A Study to Evaluate the Clinicosurgical Outcome Of Patients with Acute Cholecystitis using Tokyo Guidelines 2013

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ABSTRACT

Background:- Aim of this study was to evaluate clinicosurgical outcomes in patients of acute cholecystitis using Tokyo Guidelines 2013 in assessing duration of hospital stay, percentage of patients managed surgically or only conservatively, percentage of patients with complications and mean ICU stay.

Methods:- This study was conducted in department of general surgery, Dr. S.N. Medical College, Jodhpur, Rajasthan, from December 2018 to December 2019. This was a single centred, prospective, observational study, conducted in 100 patients, aged >18 years of acute cholecystitis excluding Patients with severe comorbid conditions like HIV, Tuberculosis, chronic kidney disease, chronic liver disease or any other factors which adversely affect the outcome. Data was summarized in the form of proportions, histograms and tables to show relationships of parameters with results.

Results:- Majority of patients belonged to age group of 31-40 years & 61-70 years. 74 patients were classified into the Mild grade (74%), 21 patients were classified into the Moderate grade (21%) and 5 patients were classified into the Severe grade (5.0%). Patients with higher severity as per the Tokyo Guidelines 2013 had longer hospital stay and more prone to develop post operative complications.

Conclusion:- This study focused on three groups of patients with acute cholecystitis according to the severity grading in the Tokyo guidelines criteria. Significant benefit of the application of the Tokyo guidelines in outcomes, including incidences of survival, post-surgery complications, reduced mean length of hospital stay and mortality was found. Thus Tokyo Guidelines is a useful score for evaluation of prognosis, outcome and hospital stay in patients of acute cholecystitis.

Keywords:- Acute cholecystitis, Tokyo Guidelines 2013, Diagnostic criteria, Severity assessment

INTRODUCTION

Acute cholecystitis is a disease frequently encountered in daily practice presenting with right hypochondrial pain as the main symptom. However, there were no diagnostic criteria and severity assessment criteria for this disease before the publication in 2007 of the Tokyo Guidelines for the management of acute cholangitis and cholecystitis (TG07) in the Journal of Hepato-Biliary-Pancreatic Surgery[1]. The diagnostic criteria of the updated Tokyo Guidelines (TG13) have high sensitivity (87.6 %) and high specificity (77.7 %)[1]-[5]. A diagnosis of acute cholecystitis is made as follows according to Tokyo Guidelines 2013.

TG13 DIAGNOSTIC CRITERIA FOR ACUTE CHOLECYSTITIS
A. Local signs of inflammation etc. – 1. Murphy's sign, 2. Right Upper Quadrant mass/pain/tenderness
B. Systemic signs of inflammation etc. - 1. Fever, 2. Elevated C - reactive protein, 3. Elevated WBC count
C. Imaging findings imaging findings characteristic of acute Cholecystitis
Suspected diagnosis: One item in A + one item in B
Definite diagnosis: One item in A + one item in B + C
Acute hepatitis, other acute abdominal diseases, and chronic Cholecystitis should be excluded.

TG13 SEVERITY GRADING FOR ACUTE CHOLECYSTITIS:-
Grade III (Severe) Acute Cholecystitis:-

Associated with dysfunction of any one of the following organs/systems:
1. Cardiovascular dysfunction- Hypotension requiring treatment with dopamine >=5 mcg/kg per min or any dose of norepinephrine.
2. Neurological dysfunction- Decreased level of consciousness
3. Respiratory dysfunction- PaO2/FiO2 ratio <300
4. Renal dysfunction- Oliguria (urine output <450ml/day), creatinine >2.0 mg/dl
5. Hepatic dysfunction - PT-INR >1.5
6. Hematological dysfunction -Platelet count <100,000/mm3
Grade II (Moderate) Acute Cholecystitis -
Associated with any one of the following conditions:
1. Elevated white blood cell count (>18,000/mm3)
2. Palpable tender mass in the right upper abdominal quadrant.
3. Duration of complaints >72 hours.
 4. Marked local inflammation (gangrenous Cholecystitis, pericholecystic abscess, hepatic abscess, biliary peritonitis, emphysematous cholecystitis)

Grade I (mild) Acute Cholecystitis -
Does not meet the criteria of ''Grade III'' or ''Grade II'' Acute Cholecystitis.

MATERIALS AND METHODS

This study was conducted in department of general surgery, Dr. S.N. Medical College, Jodhpur, Rajasthan, from December 2018 to December 2019. This was a single centred, prospective, observational study, conducted in 100 patients, aged >18 years of acute cholecystitis excluding patients with severe comorbid conditions like HIV, Tuberculosis, chronic kidney disease, chronic liver disease or any other factors which adversely affect the outcome. All patients were assessed on the basis of Tokyo Guidelines 2013, after managing the patient with all standard treatment protocols. After admitting the patient, presenting complaints and history of presenting illness was recorded in every case. All patients were inquired about their symptoms like pain abdomen, nausea, vomiting and fever complete blood count, liver function tests, renal function tests, blood sugar random, chest x-ray, arterial blood gas analysis on the day of admission. Ultrasonogrphy abdomen with special mention regarding Gall bladder wall thickness, presence of gall stone, common bile duct status (diameter, presence of stone), liver (echogenicity, biliary radicals) and pancreas (echotexture, peripancreatic fluid, main duct diameter) was made. Data was summarized in the form of proportions, histograms and tables to show relationships of parameters with results. Chi Square test were used wherever necessary for association analysis between categorical variables. Diagnostic test characteristics for mortality and complications was calculated from the ROC curves. A two sided of p values of less than 0.05 was considered statistically significant.Apporval from ethical committee of the institute and informed consent from the patients were taken.

RESULTS

In our study, 100 patients with diagnosis of Acute Cholecystitis were included .Among these patients, 74 patients were classified into the Mild grade (74%), 21 patients were classified into the Moderate grade (21%) and the other 5 patients were classified into the Severe grade (5.0%). Maximum numbers of patients with mild Cholecystitis (21%) were of age group 31-40 years. Maximum numbers of patients with moderate Cholecystitis (7%) were of age group 61-70 years. All patients with Severe Cholecystitis were 60 to 80 years old.There was Female preponderance (74%), with male to female ratio of 0.35:1.Most common presentation of Acute Cholecystitis was pain abdomen which was present in almost 100% of the patients. Second most common presentation was Nausea & vomiting in about 26%, followed by fever (10%), abdominal distension (3%), Dyspnoea (2%), Diarrhoea (1%) and Yellow discoloration of urine (1%).

62 patients (mild grade) underwent Laproscopic cholecystectomy. 1 patient (mild grade) underwent Laproscopic Cholecystectomy & Laproscopic CBD Exploration. 4 patients (moderate grade) underwent ERCP +/- CBD Stenting followed by Laproscopic Cholecystectomy. 1 patients (moderate grade) underwent ERCP + CBD Stenting followed by Open Cholecystectomy. Total 11 patients (2 patients of mild grade and 9 patients of moderate grade) underwent Laproscopic converted to Open cholecystectomy.12 patients (9 patients of mild grade & 3 patients of moderate grade) underwent Open cholecystectomy. 9 patients were managed conservatively (4 patients of moderate grade and 5 patients of severe grade). Average hospital stay of patients with mild cholecystitis was 8 days . Average hospital stay of patients with moderate cholecystitis was 15 days. Average hospital stay of patients with severe cholecystitis was 20 days. 7 patients (2 patients of mild grade and 5 patients of moderate grade) developed wound infection. One patient developed postoperative biliary leak for which CBD stenting was done. One patient who developed postoperative biliary leak had normal MRCP study and was managed conservatively.

DISCUSSION

In our study, 100 patients with diagnosis of Acute Cholecystitis were included .Among these patients, 74 patients were classified into the Mild grade (74%), 21 patients were classified into the Moderate grade (21%) and the other 5 patients were classified into the Severe grade (5.0%).Similar results were shown by **Shou-Wu Lee et al(2009)**[6] in their study which included 235 patients which were classified as mild cholecystitis (group I), moderate cholecystitis (group II) and severe cholecystitis (group III). Among these patients, 161 patients were classified into the grade I group (68.5%), 60 patients were classified into the grade II group (25.5%) and the other 14 patients were classified into the grade III group (6.0%). Although no significant differences among the three groups in age and gender were found, older age and more male predominance were noted in patients with more severe disease, especially in the grade III group. In study of **Ambe et al.(2015)**[7] Conversion from laparoscopic to open cholecystectomy was performed in 19 cases (13.7 %). There was a significant correlation ($\chi 2(1) = 10.43$, $p = 0.01$) between the preoperative severity grade and the extent of gallbladder inflammation on histopathology.Conversion to open surgery (14 vs. 5, $p = 0.002$) and complications (17 vs. 7, $p = 0.001$) were significantly higher inpatients with preoperative severity grade II/III compared to patients with severity grade I. In total, 19 patients (25.0% of 76 cases who received intervention) encountered major complications during hospitalization. The complication rate increased\along with Tokyo grading (Grade I: 3/31, 9.7%, Grade II: 7/25, 28.0%, Grade III: 9/20, 45.0%, p Z 0.016). Patients who did not undergo cholecystectomy were older,had higher rates of raised serum CRP or leukocytosis, more organ dysfunctions, and more comorbidities as indicated by higher Charlson's Comorbidity Score than patients who underwent surgical treatment. While in our study 11 patients (2 patients of mild grade and 9 patients of moderate grade) underwent Laproscopic converted to Open cholecystectomy.7 patients (2 patients of mild grade and 5 patients of moderate grade) developed wound infection. One patient developed postoperative biliary leak for which CBD stenting was done. In study of **Wei-Chun Cheng et al(2014)**[8] most frequently seen systemic complications of acute cholecystitis causing patients to be classified as Grade III were kidney and Hematological dysfunction. The least number of patients underwent cholecystectomy from the Grade III group (2 out of 24 patients, 8.3%) The length of hospital stay of the Grade III group was significantly longer than that of the other groups. Regarding the impact of treatment on hospital stay, the hospital stay was similar between Grade I patients who received surgery or non-surgical management. In total, 19 patients (25.0% of 76 cases who received intervention) encountered major complications during hospitalization. The complication rate increased along with Tokyo grading (Grade I: 3/31, 9.7%, Grade II: 7/ 25, 28.0%, Grade III: 9/20, 45.0%, p Z 0.016). In our study, average hospital stay of patients with mild cholecystitis was 8 days .Average hospital stay of patients with moderate cholecystitis was 15 days. Average hospital stay of patients with severe cholecystitis was 20 days.

CONCLUSIONS

The present study focused on three groups of patients with acute cholecystitis according to the severity grading in the Tokyo guidelines criteria. Significant benefit of the application of the Tokyo guidelines in outcomes, including incidences of survival, post-surgery complications, reduced mean length of hospital stay and mortality was found. Thus, Tokyo severity grading have an impact on therapeutic decision making of surgeons and also the clinical outcomes of patients with acute cholecystitis.

Table 1. Age Wise Distribution of patients with Acute Cholecystitis with severity grading

Age (yrs)	Mild		Moderate		Severe		Total	
	N	%	N	%	N	%	N	%
20-30	11	100.00	0	0.00	0	0.00	11	11.00
31-40	21	87.50	3	12.50	0	0.00	24	24.00
41-50	9	81.82	2	18.18	0	0.00	11	11.00
51-60	15	78.95	4	21.05	0	0.00	19	19.00
61-70	16	66.67	7	29.17	1	4.17	24	24.00
≥71	2	18.18	5	45.45	4	36.36	11	11
Total	74	74.00	21	21.00	5	5.00	100	100

Table- 2. Correlation of Hospital stay with severity of Acute Cholecystitis

Hospital stay (days)	Mild		Moderate		Severe		Total	
	N	%	N	%	N	%	N	%
5-10	65	87.84	9	12.16	0	0.00	74	74.00
11-15	6	42.86	7	50.00	1	7.14	14	14.00

16-20	3	42.86	1	14.29	3	42.86	7	7.00
≥21	0	0.00	4	80.00	1	20.00	5	5.00
Total	74	74.00	21	21.00	5	5.00	100	100.00

Table- 3. Correlation of Treatment Modality with severity of Acute Cholecystitis

| Treatment Modality	Mild		Moderate		Severe		Total	
	N	%	N	%	N	%	N	%
Conservative	0	0.00	4	44.44	5	55.56	9	9.00
Laproscopic cholecystectomy	62	100.00	0	0.00	0	0.00	62	62.00
Laproscopic cholecystectomy & Laproscopic CBD Exploration	1	100.00	0	0.00	0	0.00	1	1.00
ERCP followed by Laproscopic cholecystectomy	0	0.00	1	100.00	0	0.00	1	1.00
Laproscopic converted to Open cholecystectomy	2	18.18	9	81.82	0	0.00	11	11.00
Open cholecystectomy	9	75.00	3	25.00	0	0.00	12	12.00
ERCP with CBD Stenting followed by Open cholecystectomy	0	0.00	1	100.00	0	0.00	1	1.00
ERCP with CBD Stenting followed by Laproscopic cholecystectomy	0	0.00	3	100.00	0	0.00	3	3.00
Total	74	74.00	21	21.00	5	5.00	100	100.00
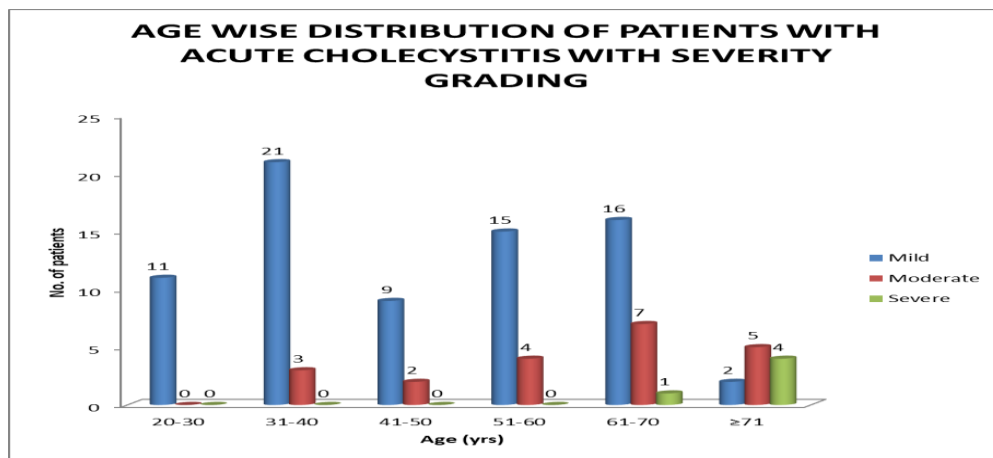
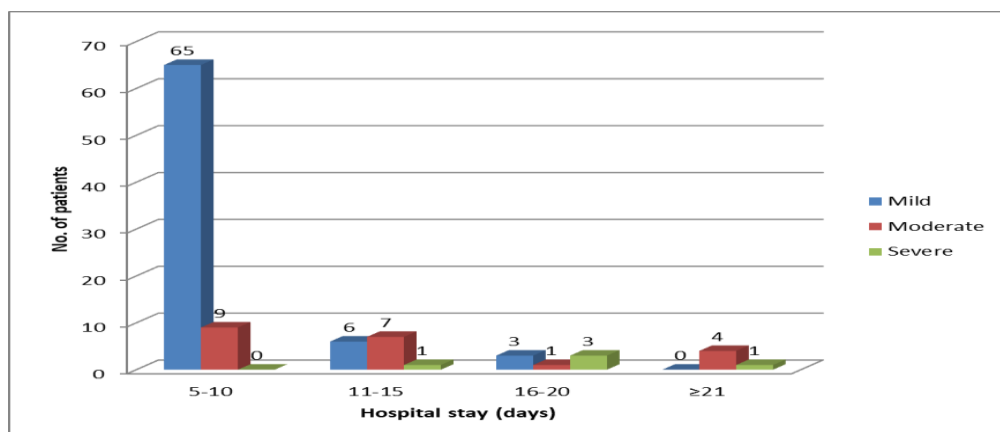**Figure - I . Age wise distribution of patients with acute cholecystitis with severity grading**

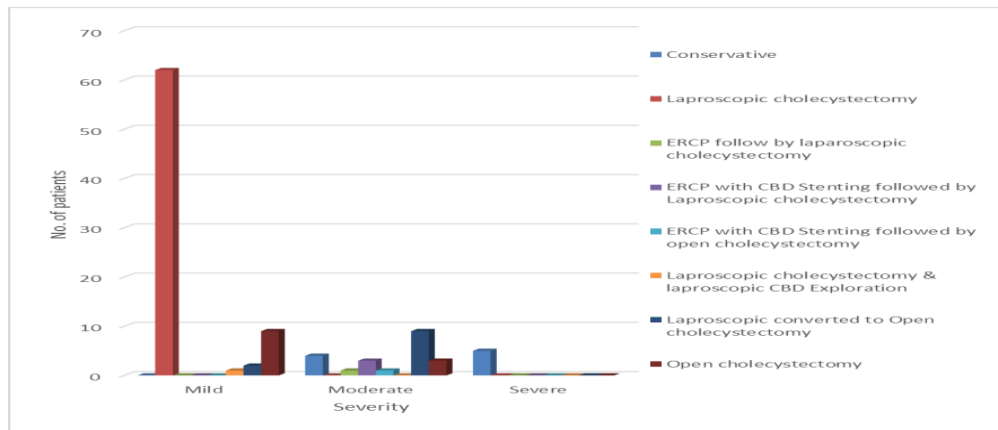**Figure - II . Correlation of Hospital stay with severity of Acute Cholecystitis**

Figure – III. Correlation of Treatment Modality with severity of Acute Cholecystitis

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