Contrast substance radiography of the digestive tract in goats

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Abstract
The gastro-intestinal anatomy of the goat is well known (3). Using contrast substance like barium sulfate the examiner is able to identify changes in the gastro-intestinal mucosa, also being able to follow the gastrointestinal passage of the content.
***Keywords**: digestive tract, radiography, contrast, goat*

Introduction

Due to the increasing demand on the consumer market for products and by-products resulting from goats, the growth of this species has been increasing in recent years (1, 2).

The lack of information on growing and exploitation technology among goat breeders is increasing, generating pathological disorders with serious repercussions on the animal and implicitly on the profit obtained by the breeder (1, 4).

Considering that the digestive system is most frequently affected, it is our goal to highlight by radiological examination, with the help of contrast agents, the time taken by the digestive content from the level of the rumen to the elimination.

Material and method

The biological material used in the research was represented by a group of 5 goats aged between 1 and 3 years.

The goats studied are of the native breed - Carpathina - and the hybrid between the Carpathian and Saanen breeds belonging to private breeder.

The method of working consists in preparing the contrast medium with water, reaching a viscous consistency and administered orally, to the animal in different amounts depending on the size of the patient. After individual administration of the contrast agent, individual serial exposures were performed at different time intervals from exposure immediately after administration to 1 hour, 3 hours, 5 hours, 24 hours and 48 hours.

The work parameters have been adjusted for each case, depending on the size of each.

Exposure locations were different by performing latero-lateral exposure with the pacient standing or in lateral decubitus as well as dorsal exposures of patients.

Results and discussion

In the first case, a 1 year old male from the Charpatina breed, the contrast substance was administered in a single dose of 200 ml barium solution. The animal was restrained in standing position and lateral decubitus for the radiographic examination and the dose were of 103 kV with 25 mAs (fig. 1, fig. 2, fig. 3, fig. 4, fig. 5, fig 6, fig 7).

Fig.1 VD exposure after 200 ml barium ingestion (130 kV, 25 mAs)

Fig. 2 Latero-lateral exposure after 1 hour post contrast

Fig. 3 VD exposure after 3 hours from barium administration

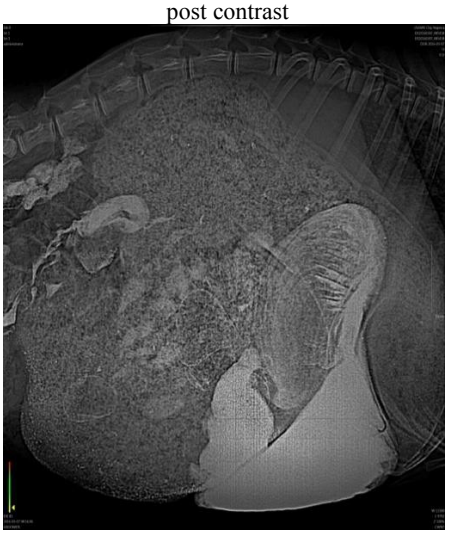

Fig. 4 Latero-lateral exposure at 5 hours post contrast

Fig. 5 Ventro-dorsal exposure at 24 hours post contrast administration

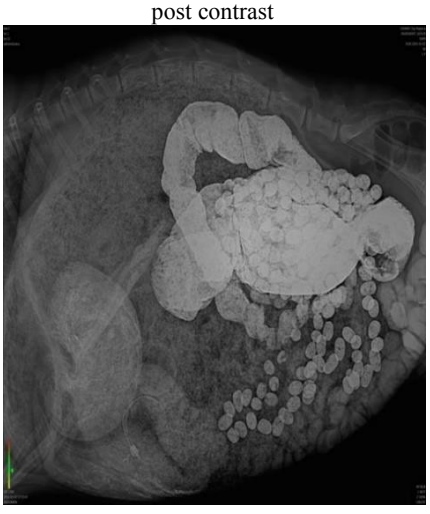

Fig. 6 Latero-lateral examination after 48 hours post contrast administration

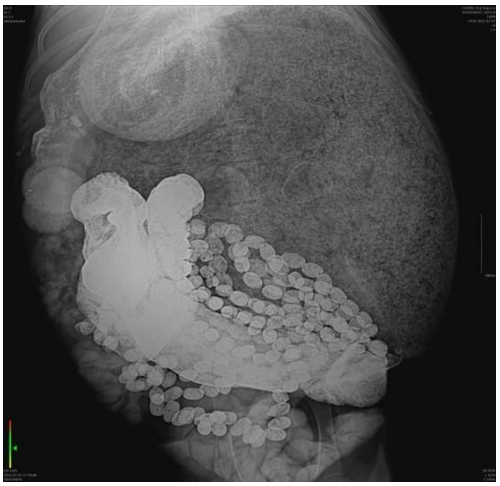

Fig. 7 VD exposure at 48 hours after contrast administration

For the second patient, the quantity of barium administered was 300 ml/animal and the parameters were of 106kV and 30 mAs. The third patient got 350 ml/ animal of barium and the exposures were made at 115 kV and 40 mAs. For the fourth patient, the barium quantity administered was of 400 ml and the exposures were made at 120 kV and 35 mAs.

For the last case taken in the study the barium quantity administered was 450 ml and the parameters used for exposure were 125 kV with 40 mAs.

One hour after administration, the contrast substance is almost entirely found in the reticulum, but we can very well observe both conducting the rest of the substance to the reticulum and passing the barium to the omasum (fig. 8, fig. 9).

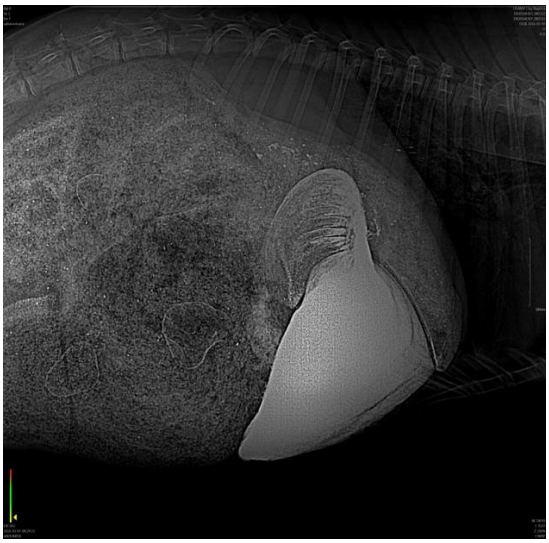

Fig. 8 Latero-lateral exposure at 1 hour after barium ingestion

Fig. 9 VD exposure at 1 hour after barium ingestion

At 3 hours, all of the substance is at the reticulum level, the omasum blades are well highlighted, as well as the abomasum structure that passes the content to the small intestines (fig. 10, fig 11).

In lateral exposure 5 hours after administration of the contrast substance, it is visible at all gastric levels except rumen (fig. 12, fig 13).

Fig. 10 Latero-lateral exposure at 3 hours after barium ingestion

Fig. 11 VD exposure at 3 hours after barium ingestion

Fig. 12 Latero-lateral exposure at 5 hours after barium ingestion

Fig. 13 VD exposure at 5 hours after barium ingestion

At 24 hours, the substance is still present, but with greater concentration on the small intestine (fig. 14, fig. 15).

At 48 hours, the substance is predominantly found in the large intestine and partially embedded in the faeces (fig. 16, fig. 17).

Fig. 14 Latero-lateral exposure at 24 hours after barium ingestion

Fig. 15 VD exposure at 24 hours after barium ingestion

Fig. 16 Latero-lateral exposure at 48 hours after barium ingestion

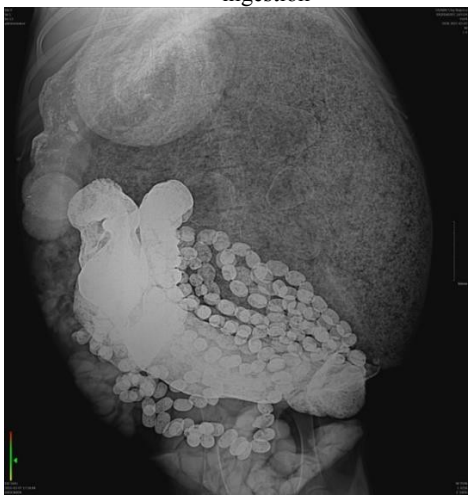

Fig. 17 VD exposure at 48 hours after barium ingestion

Conclusions

1. Barium sulfate doses ranging from 200-300 ml, provide good radioopacity to the digestive tract in goats.

2. Barium sulfate doses ranging from 350-400-450 ml / animal give excellent opacity for the radiographic view of the digestive tract in the goats, and can be used without restrictions in assessing digestive transit.

3. Dosing parameters (Kilovoltage and milliamperage) ranging from 106 - 110 kV and 30 - 32 mAs, provide good radiological imaging to interpret a possible diagnosis on the digestive tract.

4. Exposure parameters ranging from 115 - 120 - 125 kV and 35 - 40 mAs, give excellent radiological images capable of providing fine details about the entire digestive tract.

5. The exposure positions used (standing, latero-lateral and ventro-dorsal) are equally important in investigating digestive tract segments.

6. Exposure times at 1 and 3 hours after barium sulfate administration are excellent for visualization of transit across the reticulum, omasum and abomasum.

7. Exposures between 5 and 24 hours after administration are beneficial for the visualization of small and large intestines, and at 48 hours the radiological examination gives the possibility of investigating the rectum.

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