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General Surgery

COMPARISON OF OUTCOMES OF ACUTE CHOLECYSTITIS AMONG DIABETIC AND NON DIABETICS

Priyanka Jaiswal	Senior Resident
Tejesh Kumar Vashishtha	Senior Resident
Ani Sharma	Senior Resident

ABSTRACT **Aim and Objectives:** The aim of this study is to compare the para-clinical, intraoperative & post operative findings among patients with Acute Cholecystitis between Diabetic and Non- Diabetic patients. **Materials and Method:** The present prospective observational comparative study was conducted in the Department of General Surgery, Santosh Medical College & Hospital, Ghaziabad from January 2021 to June 2022. The sample size was determined to be 80 patients. The clinical features were recorded. The investigations recorded were Peripheral blood smear, Biochemical evaluation (Serum electrolytes, Blood Urea & Creatinine level, Blood sugar level, HBA1C Glycated hemoglobin, Fasting blood sugar, Post prandial blood sugar and Liver function tests). **Results:** Pain (45 %) and Fever (62.5 %) was significantly more among Diabetic group compared to Non-Diabetic group. Jaundice (3%) Biliary Colic (47.5%), guarding and rigidity (17.5%) and Murphy's Sign (25%) was significantly more among Diabetic group compared to Non-Diabetic group. Wound complication was significantly more among Diabetic group (12.5%) compared to Non-Diabetic group (2.5%). **Conclusion:** Comparatively, diabetics had bulky gallbladders, pericholecystic adhesions, and restricted gallbladders during elective laparoscopic cholecystectomy. Diabetes necessitated longer anaesthetic recovery and conversion to open.

KEYWORDS : Acute Cholecystitis, Cholelithiasis, Biliary Colic, Diabetes Mellitus

INTRODUCTION

Gallbladder inflammation is cholecystitis. Acute cholecystitis results from duct occlusion. Cystic duct blockage differentiates biliary colic from acute cholecystitis. Acute cholecystitis causes blockage, inflammation, oedema, and bleeding. A gas-forming bacterium makes acute cholecystitis gangrenous and emphysematous.[1]

Inflammatory gall bladder wall changes cause fever, right upper quadrant pain, palpable soreness, and right quadrant guarding. Acute cholecystitis is differentiated from biliary colic by tenderness and the murphy sign. Mild elevations in alkaline phosphatase, bilirubin, and transaminases, plus leukocytosis, indicate acute cholecystitis. Acute cholecystitis is a leading cause of stomach pain in middle-aged women and the elderly.[1]

Acute calculous cholecystitis occurs when a stone blocks the cystic duct. If the pain does not go away after six hours, the diagnosis of biliary colic is changed to acute calculous cholecystitis. If no stone is found, the condition is known as acute acalculous cholecystitis.[2,3]

Gallstones are present in around 95% of persons with acute cholecystitis.[4] However, because it is estimated that only 20% of patients with asymptomatic stones will develop symptoms within 20 years, and because approximately 1% of patients with asymptomatic stones develop complications of their stones before the onset of symptoms, prophylactic cholecystectomy is not warranted in asymptomatic patients.

With the global incidence of diabetes mellitus (DM) increasing, greater understanding of the varied clinical spectrum of biliary problems in diabetic patients should lead to earlier diagnosis and better results.[5] As a consequence, prior to the age of evidence based medicine, the logic driven inclination to propose preventative cholecystectomies in this group of patients remained a perpetuated paradigm for many generations of surgeons.[6]

Cholelithiasis and Diabetes mellitus affect each other's clinical course, motivating research in both in recent decades.[7] Cholecystitis, or gallbladder inflammation, is caused by gallbladder stones in 90% of cases (calculus cholecystitis). 10–15% of Western adults have gallstones. 1-4% of people develop symptoms per year. Nearly 500,000 cholecystectomies are performed annually in the US. In India, gallbladder disease is increasing, therefore cholecystectomies are too.[8]

Gallstones affect around 10% of the population, and cholecystectomy is the most frequent kind of major surgery in Western nations. Laparoscopic Cholecystectomy is a safe and effective way to treat cholecystitis. Although laparoscopic cholecystectomy is the conventional therapy for symptomatic gallstones, its significance in the treatment of acute cholecystitis remains unknown. As a result, there are still contraindications in this case.[9]

This is first-line treatment for acute cholecystitis. Studies compared medical and non-surgical treatments with emergency surgery for acute cholecystitis. Acute cholecystitis is deadly.[10-12]

Diabetes Mellitus is the world's most prevalent endocrine illness. Due to differences in diagnostic techniques, determining the real prevalence of this illness in the global population is similarly problematic. However, according to current figures, the global prevalence of this condition is 1 to 2%.[13]

Because of the prevalence of diabetes mellitus and the likelihood of operating on diabetics, the surgeon must constantly be aware of diabetic patients' concerns before, during, and after surgery. The surgeon should also be aware of the potential negative effects of surgery in these patients, as well as how to deal with them.[14]

The current research aims to assess the clinical, paraclinical, intraoperative findings, and postoperative consequences in diabetes vs. non-diabetic individuals with acute cholecystitis.

MATERIALS AND METHODS

The present prospective observational comparative study was conducted in the Department of General Surgery, Santosh Medical College & Hospital, Ghaziabad from January 2021 to June2022. The sample size was determined to be 80 patients.

The clinical features were recorded. The investigations recorded were Peripheral blood smear, Biochemical evaluation (Serum electrolytes, Blood Urea & Creatinine level, Blood sugar level, HBA1C Glycated hemoglobin, Fasting blood sugar, Post prandial blood sugar and Liver function tests).

Patients were subjected to routine plain X-Ray Abdomen to rule out other causes of acute abdomen like Duodenal ulcer with gas under the diaphragm, Calculi in upper renal system and Gas in the biliary system. Patients were subjected to ultrasound evaluation on clinical suspicion of acute cholecystitis. The following findings, if present were suggestive of acute cholecystitis

1. Presence of calculi
2. Presence of gall bladder wall edema>3mm
3. Pericholecystic collection
4. Evidence of free fluid in the subhepatic space
5. Presence of calculi obstructing the cystic duct.
6. Presence of adhesions if any
7. Presence of sonographic Murphy's sign

The study included patients aged upto 70 years of any gender and Newly diagnosed or Known case of diabetes mellitus. The study excluded Gall bladder cancer, comorbidities such as the cardiovascular, hypertension, COPD, bleeding disorders, Previous hepatobiliary surgery, Immunocompromised patients, Patient unfit for surgery, Age more than 70 and Patient not giving consent.

RESULTS

Among diabetic group (Group A), majority of the subjects belonged to 41-50 years (40.0%) followed by 31-40 years (32.5%). Among Non-Diabetic group (Group B), majority of the subjects belonged to 21-30 years (45.0%) followed by 31-40 years (42.5%). There were males 14 (35 %), females 26 (65%) in the diabetic group and males 9 (22.5%) and females 31(71.3%) in non-diabetic group. The p-value is 0.217.

Table 1: Symptoms

	Groups		p-value
	Diabetic	Non-Diabetic	
Pain	18	10	0.001*
	45.0%	25.0%	
Nausea/ Vomiting	38	35	0.235
	95.0%	87.5%	
Fever	25	16	0.044*
	62.5%	40.0%	

Table 2: Per Abdominal Findings

	Groups		p-value
	Diabetic	Non-Diabetic	
Biliary colic	19	20	0.823
	47.5%	50.0%	
Jaundice	3	2	0.021*
	7.5%	5.0%	
Guarding/ Rigidity	7	18	0.008*
	17.5%	45.0%	
Murphy's sign	10	20	0.021*
	25.0%	50.0%	
BOA 'S SIGN	0	0	1.000
	0.0%	0.0%	

Table 3: Wound Complications and Bile Leak

	Groups		p-value
	Diabetic	Non-Diabetic	
Wound complication	5	1	0.041*
	12.5%	2.5%	
Bile Leak	2	1	0.556
	5.0%	2.5%	
Drain Placed	19	16	
	47.5%	40.0%	
Wound infection	3	2	0.664
	7.5%	5.0%	
Double cystic duct	1	0	0.285
	2.5%	0.0%	
Frozen, dense pericholecystic adhesions	5	2	
	12.5%	5.0%	

Wound complication was significantly more among Diabetic group (12.5%) compared to Non-Diabetic group (2.5%).(p-value <0.05)

Bile Leak did not differ significantly between Diabetic (5%) and Non-Diabetic groups(2.5%). (p-value > 0.05). Bile leak in diabetic patients was because of difficult cholecystectomy, GB fossa leak and slippage of ligature. In non-diabetic it was due to difficult cholecystectomy and GB fossa leak.

Subhepatic drain was placed in 19 patients in diabetics and 16 patients in non-diabetics. Drain Placement was significantly more among Diabetic group compared to Non-Diabetic group.(p-value <0.05)

Wound infection is seen in 3 patients in diabetics group and 2 patients in non- diabetics. Wound infection was not significantly different between Diabetic and Non-Diabetic groups. (p-value <0.05).

Double cystic duct in 1 patients in diabetics and 0 in non-diabetic; frozen, dense pericholecystic adhesions in 5 patients in diabetics and 2 in non-diabetics with p value of 0.285. No significant difference was between Diabetic and Non-Diabetic groups. (p-value <0.05)

Table 4: Gall Bladder Pathology

Gall bladder status	Groups		p-value
	Diabetic	Non-Diabetic	
Normal	8	21	0.046*
	20.0%	52.5%	
Distended	23	16	
	57.5%	40.0%	
Oedematous	5	2	
	12.5%	7.5%	
Mucocele	6	3	
	15.0%	7.5%	
Empyema gall bladder	3	1	
	7.5%	2.5%	
Phyregian cap	1	0	
	2.5%	0.0%	

Table 5: Number of Calculi

Number of Calculus	Groups		p-value
	Diabetic	Non-Diabetic	
One	15	20	0.260
	37.5%	50.0%	
Multiple	25	20	
	62.5%	50.0%	

DISCUSSION

Gallstone disease is common in India, affecting more women than men and is increasing with time. This may be related to lifestyle modifications and is more commonly diagnosed due to the ease of availability of ultrasonography to assess abdominal problems.

In present study, the mean age was significantly more among Diabetic group compared to Non-Diabetic group. Age increases the likelihood of having numerous cholecystitis bouts. Vivek et al. experienced difficulty in performing surgery in patients over 65 years due to adhesions.[7]

It was found in our research that there was no significant difference in the distribution of males and females between Diabetic and Non-Diabetic groups. Kaplan et al.[6]has shown similar findings in his study. Male sex was a statistically significant predictor of inflammation and surgery was more challenging in a gender-specific research by Ambe et al.[1]

The number of patients who were hospitalized for Acute cholecystitis in the general population, among them 28.8% of patients those who underwent Cholecystectomy were men. Male gender has been identified as a risk factor for severe cholecystitis by Lein et al.[8] This data indicates increased disease severity in males and may support the suggestion of early intervention in male patients with acute cholecystitis . The reason for doing Cholecystectomy would be severity or lack of improvement in symptoms.[18] In our study , majority of the patients were female.

In our study, pain was significantly more among Diabetic group compared to Non-Diabetic group. Martínez-Alpuche R.A. et al.[9] reported that diabetic individuals experienced much more intense pain than non-diabetic people. It was observed that diabetic patients having open cholecystectomy had higher postoperative pain intensity when compared to non-diabetic patients.

Our findings are consistent with those of Karci and co-workers who found that diabetic patients having major elective abdominal surgeries experienced greater pain and needed more rescue analgesics than non-diabetic patients.

Additionally, diabetic patients with glycosylated haemoglobin (HbA1c) levels higher than 6.5% are more likely to experience inadequate analgesia in the early postoperative period[23] or require more analgesics during surgery, which suggests that these patients experience more pain than non-diabetic patients with HbA1c levels below 6.5%.

Open cholecystectomy patients who are non-diabetics are reported to experience moderate to severe postoperative discomfort.[10] Polanco-Garca et al., demonstrated that the mean pain score following general surgery was about 6 NRS (severe pain), and the percentage of patients who experienced moderate to severe pain was approximately 40%.[10] As per one study, diabetes exacerbates the pain hypersensitivity

associated with surgery, and this is also consistent with the findings of several preclinical studies.[30-34]

Jaundice, Biliary Colic and Murphy's Sign was significantly more among Diabetic group compared to Non-Diabetic group. This was similar to the findings by Serban et al., Lal et al and Luthra et al.[11-13] In our study, Jaundice, Biliary Colic and Murphy's Sign was significantly more among Diabetic group compared to Non-Diabetic group. (p-value <0.05)

We found that wound complication was significantly more among Diabetic group compared to Non-Diabetic group. Serban D. et al.[11] stated that minor problems, such as surgical site infections, and significant cardiovascular events were more prevalent in the diabetic category;

In our study, wound complication was significantly more among Diabetic group compared to Non-Diabetic group. (p-value <0.05) Bile Leak was significantly more among Diabetic group compared to Non-Diabetic group.

Distended Gall bladder was significantly more among Diabetic group. Serban D. et al.[11] discovered that the diabetic group had higher Charlson co-morbidity index (CCI) and ASA risk classifications.

Lap to Open conversion of surgery was significantly more among Diabetic group compared to Non-Diabetic group. Luthra A et al.[13] discovered that open conversion were more likely in diabetic patients than in non-diabetic patients. Serban D. et al.[11] discovered that the rate of conversion was higher in the diabetic group (13.2%) vs. the non-diabetic group (6.9%)

Drain Placement was significantly more among Diabetic group compared to Non-Diabetic group. Kaplan U et al.[7] noticed that the bile cultures were collected from 252 (92.64 percent) patients and were positive in 134 (53.2 percent) patients. Two pathogens were detected in 4% of cases.

In our study, Drain Placement was significantly more among Diabetic group compared to Non-Diabetic group.(p-value <0.05).

In this current study, wound infection was significantly more among the Diabetic group as compared to Non-Diabetic group. Serban D. et al.[11] discovered that minor problems, such as surgical site infections, and significant cardiovascular events were more prevalent in the diabetic category, and were well linked with preoperative status and baseline cardiovascular comorbidities.

In our study post-operative wound infection was not significantly different between Diabetic and Non-Diabetic groups.(p-value <0.05)

In this current study, frozen, dense pericholecystic adhesions was significantly more among Diabetic group compared to Non-Diabetic group. Multiple Calculus was significantly more among Diabetic group compared to Non-Diabetic group. In our study calot's triangle anatomy was normal in 34 patients in diabetic group and 38 patients in non-diabetics ; double cystic duct was seen in 1 patients in diabetics and 0 in non-diabetic; frozen ,dense pericholecystic adhesions was seen in 5 patients in diabetics and 2 in non-diabetics with p value of 0.285. No significant difference was between Diabetic and Non-Diabetic groups. (p-value <0.05).

In our study based on the number of calculi, Multiple Calculus was significantly more among diabetic group compared to non-diabetic group.(p-value <0.05). Luthra A et al.[13] discovered that adverse intraoperative findings such as thick-walled gallbladder (GB), pericholecystic collections, and adhesions to the surrounding structures, surgical complications and modification to subtotal cholecystectomy were more likely in diabetic patients than in non-diabetic patients.

Poorly managed diabetes (elevated HbA1c > 6) was associated with a higher probability of switching to an open procedure, according to a research by Ibrahim et al. in Singapore.[14] They believed that improperly managed blood sugar levels cause significant inflammation and, in turn, severe adhesions, which affect patients' anatomy of the hepatobiliary structures.

CONCLUSIONS

Compared to non-diabetics, elective laparoscopic cholecystectomy in diabetics was associated with more unfavourable intraoperative findings, including thicker gallbladder, pericholecystic adhesions, and constricted gallbladder. Additionally, it was shown that the diabetic group required greater time for anaesthetic recovery and conversion to open.

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