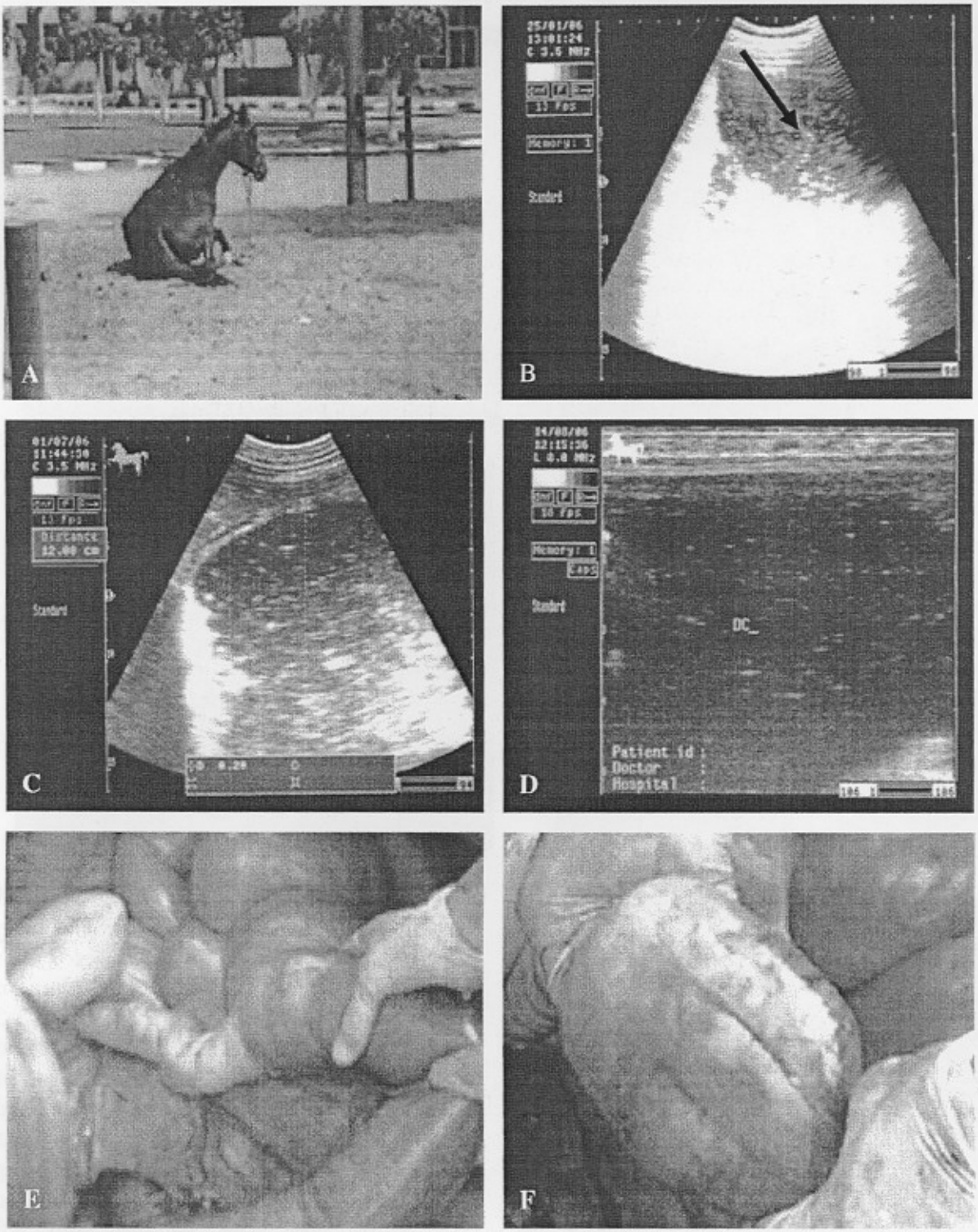

Fig. 4. Horses with impactive colic showed **(A)** signs of impactive colic. Sonograms of horses with impactive colic that shows **(B)** Large circular hyperechoic mass (arrow) in the cecum which casts an acoustic enhancement consistent with a dense material or an enterolith. Also notice absence of sacculations. **(C)** The cecum obtained from the right flank region using 3.5 MHz transducer. Notice the stretched wall with absence of sacculations. **(D)** The descending colon obtained from transrectal window using 8 MHz transducer. Notice the thin bowel wall. This area of impaction had a complete ileus on real time scanning. **(E; F)** Site of impaction in descending colon of the horse; notice the distended oral segment of the intestine and the collapsed aboral segment next to impaction seat and the changes in the serosal surface of this part.

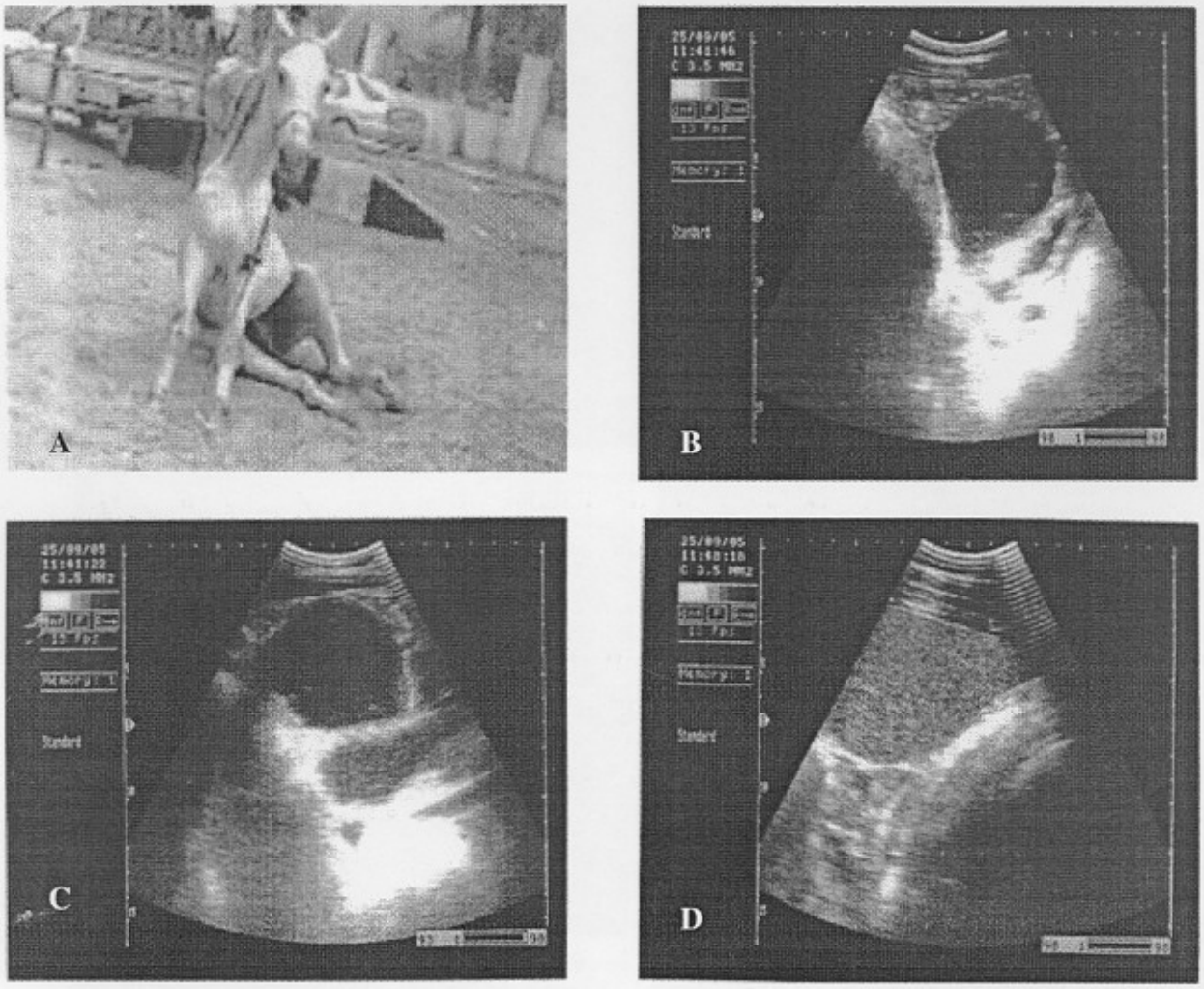

Fig. 5. **(A)** horse showing the clinical findings of obstructive colic "dog sitting position". Sonograms of horses with obstructive colic showed **(B)** The jejunum imaged in the left ventral abdomen using 3.5 MHz transducer. Notice the greatly distended loop of the jejunum and its contents are of mixed echogenicity. **(C)** The jejunum imaged in the left ventral abdomen using 3.5 MHz transducer. Notice the greatly distended loop of the jejunum and its contents are of mixed echogenicity. **(D)** The jejunum and left ventral colon obtained from the left flank region caudal to the costal arch using 3.5 MHz transducer. The jejunal contents are more echogenic. Left ventral colon appeared with no sacculations. **(E)** The pelvic flexure obtained from transrectal window using 6 MHz transducer. It appeared distended, complete ileus was observed during real time scanning.

DISCUSSION

Horses showed clinical signs of colic were classified into four groups according to clinical signs (spasmodic, flatulent, impactive and obstructive colic); similar clinical findings were previously cited by several authors *(8, 29, 30, 31, 32)*. Body temperature was significantly increased in all groups with gastrointestinal colic which may be attributed to excitement, pain and muscular exertion *(8)*. Pulse rate showed significant increase and this may be due to excitation and the development of endotoxemia *(33)*. Similarly, there was significant increase in respiratory rate and this may be attributed to excitation, muscular exertion or due to toxemia and metabolic acidosis *(34)*. The mucous membrane was congested and the eye capillaries were engorged with blood due to increased heart rate and consequently increase blood flow to the mucous membrane *(8, 30)*.

On abdominal auscultation it was obvious that there were intestinal hypermotility, decrease to complete absence of intestinal sound, complete absence of intestinal sound and complete absence of intestinal sound in horses with spasmodic, flatulent, impactive and obstructive colic respectively. The increased peristalsis may be attributed to an increase in parasympathetic tone under influence of any irritation of the gastrointestinal tract as drinking of cold water. On the other hand, decreased peristalsis or complete absence was due to gaseous distension, overload of food inside the colon, decrease of colonic sensation to stimuli by distension *(2, 35)*. On rectal examination horses with spasmodic colic showed normal features except frequent defecation due to increased peristaltic activity. However, horses with flatulent colic showed distension of the bowel and this may be attributed to excessive gas production with cessation of intestinal peristalsis *(8)*. In horses with impactive colic, there was mass detected in the right and left dorsal quadrants which may be due to food, feces or enteroliths. In horses with obstructive colic the rectum appeared empty, sticky to touch and there was no defecation due to obstruction of the bowel *(8, 29, 36)*.

The increase in packed cell volume may be attributed to dehydration status that occurs during most types of colic *(2)*. The decrease in glucose level may be due to the disturbed liver function followed by reduction in glycogen storage capacity of the liver *(8)*. Plasma lactate concentration was significantly increased where its level is used as an indicator for the severity of shock and the increase in its level is attributed to a common metabolic acidosis where it is produced as a result of increased anaerobic glycolysis secondary to shock and also absorption of lactic acid produced by bacteria in the gastrointestinal tract *(37, 38, 39)*. The total serum protein was significantly increased in all groups and this may be attributed to dehydration and hypovolemia *(2)*.

Gamma glutamyl transpeptidase showed significant increase in horses with obstructive colic and moderate increase in horses with spasmodic, flatulent and impactive colic. These changes may be expalined due to hepatocellular damage from endotoxin delivered in portal circulation *(40)*. There was significant decrease in the concentration of both chloride, sodium and potassium in all colic groups. This may be due to excessive loss of water in sweating and urination leading to changes in osmosis during colicky fits causing losses of electrolytes. This also may be attributed to electrolyte loss in gastrointestinal tract by hyperosmolality of intestine caused by long standing of food and feces *(41, 42)*.

Ultrasonographic examination of the abdomen in the horses yielded information about the gastrointestinal tract and abdominal organs that was difficult or impossible to obtain through other diagnostic modalities. Ultrasonography was valuable in giving information about the abdomen of healthy

horses and comparing it to those with gastrointestinal colic. In this study horses with spasmodic colic had an increased peristaltic activity and this might be due to the inflammatory conditions as enteritis and colitis *(43)*. The ultrasonographic appearance of the abdominal organ in this group showed that the cecum appeared with echogenic wall and contents of variable echogenicities, the wall thickness was increased, the peristaltic activity of the cecum was detected as hypermotile on ultrasonography. The left ventral colon appeared with increased wall thickness and sacculations were detected in some cases while, in others it appeared with normal wall thickness. The descending colon appeared with thin echogenic wall and contained isoechoic ingesta which appeared in continuous motion that indicated hypermotility of the bowel *(27)*.

The cecum of horses with flatulent colic appeared thin walled due to gas distension; absence of sacculations; hypomotile on ultrasonography and the gases in the cecum prevented visualization of the ingesta inside the cecum *(26, 44)*, in comparison to the control horses the cecum was identified by its sacculations and contractions *(45)*. The left ventral colon appeared with thin echogenic wall, absence of sacculations and the gases inside it hindered the visualization of the ingesta inside it. The right ventral colon, compared to clinically normal horses, showed absence of sacculations and may be with thin or increased wall thickness *(46)* while in control horses it was characterized by presence of sacculations, bright hyperechoic line and the inability to identify the entire circumference of its wall *(24)*.

Scanning horses with impactive colic showed large circular hyperechoic mass in the cecum which casts an acoustic enhancement consistent with a dense material or an enteroliths. Sacculations was absent and the wall may be increased or decreased thickness according to presence of intestinal compromise *(12)*. The descending colon appeared severely distended with isoechoic ingesta and reduced motility *(26)*. In addition, the right dorsal colon were more echogenic and casts an acoustic shadow, the wall appeared also more echogenic and thicker than normal.

Ultrasonographic examination of horses with obstructive colic showed that the small intestine especially the jejunum appeared distended with fluid containing ingesta that appeared of mixed echogenicity, there were no detectable peristaltic activities *(25)*. The descending colon was distended with fluid and ingesta, and the left ventral colon appeared with no sacculations and no detectable motility. Transrectal ultrasonographic examination showed that the pelvic flexure was distended with gas, fluid and ingesta with no detectable contractions *(26)*.

It could be concluded that diagnostic ultrasonography of the abdomen is a valuable method for the evaluation of horses with signs of gastrointestinal colics, because bowel distension, edema, and lack of bowel motility can be identified and allow early medical or surgical intervention. In addition, ultrasonography can improve the diagnosis, treatment and prognosis of horses presenting with acute abdominal pain; where an immediate horse side results are obtained.

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الملخص العربى

المغص المعوي في الحصان: الأعراض الاكلينيكيه، التحاليل المعملية، الموجات فوق الصوتية ونتائج التشريح المرضي

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في هذه الدراسة تم فحص عدد تسعه وثلاثون حصاناً من كلا الجنسين تعاني من المغص المعوي وتم تقسيمها إلي أربعه مجموعات طبقاً للفحص الإكلينيكي، والفحص المعملي، وفحص البطن باستخدام الموجات فوق الصوتية ثم مقارنه النتائج بصوره الفحص التشريحي للحيوانات التي نفقت ومقارنتها بعدد عشره حصاناً طبيعياً.والمجموعات كالأتي أربعه عشره حصانا تعاني من المغص التقلصي ، احدي عشره حصانا تعاني من المغص النفاخي ، عشره حصانا تعاني من تخمة الأمعاء وأربعه حصانا تعاني من انسداد الأمعاء. وقد لوحظ زيادة معنوية في اللاكتات في الدم في الحيوانات التي تعاني من أعراض حادة من المغص وقد أظهرت نتائج الفحص بالموجات فوق الصوتية للحيوانات التي تعاني من المغص التقلصي وجود زيادة في الحركة الدودية في الأمعاء مع وجود زيادة في حجم الجدار. أما بالنسبة للحيوانات التي تعاني من المغص النفاخي ظهر بها المصران الأعور والقولون بجدار رقيق مع غياب الثنايا المعوية ونقص في الحركة الدودية. الحيوانات التي تعاني من تخمة الأمعاء وجد بها كتله دائرية الشكل في المصران الأعور كما ظهر القولون بجدار رقيق مع غياب الثنايا المعوية ونقص في الحركة الدودية. وأيضا ظهرت بعض أجزاء الأمعاء ممتلئة بالسوائل والغازات. الحيوانات التي تعاني من انسداد في الأمعاء وجد امتلاء الصائم بالسوائل والأكل المهضوم. كما لوحظ غياب الثنايا المعوية والحركة الدودية.

الخلاصه: يمكن الحصول علي نتائج سريعه ومفيده عند استخدام الموجات فوق الصوتيه في الخيول المصابه بالمغص المعوي والتي يمكن استخدامها في التشخيص السريع وقياس درجه التحسن للوصول الي استجابه سريعه للعلاج. ايضاً يمكن استخدام اللاكتات لتحديد درجه التحسن في الخيول المصابه بالمغص المعوي.