



## Abdominal Ultrasound Findings in Patients with Pathologies Associated Ascites

\*Kamal Badawi<sup>1</sup>, Mohamed Idris<sup>2</sup>, Yasser Seddeg<sup>3</sup>

Department of Anatomy, The National Ribat University - Faculty of Medicine, Sudan<sup>1</sup>

Department of Anatomy, The National Ribat University, Sudan<sup>2</sup>

Department of Anatomy, The National Ribat University - Faculty of Medicine, Sudan<sup>3</sup>.

Corresponding Author: \*Kamal Badawi

Received 16 November, 2017; Accepted 07 December, 2017 © The Author(S) 2017. Published With Open Access At [www.Questjournals.Org](http://www.Questjournals.Org)

**ABSTRACT:** This study was present to determine the efficiency of ultrasound in diagnosis of the abdominal ascites, which is accumulation of fluid in the peritoneal cavity, and gradually became more spreadable and associated with a large amount of diseases, then evaluate the role of ultrasound in determination the degree and differentiating between its two types. In addition to that aids in definite diagnosis of the causative pathologies which lead to ascites. The sample of this study was taken from seventy patients who were clinically had ascites, they all underwent US examination. The study was done in period between august 2016 to January 2017. The study resulted in that the males 45 (62%) were more affected than females 25 (38%). And the clinical suspicion of ascites was higher in age group between (50-59) years old. The majority of patients 62 (88%) had pathology with symptomatic ascites where asymptomatic only found in 8 (12%).

Also the study showed that the majority 39 (56%) of cases had severe ascites, while the other two degrees of ascites (mild and moderate) had got the same numbers of 16 (22%) for each.

Finally the study showed that the most common causative diseases leading to ascites were portal hypertension and liver diseases which represent (63%) of all cases.

**Keywords:** Ascites, Asymptomatic, Causative, Portal hypertension.

### I. INTRODUCTION

US is the dominant first line investigation for an enormous variety of abdominal symptoms because it is non invasive and comparatively accessible nature and its benefits to patients outweigh the risks. Also the Doppler US is an integral part of the examination because many pathological processes in the abdomen affect the hemodynamic of relevant organs. The peritoneum is a thin membrane that lines the wall of the abdomenopelvic cavity which forms by two layers; the outer layer is the parietal peritoneum attached to abdominal walls and pelvic walls. The inner layer; the visceral peritoneum, is wrapped around the visceral organs, located inside the intraperitoneal space for protection. It is thinner than the parietal peritoneum (2).

Peritoneum consists of connections connects viscera to each other and to abdominal and pelvic walls. These connections of peritoneum are folds called ligaments, mesenteric, mesocolons and omenta and they contain fat, nerves, blood vessels, lymph vessels and sometimes bile ducts, the peritoneum classifies the organs into three types: intraperitoneal, retroperitoneal and extraperitoneal. The mesentery is a double layer of visceral peritoneal that attaches to the gastrointestinal tract. There are often blood vessels, nerves and other structures between these layers. The space between these two layers is technically outside of the peritoneal sac, and thus not in the peritoneal cavity. The potential space between these two layers is the peritoneal cavity; filled with small amount (less than 100 ml) of the slippery serous fluid that allows the two layers to slide freely over each other (2).

Ascites is a term given to the presence of free fluid in the peritoneal cavity when exceeding the amount of 100 ml and there are two type of ascites; transudative ascites: its fluid contains little or no protein and caused by increased intravascular pressure; exudative ascites; its fluid contain debris and caused by decrease vascular permeability resulting of increasing the levels of plasma entering the interstitial areas (4). US rapidly becoming initial imaging study for detection of free fluid inside the peritoneum cavity. Despite the normal serous fluid within peritoneal cavity is not evident in sonogram. Simple ascites (transudate), is anechoic but septation and

debris are found in (exudates) one and appears sonographically as a fluid with low level echoes. Also US is the best choice worldwide for the detection of intraabdominal injury (IAI), in view of hemorrhage, old hematomas and abscesses (4).

Transudative ascites is most commonly caused by alcoholic cirrhosis and organ failure but exudative ascites is associated with infection and malignancy. Although this diagnosis based on US solely but is often not possible, however lab test results, clinical history and fine needle aspiration are helpful in definitive diagnosis. The US helps in choice of appropriate treatment (Conservative precutaneous drainage or surgical intervention) (4).

## II. MATERIALS AND METHODS

This is a descriptive study dealt with patients who were clinically had ascites and underwent abdominal US scan in The Ribat University Hospitals at Radiology department. The duration of the study was from August 2016 to January 2017. The study included 70 patients who were clinically complaining of pathologies associated with ascites and their ages ranged (18-70) years, those with pathologies without association of ascites and their ages below 18 and above to 70 were excluded. The study variables were; age, gender and pathologies associated with ascites. The Sample size of 70 Patient whom had been taken randomly either male or female and their ages (18->70). The abdominal US was done by using the Mendary US machine with curvilinear probe (3.5 MHz) for adults. Area of interest was completely evaluated in at least two scanning planes (longitudinal and transverse). Full abdominal surveys began with aorta then IVC, liver and the rest of abdominal organs and related structures.

Patient should be in comfort state and the amount of transducer pressure on the skin is an important consideration, although more pressure may make the patient uncomfortable. Usually patients prefer to be fasting, but ascitic patient hadn't preparation required. Patient was scanning in supine position and also in decubitus (either right lateral decubitus or left lateral decubitus). Scan may help to differentiate loculated and free fluid collection. Also the posterior approach was used when needed. Patient scanned in deep inspiration. Peritoneal cavities in the normal patient are not routinely visualized. Ethical approval was taken in considerations from authority of faculty of graduate studies, The National Ribat University.

## III. STATISTICAL METHODS

The data were collected from the ultrasonographic images by data collection sheet and had been stored in: personal flash and computer; it had been carried out using computer program and Statistical Package for Social Sciences (SPSS) version 2010, and presented in tables, graphs and figures. .

## IV. STUDY SAMPLE CHARACTERISTICS

The sample size of this study was selected randomly among Sudanese individuals, who underwent the study of abdominal US during the period (August 2016 to January 2017) at the Radiology department, The Ribat Hospital, in Khartoum state, Sudan.

## V. RESULTS

Out of the 70 patients with pathologies associated with ascites, 45 (64%) were males and the rest 25 (36%) were females. According to the age groups the patients were divided into 6 groups; 3 (2.1%) of them their ages ranged from (18-29) years; 5 (3.5%) their ages from (30-39) years; 10 (7%) from (40-49) years; 33 (23.1%) from (50-59) years; 13(9.1) years; 6 (4.2%) their ages >70, as shown in Table (1).

**Table (1):** Shows the relation between sex and age in patients with ascites.

Sex	Age groups					
	18-29	30-39	40-49	50-59	60-69	>70
Males	2	3	6	23	8	3
Females	1	2	4	10	5	3
Total	3	5	10	33	13	6

Regarding the types of ascites; 62 (88.5%) of the total number of the patients had symptomatic ascites; while the rest 8 (11.5%) had asymptomatic ascites; as shown in table (2).

**Table (2):** Shows Types Of Ascites.

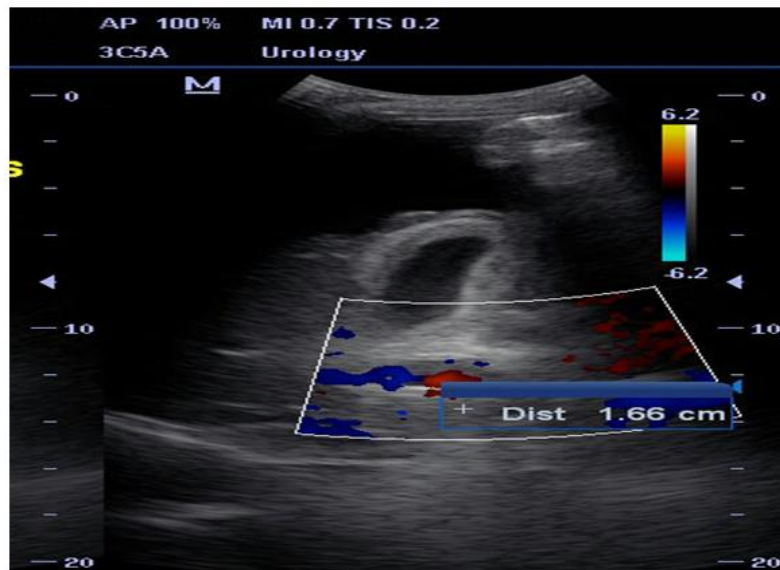
Types of ascites	Frequency	Percent
Symptomatic	62	88.5%
Asymptomatic	8	11.5%
Total	70	100%

Abdominal Ultrasound Findings in Patients with Pathologies Associated Ascites

Considering the cause of ascites, in 47 (67.1%) their cause was cirrhosis due to portal hypertension, 2 (3%) hepatitis, 6 (8.5%) due to hepatocellular carcinoma, 9 (12.8%) heart failure, 4 (6%) renal failure and 2 (3%) peritonitis; as shown in table (3) and figs (1-2).

**Table (3):** Shows causes of ascites among the total numbers of patients with ascites.

Cause	Frequency	Percent
Cirrhosis (PHT)	47	67.1%
Hepatitis	2	3%
HCC		
CHF		
Renal failure	6	8.5%
Peritonitis	9	12.8%
Total	4	6%
	2	3%
	70	100%



**Fig (1):** US image shows shrunken liver with severe ascites due to portal hypertension and chronic cholecystitis.

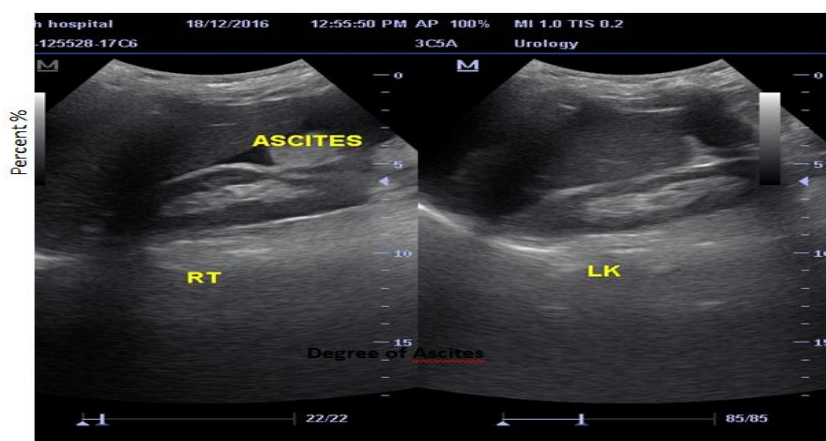


**Fig (2):** US images in a patient with peritonitis showing severe ascites.

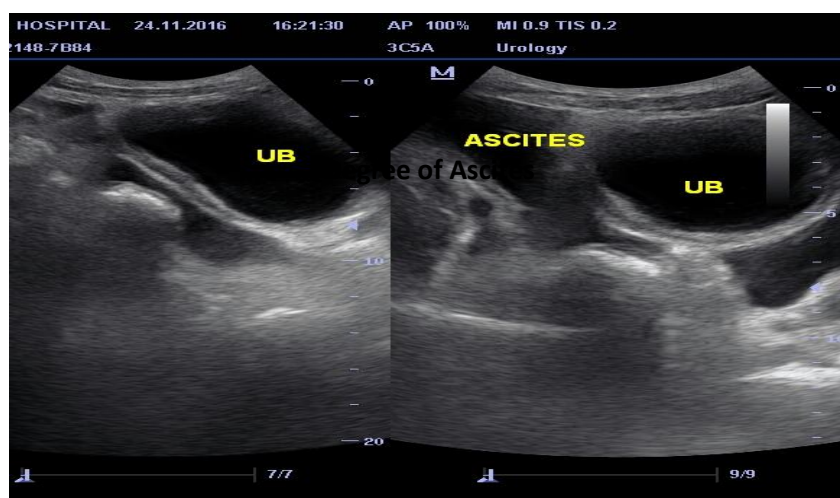
Regarding the degree of ascites, out of (70) patients with pathologies associated ascites, there were 16 (22.8%) of them had mild ascites, 15 (21%) had moderate ascites and 39 (56%) severe ascites; as shown in table (4) and figs (3-5).

**Table (4):** Shows the degree of ascites.

Degree	Frequency	Percent
Mild	16	22.8%
Moderate	15	21.5%
Severe	39	56%
Total	70	100%



**Fig (3):** US images show mild ascites in patient with CRF.



**Fig (4):** US images show moderate ascites in a patient with liver cirrhosis.



**Fig (5):** US Images Show Severe Ascites In A Patient With Liver Cirrhosis And Cholecystitis.

When comparing the signs and symptoms with the degree of ascites, it was found that of (16) patients with mild ascites, one of them was asymptomatic while the rest (15) were symptomatic. Out of (15) patients who had moderate ascites, (2) of them were asymptomatic, while the rest (13) were symptomatic. Where out of (39) patients who had severe ascites, (5) of them were asymptomatic, while the rest (34) were symptomatic, as shown in table (5).

**Table (5):** Showed the relation between signs, symptoms and their degree.

Type of ascites	Degree of ascites distribution			Total
	Mild	Moderate	Severe	
Symptomatic	15	13	34	62
Asymptomatic	1	2	5	8
Total	16	15	39	70

## VI. DISCUSSION

The present study showed that most patients with ascites were male with percentage of 72 % and 28 % female and this agrees with what mentioned by Esra Salah study, because male are more affected with liver pathologies which may link with alcohol abuse and schistosomiasis, although female have other causes like ectopic pregnancy and ovarian masses. The present study showed that the clinical suspicion of ascites was higher in age group ranging between (50-60) years, depends on the cause of ascites which was comparatively more in age group above 50 years, like malignancy and organ failure which is acceptable when comparing that with what mentioned in the previous studies, although ultrasound is capable enough even if the age of the patient is more old or more young. Also the present study showed that the transudative ascites had wide distribution than exudative ascites and US can differentiate between the two types of ascites, due to their echogenicity and that aid in good diagnosis of the pathologies associated with ascites and coincide with which mentioned in literature by Esra Salah. In addition to above the study showed that the symptoms and signs of the pathologies associated with the ascites and their degree were depended on progression of the causative diseases, which also agree with what mentioned in the previous study.

Finally this study showed that the portal hypertension and liver diseases generally had high percentage of all causative agents and this also is acceptable when comparing with what mentioned in the previous studies. The limit of ultrasound in present study was the deficiency of ultrasound in differentiating between the types and nature of the cells in ascitic fluid (blood, pus, cancer's cells or others); therefore fine needle biopsy under ultrasound guidance and laboratory are needed.

## VII. CONCLUSION AND RECOMMENDATION

The main finding in the present study is that ultrasound has been widely accepted as initial screening procedure in patient with ascites and is important and very sensitive imaging technology which can differentiate between the two types of ascites, also demonstrating the main cause of ascites, site and degree. The common cause of transudative ascites was the portal hypertension more than the cirrhosis, schistosomiasis, alcohol, congestive heart disease and others. The common causes of exudative ascites were tumors (malignancy) and infectious disease like hepatitis, TB, peritonitis and others. The degree, symptoms and sites of ascites depend upon the progress of the causative disease; therefore patients with mild ascites are not necessary to have symptoms and signs of ascites.

Lastly there is a good future for US, especially with improving resolution of the new machine and usage of endoscopic US, which will increase the accuracy and specificity of US in early detection and differentiation between benign and malignant tumors. Therefore all primary health centers should be equipped well by high quality ultrasound machines and good qualified sonographers. Quick ultrasound examination should be perform for all patients with abdominal distention or discomfort abdomen. Although everybody should be routinely examined by ultrasound at least twice a year, especially those who had family history of organs failure or liver tumor, alcohol abuse and tropical areas. People must stop drinking alcohol and decrease their weight because they are common risk factors leading to liver cirrhosis and ascites. Lastly further studies must be recommended for more investigation of hepatitis and schistosomiasis.

## ACKNOWLEDGEMENTS

Our thanks and appreciation extended to the Department of radiology and imaging at The Ribat Hospital in Khartoum, Sudan for providing the data used in this study. Finally we would like to thank everybody who helped in this research.



**REFERENCES**

- [1]. Jane Bates. Abdomen. In: Dinah Thom (editor). *Abdominal ultrasound How, Why and When* (2<sup>nd</sup> Ed), China, Elsevier 2004; P: 6-8.
- [2]. Richard L Drake. Abdomen. In: Patricia Tannian (editor). *Grays Anatomy for Students* (3<sup>rd</sup> Ed), Canada, Elsevier. 2014; P: 303-308.
- [3]. Paul Butler, Adam W, M, Mitchell, Harold Ellis et al. Abdomen and pelvis. In: Paul Butler, Adam W, M, Mitchell (editors). *Applied radiological anatomy* (1<sup>st</sup> Ed), Cambridge New York 2007; P: 45.
- [4]. Alnumeiri MS, Ayad CE, Ahmed BH et al. Evaluation of Ascites and its Etiology using Ultrasonography. *J Res Development*. 2015; 3:1.
- [5]. Guenter Schmidt, Lucas Greiner, Dieter Nuernberg. Gastrointestinal tract. In: Guenter Schmidt, Lucas Greiner, Dieter Nuernberg (editors), *Differential Diagnosis in ultrasound imaging*, (2<sup>nd</sup> Ed). Germany, Georg, 2013; P: 276.
- [6]. Arthur C, Guyton, John E, Hall. Body fluid. In: William Schmitt (editor). *Medical physiology* (10<sup>th</sup> Ed), London, Saunders company, 2000; P 45.
- [7]. Sukkar, El-Munshid, Ardawi et al. Body fluid. In: Sukkar, El-Munshid, Ardawi (editors). *Concise human physiology* (2<sup>nd</sup> Ed). Oxford, Blackwell, 2006; P: 6
- [8]. Vinay Kumar, Abul K. Abbas, Jon C, Aster. Ascites. In: Robbins and Cotran (editors). *Pathologic Basis of Disease* (9<sup>th</sup> Ed), Canada, Elsevier 2015; P: 884
- [9]. Joanne C Rosenberg, Arnold, Laura J Zuidema, et al.
- [10]. 9. Abdomen. In: Sandra L. Hagen-Ansert (editors). *Diagnostic ultrasonography* (4<sup>th</sup> Ed) Germany, Georg 2015;
- [11]. vol (1): P 56.
- [12]. 10. Guenter Schmidt, Lucas Greiner, Dieter Nuernberg. Abdomen. In: Guenter Schmidt, Lucas Greiner, Dieter Nuernberg (editors). *Differential Diagnosis in Ultrasound Imaging* (2<sup>nd</sup> Ed), Robert Hurlle Germany 2013; P 76-352.
- [13].

\*Kamal Badawi. "Abdominal Ultrasound Findings in Patients with Pathologies Associated Ascites." *Quest Journals Journal of Medical and Dental Science Research*, vol. 04, no. 08, 2017, pp. 35–40.