e-ISSN: 0975-5160, p-ISSN: 2820-2651

Available online on www.ijtpr.com

International Journal of Toxicological and Pharmacological Research 2022; 12(6); 149-157

Original Research Article

A Retrospective Study of USG Guided Drain Placement in Critically Ill Patients with Pyoperitoneum

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Received: 10-04-2022 / Revised: 15-05-2022 / Accepted: 20-06-2022
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Conflict of interest: Nil

Abstract

Background: Pyoperitoneum is a well encountered condition noted by surgeons during their lifetime practice. Primarily this study points about the management of critically ill patients with Pyoperitoneum by minimal invasive surgery with good outcome. In this study the patients with Pyoperitoneum in critical condition underwent minimal invasive surgery with the aim for better survival rates and less morbidity.

Materials and Methods: This is a retrospective record based observational study conducted at tertiary care centre from September 2018- to December 2021 for 3 Years. During this period a total of 26 patients who were suggestive of Pyoperitoneum and detailed analysis was conducted on their medical records. Data is expressed as numbers and percentages in tables and figures with appropriate statistical analysis.

Results: Twenty-six patients records were suggestive of Pyoperitoneum and 19 patients out of this 26 were found to be of ruptured liver abscess leading to the Pyoperitoneum with detailed results discussed in the study.

Conclusion: It is concluded with a message that all the patients of Pyoperitoneum with critical condition should undergo minimally invasive drain placement procedure and should be given a chance for survival.

Keywords: Pyoperitoneum, Ruptured liver abscess; Percutaneous catheter drainage; Critically ill patients; survival, surgery.

Introduction

Pyoperitoneum is a well encountered condition noted by surgeons during their lifetime practice. This Pyoperitoneum develops primarily in patients with immunocompromised status, tubercular abdomen, primary peritonitis, ruptured liver abscess, pelvic abscess, sealed perforation, etc.

Figure 1: Post-operative Bile Leakage with resulting peritonitis

Ruptured Liver abscess is the most common extraintestinal complication of amoebiasis and occurs in approximately 3% to 9% of patients with amoebic infection (Debakey & Ochsner 1959; Landay *et al*. 1980; Peters *et al*. 1981).[1,2] Due to the effectiveness of amoebicidal therapy in the management of these abscesses, aspiration or catheter drainage is rarely necessary (Ralls 1998). However, resistance to drug therapy occurs in some patients (Singh & Kashyap 1989), who may consequently need alternative or additional methods of treatment. The intra–abdominal drain placement is adjunct procedure in critically ill patients /neglected alcoholic patients prior to exploratory laparotomy for acute abdomen.

Since the initial studies published in the eighties, percutaneous radiologic drainage, is considered the first-line treatment of infected post-operative collections and is successful in over 80% of patients. Mortality due to undrained abscesses is estimated between 45 and 100%.[3]

Historically, the diagnosis of liver abscess was associated with high morbidity and mortality rates. Often there is delay in diagnosis because the clinical picture of a hepatic abscess can be characterized by a variety of non-specific constitutional symptoms.[4] With the introduction of high-resolution imaging techniques such as ultrasonography and CT, advances in bacteriology and the development of more potent antibiotics, the outcome for such patients has generally improved.[5]

Pyoperitoneum is also secondary as a sequel gastric/pyloric perforation. The patients with Pyoperitoneum (except acute peritonitis after perforation) goes into decreased immunity status as a consequence of bacterial infection. This bacterial infection and pus lead to decrease in hematocrit, increase TLC count, disrupted liver functions specially in cases of liver abscess. These patients with altered investigation gradually become critical, because of decrease vital functions and increased in bacterial load, further leading to deterioration of organ functions, increased in sepsis and ultimately landing in multi-organ dysfunction.

Materials and Methods

In this retrospective record-based study, Patient Records were searched from the year 2018 till 2021 (September 2018- December 2021) from MRD section of Department of Surgery in a tertiary care institution & elaborately studied. During the period of study, 26 patient record were found which where suggestive of Pyoperitoneum.

The records by which the authors concluded that the patients are of Pyoperitoneum consisted of USG abdomen, doctors' notes and supportive Hematological investigation and surgical findings in operative notes. An extensive medical examination was performed on all individuals. Standard criteria were used to establish the diagnosis.

On admission, patients were assessed clinically and by ultrasonography to see if peritoneal drainage might be used to avoid surgical care in severely sick patients. Researchers have retrospectively reviewed cases of Pyoperitoneum who underwent ruptured abscess and required drainage in critically ill patients. High risk patients were categorized by Boey's Score[6] (1. Preoperative blood pressure <100 mm/hg, 2. Delayed presentation >24 hours, 3. Major medical co morbid illness.)

Figure 2: USG showing Pyoperitoneum/ Ruptured liver abscess.

Figure 3: USG showing Pyoperitoneum/ Ruptured liver abscess.

Results

Twenty-six Patients records were suggestive of Pyoperitoneum and 19 patients out of this 26 were found to be of ruptured liver abscess leading to the Pyoperitoneum, rest 7 patients did not suggest any etiology.

Out of 26 patients, 18 patients were males and the rest 8 patients were females. Out of 5 patients in which the records were suggestive of sealed perforation, 3 patients were males in the age group 40 -50 years and 2 patients were females with primary peritonitis of younger age group between 20–30 year.

Patient distribution according to age group is as shown in Figure 4. Conclusion drawn from the doctors' notes were suggestive of Pyoperitoneum in 19 patients followed by sealed perforation in 5 records and primary peritonitis in 2 records.

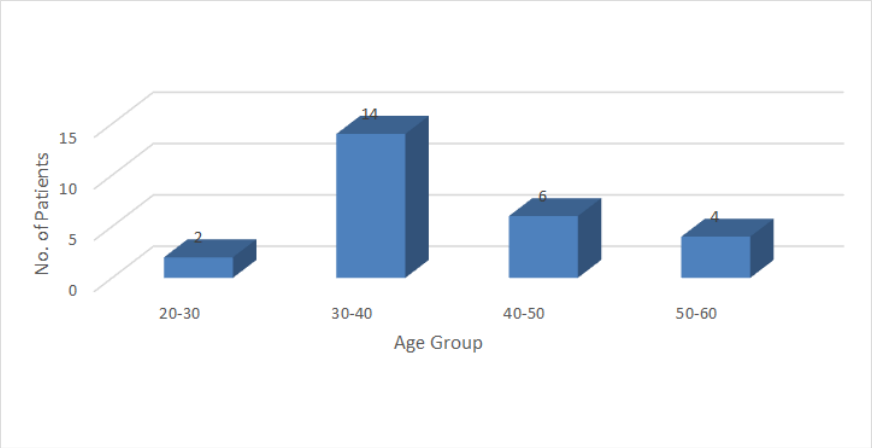

Figure 4: No. of Patients with Pyoperitoneum

There were 14 male patients and 5 female patients among the 19 individuals whose data suggested a ruptured liver abscess. The age group of these patients was varying, but the majority of the patients were in middle and younger age group as per the record.

The records further suggested that, the patients of ruptured liver abscess were mostly males of younger and middle age group and addicted to some or other kind of nicotinic addiction and alcohol.

The females having ruptured liver abscess were in the age group of 30-50 year and 3 females out of 4 were having associated gallstones and long history of fever. According to NW Pearce et al, coliforms were the most common isolate in the liver abscess of both biliary & portal origin, [7] Gram positive cocci accounted for most cases of gallstones with fever which is similar in this study.

Table 1: Association of Pyoperitoneum with Liver Abscess

Causative factor	No. of Patients
Amoebiasis	15
Cholecystitis	03
Diabetes mellitus with sepsis	06
Cryptogenic	02

In all patients, abdominal pain, fever and tenderness were present on examination along with acute abdomen as shown in Table 2.

All these 26 patients were having deranged hematological investigation suggestive of bacterial sepsis and the general condition was poor hence they underwent bilateral drain placement under USG guidance even if they were not included for analysis. In patients with a high fever, toxemia, or a lack of response to pharmacological therapy, an abdominal drain was inserted to confirm the diagnosis. After obtaining necessary consent, 32 French drains were placed into the peritoneal cavity under ultrasonographic (US) guidance.

As per the records the patients were not fit to undergo exploratory laparotomy under anesthesia because of poor general condition and other comorbidities (such as ischemic heart diseases, COPD and Cirrhotic liver diseases), hence the patient underwent drainage procedure.

All the 26 patients underwent USG guided drain placement, but this study will now further deal with the 19 patient of ruptured liver abscess. The planned drain placement was done in operation theater under all aseptic condition with the help of portable USG machine (esoate) under the guidance of sonologist with local anesthesia.

All the 19 patients underwent bilateral drain placement from the lumber region on both sides with the attempt to place the right drain in the epigastric region and the left drain in the pelvic region.

The drain placement was done after painting & draping with all aseptic precaution and instillation of 2% injection xylocaine as local anesthesia. All the patients were covered with intravenous antibiotics coverage of piperacillin +tazobactam and metronidazole.

Table 2: Clinical features of patients with liver abscess

Signs and associated illness	No. of patients
Abdominal pain	26
Fever > 38^0c	26
Jaundice	8
Septicemic shock	1
Diabetes mellitus	9

After placement of drain all the patients were shifted to ICU and were kept on intravenous fluids and antibiotic coverage. Patients were kept on Taylor's regime before & after surgical procedure, consisting of intravenous fluids, nil per oral, nasogastric aspiration done by large Ryle's tube placed in greater curvature and output measured.[8,9]

The 19 patients with Pyoperitoneum due to a ruptured liver abscess were separated from the other 7 patients with primary peritonitis, and the ruptured liver abscess patients were the focus of further research.

Out of 19 patients of ruptured liver abscess, clinical conditions of 17 patients started to improve nearly 48–72-hour post drainage where 2 patients did not show any signs of clinical/hematological improvement in their conditions and later on succumbed owing to sepsis.

Signs of clinical improvement in the 17 patients was stabilization of blood pressure after withdrawal of ionotropic support in few patients with decreased TLC, CRP, SGOT, SGPT & Alkaline phosphatase. The fever was subsided subsequently and periphery becomes warm as per clinical signs of improvement.

Some patients had positive serological results for Entamoeba histolytica (1:400 or more by enzyme-linked immunosorbent assay) similar to study by A. Ramani et al. [10] In the study by Madalina Stan-lie et al, Microbiological

analysis showed that the majority (54%) were monomicrobial. The most encountered pathogens were Klebsiella pneumoniae and Escherichia coli.[11] In 12 cases, the culture sensitivity report suggested amoebic liver abscess and in 7 individuals, pyogenic liver abscess similar to findings by Yang Ya-Fei et al. [12] On an average nearly 5-7 days were required for the patients to start on oral feeds and removal of the drain. All the patients were discharged on oral antibiotics which consisted of ofloxacin mg/bd, metronidazole 400mg /tds & Paracetamol SOS as per standard protocol.[13]

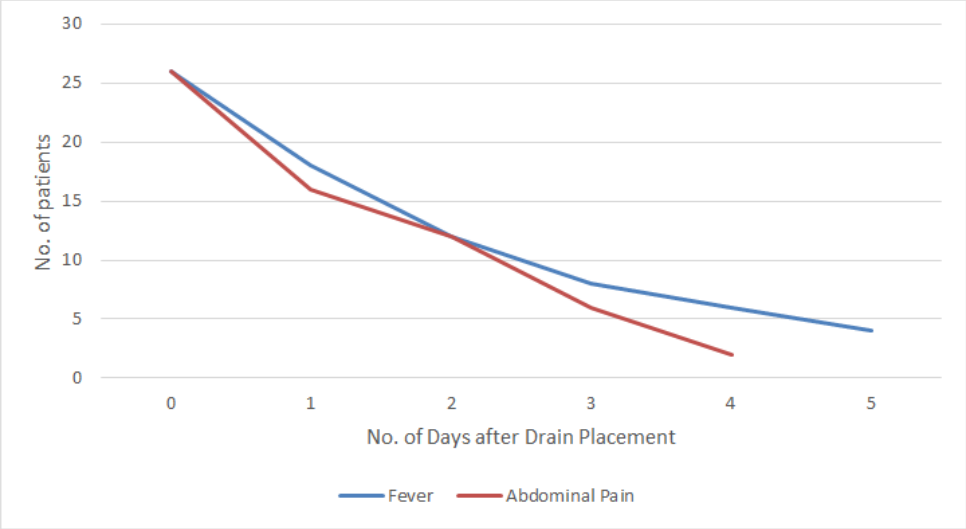

Figure 5: Resolution of fever & abdominal pain after drain placement

Discussion

In underdeveloped and third-world nations, Pyoperitoneum is one of the leading causes of illness and, eventually, mortality. The increasing incidence of Pyoperitoneum in these countries shows a pattern of increasing trends of intoxication with alcohol, changed in life style & habits and deterioration in food and eating habits. Pyoperitoneum as a result of primary peritonitis, especially in females resulting from unhygienic lifestyle.

In this study we have dealt with already treated cases of Pyoperitoneum who were admitted with critical condition & life-threatening sepsis. These patients could not be operated (Laparotomy) because the anesthesia clearance could not be done hence the decision of treating the patient with minimally invasive, surgical procedure was made. Similarly, Yu-Long Cai et al [14,15] in their study quoted that "in the modern era of minimal invasiveness, percutaneous treatment (either needle aspiration or catheter drainage) has become the preferred method for the management of liver abscess.

Because this is retrospective research, all conclusions and findings are based on previously performed surgical procedures and treatments. In this study, we discovered that incidence of amoebic liver abscess is considerably more common in this part of India (Bundelkhand) than pyogenic liver abscess and primary peritonitis.

We also found males are much more affected by the amoebic liver abscess as compared to females. [16] Moreover, the incidence of amoebic liver abscess was found to be increased in the patient who were addicted to alcohol and junk food.

Pyogenic liver abscess was also found in patient who had decreased immunity because of any other reason and also in patients with decreased in total proteins, encounter of pyogenic liver abscess in females was found in the age group of 30-40 years and both the females were found to have gallstones. 2 female patients in the younger age group were having primary peritonitis, however the cause could still not be understood.

According to Dr. Ismael Quezada-Adame et al [17] Rupture predominated in men with an average age of 38 years; the most common location of the abscess was in the right lobe; peritonitis was the most frequent indication for surgery.

All the patients in Pyoperitoneum in our study underwent placement of drain of size 28-32 Fr depending on the body stature and the amount of pus present in the peritoneal cavity.

All the patients tolerated the minimally invasive surgical procedure under local anesthesia very well and no mishaps was recorded in the operation thereafter. However, two patient succumbed owing to sepsis and poor general condition. Rest of the patients survived the surgical procedure in due time. Improvement in general condition was noted. According to Carlos A. Ordoñez *et al*, allowing for aggressive resuscitation and judicious assessment of the progression of the local inflammation are safe strategies to achieve the highest success and minimize serious and protracted complications in patients who survive the initial septic insult. [18]

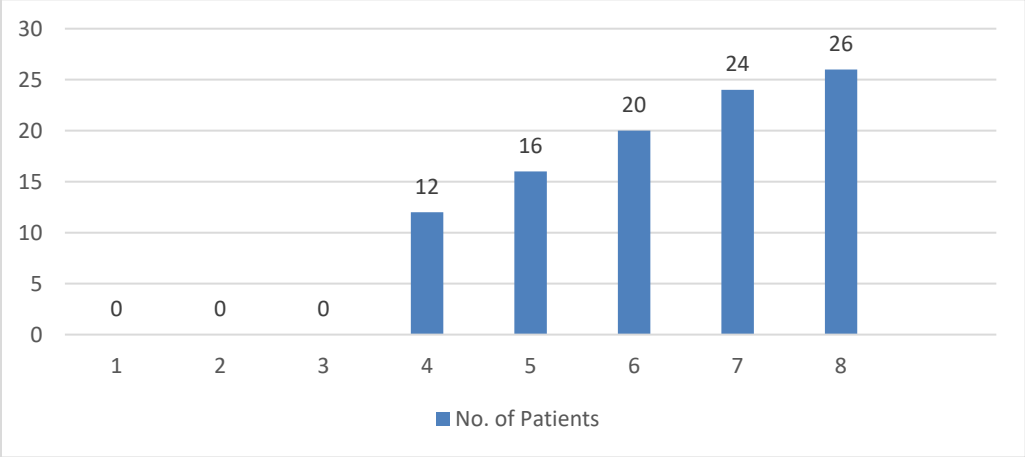

Figure 6: Initiation of oral intake after operation

Patients were started on oral diet on 4th & 5th day of surgical procedure as shown in Fig 6 and were discharged after removal of drain on 9th& 10th day.

As a result, it was discovered in this study that the condition primarily affects males between the ages of 25 and 55, with drinking alcohol being the primary predisposing factor. Poor economic condition and malnutrition, in addition to drinking, are important predisposing factors in the genesis of liver abscess. Consumption of locally manufactured alcohol is also important in the formation of liver abscess, although the reason for this remains unknown and need further studies. Although alcoholism is a risk factor, no role was observed in the etiopathogenesis, and liver function testing revealed no significant changes. Radio diagnostic techniques are improving, which aids not only in diagnosis but also in management. Pleuropulmonary complications were shown to be the most prevalent in severe liver abscesses, followed by peritoneal and

pericardial complications. The case fatality rate is nil when the abscess is contained to the liver. The case mortality rate is modest, even in severe instances. When the results of our study are compared to those of other studies conducted throughout the world, they are found to be similar.

Conclusion

The retrospective study reveals there is higher incidence of liver abscess in patients addicted to alcoholism and unhygienic food habits. Patients of liver abscess attain sepsis in very short periods of time and deterioration in liver functions makes the condition more critical.

Minimal invasive surgical procedure that is USG guided drain placement found to be very effective & fruitful method to drain pus and save life of the patient. Liver abscess in females was seen in association with gallstones however the sample size was too small to give any direct conclusion. We conclude with a message that all the patients of Pyoperitoneum with critical condition should undergo minimally invasive drain placement procedure and should be given a chance for survival which is in concordance to other studies. [7,19]

However, in agreement to Farges et al & KH Tay et al, large or multiloculated abscesses often require minimal access surgery or endoscopic approach.[20,21,22]

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