



Doppler Ultrasonographic Study of the Spleen in Live Post Natal Goats

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ABSTRACT

Background: The ultrasonograph of spleen in live goats were studied using a convex probe 2.5 to 5 MHz Colour Doppler Mylab onevet (e-saote) German Ultrasound Scanner in Veterinary Clinical Complex, Veterinary College and Research Institute, Namakkal.

Methods: The extent of spleen in live goats when examined by USG revealed differences from the usual gross anatomical observations made in the embalmed or exsanguinated goats. The parietal surface of spleen was in direct contact with the pulmonary diaphragm while the ventral visceral surface lay over the cranial part of dorsal sac of the rumen.

Result: The capsule was highly echogenic while the parenchyma consisted of numerous weak echoes distributed homogenously. The splenic vessels were anechoic with hyperechoic walls and appeared as longitudinal or cross sections. The greatest length was found at 11th intercostal space during the post-natal age of three to five months which was about 6 cm. The greatest length was found at 10th intercostal space during the post-natal age of eight to twelve months which was about 7 cm. The greatest length was found at 9th intercostal space during the post-natal age above one year which was about 9 to 15 cm. During the post-natal age above one year the smallest length was found to be behind the last rib which was about 4 cm in adult goats.

Key words: Goat, Spleen, Ultrasonography.

INTRODUCTION

The spleen is a secondary lymphoid organ of anatomic and functional component of reticuloendothelial system. The normal gross anatomical observations made in the embalmed or exsanguinated goats revealed that the spleen extended between 11th intercostal space to 13th rib in the first year of post-natal age whereas it extended between 9th rib to 13th rib during one to two years of post-natal age after which it extended beyond the last rib (13th rib) in the lumbo-costal angle. Therefore parietal surface of in-situ fixed adult spleen showed impressions of last four ribs. The ultrasonographic observations of spleen in live goats at different age groups were done using a convex probe 2.5 to 5 MHz Colour Doppler Mylab onevet (e-saote) German Ultrasound Scanner. The gross anatomy of location and extent of spleen were observed using USG. The study revealed differences from the usual gross anatomical observations made in the embalmed or exsanguinated goats.

MATERIALS AND METHODS

Apparently healthy goats with clear records of age from the Instructional Livestock Farm Complex (ILFC), Veterinary College and Research Institute, Namakkal were prepared for ultrasonographic study. One goat from each age groups (8 months, 14 months, 20 months, 26 months, 32 months, 39 months and 45 months) under study, thereby seven goats at different ages were prepared by shaving the skin on their left costal wall of the abdomen and flank. Goats were subjected to ultrasound study using a convex probe 2.5 to 5 MHz Colour Doppler Mylab onevet (e-saote) German Ultrasound Scanner. Ultrasonography was performed and

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the results were interpreted by the expert team in Veterinary Clinical Complex (VCC), Veterinary College and Research Institute, Namakkal.

RESULTS AND DISCUSSION

The convex probe of the ultra sound scanner was applied on the left abdominal wall and the margins of the spleen were visualized at 8th, 9th, 10th, 12th intercostal spaces and immediately caudal to the last rib. Dorsally the parietal surface of spleen was in direct contact with the pulmonary diaphragm while the ventral visceral surface lay over the cranial part of dorsal sac of the rumen (Fig 4). Similar observations were noticed by Acorda *et al.* (2009) who recorded the ultrasound features of spleen in one to three year old goats using a 3.5 MHz convex-array transducer. Whereas, the normal gross anatomical observations made in the embalmed or exsanguinated goats revealed that the

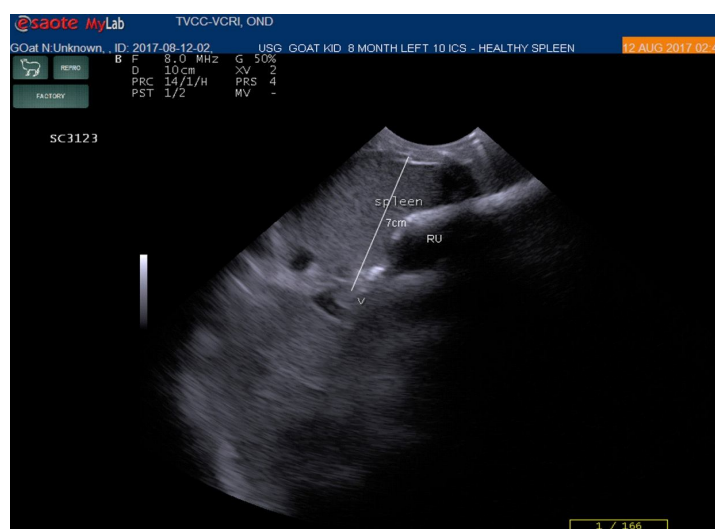


Fig 1: Ultrasonograph of spleen of 8 month old goat kid visualized at left 10th intercostal space.



Fig 2: Ultrasonograph of spleen of 2 year 6 month old goat visualized at left 11th intercostal space. A- Anterior Border, P- Posterior Border, D- Dorsal Border, V- Ventral Border, BV- Blood Vessels, RU- Ruman.

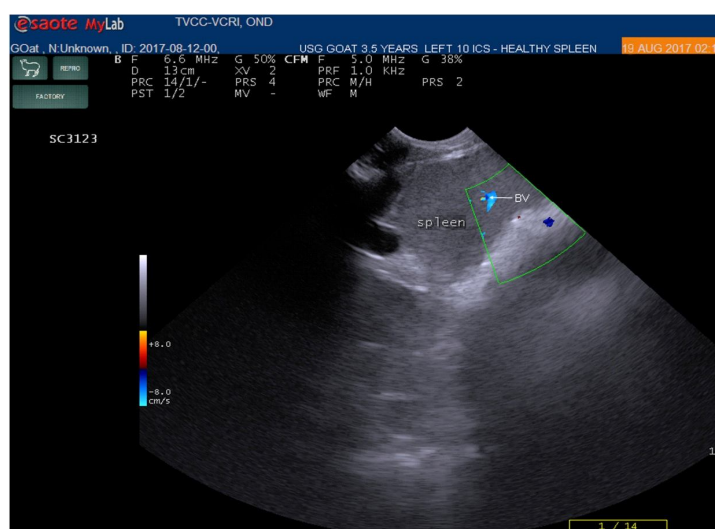


Fig 3: Ultrasonograph of spleen of 3 year 6 month old goat visualized at left 10th intercostal space. BV - Splenic Vessels.



Fig 4: Ultrasonograph of spleen of 8 month old goat kid visualized at left 12th intercostal space. RU - Ruman.

spleen extended between 11th intercostal space to 13th rib in the first year of post-natal age whereas it extended between 9th rib to 13th rib during one to two years of post-natal age after which it extended beyond the last rib (13th rib) in the lumbo-costal angle. Therefore parietal surface of in-situ fixed adult spleen showed impressions of last four ribs.

The capsule was highly echogenic while the parenchyma consisted of numerous weak echoes distributed homogenously. The splenic vessels were anechoic with hyperechoic walls and appeared as longitudinal or cross sections (Fig 3). Similar observations were noticed by Braun *et al.* (2013) in goats.

The greatest length was found at 11th intercostal space (Fig 1) during the post-natal age of three to eight months which was about 6 cm. The greatest length was found at 10th intercostal space during the post-natal age of eight to twelve months which was about 7 cm (Fig 4). The greatest length was found at 9th intercostal space during the post-natal age above one year (Fig 2) which was about 9 to 15 cm. During the post-natal age above one year the smallest length was found to be behind the last rib which was about 4 cm in adult goats. The ultrasonographic appearance and location of the spleen in thirty number of female Saanen goats were described by Braun and Steininger (2010) who scanned the intercostal spaces of left thoracic wall with a real-time ultrasound machine (Hitachi EUB 8500) with a 5.0 MHz linear transducer in standing goats. The margins of the spleen were visualized at 8th, 9th, 10th, 12th intercostals spaces and immediately caudal to the last rib. They revealed that the greatest length was found at 8th intercostal space which was about 20 cm and the smallest length was found to be behind the last rib which was about 7 cm in adult goats.

CONCLUSION

The spleen in goats showed greatest length at 11th intercostal space during the post-natal age of six months which was about 6 cm. The greatest length was found at 10th intercostal space during the post-natal age of twelve months which was about 7 cm. The greatest length was found at 9th intercostal space during the post-natal age above one year which was about 9 to 15 cm. During the post-natal age above one year the smallest length was found to be behind the last rib which was about 4 cm in adult goats. The gross anatomy of spleen in exsanguinated, embalmed or slaughtered goats revealed that the posterior extent was at 12th intercostals space. But when studied using ultrasound in live goats, the posterior end of spleen extended beyond the last rib which may be attributed to the storage of blood in the organ.

REFERENCES

- Acorda, J.A., Ancheta, M.N., Detera, M.A.J., Cabrera, L.A. and Maligaya, R.L. (2009). Comparative ultrasound features and echo histograms of the spleen in female goats, sheep and buffaloes. *Philippines Journal of Veterinary and Animal Science*. 35(2): 135-146.
- Braun, U. and Steininger, K. (2010). Ultrasonographic examination of the spleen in goats. *Schweiz Archiv fur Tierheilkunde*. 152(10): 477-481.
- Braun, U., Jacquat, D., Steininger, K. (2013). Ultrasonographic examination of the abdomen of the goat. II. Liver, spleen, urinary tract and greater omentum. *Schweiz Archiv fur Tierheilkunde*. 155(3): 185-195.