

Analysis of Serum Ascites Albumin Gradient Test in Ascitic Dogs

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Abstract

The aim of the study was to evaluate Serum Ascites Albumin Gradient (SAAG) in ascitic dogs. Study was conducted at Referral Veterinary Poly Clinic, Indian Veterinary Research Institute, Izatnagar. Sick dogs were brought with clinical signs suggestive of distended abdomen and inappetance. General clinical examination, biochemical, ultrasound examination, abdominocentesis and peritoneal fluid examination were performed. Spitz dogs had more incidences of ascites followed by Labrador Retrievers. Male dogs had more incidence than female dogs and most ascites were noticed in 4-5 years aged dogs. Mean \pm SE of serum ascites albumin gradients (SAAG) are 1.793 ± 0.185 . SAAG can be used as a screening test in ascetic due to chronic liver disease.

KeyWords: Ascites, liver cirrhosis, SAAG, Transudate.

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Introduction

Ascites is defined as the abnormal accumulation of fluid inside the peritoneal cavity (Das *et al.*, 1998). Earlier ascites was classified as transudative and exudative based on the total protein concentration of the ascetic fluid. Ascites is now being classified as "high gradient" and "low gradient" based on the serum ascites albumin gradient (SAAG) Burgess (2004). The SAAG is based on oncotic hydrostatic balance. Portal hypertension results in an abnormally high hydrostatic pressure gradient between the portal bed and the ascitic fluid. There must be a similarly large difference between ascitic fluid and intravascular oncotic pressure than other proteins. The difference between serum and ascitic fluid albumin concentration correlates directly with portal pressure.

Difference between serum albumin and ascitic fluid albumin is ≥ 1.1 g /dl it is called high gradient ascites, whereas if the difference is ≤ 1.1 g/dl it is termed as low gradient ascites (Burgess, 2004). SAAG considered as a marker of portal hypertension and the use of this index to replace the exudates- transudate concept in ascitic fluid (Tan and Lapworth, 2010).

Considering all these factors the present study was undertaken with the objective to evaluate Serum Ascites Albumin Gradient (SAAG) in ascitic dogs.

Materials and Methods

Ethical approval: The study has been conducted in clinical cases and no such experimental model has been created / used in this study. The peritoneal fluid was collected aseptically following standard procedure as per CPCSEA norms in all the clinical cases under the study. The biological / peritoneal fluid if was collected, that was for better scientific diagnosis and to alleviate the abdominal discomfort/ dyspnoea of the animal. it is also routine clinical procedure on emergency. Ascites need emergency treatment if condition is so severe and peritoneocentesis is one of the remedy.

The study was conducted at Referral Veterinary Poly clinic (RVP), Indian Veterinary research Institute (IVRI), Izatnagar during the period of March to August 2010. Sick dogs that were brought to Small Animal Clinic Out-Patient Medical Unit, with clinical signs suggestive of inappetance and distended abdomen.

The examinations were performed as follows: history and clinical examination, abdominal ultrasound examination (Nyland and Mattoon, 2002) and biochemical, abdominocentesis (Rudloff, 2005) and peritoneal fluid examination (Alleman, 2003). The fluid collected from the peritoneal cavity was evaluated for colour, turbidity, specific gravity and total protein. The serum ascites albumin gradient

Table.1 Mean \pm SE of Biochemical parameters in Ascitic fluid and serum sample of same dog

| S.No | Parameters | Mean \pm SE | |
|------|----------------------|---------------------|-------------------|
| | | Serum | Ascitic fluid |
| 1. | Total protein (g/dl) | 4.208 \pm 0.245 | 0.770 \pm 0.086 |
| 2. | Albumin (g/dl) | 2.089 \pm 0.195 | 0.296 \pm 0.057 |
| 3. | Globulin (g/dl) | 2.119 \pm 0.259 | 0.473 \pm 0.099 |
| 4. | A: G ratio | 1.212 \pm 0.230 | 1.024 \pm 0.378 |
| 5. | SAAG | 1.793 \pm 0.185** | |

** Serum-Ascites albumin gradient (SAAG) (g/dl) \geq 1.1g/dl is considered as high gradient ascites.
Serum-Ascites albumin gradient (SAAG) (g/dl) $<$ 1.1g/dl is considered as low gradient ascites.

(SAAG) was calculated by subtracting the albumin concentration of the ascitic fluid from the albumin concentration of a serum specimen obtained on the same day (Burgess, 2004).

Results and Discussion

Total number of dogs brought to medicine unit RVP IVRI irrespective of nature of diseases was 2754 during the study period. Out of these ten (0.36 per cent) were observed to have ascites dogs. Spitz dogs had more incidences of ascites (seven dogs), followed by Labrador Retrievers (two dogs) and non-descriptive dog (one dog) were recorded. This may be more population of Spitz dogs in and around Bareilly. Male dogs (six dogs) had more incidence than female dogs (four dogs) and most of the ascites were noticed in 4-5 years aged dogs (5dogs) followed by 2-4 years (3 dogs) and more than 5 years of aged dogs (2 dogs). Male dog incidence could be due to the higher proportion of male dogs in the population and the preference of pet owners to male dogs.

The clinical signs of anorexia, lethargy and distended abdomen were observed in all the dogs. This clinical signs are non specific because the causes of ascites were variable. But these signs were correlated with Mayer (2005) findings in signs of liver disease. Physical examination revealed fluid thrill in the abdominal palpation. All the affected dogs in abdominal ultrasound examination revealed anechoic areas and hyper echoic/cirrhotic liver was noticed in five dogs. Abdo-minocentesis was performed in all the cases and ascitic fluid was collected according to the size of the animal as per standard procedure (Rudloff, 2005). Ascitic fluid examination revealed clear watery transuded in all the dogs.

The mean \pm SE of serum and ascites fluid specific gravity, total protein, albumin, and globulin and A: G ratio of ascites dogs are given in table 1. Steiner (2008) reported the characteristic features of transudate are clear and colourless pure transudate, specific gravity below 1.016 and low protein concentration ($<$ 2.5 g/dl). Transudate that forms as a result of

low osmotic pressure usually had a low protein concentration. These findings were correlated with this study. Hypoproteinemia and hypoalbuminemia was noticed due to low osmotic pressure caused by inadequate albumin synthesis in severe liver disease, excessive protein loss, maldigestion, malabsorption and starvation (Tantis, 2004).

In the present study, mean \pm SE of serum ascites albumin gradients (SAAG) are given in table 1. All the ascites affected dogs having the Serum Ascites Albumin Gradient (SAAG) more than 1.1g/dl (\geq 1.1g/dl). This could be suggestive of high gradient ascites. Portal hypertension results in an abnormally increased hydrostatic pressure between the portal bed and the ascitic fluid. These findings were correlated with Beg *et al.* (2001) and Burgess (2004) who said that more than 1.1 g/dl of SAAG are directly related with portal pressure. High SAAG were noticed in cirrhotic liver, cardiac failure, Portal-vein Thrombosis and hepatic failure (Das *et al.*, 1998).

Conclusion

The serum-Ascites albumin gradient provided better discrimination between ascites due to chronic liver diseases from other origin of ascites. Hence, SAAG $>$ 1.1 g/dl is suggestive of the presence of portal hypertension, it could be due to chronic liver disease and also these findings were correlated with Ultrasonography of hyper echoic/ cirrhotic liver in ascites dog. Serum-Ascites Albumin Gradient (SAAG) can be used as a screening test in ascetic due to chronic liver disease.

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Conflict of interest

Authors declare that they have no conflict of interest.

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