Haryana Vet. (Dec., 2017) **56 (2),** 135-137

Research Article

POST-NATAL DEVELOPMENTAL CHANGES OF OMASUM AND ABOMASUM IN BUFFALO CALVES

NEERAJ ARORA[1*], S.M. BEHL[1], PREM SINGH[1], RISHI TAYAL[1] and R.K. CHANDOLIA[2]
[1]Department of Veterinary Surgery and Radiology, [2]Department of Veterinary Gynaecology and Obstetrics, College of Veterinary Sciences, Lala Lajpat Rai University of Veterinary and Animal Sciences, Hisar

ABSTRACT

In the present study postnatal developmental changes in the omasum and abomasum were studied by ultrasonography in six apparently healthy male buffalo calves. The study started from the 15 days of age till four months of age. No pathological changes were observed during scanning of all these buffalo calves. At 15 days of age, the omasum was seen between 7th and 8th intercostal space on right side of the abdomen as an elliptical structure while the abomasum was seen just behind the xiphoid process, situated more towards right side of the abdominal wall and appeared as a sac like structure. The wall of abomasum was seen as a hyperechoic arc like structure. Ultrasonography appeared to be a good imaging technique for recording of developmental changes of omasum and abomasum in buffalo calves.

Key words: Buffalo ultrasonography, omasum, abomasum.

Omasum and abomasum are the major components of compound stomach in bovines. The omasum is ellipsoidal in shape and situated towards right side of the abdomen between 8th and 11th intercostal space and acts like a churning machine in bovine's stomach. The main functions of omasum are absorption of water and to dissolve minerals and short chain fatty acids. The abomasum is an elongated sac like structure which is situated on the abdominal floor. When a calf is born, the abomasum is the biggest in size as compared to other components of compound stomach i.e. rumen, reticulum and omasum of bovines. The abomasum produces acids and some enzymes which help in digestion. The main content of omasum and abomasum at early stages of life is fluid, hence ultrasonography was carried out starting from day 15 of age and then at 1st, 2nd, 3rd and 4th months.

MATERIALS AND METHODS

The present study was conducted on six apparently healthy male buffalo calves weighing approximately 60-90 kg. Normal post-natal developmental changes of omasum and abomasum were studied in these calves. All calves were procured locally. Ultrasonography of omasum and abomasum in these calves was conducted at day 15 day of age and then at one month, two months, three months and four months of age. The calves were restrained in standing position without giving any anaesthesia. For scanning of omasum, 7th – 12th intercostal space was shaved on right side, while for abomasum ventral mid line caudal to xiphoid was prepared, washed, cleaned and ultrasound gel was applied liberally. Ultrasonographic images of both organs were taken using Famio 8 (Toshiba, Japan) ultrasound machine in real time B mode and B+M mode with 3.5 MHz curvilinear probe. Scanning of omasum and abomasum was done as per the procedures described by Braun and Blessing (2006), Mohindroo (2008) and Braun *et al.* (1997). The dorsal and ventral limits of omasum and cranial and caudal margins of abomasum were measured by using in-built calibers in the ultrasound machine.

*Corresponding author: drneerajsurgery@gmail.com

RESULTS AND DISCUSSION

At 15 days of age, the omasum was observed between 7th and 8th intercostal space as an elliptical structure. The main diet of calves was milk so majority of ultrasonic waves were absorbed and content of omasum appeared anechoic. Some ultrasound waves formed moderate echo so wall of omasum and omasal laminae appeared as hyperechoic structures. Mean omasal wall thickness was 2.1 mm. Image of liver was also seen near to dorsal border of omasum (Fig. 1). The dorsal and ventral limits of omasum were 8.5±1.21 cm and 7.2±1.09 cm, respectively (Table 1). Size of omasum was very small and the horizontal and vertical limits were 52 mm and 89.4 mm, respectively. In one calf at day 15 of age, abomasum was seen just behind the xiphoid process, situated more towards right side of abdominal wall. Abomasum appeared sac like and its wall appeared as a hyperechoic arc like structure (Fig. 2). The average wall thickness of abomasum was 4.6 mm. The abomasal contents were anechoic in nature. The cranial and caudal

Table 1

Mean±SE of dorsal and ventral margins of omasum in buffalo calves (n=6)

Age	Omasal limits	
	Dorsal	Ventral
15 days	8.5±1.21 cm	7.2±1.09 cm
1 month	9.2±0.98 cm	7.6±1.87 cm
2 month	10.4±1.25 cm	8.0±2.59 cm
3 month	12.5±1.54 cm	10.9±2.38 cm
4 month	15.6±2.37 cm	12.3±1.98 cm

Table 2

Mean±SE of cranial and caudal margin of abomasum in buffalo calves (n=6)

Age	Abomasal limits	
	Cranial	Caudal
15 days	3.5±1.62 cm	10.4±1.53 cm
1 month	4.2± 1.43 cm	11.4±1.68 cm
2 month	5.1± 1.29 cm	12.5± 2.76 cm
3 month	4.9±1.08 cm	13.7±2.43 cm
4 month	5.4± 2.76 cm	15.8± 2.94 cm

margins of the abomasum were 3.5±1.62 cm and 10.4±1.53 cm, respectively.

At one month of age, the anatomical position of omasum did not change and it was seen between 7th and 8th intercostal space on the right side of the abdomen. Omasum appeared as a semicircular structure with hyperechoic wall. Mean omasal wall thickness was 3.6 mm. At this stage omasal laminae were clearly observed and appeared as small hyperechoic round structures (Fig. 3). Omasal laminae were easily differentiated from omasal contents which were observed as anechoic structure. The dorsal and ventral limits of the omasum were 9.2±0.98 cm and 7.6±1.87 cm, respectively.

At 2nd, 3rd and 4th months of age, omasum was seen between 8th and 9th intercostal space while the anatomical position of abomasum did not change (Fig. 5-10) Contents of the omasum and abomasum at these stages appeared hypoechoic and anechoic, respectively (Fig. 6, 8 and 10) because at these stages in addition to milk some feed was also given to calves. Dorsal and ventral limits of omasum and cranial and caudal margins of abomasum were measured in all buffalo calves. Omasal and abomasal limits increased with advancing age.

At one month of age, abomasum was seen just behind the xiphoid process as sac like structure. The wall of the abomasum was seen as hyperechoic structure with anechoic contents (Fig. 4). Similar findings were reported by Braun and Gautschi (2013).

In adult buffaloes, omasum was scanned from 8th to 11th intercostal space and it appeared as a semicircular structure with arc like hyperechoic wall (Braun and Blessing, 2006). Mean wall thickness of omasum was found 4.3mm. Omasal laminae were not appreciated in all the buffaloes. Active churning motility was seen in all the buffaloes. Omasum of healthy buffalo has also been reported to have regular cyclic contractions which were less prominent in healthy cows as suggested by Udehiya (2007), Mohindroo *et al.* (2008), Singh (2008) and Athar (2009). At 4 months, the abomasum was scanned from ventral abdominal region, caudal to xiphoid process (approx. 10 to 15cm). Abomasal wall appeared as an echogenic line adjacent to the abdominal wall. The mean wall thickness of the abomasum was 4.0 mm. Abomasal contents in all the animals were heterogeneous in nature. Similar findings were also observed by Braun *et al.* (1997). In the present study, abomasal contractions were observed in all the animals and abomasal contents appeared as hypoechonic stripping. Contractions of the abomasal wall and feed were observed in all the buffaloes. Dyce *et al.* (1996) observed forceful peristalsis contractions confined to pyloric part of abomasum. The present study concluded that just after birth the calves are usually reared upon milk and at this stage ultrasonography may effectively play an important a role to image post-natal developmental changes of omasum and abomasum.

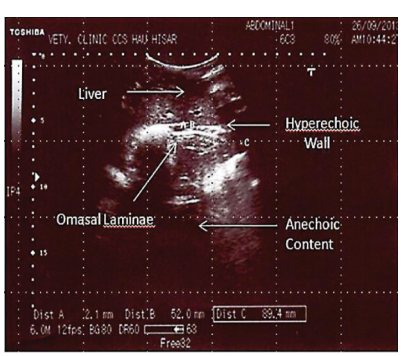

Fig 1: Normal ultrasonogram of omasum at 15 days of age.

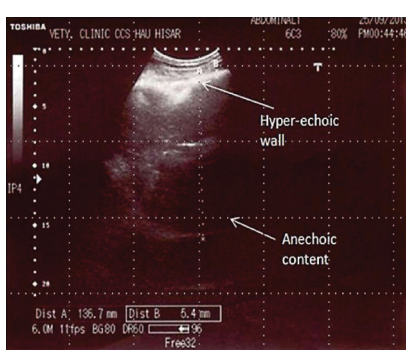

Fig 2: Normal ultrasonogram of abomasum at 15 days of age

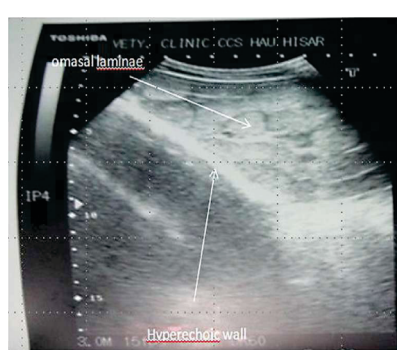

Fig 3: Normal ultrasonogram of omasum at 1 month of age.

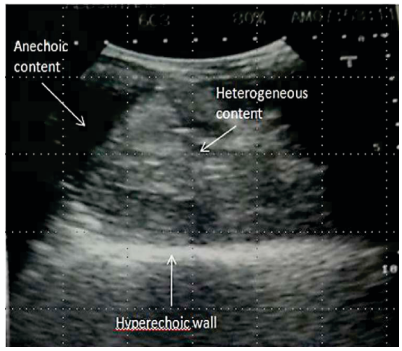

Fig 4: Normal ultrasonogram of abomasum at 1 month of age.

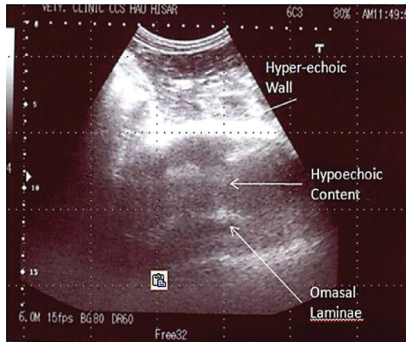

Fig 5: Normal ultrasonogram of omasum at 2 months of age.

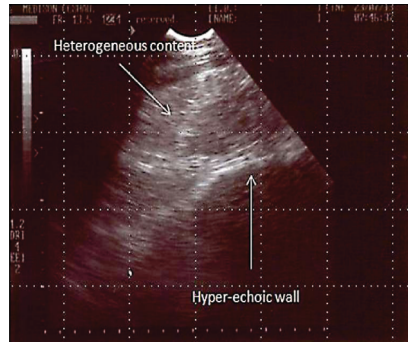

Fig 6: Normal ultrasonogram of abomasum at 2 months of age.

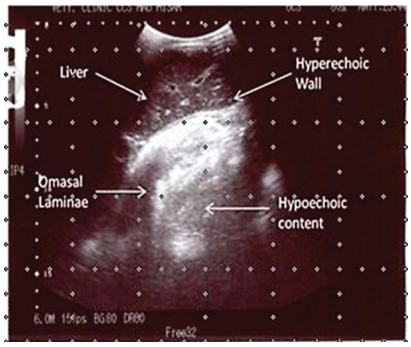

Fig 7: Normal ultrasonogram of omasum at 3 months of age.

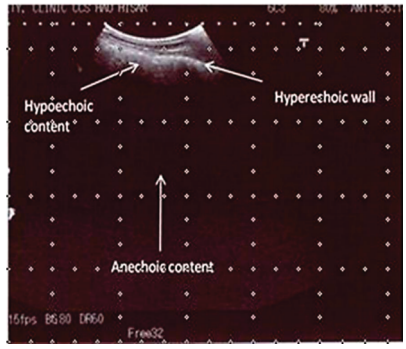

Fig 8: Normal ultrasonogram of abomasum at 3 months of age.

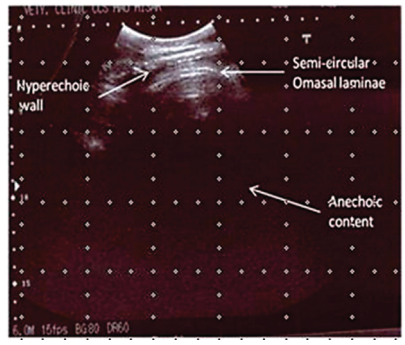

Fig 9: Normal ultrasonogram of omasum at 4 months of age.

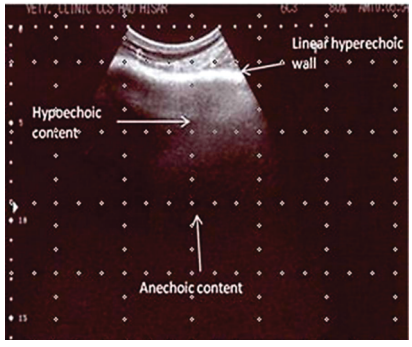

Fig 10: Normal ultrasonogram of abomasum at 4 months of age.

REFERENCES

Athar, H., Mohindroo, J., and Singh, T. (2009). Ultrasonographic features of omasal impaction in bovines. *Indian J. Vet. Surg.* **30**: 115-116.

Braun, U. and Blessing, S. (2006). Ultrasonographic examination of the omasum in 30 healthy cows. *Vet. Rec.* **159:** 812-15.

Braun, U. and Gautschi, A. (2013). Ultrasonographic examination of the forestomachs and the abomasum in ruminal drinker calves. *Acta Vet. Scandinavica* **55**: 3-8.

Braun, U., Wild, K. and Guscetti, F. (1997). Ultrasonographic examination of the abomasum of 50 cows. *Vet. Rec.* **140**: 93-98.

Dyce, K.M., Sack, W.O. and Wensing, C.J.G. (1996). Text Book of Veterinary Anatomy. (3rd edn.), Elseviers, Pennsylvania.

Mohindroo, J., Kumar, A., Sangwan, V., Udehiya, R. and Singh, S.S. (2008). Ultrasonographic evaluation of omasum in cows and buffaloes. *Vet. Radiol. Ultrasound.* **49**: 295-299.

Singh, S. (2008). Ultrasonographic evaluation of bovine reticulum, omasum and abomasum in healthy and diseased animals. M.V.Sc. Thesis, Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.

Udehiya, R. (2007) Evaluation of ultrasonography as a diagnostic tool for reticulo-omasal disorders in bovines. M.V.Sc. thesis. Guru Angad Dev Veterinary and Animal Sciences University, Ludhiana, India.