Ultrasonographic findings in cows with left and right displacement of abomasum

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SUMMARY
The purpose of this study was to determine the position appearance of the abomasum of 20 displace of left and 15 right by ultrasonography. Thus, this investigation was also carried out to determine the clinical features of abomasal displacement.

The hair was clipped over the from 11th-12th intercostal spaces on the left side and the area was examined ventrally to dorsally with 3.5 MHz and 5MHz transducer held ventra-cranial to the ribs. The similar procedure has been done for right side. After than, the displace abomasum could be visualised from both sides either left or right flanks. The abomasum could be clearly differentiated from adjacent organs because of its contents, which appeared as a heterogeneous moderately echogenic structure with echogenic stippling. However, the wall of the abomasum appeared it at all as a narrow echogenic line. Parts of the abomasal folds were visible occasionally as echogenic structures within the abomasum. Slow movement of the feed in the abomasum was also often visualised.

This study shows that ultrasonography is a valuable supplementary technique for the assessment of the left and right displacement of abomasum.

KEY-WORDS : cows - abomasal displacement - ultrasonography.

RÉSUMÉ
Examen échographique des déplacements de la caillette chez la vache.
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Le but de cette étude était de déterminer par échographie la nouvelle position de l’abomasum de 20 vaches souffrant d’un déplacement à gauche et 10 vaches avec déplacement à droite. Cette investigation concernait les autres signes cliniques et paracliniques de cette pathologie.

Les poils ont été rasés dans les 11ème-12ème espaces intercostaux à gauche. Cette zone a été examinée de bas en haut à l’aide de têtes sonores de 3,5 MHz et 5 MHz tenues en avant des côtes. Un même protocole a été appliqué du côté droit. Ainsi l’abomasum a pu être visualisé des deux côtés, et être distingué des organes adjacents par son contenu moyennement échogène. Sa paroi est apparu sous la forme d’une mine ligne échogène. Quelques plis de la paroi étaient visibles de temps en temps. De même, le contenu était animé de mouvements lents, souvent visualisés.

Cette étude a montré que l’échographie est une technique supplémentaire valable de diagnostic de déplacements de la caillette.


Introduction
In cattle, diseases of abomasum are of great importance and include right and left displacement, torsion, impaction, pyloric stenosis and ulceration [4, 16]. Left or right displacement of the abomasum is one of the most important metabolic and organic internal disorders of cattle and the disease is most prevalent in high performing milk breeds [6, 19]. Left displacement of the abomasum in dairy cattle occurs when the cow’s abomasum moves from its normal anatomic location and becomes entrapped between the rumen and left abdominal wall. Right displacement of the abomasum twists in 2 planes: on its longitudinal axis and on its mesenteric or omental axis when abomasum moves from its normal anatomic location and becomes entrapped between liver/intestine and right abdominal wall [12, 19]. This difficulty emphasis the need for the investigation of alternative diagnostic techniques such as ultrasonography [2]. It was shown that an ultrasonographic examination should provide reliable information about the position of the abomasum, its contents and the condition of its wall and should make it possible to identify and assess any changes in adjacent structures such as the reticulum and the anterior dorsal blind sac and ventral sac of rumen and in the omasum, spleen and liver [2, 3]. The ultrasonographic appearance of the normal abomasum was recently described by WILD [20] and BRAUN et al. [4].
Left displacement of the abomasum (LDA) is a condition of dairy cows in which the abomasum becomes greatly distended with gas and fluid and assumes a position between the rumen and the left abdominal wall. Most cases require a surgical procedure the deflate the abomasum, return it to the right abdomen and secure it or the greater omentum to the abdominal wall [14]. Diagnosis is confirmed by simultaneous auscultation and percussion of the left abdomen over the 10th-13th ribs. If the abomasum is displaced and distended with gas, a tympanitic resonance identified as a metallic 'ping' sound is heard. Since LDA is most common in early lactation a period when serum calcium is unstable, hypocalcemia has also been considered a contributing factor [15].

Clinical and metabolic features of dilatation and right-side torsion of the abomasum in cattle have been described [12, 18]. The haematology electrolyte, and acid-base abnormalities usually associated with right displacement of the abomasum [8, 10]. Several different methods for the surgical correction or prevention of a left displacement of the abomasum have been proposed [11, 13, 17]. The most accepted methods which prevent a recurrence of the condition are, first, a right-sided laparotomy combined with a caudoventral omentopexy [1, 11].

The aim of this study was to describe the ultrasonographic appearance of the abomasum and to determine its position in left and right displacement of abomasum.

Materials and methods

A) ANIMALS

In this study, fifteen cows with tentative right abomasal displacement (RDA), twenty cows with tentative left abomasal displacement (LDA) and 10 healthy cows (after calving) weighing between 430-650 (Holstein Friesland) have been used as materials. Age of animals varied from 3 to 7 years. These animals were calved.

B) ULTRASONOGRAPHIC EXAMINATION OF THE ABOMASUM.

Ultrasonographic examinations were made on cows. A 3.5 MHz and 5 MHz sector transducer and real-time scanner (Pie-medical scanner 250) were used. The standing cows were examined. The hair over the region of the abomasum was dipped and remaining hair was removed. 10th and 13th intercostal spaces on the left/right side and the area was examined ventrally to dorsally with a 3.5 MHz, 5MHz transducer held ventra-cranially to the ribs. Transmission gel was applied to the transducer, and the cow was examined along the ventral midline and in the left and right paramedian regions.

The positions of the cranial and caudal margins of the abomasum were determined. The transducer was placed on the ventral midline and moved laterally to each side until the abomasum could no longer be imaged. The ultrasonographic images were stored electronically.

C) SURGICAL METHODS

Operation procedure have been preferred a modification of Dirksen [7]. Exploratory surgery was used to confirm the diagnosis and to correct the displacement. After surgery all the cows were hospitalised for 7 days. All cows recovered and went back to their herds when their appetites and digestion appeared to be normal.

Results

The abomasum could be visualised from the ventral midline and from both paramedian regions of 10 of the cows without displacement. Cows with LDA, the ultrasonographic findings were generally consistent. In the ventral region, the ruminal wall was visible as a thick echogenic line usually immediately adjacent to the abdominal wall (Fig.1). More dorsally, the rumen was displaced from the abdominal wall by the abomasum (Fig.2). But, ultrasonographic examination has not been succeed for two cases, the abomasal contents
FIGURE 2. — Ultrasonogram and schematic representation of left displacement of the abomasum imaged 12th intercostal space. 1 Abdominal wall, 2 Abomasum with hypoechogenic ingesta 3 Rumen.

FIGURE 3. — Ultrasonogram and schematic representation of right displacement of the abomasum imaged 12th intercostal space. 1 Abomasum with hypoechogenic ingesta 2 Right abdominal cavity.

FIGURE 4. — Ultrasonogram and schematic representation of right displacement of the abomasum imaged 12th intercostal space. An echogenic abomasal fold is visible in the hypoechogenic ingesta. 1 Abomasum with hypoechogenic ingesta 2 Right abdominal cavity.
did not appear uniform because, ventrally, there were fluid ingesta and dorsally. The ingest visible ventrally in the abomasum appeared hypoechoic in 33 of cows. Occasionally, the abomasal folds were visible as vague echogenic stripes. Displaced abomasum is easily accessible to ultrasonograph cows with RDA (Fig. 3). On the other hand, The ultrasonographic findings were clearly showed that liver was disappear in cows with RDA (Fig. 4). But, ultrasonographic examination show that liver will be seen in normal sites of right flank in control cows.

**Discussion and Conclusion**

The normal abomasum could be imaged approximately 10 cm caudal to the xiphoid process from the left and right para- median regions and from the ventral midline and than move of the abomasum was situated to the right of the ventral midline than to the left. These results are in agreement with BRAUN et al. [4, 5]. The position of the abomasum depends on the degree of ruminal filling and the stage of pregnancy [7]. It is important to differentiate between the passive movements of the abomasum associated with reticular contraction, the movements of abomasal ingesta and abomasal motility.

The results of this study indicate that the abomasum is easily accessible to ultrasonography, because it is situated immediately adjacent to the right/left abdominal wall as other [4, 5]. The displaced abomasum could be clearly differentiated from adjacent organs because of its contents, which appeared as a heterogeneous moderately echogenic structure with echogenic stippling. However, the wall of the abomasum appeared at all as a narrow echogenic line. Parts of the abomasal folds were visible occasionally as echogenic structures within the abomasum. Slow movement of the feed in the abomasum was also often visualised. The different layers of the abomasal wall is visualised ultrasonographically easily. It is also distinguished easily looking at movement of the thick feed particles and thick rumen walls. The abomasum could not be imaged from the left side of two cows. Therefore, it has been explained that the abomasum could not be visible ultrasonographically.

Cows with RDA, the abomasum is imaged easily from the right side. The right displaced abomasum could be clearly differentiated from other organs because of its contents, which appeared as a heterogeneous moderately echogenic structure. However, the wall of the abomasum appeared it at all as a narrow echogenic line. Displaced abomasum was seen dilated form. On the other hand, The ultrasonographic findings were clearly showed that liver was disappear in cows with RDA. But, ultrasonographic examination show that liver will be seen in normal sites of right flank in control cows. Therefore, It might be distinguished from others.

Treatment of LDA by right flank approach with fixation of the omentum has been reported on the basis of long term follow-up to be successful in 92 % of 21 cases [6]. Although this technique has the advantage of eliminating casting of the cow, the final position of the abomasum is probably less desirable physiologically than that achieved by the paramedian approach [9]. None of the animals was treated for left displacement of the abomasum again. All cows recovered and went back to their herds when their appetites and digestion appeared to be normal.

The results of this study have shown that ultrasonography is a valuable supplementary technique for the assessment of the abomasum, yielding information about its position and content. Even though, clinical and laboratory findings of abomasum displacement is necessary for diagnosis of abomasum displacement. Ultrasonography would be confirm the diagnosis.

**Bibliography**

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