IOSR Journal of Dental and Medical Sciences (IOSR-JDMS)
e-ISSN: 2279-0853, p-ISSN: 2279-0861.Volume 18, Issue 6 Ser. 14 (June. 2019), PP 62-64
www.iosrjournals.org

Assessing the Reliability of Point of Care Dipstick for Ascitic Fluid: Comparing With Serum Ascites Albumin Gradient (SAAG) For Determining Ascitic Fluid as Exudates or Transudate.

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Abstract –*Ascitic fluid accumulation in peritoneal cavity is a common problem in Indian scenario manifesting in varied diseased conditions ranging from tuberculosis to liver cirrhosis including carcinogenic conditions. The clinical scenario changes depending on the nature of exudative or transudative ascitic fluid. Introduction of easy point of care kits have helped the clinicians to decide treatment without delay. Objective- To compare the available point of care diagnostic dipstick with the SAAG for deciding its reliability Methodology – Patients admitted in AIIMS Raipur in surgery and medicine with presence of ascitic fluid in their peritoneal cavity were chosen using a cross sectional study design . Point of care dipstick was compared with gold standard SAAG based on albumin values of venous blood and ascitic fluid for classifying ascitic fluid as transudate or exudate. Results Patients were of mean age 52.11 ± 12.21 for both genders totaling 68 patients in all. A total of 42 (61.8%) had high ascitic fluid protein based on dipstick (500 mg/dl), while 26 had low ascitic fluid protein (30 mg/dl). SAAG was the standard used to differentiate exudates from transudate. In comparing dipstick protein (high or low) to correlate with low SAAG (exudates) and high SAAG (transudate) yielded a sensitivity, specificity, positive predictive value, negative predictive value, and accuracy of 65.79%, 53.33%, 64.10%, 55.17%, and 60.29%, respectively.*

Date of Submission: 08-06-2019 Date of acceptance: 25-06-2019

I. Introduction

Globally patients develop peritoneal fluid accumulation more than 100 ml free fluid in varied conditions ranging from cirrhosis to malignant neoplasm. For the ascites to become clinically evident, fluid accumulated must be more than 1500 ml. (1, 2) The ascitic fluid thus accumulated can develop infection changing its consistency and demanding urgent antimicrobial intervention. The change in consistency is classified as transudate or exudate. (3, 4, 5) A detailed lab analysis of fluid is necessary to rightly classify as transudate or exudate. Pathology leading to two are vastly different. Diseases like malignancy, tubercular peritonitis, metastasis of gastric and ovarian cancers, biliary obstruction, and bacterial peritonitis generally result in exudate. While organ failures, hypoalbuminemia, and ascites of cirrhotic origin results in transudates. (6,7) .

Evidence over the years have proved that Serum ascites albumin gradient (SAAG) is the gold standard when it comes to differentiating ascitic fluid into exudate or transudate. (8,9,10) Differentiating ascitic fluid into exudate or transudate is important as it helps in diagnosis and early starting of treatment .(9,11)

With the advent of urinary dipstick a point of care technique is now available. Over the years research is going on to determine the usefulness or its reliability for determining the etiologies of various disease. Evidence is accumulating over its ability to assess the presence of infection in spontaneous bacterial peritonitis. (12 ,13,14) Dipsticks are coated with chemicals that change color in presence of protein , ketones, specific gravity etc . (15) As exudates are high in protein and cholesterol while transudates are low in both there is in principle reasons to check the validity of these dipsticks .

The present study was thus conceptualized to know diagnostic reliability for classifying ascitic fluid as exudate or transudate , of urinary dipsticks in comparison to SAAG .

II. Methodology

A cross sectional study was performed in AIIMS Raipur in the Department of Physiology. A total of 68 patients who were willing to participate from various indoor wards of Surgery and Medicine department were included in the study. Ascitic fluid was tapped using abdominal paracentesis using standard protocols (16).

Simultaneously from each patient 5 ml of venous blood was also collected . Removal of debris from the ascitic fluid was done using a 10,000 rpm centrifugation for 10 minutes. Dipstick (Multistix 10 SG®, Bayer Diagnostics, Illinois) was used to determine the clear ascitic fluid as having protein level either low or high . The stick used was graduated to detect protein level mg/dL as either low (30mg/dL) or high (500mg/dL) . After 60 seconds of insertion the sticks were read . The venous blood taken was analyzed for serum albumin using appropriate methods . (17) Albumin in the collected ascitic fluid and SAAG was determined using

SAAG = Serum Albumin – Ascitic Albumin .

We took fluid SAAG values of >11g/dl as transudate and values ≤11g/dL as exudate .

Data Analysis – Data thus collected on MS Office Excel Sheets template was analyzed using SPSS version 18.0 (IBM Corp) . The values were presented as percentages while tests for sensitivity, specifity, true negative predictive values, true positive predictor values were employed. p value<.05 was considered as statistically significant .

III. Results

		Percentages	Mean Age	p value
Total	68		52.11 ± 12.21	
Male	46	67.65	54.01 ± 10.24	>.05
Female	22	32.35	50.18 ± 11.38	

Table 1. Describing the age of different gender and comparing the means with ANOVA along with p value .

In our study we had 22 females as opposed to 46 males who were part of study.
The mean age of males were 54.01 ± 10.24 a bit higher than the total mean age. (Table 1)
High protein levels in Ascitic fluid was of Exudate (500mg/dl) whereas transudate had low ascitic fluid protein content (30 mg/dl) .A total of 42 (61.8%) had high ascitic fluid protein based on dipstick (500 mg/dl), while 26 had low ascitic fluid protein (30 mg/dl) . SAAG was used to arrive at final diagnosis which gave us 38 Exudates and 30 transudates . On using the dipstick we found 25 true positives while 13 were false negatives (Table 2)

Dipstick	**Transudate**	**n**	**Exudate**	**n**	**Total**
Positive	True Positive	a= 25	False Positive	c= 14	a + c = **39**
Negative	False Negative	b= 13	True Negative	d= 16	b + d = **29**
Total		a + b = **38**		c + d = **30**	

Table 2 Break up of final results of Ascitic fluid diagnosed by SAAG as exudate and transudate when evaluated using dipstick .

On applying the diagnostic efficacy test using the standard formula we got a result suggesting the poor efficacy and reliability of point of care urinary dipstick as a diagnostic tool for categorizing ascitic fluid as Exudate or Transudate.

Statistic	**Value**	**95% CI**
Sensitivity	65.79%	48.65% to 80.37%
Specificity	53.33 %	34.33% to 71.66%
Positive Likelihood Ratio	1.41	0.90 to 2.20
Negative Likelihood Ratio	0.64	0.37 to 1.12
Disease prevalence	55.88%	43.32% to 67.92%

Positive Predictive Value	64.10%	53.34% to 73.61%
Negative Predictive Value	55.17 %	41.44% to 68.16%
Accuracy	60.29%	47.70% to 71.97%

Table 3 . The statistic result for diagnostic efficacy parameters with 95% CI .

The urinary dipstick had an accuracy of 60.29% with sensitivity of 65.79% and specifity of 53.33% making it a poor diagnostic tool . (Table3) .

IV. Discussion

As noted in other studies too the point of care could be a reliable tool and of immense help for both clinician and patient in deciding when to start appropriate treatment . SAAG owing to its cumbersome determining process is time taking process and reliable diagnostic tool is of immense need . Availability of point of care dipsticks for these is a testimonial of this urgent need (18) Nevertheless repeated attempts by others have not been able to get a reliable results with the available point of care dipsticks when it comes to deciding ascitic fluid as transudate or exudate .(3, 19) Its still SAAG which is the gold standard for doing this differentiation.

V. Conclusion

SAAG is still the method of choice when it comes to deciding whether the Ascitic fluid is exudate or transudate . Though it does takes time but till the time newer technology is developed and we have more reliable or accurate tests available we will have to rely on SAAG .

References

[1]. Indian J Clin Biochem. 2001 Jan;16(1):106-9. doi: 10.1007/BF02867577. Value of ascitic fluid cholesterol and serum-ascites albumin gradient in differentiating cirrhotic and malignancy related ascites. Bijoor AR(1), Venkatesh T.

[2]. Runyon BA. Management of adult patients with ascites due to cirrhosis. AASLD Practice Guideline. Hepatology 2004; 39:1–16; https://doi.org/10.1002/hep.20066

[3]. Ekpe EL, Omotoso AJ. The relevance of ascitic LDH and SAAG in the differential diagnosis of ascites among patients in a Nigerian Hospital. Br J Med Med Res 2015; 3(3):211– 9; https://doi.org/10.9734/BJMMR/2015/12554

[4]. Dharwadkar K, Bijoor AR. Usefulness of serum ascites cholesterol gradient (SACG), Total Protein (TP) ratio and serum ascites albumin gradient (SAAG) in differentiating tuberculosis ascites and cirrhotic ascites. Int J Med Sci Public Health 2013; 2:1099–103; https://doi.org/10.5455/ijmsph.2013.010920134.

[5]. LawsonE,VictorE,EyamE,EkanemE Point of care dipstick assessment of ascitic fluid: comparison with serum ascites albumin gradient (SAAG) in differentiation of ascitic fluid into exudate and transudate. Int. Journal of Medicine in Developing Countries2018;2(2):55–58.

[6]. Huang LL, Xia HH, Zhu SL. Ascitic fluid analysis in the differential diagnosis of ascites: focus on cirrhotic ascites. J Clin Trans Hepatol 2014; 2(1):58–64.

[7]. Runyon BA. Montano AA, Akrivadis EA. SAAG is superior to the exudate-transudate concept in the differentdiagnosis of ascites. Ann Intern Med 1992; 117:215–20; https://doi.org/10.7326/0003-4819-117-3-215.

[8]. Hoefs JC. The mechanism of ascitic fluid protein concentration increase during diuresis in patients with chronic liver disease. Am J Gastroenterol 1981; 76(5):423–31.

[9]. Seth AK, Rangarao R, Pakhetra R, Baskaran V, Rana PV. Accuracy of SAAG in actiological diagnosis of ascite. Med J Armed Forces India 2002; 58(2):124–6; https://doi. org/10.1016/S0377-1237(02)80044-2

[10]. Rodríguez Vargas BO, Monge Salgado E, Montes Teves P, Salazar Ventura S, Guzmán Calderón E. Rev Gastroenterol Peru.Diagnostic of ascites due to portal hypertension: accuracy of the serum-ascites albumin gradient and protein analises in ascitic fluid 2014 Jan-Mar; 34(1):23-8.

[11]. Uddin MS, Hoque MI, Islam BH, Uddin MK, Haq I. Serum ascites albumin gradient in differential diagnosis of ascites. Mymensingh Med J 2013; 22(4):748–54.

[12]. Chugh K. Aruwal Y, Goyal V, Khatri V, Kumer P. Diagnosing bacterial peritonitis made easy by use of Leukrayte esterase dipstick. Int J Crit Ill Inj Sci 2015; 5:32–7; https:// doi.org/10.4103/2229-5151.152337

[13]. Khatwani R, Chutto MA, Abro HA, Shaikh MA. Diagnostic validity of leukocyte esterase dipstick test for diagnosis of spontaneous bacterial peritonitis in cirrhotic patients. J Ayub Med Coll Abbottabad 2011; 23(1):51–4.

[14]. Akman S, Uygun V, Guven AG. Value of Urine strip test in the early diagnosis of bacterial peritonitis. PediatrInt 2005; 47(5):523–7; https://doi.org/10.1111/j.1442-200x.2005.02119.x

[15]. Gallagher EJ, Schwartz E, Weinstein RS. Performance characteristic of urine dipstick stored in open containers. Am J Emerg Med 1990; 8:121–3; https://doi. org/10.1016/0735-6757(90)90197-8

[16]. Fyson J, Chapman L, Tatton M, Raos Z. Abdominal paracentesis: use of a standardised procedure checklist and equipment kit improves procedural quality and reduces complications. Intern Med J. 2018 May;48(5):572-579. doi: 10.1111/imj.13741. PubMed PMID: 29345405.

[17]. Silverman LM, Christensen RU. Amino acids and proteins. In: Burtis, Ashwood RE, editors. Teitz textbook of clinical Chemistry. 2nd ed. Philadelphia, PA: WB Paunders; 1994. pp 625–734.

[18]. Heidari K, Amiri M, Kariman H, Bassin M. Differentiation of exudate from transudate ascites based on the dipstick values of protein, glucose and pH. Am J Emerg Med 2013; 13:779–82; https://doi.org/10.1016/j.ajem.2013.01.010.

[19]. Abdollahi A, Nozarian Z. Diagnostic value of measurement specific gravity by refractometric and dipstick method in differentiation between transudate and exudates in pleural and peritoneal fluid. Iran J Pathol 2016; 11(4):363–9.