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Original Research Article

Comparison of the role of ultrasound guided transhepatic aspiration of gallbladder versus conservative management of acute calculous cholecystitis

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ABSTRACT

Background: Gall stone disease remains one of the most common medical problem leading to surgical intervention. Cholecystitis accounts for 3-10% of abdominal pain worldwide. Acute cholecystitis is the most common complication of cholelithiasis accounting for 14 to 30% of cholecystectomies performed in many countries. Symptoms in cholecystitis are due to impaction of stone and subsequent distention of gallbladder with inflammation. Study is aimed to clarify the role of ultrasound guided transhepatic gallbladder aspiration in the early management of acute calculous cholecystitis.
Methods: The study was conducted in total of 40 patients presenting with acute cholecystitis. 20 patients underwent ultrasound guided transhepatic aspiration of gallbladder with antibiotics (group A) and 20 patients were given antibiotics only (group B). Data were collected before intervention and post intervention duration of stay, pain according to visual analog scale, leucocytosis and fever were recorded for analysis. No complications were related to aspiration procedure.
Results: Both groups were comparable. Group A patients had better pain relief (p=0.0001 day on 2 and p=0.004 on day 3 post aspiration), percentage reduction of leucocyte count (p=0.041 on day 3) and duration of hospital stay (p=0.004) which were statistically significant.
Conclusions: Ultrasound guided transhepatic aspiration of gall bladder with antibiotics in acute cholecystitis results in better pain profile, faster reduction in leucocyte count and shorter duration of hospital stay when compared to antibiotics alone.

Keywords: Ultrasound guided aspiration, Acute cholecystitis, Leucocytosis, Pain, Duration of stay

INTRODUCTION

Acute cholecystitis is a frequently encountered disease in general surgical practice. Obstruction of cystic duct from stone impaction causes acute calculous cholecystitis. Temporary impaction as seen with biliary colic does not create inflammation as obstruction resolves. If it does not resolve, inflammation ensues with edema and a process known as acute cholecystitis. Infection of stagnant pool of bile is a secondary phenomenon, if primary pathology is unresolved cystic duct obstruction. Inflammatory changes manifest as fever, right upper quadrant pain with tenderness, guarding in right upper quadrant and positive Murphy's sign.[1]

The mainstay of therapy for acute cholecystitis is antibiotic therapy and early laparoscopic cholecystectomy has been advocated.[1] Some surgeons prefer to initially use the conservative approach to acute cholecystitis where intravenous fluid and antibiotic therapy are administered, and cholecystectomy is

performed after full recovery with adequate preoperative evaluation and preparation.[1]

Ultrasound guided transhepatic percutaneous aspiration of gallbladder is a minimally invasive radiological procedure designed to decompress the acutely inflamed gallbladder thereby removing the contents which is a source of biliary sepsis.[2-4] Drainage of content improves the overall condition of patient by decompressing the gall bladder and reducing edema and inflammation of gallbladder wall, reduces pain and reduces the possibility of secondary infection of gallbladder.[5]

The purpose of this study was to compare the role of ultrasound guided transhepatic gallbladder aspiration in the early management of acute calculous cholecystitis.

METHODS

This is a randomised control study conducted in the Department of Surgery, Maulana Azad Medical College and Associated Hospitals, New Delhi. The study population comprised of patients presenting to General Surgery Department of Lok Nayak Hospital, clinically and radiologically diagnosed as acute calculous cholecystitis, planned for conservative management, meeting the inclusion and exclusion criteria between March 2018 to March 2019.

Inclusion criteria were all patients above age of 18 years diagnosed with clinical acute calculus cholecystitis (proven on ultrasound abdomen). Exclusion criteria were deranged coagulation profile, immunocompromised individuals, cholangitis, pregnancy and lactation, normal WBC count at presentation.

Group A consisted of 20 patients (aspiration group) were test group. Group B consisted 20 patients (antibiotics group) were control group.

This study has been reported in line with Consolidated Standards of Reporting Trails guidelines. Patient coming with symptoms of acute cholecystitis were admitted and ultrasound abdomen was done to confirm the diagnosis of acute calculus cholecystitis. Written informed consent was taken. Simple randomization design was used for experimental and control with technique of blinding using sealed envelopes.

Group A

Patients were started on injection ciprofloxacin 500 mg IV BD, injection metronidazole 500 mg IV TDS and injection diclofenac 75 mg IM TDS. Under aseptic precautions after cleaning and draping, transhepatic therapeutic aspiration of gallbladder contents was done using 20 g needle under ultrasound guidance on day 1 of admission. Aspirated content was sent for culture and cytology and biochemistry. Post procedure ultrasound was done to look for any collection within the next 24 hours.

Follow up was done with daily white blood cells (WBC) count monitoring, pain relief according to visual analogue scale and temperature charting 4 hourly. Follow up was continued till the patient was completely asymptomatic, were observed for 24 hours of pain free interval and subsequently discharged. The patients were advised to undergo elective cholecystectomy after 4-6 weeks, subsequently.

Group B

Patients were started on same IV antibiotics and followed up with daily WBC, pain and temperature monitoring. Criteria for discharge and advice on discharge were the same.

In both the groups if the primary procedure failed to achieve remission of symptoms till maximum period of five days, the patient were subjected to either cholecystostomy or emergency cholecystectomy as a salvage procedure.

Statistical analysis

The collected data was entered in MS Excel. For quantitative data comparison was done by student t test. For qualitative data chi square test was used. P value<0.05 was considered statistically significant.

RESULTS

The study was conducted in Department of Surgery, Maulana Azad Medical College associated with Lok Nayak Hospital for 1 year.

A total of 40 patients were included in the study and were randomized into two groups (group A and group B) using sealed envelope method, each having 20 patients. Group A underwent ultrasound guided transhepatic aspiration of gall bladder and Group B was managed conservatively.

Outcome characteristics

The aspiration group (group A) compared to non-aspiration group had significant decrease in pain according to visual analog scale (VAS) on day 2 (p=0.0001) and day 3 (p=0.004), faster percentage reduction in total leucocyte count on day 3 (p=0.041) and lesser duration of hospital stay (p=0.004) as highlighted in Table 2.

Table 1: Patient characteristics.

Parameters	Total (n=40)	Group A (n=20)	Group B (n=20)
Age in years	40.5	40.5±11.24	38.5±8.64
Gender			
Females	40	20	20
Males	0	0	0
Gall bladder calculi			
Single	20	14	6
Multiple	20	13	7
Increased gall bladder wall thickness	16	7	9
Pericholecystic fluid	40	20	20
Total bilirubin	0.43	0.46±0.19	0.41±0.14
Alanine transferase	60	59.5±17.8	61.65±17.93
Aminotransferase	54	51.65±20.94	57.15±13.33
Alkaline phosphatase	82	83.9±23.19	81.25±16.59
Platelets	2.465	2.43±0.69	2.51±0.67
Urea	24	22.9±6.25	24.9±5.79
Creatinine	0.62	0.62±0.19	0.62±0.28
Sodium	137	137.2±2.57	137.4±2.46
Potassium	4.1	4.29±0.29	4.04±0.88

Table 2: Output characteristics.

Parameter	Group A (n=20)	Group B (n=20)	P value
Pain (VAS)			
Day 1	6.4±0.75	6.15±0.59	0.244
Day 2	2.35±0.59	3.15±0.49	0.0001
Day 3	0.65±0.75	1.4±0.75	0.004
Day 4	0.17±0.41	0.43±0.53	0.327
Percentage fall in TLC			
Day 2 (compared to Day 1)	15.89±7.7	15.67±6.32	0.922
Day 3 (compared to Day 2)	16.07±12.58	9.37±6.5	0.041
Day 4 (compared to Day 3)	17.35±11.73	7.32±9.58	0.118
Fever (no. of patients)			
Day 1	19	18	0.71
Day 2	11	11	0.888
Day 3	1	1	0.834
Day 4	1	0	0.648
Duration of hospital stay	3.3±0.57	3.75±0.44	0.004

TLC: Total leucocyte count.

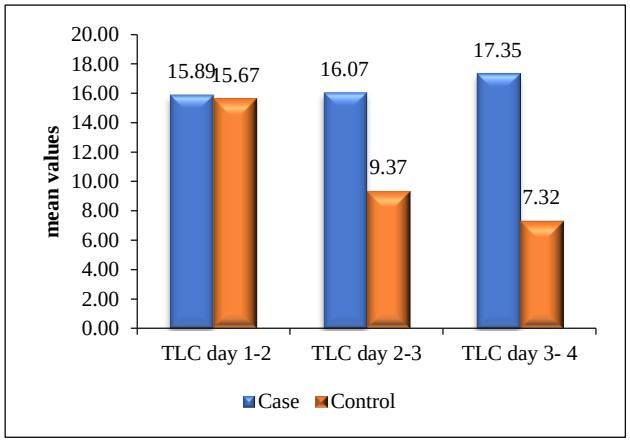

Figure 1: Percentage reduction in TLC.

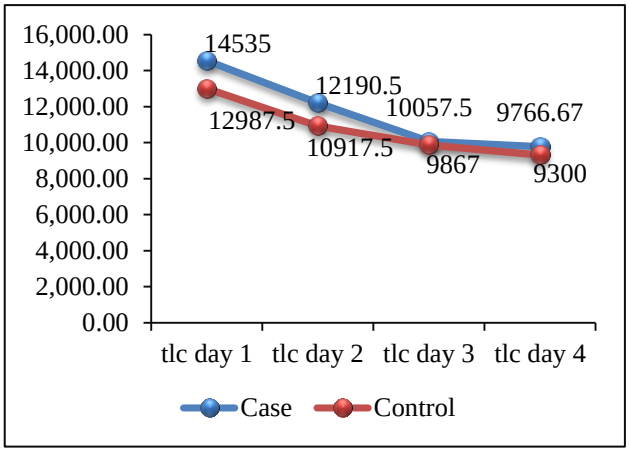

Figure 2: TLC trend.

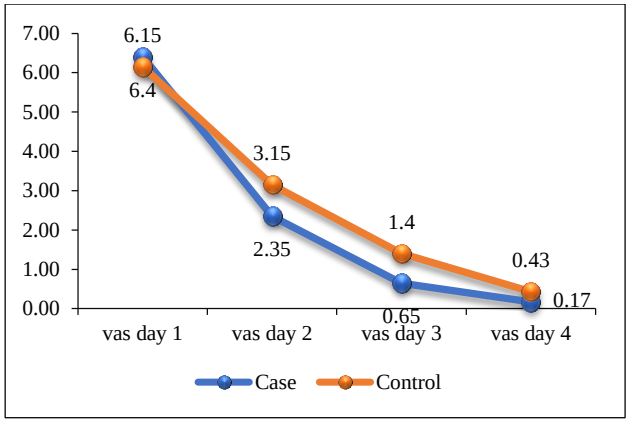

Figure 3: VAS trend.

DISCUSSION

Acute calculous cholecystitis (ACC) represents the second source of complicated intra-abdominal infection (18.5%), according to the World Society of Emergency Surgery Complicated Intra-abdominal Infections Score study.[6] Furthermore, it is recognized that patients with symptomatic cholecystolithiasis will develop ACC more frequently than their asymptomatic counterparts.[7] ACC is the most common complication of cholelithiasis accounting for 14 to 30% of cholecystectomies performed in many countries. The disease can be diagnosed at any grade of severity including wall inflammation, local complication and systemic organ dysfunction. Moreover, complicated grades of the disease increase with age, with a peak between 70 and 75 years.[8] First line therapy is generally conservative with analgesics and empirical antibiotics. If the patients present to the emergency within 24-72 hours emergency laparoscopic cholecystectomy is attempted in a lot of centres. References of ultrasound guided transhepatic aspiration of gall bladder dates backs to early 1920's. It was only done in patients who are critically ill and moribund patients as a salvage procedure. Percutaneous cholecystostomy has been introduced as a safe and effective procedure, but catheters left in place may cause complications.[9-12] On the other hand, gallbladder aspiration, which consists of only aspiration of the gallbladder content without the placement of a drainage catheter is useful in the treatment of acute cholecystitis in high-surgical-risk patients who are not critically ill. Our study was aimed at defining the role of gall bladder aspiration in low risk patients also (risk defined according to classification of acute cholecystitis in Tokyo guidelines.[13,14]

In our study both the groups were comparable. All the patients in this study were females. Teckchandani et al study showed more incidence in females with 92% and 8% males.[15] Ahmed et al study showed 80% incidence in females and 20% in males.[16] The above data further supports the fact that acute cholecystitis is more common in females than in males which is also reflected in this study.

No complications were reported in our study related to gall bladder aspiration and review ultrasound had no evidence of collection in all 20 patients.

In this study there is significant decrease in pain profile of the patients after aspiration on day 2 and day 3 since aspiration decreases the distension and the intraluminal pressure alleviating the patient from pain. Studies by Tazawa et al, Verbanck et al, Tsutsui et al conducted aspiration in 73, 18, and 42 patients respectively.[17-19] Tazawa et al reported 99% patient had immediate pain control(within 24 hours of procedure). Tsutsui et al reported 32 of 45 patients were relieved symptomatically with single aspiration and other patients required repeated aspirations.[19] Verbanck et al reported 15 of 18 patients were relieved symptomatically with single aspiration and other patients required repeated aspirations.[18]

In above conducted studies patients had associated co morbidities (chronic obstructive pulmonary disease, diabetes mellitus, malignancy etc) and were considered as moderate to severe acute cholecystitis (according to Tokyo guidelines) but in our study patients had no associated co morbidities.[13,14] There are no studies comparing role of gall bladder aspiration in mild acute cholecytitis (according to Tokyo guidelines) with no co morbidities. Statistically significant difference is suggestive that even patients without co morbidities can undergo gall bladder aspiration to relieve symptoms rapidly.

In this study there is statistically significant percentage reduction in total leucocyte count (TLC) on day 3. This could be due to early subsiding of inflammation post ultrasound guided aspiration. Since the gall bladder contents are aspirated there will be reduction in the inflammation which is reflected by the faster decline in TLC and thus felicitating in early discharge of patients. Tazawa et al conducted a study in which mean TLC at presentation was 12300±4700 and mean duration of normalisation of count was 5.7±4.5 days.[17] All the study in literature had data of TLC only at the time of presentation. In our study we have studied the trend of decrease in TLC with aspiration and antibiotics.

In this study the duration of hospital stay in patients who are managed with aspiration had a shorter duration of stay. Saber et al study showed a mean duration of hospital of about 5.7 days.[20] Macafee et al study the mean duration of hospital stay was 6.0 days.[21] Johansson et al showed a mean hospital stay of 8.0 days.[22] Comparing to literature our study had a still shorter duration of stay. The intervention done could be responsible for early alleviation of pain and the increased rate of fall of total leucocyte count in patients which resulted in early resolution of symptoms and hence shorter duration of stay.

CONCLUSION

We can conclude from the study that ultrasound guided transhepatic aspiration of gall bladder in acute calculous cholecystitis is a safe procedure which can be carried out even in early grade acute cholecystitis so that patients are relieved of symptoms early and also help in prevention of grave sequelae of the disease accounting to early discharge of the patient.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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