ejpmr, 2017,4(11), 536-543

SJIF Impact Factor 4.161

EUROPEAN JOURNAL OF PHARMACEUTICAL AND MEDICAL RESEARCH

www.ejpmr.com

Research Article

ISSN 2394-3211

EJPMR

PSEUDOASCITES, WHAT WE CAN LEARN FROM PUBLISHED CASE REPORTS AND SERIES

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Article Received on 15/09/2017 **Article Revised on 06/10/2017** **Article Accepted on 27/10/2017**

ABSTRACT

For patients with abdominal distension but without free peritoneal fluid, that give the false impression of ascites the term pseudoascites is used. The aim of this review is to summarize the published cases of pseudoascites in order to enrich our knowledge about the etiology of this condition and to avoid futile invasive diagnostic procedures. We searched MEDLINE, for any type of giant abdominal cystic lesion mistaken for ascites. We also perused the references of the retrieved articles to identify reports that may have been missed by the electronic searches. Totally we identified 42, relevant to the study topic articles that included 49 cases (29 males) between 15 months -92 years old. The most frequent diagnoses were omental and ovarian cyst. As it seems from the published cases of pseudoascites, the differential diagnosis from ascites cannot be based only on history and clinical examination. All patients should undergo an abdominal ultrasonography and in doubtful cases a computed tomography or a magnetic resonance imaging of the abdomen should be performed. If the imaging studies do not reveal typical signs of free fluid, the patients (which ultimately are few) should undergo an exploratory laparotomy instead of an abdominal paracentesis, which could have disastrous consequences.

KEYWORDS: Pseudoascites, ascites, abdominal cyst.

INTRODUCTION

Ascites is the pathologic accumulation of free fluid in the peritoneal cavity.[1,2] The commonest cause of ascites is liver cirrhosis (responsible for approximately 85% of the cases) in the setting of portal hypertension.[3] Other causes include: peritoneal malignancy (10% of the cases), congestive heart failure, peritoneal tuberculosis, renal failure etc.[2]

The presence of ascites can be detected through physical examination when more than 1000 mL of free fluid are within the peritoneum.[2] The physical examination for ascites includes: inspection for bulging flanks, percussion for flank dullness, and tests for shifting dullness and fluid wave.[1] However, these physical signs are neither sensitive nor specific for ascites.[4,5] Equivocal physical signs are observed occasionally in patients with abdominal distension but without free peritoneal fluid and in those cases the term pseudoascites is used.[6] This term, denotes the clinical impression of ascites when, in fact, no free peritoneal fluid is present.[6,7] Theoretically, any hollow abdominal viscus or potentially hollow abdominal structure may give the impression of ascites in physical examination when swells considerably due to the presence of fluid and become a cyst with a thin wall.[7]

Abdominal ultrasonography (U/S) can detect as little as 100 mL of fluid within the peritoneum[1,2] and in patients with abdominal distension it is useful in defining both the presence and the location of the fluid.[8] However, cysts of enormous size can be difficult to distinguish from ascites by U/S giving the false impression of free fluid in the peritoneal cavity. [8,9]

The aim of this review is to summarize the published cases of pseudoascites in order to enrich our knowledge about the etiology of this condition and to avoid futile invasive diagnostic procedures. The main objective was to identify cases mistaken for ascites by physical examination alone or by physical examination and U/S or/and computed tomography (CT) and the patient underwent an abdominal paracentesis or he was treated as having ascites.

METHODS

For the purpose of this review we examined publications cited in Pubmed for any type of giant abdominal cystic lesion mistaken for ascites. We searched MEDLINE, (last search May 2017) using combinations of terms such as *giant abdominal cyst, huge abdominal cyst, enormous abdominal cyst and pseudoascites.* We also perused the references of the retrieved articles to identify reports that may have been missed by the electronic searches. Cases referring to giant abdominal cystic lesions mistaken for ascites (either by the authors either by previous physicians) were included. From every study first author, year of publication, patient‟s gender and age, size and origin of the cyst were recorded.

The eligible cases were classified in four main groups:

1. Cases misdiagnosed and treated as ascites for varied periods of time before reaching the right diagnosis.
2. Cases of giant abdominal cysts mistaken for ascites by physical examination in which patients underwent an abdominal paracentesis.
3. Cases of giant abdominal cysts mistaken for ascites by physical examination and U/S in which patients underwent an abdominal paracentesis.
4. Cases of giant abdominal cysts mistaken for ascites by physical examination, U/S or/and CT which were diagnosed by laparotomy.

Reasons for exclusion

Cases whose initial diagnosis was „ascites‟ based on clinical examinations‟ and U/S findings only but the subsequent diagnostic workup revealed the right diagnosis before the patient underwent an abdominal paracentesis were not included.

Moreover, we did not include cases published in 70‟s because the new, at this time, diagnostic techniques (U/S and CT) were probably not immediately available or they were completely unavailable.[10,11]

RESULTS

The literature search yields a total of 996 applicable records, 957 of those were excluded (Figure 1). After removing 56 duplicates, 149 were excluded due to their unavailability in English. After screening the titles of the remaining articles, 162 were selected as potentially relevant to the study topic. From these potentially relevant studies, after screening the abstracts, 86 were selected for full-text review. From those, 39 were included in the review, based on the relevance to the study topic. 3 additional records were identified from the references of full-text articles and so, totally 42 reports were included.

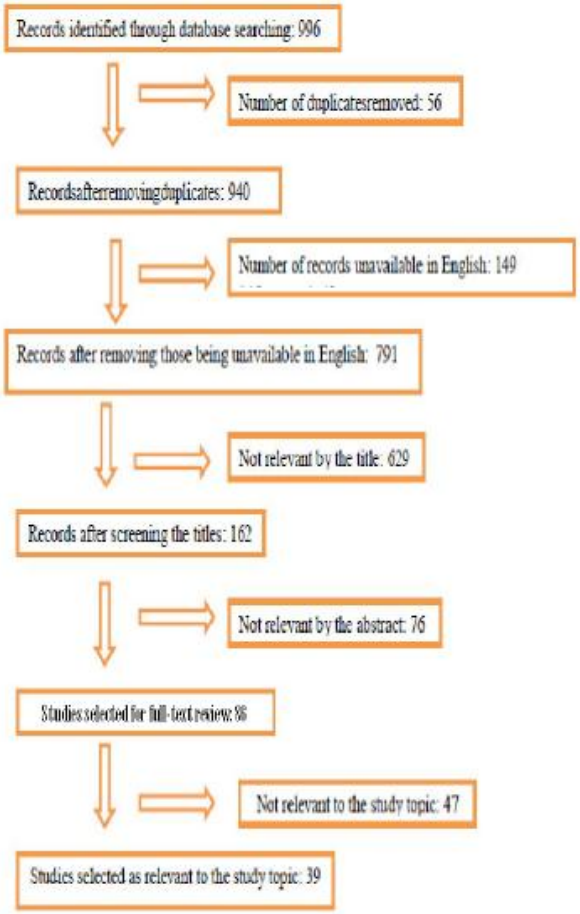

Figure 1: Study selection process.

Totally we identified 42, relevant to the study topic articles that included 49 cases. There were 29 males and 20 females. Their ages were between 15 months old and 92 years old. The most frequent diagnoses were omental cyst (19 cases), ovarian cyst (10 cases), renal cyst (4 cases), mesenteric cyst (4 cases) and hydatid cyst (2 cases).

In Table 1 we summarize cases of giant abdominal cysts mistaken for ascites for varied periods of time before reaching the right diagnosis.

In Table 2 we summarize cases of giant abdominal cysts mistaken for ascites by physical examination in which patients underwent an abdominal paracentesis.

In Table 3 we summarize cases of giant abdominal cysts mistaken for ascites by physical examination and U/S in which patients underwent an abdominal paracentesis.

In Table 4 we summarize cases of giant abdominal cysts mistaken for ascites by physical examination and U/S or/and CT, which were diagnosed by laparotomy.

Table 1: Cases misdiagnosed as ascites for varied periods of time before reaching the right diagnosis.

Author/ year	Patient's age/ Gender	Size of the cyst	Origin of the cyst	Time untilldiagnosis
Karhan[12] 2016	5.5-year old boy	25x30 cm	Omental cyst	3 years
Ragavan 2013[13]	*Case 1* 3-year old boy *Case 2* 3-year old girl	*Case 1* 25x22x19 cm *Case 2* 28x20x20 cm	*Case 1* Omental cyst *Case 2* Omental cyst	*Case 1* 2 years *Case 2* 1 year
Chute and Stasaitis 2012[14]	51-year old female	35.5x23x20 cm	Ovarian cyst	4 years
Dulger 2010[15]	25-year Female old	NA	Mesenteric cyst	6 months
Mikos 2009[9]	59-year old female	NA	Ovarian cyst	8 months
	43-year old male	Anteroposterior diameter of 74 cm	Omental cyst	6 years
Kaya 2009[17]	*Case 1* 43-year old female *Case 2* 13-year old boy *Case 3* 22-year old female	*Case 1* Contained 14 liters of fluid *Case 2* Contained 9 liters of fluid *Case 3* Contained 10 liters of fluid	*Case 1* Ovarian cyst *Case 2* Mesenteric cyst *Case 3* Ovarian cyst	*Case 1* NA *Case 2* *1* years *Case 3* *3* years
Debnath 2008[18]	*Case 1* 3.5- year old boy *Case 2* 3- year old girl	*Case 1* NA *Case 2* NA	*Case 1* Omental cyst *Case 2* Omental cyst	*Case 1* several months *Case 2* 2 years
Moralioğlu 2007[19]	4- year old girl	30×24×15 cm	Omental cyst	9 months
Menon and Rao 2005[20]	5- year old boy	Contained fluid of 5 liters	Omental cyst	4.5 years
Shilo 2001[21]	92-year old male	Diameter of 25 cm	Renal cyst	3 years

NA= not assessed

Author/ year	Patient's age/ Gender	Size of the cyst	Origin of the cyst	Time untilldiagnosis
Rahman & Johnson 2001	18-month old boy	16.7×17.3× 6.7 cm	Omental cyst	8-9 months
Prasad 2001[23]	*Case 2* 4-year Old boy	*Case 2* 20 cm in the maximal diameter	*Case 2* Omental cyst	*Case 2* 2 years
Klin 1997[24]	4-year boy old	NA	Omental cyst	3 years
Fiedorek 1991[7]	*Case 2* 61-year old male	*Case 2* 18×16×20 cm	*Case 2* Mesenteric cyst	*Case 2* 14 months
Patel 1991[25]	3-year Male old	Multiple Varying cysts sizes from 0.5 to 8 cm diameter	Congenital Lymphangiomatosis of greater omentum	21 months
Gyves-Ray 1990[26]	26-month old boy	17×11×8 cm	Omental cyst	8 months
Deorari 1985[27]	3.5-year old male	NA	Omental cyst	2 years
Dixon	85-year Male old	60x45 cm	Primary omental leiomyosarcoma	4 years
Grobe 1983[29]	*Case 1* 35-year Old female	*Case 1* NA	*Case 1* Ovarian cyst	*Case 1* 5 years

Patients presented in Table 1 considered as having ascites for varied periods of time (from several months to 6 years). They all had progressive abdominal distension and in almost all cases at least one diagnostic or therapeutic paracentesis has been performed.

In eleven cases[12,13(case1&2),15,18 (case1&2),19,23,25,27,29] patients were treated with antitubercular drugs for suspected tubercular ascites and in six cases[7(case 2),16,22,23,25,28] patients received diuretics without any response.

The final diagnosis has been revealed after months or years during clinical examination[19,22] (which was confirmed with CT, US or both), in the repeated imaging studies,[9,12,13,15-18,25,27] after reviewing the old CT,[20] at laparoscopy[24,29] or laparotomy,[23,26] after operation for incarcerated umbilical hernia[7(case2)] and at the postmortem examination.[14,21,28]

Table 2: Cases of giant abdominal cysts mistaken for ascites during physical examination in which patients underwent an abdominal paracentesis.

Author/ year	Patient's age/gender	Size of the cyst	Origin of the cyst
Dursun 2009[30]	57-year old female	14x29x22 cm	Mesenteric cyst
Viganò 2007	50-year old male	Diameter of 35 cm	Renal cyst
Oray-Schrom 2002[32]	52-year old female	NA	Intra-abdominal pseudocyst [Its precise origin was unclear]
Chand 2000[33]	46-year old male	44x30x21 cm	Multicystic Intra-abdominal Lymphangioma
Rattan 1996[34]	4-year old boy	Contained over 1.5 liters of fluid.	Omental cyst
Fiedorek 1991[7]	*Case 1* 4-year old boy	*Case 1* Contained 1.800 mL of fluid	*Case 1* Omental cyst
Brophy 1989	34-year old female	55x38 cm	Ovarian cystadenoma
Fiedorek 1986[36]	*Case 1* 3-year old boy	*Case 1* Total fluid content of 3.600 ml	*Case 1* Omental cyst
Adams & Bezuidenhout 1986[37]	60-year old male	NA	Hydatid cyst
Grobe 1983[29]	*Case 2* 20-year old female	*Case 2* 10x17 cm	*Case 2* Ovarian cyst
Liss 1982[38]	63-year old female	18 liters of fluid removed	Ovarian cyst
Bar-Maor & Lernau* 1981[39]	*Case 1* 31-year-old female	*Case 1* Diameter of about 35 cm	*Case 1* Hydatid cyst

*Availability of U/S or CT was not referred in the full text. NA= not assessed.

All patients presented in Table 2 underwent an abdominal paracentesis based on the doctors' clinical impression and patients' medical history. The subsequent U/S,[7,31,32,34-37] CT,[7,31-37] or MRI[30] revealed the correct diagnosis. In one case[29(2)] after the abdominal paracentesis, the US suggested ascites while the CT scan revealed the abdominal cyst.

In two patients, the right diagnosis was revealed after laparotomy.[38,39] In the first one[38] CT could not be performed because of patients" size and U/S was not helpful because of the massive amount of abdominal fluid. In the other case[39] the availability of U/S or CT was not referred in the full text.

In the research of bibliography three more cases of misdiagnosed ascites during physical exam were identified, whose results were not associated with the presence of cystic formations. All these patients underwent an abdominal paracentesis.

A case of a 43-year-old male with increasing abdominal girth for 3 months and a 60-pound weight gain. An abdominal distention was noted with a possible shifting dullness. Three paracenteses were performed and none of them elicited any abdominal fluid. A subsequent CT did not show any amount of fluid in the peritoneum instead significant subcutaneous fat and some mesenteric fat..[40](case 1)

A case of a 59-year-old male with abdominal pain and increased abdominal girth who had gained 45 pounds during the last 4-6 months. On physical examination, he had a distended abdomen, moderate abdominal tenderness without fluid wave and caput medusa. Several paracenteses were attempted, but none revealed ascitic fluid. Subsequent U/S revealed only fat.[40] (case2).

A case of celiac disease misdiagnosed as ascites in which the patient underwent an abdominal paracentesis based on physical examination findings. He was an 11- year-old boy with grossly distended, tense abdomen with

bulging flanks, shifting dullness, fluid wave and a prominent venous pattern on the abdominal wall. After paracentesis, upper gastrointestinal series showed markedly dilated fluid-filled intestinal loops with a malabsorption pattern. An intestinal biopsy revealed the diagnosis.[41]

Table 3: Cases of giant abdominal cysts mistaken for ascites by physical examination and U/S in which patients underwent an abdominal paracentesis.

Author/ year	Patient's age/ gender	Size of the cyst	Origin of the cyst
Riyach 2014[42]	75-year old male	35x32x22	Renal cyst
Pathak & Karki 2012[43]	13-year old girl	NA	Ovarian cyst
Parakh 2009[44]	4-year old boy	30 cm lengthwise	Cystic lymphangiomatous hamartoma
Borovec 2009[45]	77-year old male	Diameter of 27 cm	Renal cyst
Rani 2006[46]	3-year old boy	NA	Retroperitoneal lymphangioma
Menahem & Shvartzman 1994[47]	60-year-old female	22 kg	Ovarian cyst

All patients presented in Table 3, after the initial clinical examination they underwent an abdominal U/S, demonstrating the presence of free fluid in the peritoneal cavity. Subsequently they underwent an abdominal paracentesis. A further evaluation with CT demonstrated the correct diagnosis.

Table 4: Cases of giant abdominal cysts mistaken for ascites by physical examination, U/S or/and CT which were diagnosed by laparotomy or laparoscopy.

Author/ year	Patient's age/ gender	Size of the cyst	Origin of the cyst
Shafi 2009[48]	8-year old girl	25x22 cm weighed 4.3 kg	Omental cyst
De Matos 2005	2-year old girl	20×16×1.8 cm	Omental cyst
Narchi 2000	15-month-old boy	NA	Omental cyst
Lombardo & Babando* 1986[51]	89-year-old female	NA	Ovarian cyst

*Availability of CT was not referred in the full text. NA= not assessed.

The first three cases presented in Table 4[48-50] refers to patients with abdominal distention which, after the workup (clinical examination, U/S, CT and abdominal paracentesis) considered as having ascites. The final diagnosis was reached after laparotomy. In the fourth case[51] the initial diagnosis of ascites was based on both clinical examination and U/S findings. An abdominal paracentesis or the availability of CT were not mentioned in the full text. The definitive diagnosis was reached with laparoscopy.

DISCUSSION

As being highlighted from the review of the literature, the differential diagnosis between ascites and pseudoascites is not always easy and several patients were misdiagnosed and treated for ascites for varied periods of time (from months to years) before reaching an accurate diagnosis (table 1).

The physical signs of ascites are neither sensitive nor specific and their value is limited. However, some patients considered as having ascites only by physical examination and underwent an abdominal paracentesis (table 2).

Abdominal U/S is usually sufficient to demonstrate the free peritoneal fluid and to define the etiology.[7] The differential diagnosis between pseudoascites and ascites is based on specific sonographic features: the absence of fluid in Morison's pouch and the left upper quadrant,[8] the absence of floating bowel loops within the abdomen[9] as well as the absence of free fluid in the perihepatic region.[52] However, U/S is known for its operator-sensitivity[42] and may, in a minority of cases give misguiding information.[45] Actually, several cases of patients misdiagnosed with ascites by physical examination and U/S were identified, who underwent an abdominal paracentesis (Table 3).

In doubtful cases other diagnostic modalities, like CT are useful for the differential diagnosis between ascites and pseudoascites.[43] CT is not only useful for making a correct diagnosis but also to provide more accurate information than U/S regarding the exact extension and margins of cystic masses.[52] Specific CT features that differentiate between ascites and pseudoascites include: the separation of bowel loops and the absence of fluid in locations where freely mobile ascites typically collects, such as the perihepatic spaces or the cul-de-sac of the pelvis.[53]

But even then, as it seems from the cases in table 4, even after an extensive work-up the diagnosis may be inconclusive.[49] In these cases, laparoscopy is a reasonable diagnostic modality[43] as abdominal paracentesis should be avoided in equivocal diagnosis.[7]

In some of the cases referred we can detect clearly the causes that led to the initial misdiagnosis and/or incorrect handling:

In the case of Menon & Rao [20] the review of a previous CT, reported to be consistent with ascites, was suggestive of a cystic mass. In the case of Oray-Schrom et al[32] there was an obvious cause for the presence of ascites such as congestive heart failure and so the patient initially was evaluated as having ascites. Similarly, except from the clinical signs of ascites, the patient reported from Dixon et al[28] had also clinical signs of congestive heart failure.

Likewise, in the case of Mikos et al [9] there was a history of hepatitis B infection and the liver function tests appeared to be moderately elevated.

An obvious cause for the presence of ascites may be also considered in the second case of Fiedorek et al,[7] in which an alcoholic man with abnormal liver function tests presented with increasing abdominal distension. Alcohol abuse for 20 years was also reported in the case of a woman with symmetrically and massively distended abdomen, who was presented from Liss et al.[38]

In other cases[26,28] the previous longstanding diagnosis of ascites was not argued and the patients initially encountered as having ascites.

In five patients (more than 10%) an obvious cause explaining the presence of ascites (two cases with clinical signs of congestive heart failure and three cases with history compatible with chronic liver disease) existed. However, the further workup proved that the initial impression was misleading.

Most patients underwent an abdominal paracentesis. Abdominal paracentesis is a safe procedure and serious complications are uncommon.[54] The complications described were: ascitic fluid leak, bleeding, bowel perforation and infections.[55] Death due to paracentesis although rare, exists as a possibility (mortality rate 0.16 to 0.39 percent in the two largest series).[54,56] Moreover, in specific cases, abdominal paracentesis may be harmful. According Fiedorek et al[7] such cases were: ovarian cysts that may be malignant, ovarian pseudo-mucinous cystadenomas, primary malignant tumors of the omentum and malignant retroperitoneal cysts, massive hydronephrosis and hydatid cysts.

Our study has some limitations. First of all, case reports present with an overall limitation due to the fact that some cases lack complete information. Secondly, since case reports are not chosen from representative samples of patients it is not possible to calculate the frequency of misdiagnosis in the overall population. Moreover, it is possible that these cases are underreported. A third limitation is that we have not been able to review all the relevant literature but only those cases that were available in English.

CONCLUSION

As it seems, the differential diagnosis of ascites cannot be based only on history and clinical examination. All patients should undergo an abdominal U/S and in doubtful cases a CT or an MRI of the abdomen should be performed. If the imaging studies do not reveal typical signs of free fluid, especially in patients with no other signs and symptoms of chronic liver disease, renal disease, congestive heart failure or intraabdominal malignancy, the patients (which ultimately are few) should undergo an exploratory laparotomy instead of an abdominal paracentesis, which could have disastrous consequences.

ACKNOWLEDGEMENTS

Conflict of Interest: The authors have no conflict of interests or financial disclosures.

Funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

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