

Ultrasonographic Assessment of Buffalo's Spleen before and after Caesarean Section in Relation to Survival Rate

Ajit Verma^{1*}, R. K. Chandolia², Rakesh Kumar³, Nitin Soni⁴, Sandeep Kumar⁵, Anand Kumar Pandey⁶ and Sonu Kumari⁵

¹Ph.D. Scholar, Deptt. of Veterinary Gynaecology & Obstetrics, COVS, LUVAS, Hisar

²Professor, Deptt. of Veterinary Gynaecology & Obstetrics, COVS, LUVAS, Hisar

³Veterinary Surgeon, Deptt. of Animal Husbandry and Dairying, Haryana, India

⁴M.V.Sc. Scholar, Deptt. of Veterinary Gynaecology & Obstetrics, COVS, LUVAS, Hisar

⁵Assistant Professor, Deptt. of Veterinary Gynaecology & Obstetrics, COVS, LUVAS, Hisar

⁶Assistant Professor, Deptt. of Veterinary Clinical Complex, COVS, LUVAS, Hisar

*Corresponding Author E-mail: soniajit6@gmail.com

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ABSTRACT

Ultrasound has been an ideal diagnostic tool in bovine practice because of its rapidness and non-invasiveness. Spleen has been considered a mysterious organ since classical times and is responsible for blood filtration, recycling iron, antibodies production and induction of immune responses in the body. Ultrasonography can provide information regarding changes in vital organ to predict survivability of buffaloes undergoing caesarean sections. The finding of present study indicates that spleen ultrasonography is not useful for predicting survivability of buffaloes undergoing caesarean section.

Key words: Buffalo, Caesarean section, Spleen, Ultrasonography and Survival rate.

INTRODUCTION

Ultrasound has been an ideal diagnostic tool in bovine practice because of its rapidness and imaging of soft tissues in non-invasive manner. Ultrasound has been used in diagnosis of various gastrointestinal disorders in cattle e.g. traumatic reticuloperitonitis, left and right displacement of the abomasum, ileus of the small intestine and dilatation and displacement of the caecum by Braun¹ and traumatic reticuloperitonitis, diaphragmatic hernia and

perireticular abscess in buffaloes by Abouelnasr².

The spleen has been considered a mysterious organ since classical times³. The spleen is the main filter for blood-borne pathogens and antigens, as well as a key organ for iron metabolism. Its importance in filtering the blood is best illustrated by the example that asplenic human individuals due to infections have a 50-fold higher risk of developing sepsis and meningitis⁴.

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Spleen is also responsible for recycling iron, antibodies production, storage of erythrocytes, phagocytosis of aged erythrocytes and induction of adaptive immune responses in the body⁵. However, neither pathognomonic signs of splenic diseases nor specific laboratory test are available for evaluating spleen functions in buffaloes.

Caesarean section is considered as a routine obstetric technique performed on dystocia affected buffaloes at referral centers. The success rate of operated buffaloes depends upon the overall health of the internal organs and various other factors. However, the prognosis of the case can't be predicted with certainty in routine due to lack of established values of various parameters which affects prognosis of case.

Given the importance of ultrasound as an ideal diagnostic tool for soft tissue imaging and role of spleen in storage and destruction of red blood cells therefore, the present study was designed to assess ultrasonographic images of spleen of buffaloes before and after caesarean and to correlate ultrasonographic observations with survival rate of buffalo undergoing caesarean section.

MATERIAL AND METHODS

The ultrasonography was performed on 13 buffaloes after taking case history and diagnosis of dystocia before the start of caesarean section (0 h), after 12 and 24 hours of caesarean (24 h). Ultrasonography was conducted using Toshiba Nemio-XG 3D ultrasound machine. The animals were kept in chute. No sedation was given to animals for ultrasonographic studies. The area between 11th to 9th intercostals space on left side of the thorax was shaved for ultrasonography of spleen. Ultrasound gel supplied by Medicone enterprises (Chennai) were utilized for the study. Sonography image capture and management system (Cutesono, Global softwares, Jaipur) installed in the computer attached to the ultrasound machine was used for the recording purposes and subsequent re-evaluation. The brightness and contrast were adjusted to get clear images. The near and far

gains were adjusted according to the requirement to check the details of the images. Good, clear images were frozen and saved in the machine itself for the offline analysis. Pixel values of spleen were measured with the help of adobe photoshop software after obtaining saved image of spleen from ultrasound machine. Post caesarean section animals were divided into two groups. First group included animals which survived after caesarean section and second group included the animals which couldn't survive after caesarean section.

Statistical analysis

The results are presented as mean \pm SE. One way ANOVA and Independent sample t- test was employed to see the difference within group at different time interval and at same time interval between two groups, respectively. All the statistical analysis was carried out by using SPSS 16.0 software program for windows. The 5% ($P < 0.05$) difference was considered as significant.

RESULTS AND DISCUSSION

The measurements of pixel values of spleen obtained are shown in table 1, figure 1 and 2. The pixel value of spleen ranged 26.27 to 83.05 pixels. The mean pixel values of spleen in animals of group 1 (figure 3) were 48.11 ± 9.4 (before caesarean section), 44.6 ± 3.6 (12 hour post caesarean operation) and 42.8 (24 hour post caesarean section,) and in animals of group 2 (figure 4) were 43.75 ± 5.99 (before caesarean section), 45.73 ± 4.89 (12 hour post caesarean operation) and 44.62 ± 5.59 (24 hour post caesarean section) respectively. There was no significant ($P > 0.05$) variation in pixel values between animals of both groups before caesarean section and up to 24 hours post caesarean section. Pixel values of spleen did not vary significantly ($P > 0.05$) between animals those survived and died. There are no parallel reports in literature to confirm or refute our findings as ultrasonographic features of spleen; liver and kidney have been reported only for defining extent of spleen in buffaloes^{6,7,8}. Since spleen plays an important role particularly for storage of RBCs and their

destruction at ageing⁵, so it was expected that there might be some changes in echo value (pixel) of splenic parenchyma. However, in the current study no major variation in pixel values of spleen were observed which may be due to short period of observation as Constante

and Acorda⁸ have stated that splenic-echo values changes with change in physiological status of animals which can be easily assessed by pixel value splenic parenchyma in long term.

Table 1: Measurements of Pixel values of spleen (mean \pm SE) of animals survived and died

Groups	0 hr.	12 hr.	24 hr.
Pixel value of spleen in group 1 (survived)	48.11 \pm 9.4	44.6 \pm 3.6	42.5 \pm 4.1
Pixel value of spleen in group 2 (died)	43.75 \pm 5.99	45.73 \pm 4.89	44.62 \pm 5.59

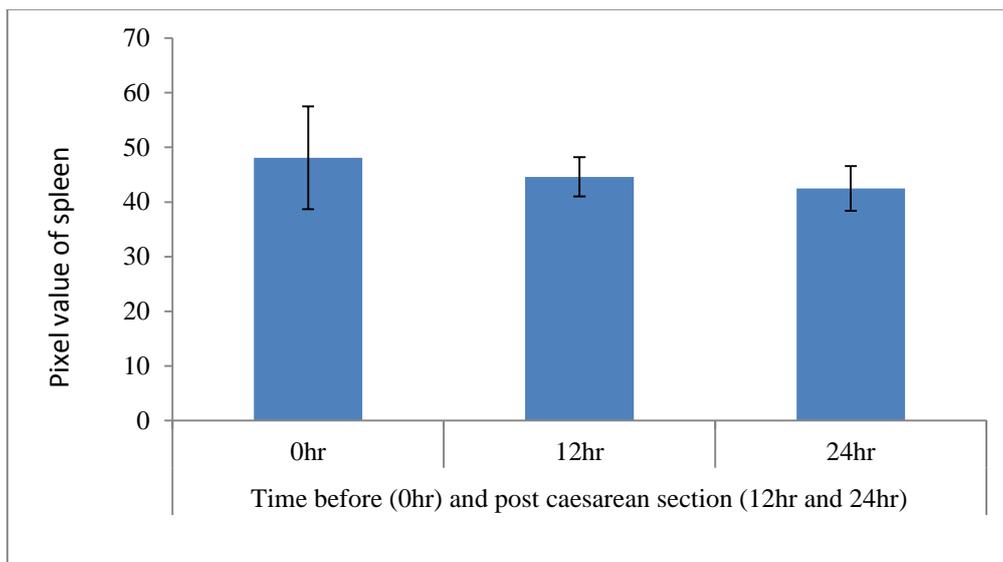


Figure 1: Measurements of pixel values (mean \pm SE) of spleen of group 1 animals (survived)

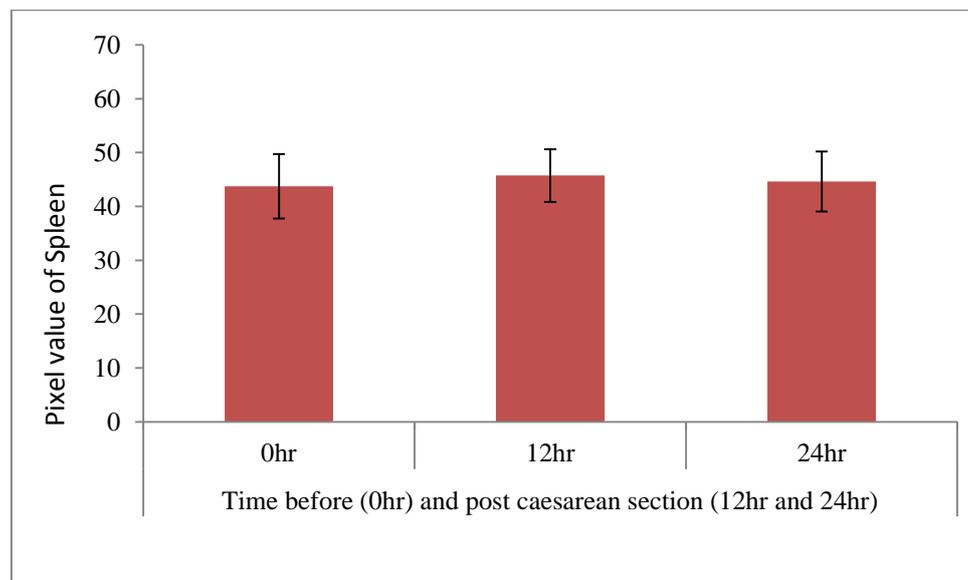


Figure 2: Measurements of pixel values (mean \pm SE) of spleen of group 2 animals (died)

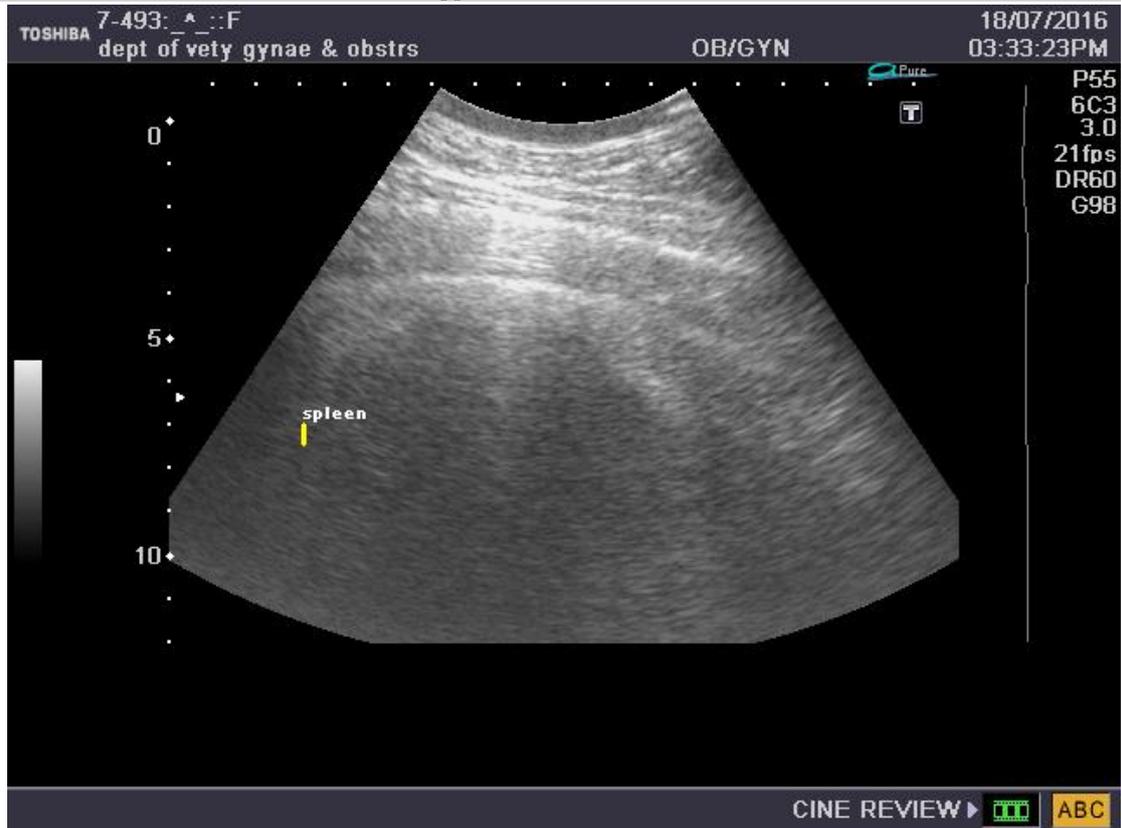


Figure 3: Ultrasonogram of animal from group 1 (survived)

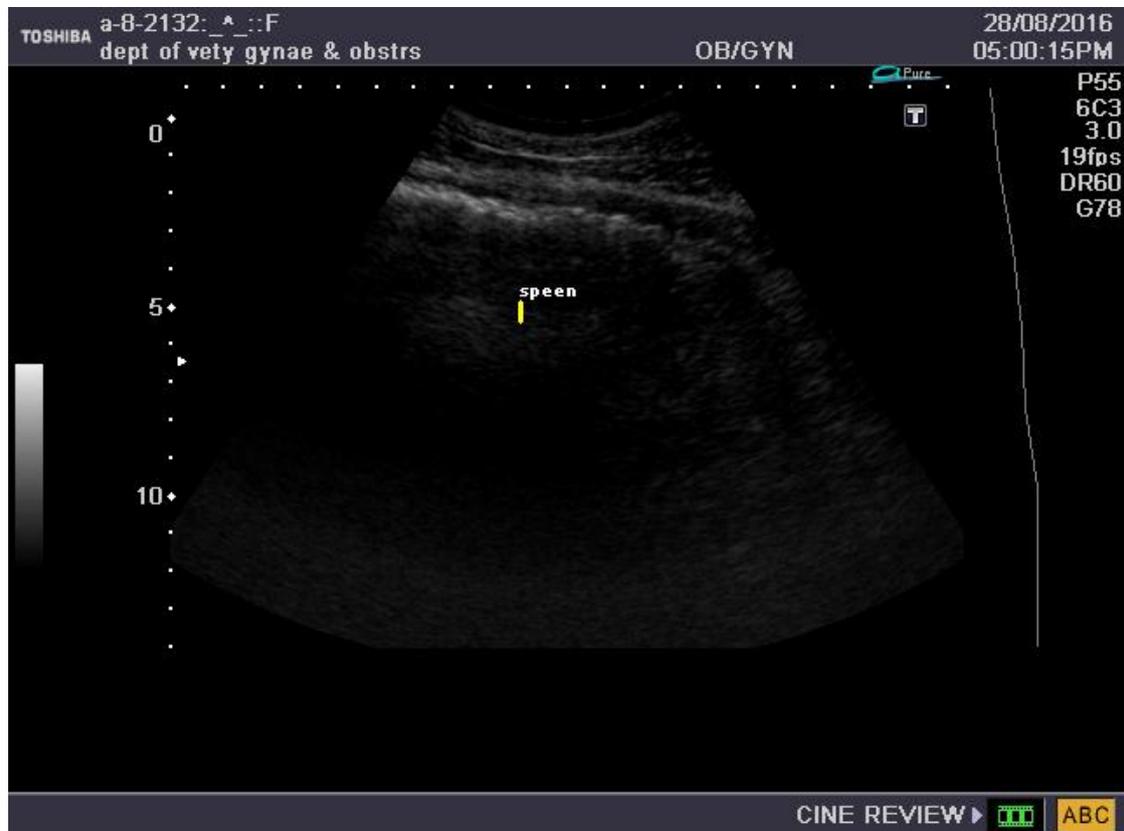


Figure 4: Ultrasonogram of animal from group 2 (died)

CONCLUSION

Pixel values of spleen through ultrasonography cannot be a parameter to predict the survivability of animals undergoing caesarean section.

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