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A Study on Etiology, Severity, Management and Outcome of Acute Pancreatitis in Tertiary Care Teaching Hospital

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ABSTRACT

Acute pancreatitis is thought to be a local inflammatory process involving premature intra-cellular activation of digestive enzymes within acinar cells leading to auto digestion of the tissue that can progress to involve distant organs. AP was one of the most common diseases in gastroenterology. Practical understanding of etiology and severity will accommodate in advocate the appropriate treatment. The aim of our study was to provide safe and effective management by evaluating the cause, severity and appropriate treatment and outcomes in patients with AP. General Medicine department Rajiv Gandhi Institute of Medical sciences, a south Indian tertiary care teaching hospital Kadapa, Andhra Pradesh. A prospective interventional study was conducted in 60 patients with AP. Data collected from 60 patients was initially assessed for isolation of etiology by using specially self designed etiology assessment form, severity based on Atlanta severity assessment scale (ASAS). Treatment was given according to American college of gastroenterology (ACG) guidelines, and outcome was measured in terms of length of stay in hospital. Out of 60 patients 24(40%) patients with alcohol, 33(55%) with alcohol and smoking, 3(5%) with gall stones. On severity assessment 42(70%) patients were mild and 18(30%) were moderate. On measurement of outcomes 23(38.3%) patients were better, 25(41.6%) patients were moderate, and 7(11.6%) patients were poor control. we conclude that evaluating cause, severity and management based on the standard guidelines are found to be the safe and effective management of AP to reduce the hospital stay.

Keywords: Acute Pancreatitis (AP), ACG, ASAC

INTRODUCTION

Acute pancreatitis is thought to be a local inflammatory process involving premature intra-cellular activation of digestive enzymes within acinar cells leading to auto digestion of the tissue that can progress to involve distant organs. [1] There are two forms of pancreatitis. Acute and Chronic pancreatitis. AP occurs suddenly and may result in life-threatening complications; however the majority of patients (80 percent) recover completely. Chronic pancreatitis is usually the result of longstanding damage to the pancreas from alcohol ingestion. [2] AP is one of the most frequent gastrointestinal causes for hospital admission in the India. The annual incidence of AP ranges from 13 to 45/100,000 persons, and CP from 5 to 12/100,000; the prevalence of AP is about 50/100,000 persons. [3] The most common causes of acute pancreatitis are as follows, Alcoholism, Cigarette smoking, Gallstones, Cystic fibrosis, Post traumatic, Family history of pancreatitis, Idiopathic, High calcium levels in the blood, Abdominal surgery, Hyper lipidemia, Certain medications ex: azatioprine, thiazide, valproicacid, sulfasalazine, dideoxyiosine, trimethaprim-sulfamethoxazole,

pentamidine, tetracycline's, Infection, post ERCP, injury to abdomen, pancreatitic cancer. [4] Main clinical symptoms of AP are Upper abdominal pain, Abdominal pain that radiates to your back, Abdominal pain that feels worse after eating, Fever, Rapid pulse, Nausea, Vomiting, Tenderness when touching the abdomen. [5] According to Revised Atlanta criteria 2012 severity is divided into 3 types. They are mild, moderately severe, and severe acute pancreatitis. [6] American college of gastroenterology guidelines in management of AP presents recommendations for the management of patients with AP. [7] Three most important issues initially are pain relief, fluid replacement and nutrition. Thereafter, the issue of preventing or treating infection emerges. According to the WHO regime, the pain treatment begins with low potent non-steroidal anti-inflammatory medication, which may be sufficient in mild or moderate pain due to and rises step by step up to highly potent NSAIDs alone or in combination with opioids. Opioid analgesics may be considered an appropriate choice in the treatment of AP-associated pain. [8] Fluid therapy is the initial management of acute pancreatitis is largely supportive, with fluid replacement and optimization of electrolyte balance, providing adequate caloric support, and preventing or identifying and treating local and systemic complications. Nutritional support aims to provide adequate caloric intake and modulate the oxidative stress response during the initial phase of acute pancreatitis, thereby counteracting the catabolic effect. [9] Antibiotics that are active against Gram negative bacteria such as imipenem, clindamycin, piperacillin, fluoroquinolones, and metronidazole have adequate tissue penetration and bactericidal properties in infected pancreatic necrosis. Compared with other intravenous antibiotics, carbapenems are associated with a significant reduction in mortality, while use of imipenem significantly reduced the incidence of infected pancreatic necrosis. [10] Excessive stimulation of the exocrine pancreas worsens acute pancreatitis and thus it is the rationale to use anti-secretory agents as potential therapies for acute pancreatitis. Among many anticholinergenic drugs Atropine is very effective drug in treatment of acute pancreatitis. [1] There is a convincing body of evidence that antioxidant blood levels diminish during severe acute pancreatitis, and that supplements of antioxidants can prevent these falls in experimental and clinical pancreatitis. [11] Outcome measurement in AP the median length of stay for the patients in this study was 6 days for better control, 9 days for moderate control and 13 days for poor control in the mild, moderately severe, and severe AP. Treatment outcomes are measured based on the patient length of the stay in the hospital. [12]

MATERIALS & METHODS

STUDY DESIGN The study was Prospective interventional study.

STUDY SETTING The study was conducted at Rajiv Gandhi Institute of Medical sciences in the department of general medicine. This study got ethical approval from the IEC of RIMS, Kadapa.

STUDY PERIOD The study was conducted at a period of 6 months from July 2018- December 2018.

INCLUSION CRITERIA 1.All adult patients aged > 18 years who were diagnosed with A.P by meeting two of the three diagnostic criteria for A.P (Abdominal pain, a serum amylase or lipase activity three times higher than upper limit of normal and pancreatitis documented by the ultra Sonography.).

2. Patients who initially presented to our hospital within 48 hours.

3. Patients with other co morbidities like obesity, and others if any.

4. Patients who are willing to participate in the study & patients who signed Informed consent form.

EXCLUSION CRITERIA

1. Patients were excluded if they are above 80 years, Pregnant and lactating women's were excluded, Psychiatry patients (alcohol dependence syndrome) were excluded.
2. Patients with incomplete medical records especially in the first 48 hours of the disease were excluded.
3. Patients with recurrent AP were excluded.

Statistical Analysis

A total of 60 Patients with Acute Pancreatitis was taken and their serum enzymes levels i.e. serum amylase and serum lipase data was analyzed by using Student Paired t – test. The serum enzymes levels data of patients during at the time of recruitment and at the time of discharge respectively was compared. All the statistical data analysis was determined by using IBM SPSS Statistics Software, Version 24.

RESULT

We categorized the patients with respect to their age groups. Out of 60 patients majority i.e. 28 (46.6%) patients were in between the age group of 15-30 years, 26(43.3%) were in between 30-45 years, 3(5%) were in between 45-60years, 03(5%) in between 60-75 years.

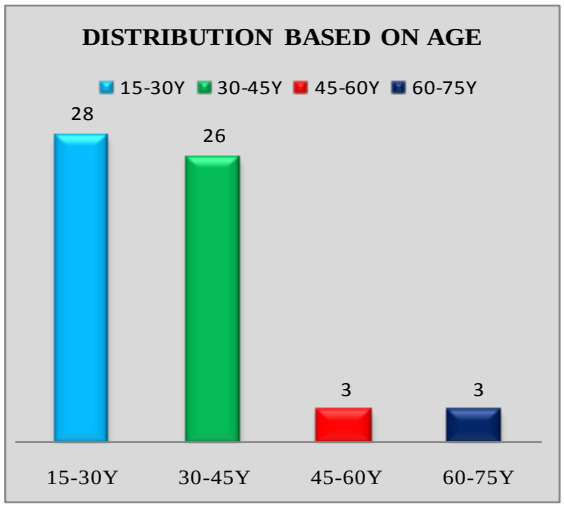

Fig.1.Distribution of patients based on age

Patients were distributed based on gender. Out of 60 patients 57 (95%) were males, 3(5%) females patients were found during the entire period of the study.

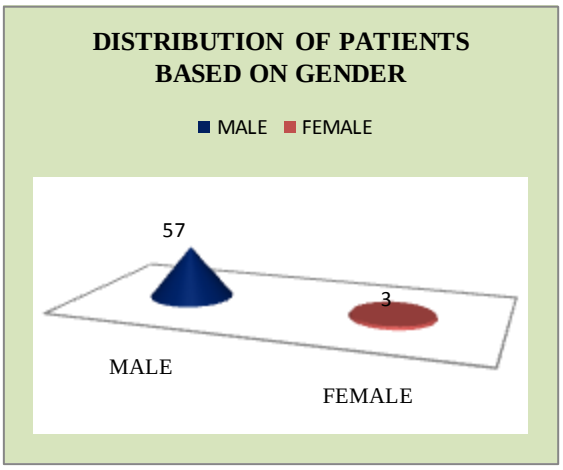

Fig.2. Distribution of patients based on gender

Patients were distributed based on social habits. We found that Out of 60(100%) patients, 57 (95%) patients were having social habits (i.e. alcohol and smoking) and 3 (5%) patients were not having any social habits.

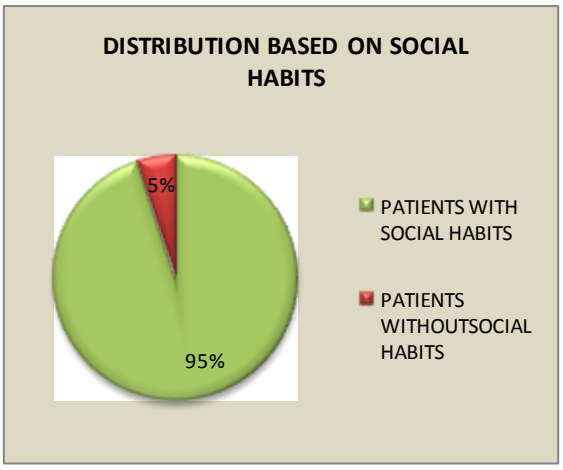

Fig.3.Distribution of patients based on social habits

Distribution based on presenting symptoms Out of 60 patient abdominal pain is the commonest presenting symptom, present in almost all the patients, i.e., 60(100%) with abdominal pain, vomiting in 33(55%), abdominal distension in 6(10%), umbilical tenderness 6(10%), burning sensation in chest 10(17%), loose motions 7(12%), fever for 6 (10%) are most common vital derangement seen in patients with acute pancreatitis.

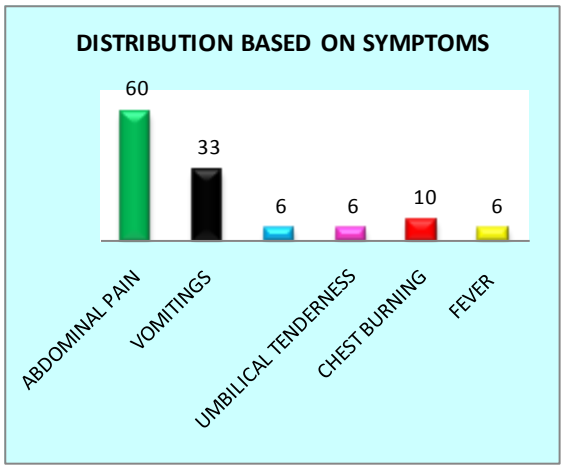

Fig.4.Distribution of patients based on symptoms

Distribution Based on Serum Amylase out of 60 patient 6(10%) were within the range of < 200 IU/L, 32(53.3%) ranging from 200-450, 22(36.7%) ranging from 450-900.

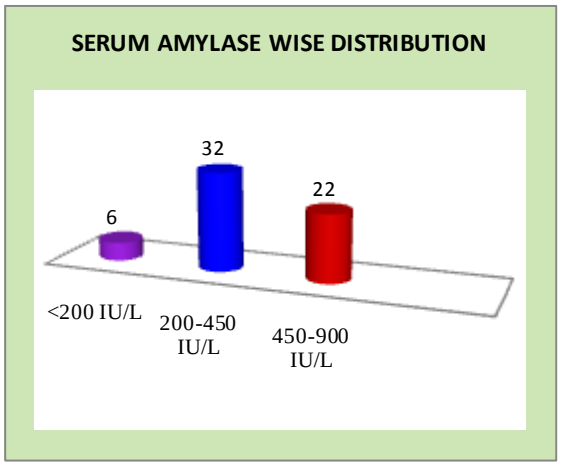

Fig.5.Distribution of patients based on serum amylase

Distribution based on serum lipase out of 60 patient 13(21.6%) were within the range of < 200 IU/L, 29(48.4%) ranging from 200-450, 18(30%) ranging from 450-900.

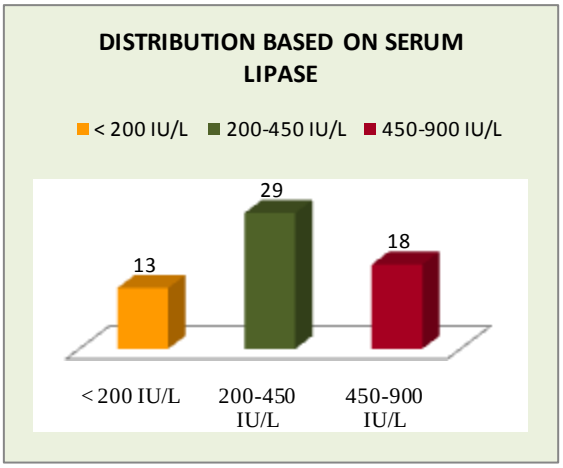

Fig.6.Distribution of patients based on serum lipase

Distribution based on ultra- Sonography, we found out the following findings during the study period bulky pancreas 40(67%), peripancreatic fluid collection 6(10%), altered echo texture 27(45%), fatty liver 6(10%), gall bladder stones 3(5%), ascetics 10 (16%), pleural effusion 6(10%), USG has not performed in 2(3%).

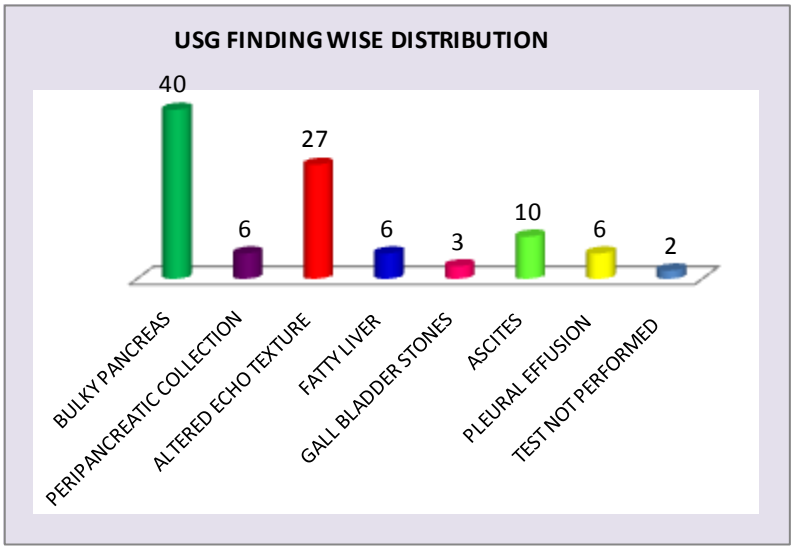

Fig.7.Distribution of patients based on USG findings

Distribution based on complications we noticed the following complications during our study period pesudocyst 2(3.3%), pancreatic necrosis 3(5%), pleural effusion 2(3.3%), ascites 9(15%), diabetes 3(5%), fatty liver 6(10%).

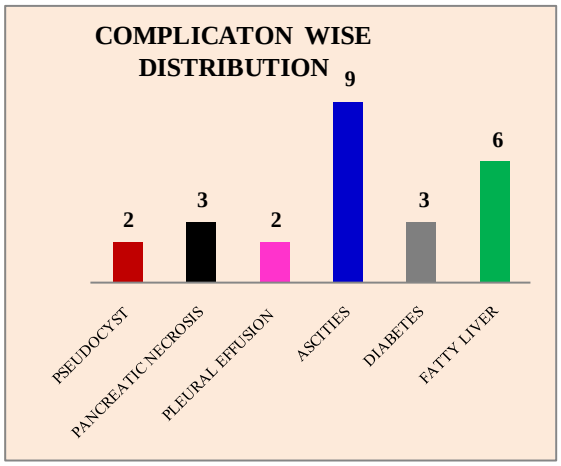

Fig.8.Distribution of patients based on complications

Distribution of patients based on etiology out of 60(100%) patients, 24 (40%) patients cause for A.P is alcohol intake, where as 33(55%) patients cause for A.P is both alcohol and smoking intake, 3 (5%) patients cause for A.P is gall stones, We have also verified for other causes like infection, Post ERCP, injury to abdomen and hyperlipidemia but no such causes were identified during the entire period of our study.

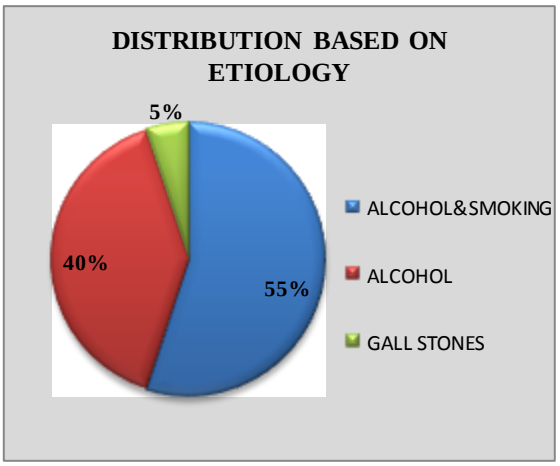

Fig.9.Distribution of patients based on etiology

Distribution of patients based on severity we found that out of 60(100%) patients, 42 (70%) patients were mild and 18 (30%) patients were moderate.

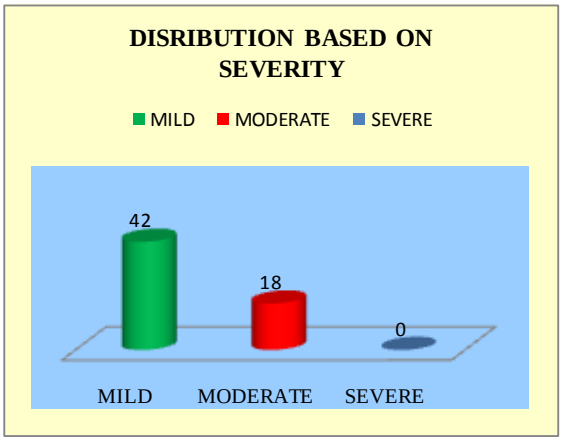

Fig.10.Distribution of patients based on severity

Distribution based on the treatment out of 60(100%) patients, 42 (70%) patients were mild and 18 (30%) patients were moderate

Table.1. Distribution of patients based on treatment

S.NO.	CONDITION	TREATMENT GIVEN	NO. OF PATIENTS
01	MILD	NBM &Hemodynamic, Serum Parameters monitoring	42(70%)
02		Fluid Replacement	
03		Analgesics	
04		Antibiotics, Surgery	
05		Enteral Nutrition Support	
06	MODERATE	ABOVE ALL & ANTI-CHOLINERGICS(ATROPHINE), AND TREATMENT BASED ON THE COMPLICATION	18(30%)
TOTAL			60

Distribution of patients based on outcomes Out of 60(100%) patients, 23 (38.3%) patients were under category better control, 25 (41.6%) patients were under moderate category, 7(11.6%) patients under category poor control and 5 (8.3%) were not found on the bed.

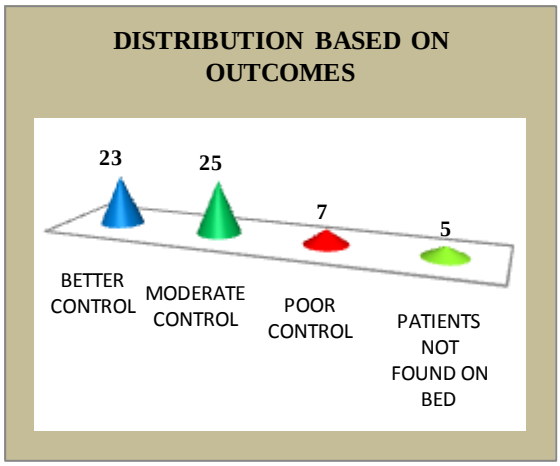

Fig.11.Distribution of patients based on outcomes

Patient data analysis:

Out of 60 patients the average of serum amylase (437.716) and serum lipase (365.800) at the time of recruitment and at the time of discharge serum amylase (148.550) and serum lipase (158.650) respectively. Standard deviation of serum amylase (151.691) and serum lipase (164.500) at the time of recruitment and at the time of discharge serum amylase (14.385) and serum lipase (5.937) respectively. Statistical difference between serum amylase base line Vs Final is as follows ($P < 0.000003$) respectively, and serum lipase base line Vs Final is as follows ($P < 0.00000005$) respectively.

Table.2. Statistical analysis details of patients with acute pancreatitis

S.NO.	PATIENT PARAMETERS	MEAN	STANDARD DEVIATION	P- VALUE
01	Age	35.3667	11.36746	---
02	Serum Amylase (Pre)	437.7167	151.69104	< 0.000003
03	Serum Amylase (Post)	148.5500	14.38505	
04	Serum Lipase (Pre)	365.8000	164.50097	< 0.00000005
05	Serum Lipase (Post)	158.6500	5.93703	

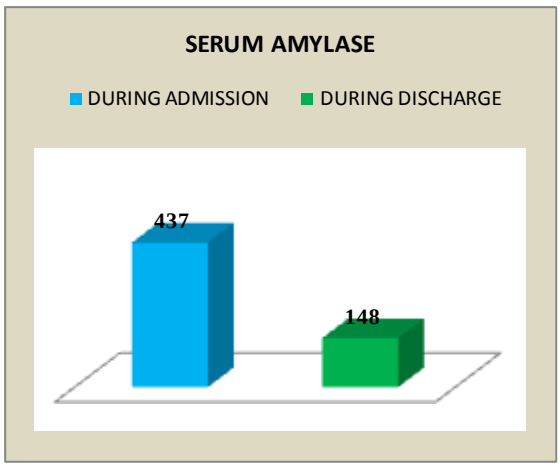

Fig.12.Showing reduction in serum amylase levels from the day of admission to day of discharge

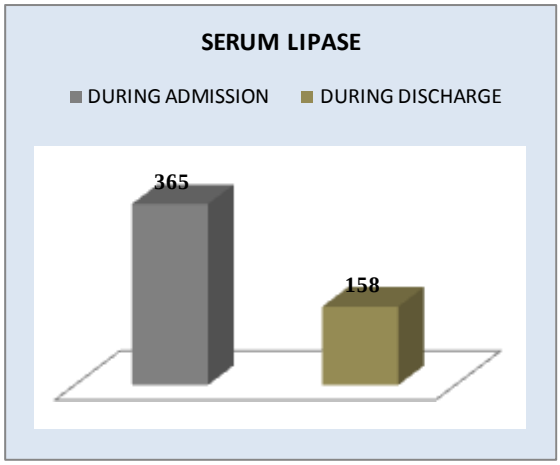

Fig.12.Showing reduction in serum amylase levels from the day of admission to day of discharge

DISCUSSION

Acute pancreatitis (AP) is a relatively a common disease with incidence of 5-80 per 1,00,000 members of population worldwide. Although its prevalence varies in different countries and different areas of our country, there has been a significant increase in the number of new cases in recent years. Early diagnosis and prompt treatment is the main stay of therapy in AP for significantly decreasing morbidity and mortality which was supported by Vijay Ahlawat *et.al.* [13]

In the present study we have recruited acute pancreatitis patients with or without complications i.e. 60 patients based on inclusion and exclusion criteria. The average age of patients recruited in the study was 35.36 ± 4.04.

AP can affect both males and females with variable frequency. In our study we found that AP affecting 57 (95%) Patients were found to be males and 3(5%) Patients were found to be males with the ratio of (M: F=19:1).

This showing a male predominance which is in contrary to the studies done earlier. However, compared to other Indian

studies with majority of cases of biliary AP which was supported by *Pawan et.al.* [14]

Our study has yielded different results with male predominance in our study compared to female predominance in their study, which indicates demographics vary considerably within the same country in different regions and males are more susceptible to develop AP compared to females. Further studies are needed to explore the underlying biological mechanisms leading to the observed differences between men and women which was supported by vijay ahlawat *et.al.* [13]

Any age group can be affected by AP. The age distribution of AP is quite variable. There was no significant difference in mean age among males and females as it was 35.45 years and 37.33 years in our study respectively, which can be explained by higher incidence of AP among younger males compared to females. In many of the studies done in Asian countries, the mean age is relatively lower compared to that of western population indicating ethnic variations in demographics of AP worldwide. Even in the same country the results are variable as the mean age of our study group is lower compared to other studies done across the country which was supported by Harindranath *et.al*. [15]

In patient group more than 47% of patients were in the age group of above15-30 years. We also found 43% of patients in between the age group of 30-45. This indicates the occurrence of acute pancreatitis in adults and middle age group is rising. Very less patients were found i.e. 6 in between age group of 45-75 years. This indicates due to the number of poor prognostic factors and diminished organ function incidence of acute pancreatitis in senior adults and geriatrics is low which was supported by *S. T. FAN et.al.* [16]

Incidence of acute pancreatitis may be linked to some predisposing factors including social habits like alcohol, smoking or both. In our study we found that 95% of the patients had social habits and only 5% of the patients are present without social habits. Among social habits majority of the patients i.e. 33(57%) were having both alcohol & smoking habits, 24(42%) patients were have only alcohol habit. This indicates AP was strongly associated with higher levels of social habits especially with alcohol & smoking habits or both which was supported by Jayesh Kumar *et.al.* [17]

In our study we found that abdominal pain is the commonest presenting symptom, present in almost all the patients, i.e. 60(100%). This represents abdominal pain occurs when digestive enzymes become activated within the pancreas, irritating the cells of pancreas and causing inflammation followed by pain. A poorly functioning pancreas can cause digestion problems which eventually leads to the outgrowth of vomiting which was found in 33(55%), abdominal distension in 6(10%), umbilical tenderness 6(10%), burning sensation in chest 10(17%), loose motions 7(12%), fever for 6 (10%) are most common vital derangement seen in patients with acute pancreatitis. Epigastric tenderness is found in almost all patients. This illustrate that most typically presenting symptoms are abdominal pain, vomiting and also other GI symptoms which was supported by Harindranath *et.al.* [15]

In acute pancreatitis serum amylase levels may be elevated more consistently. A raised level of serum amylase activity, at least three times the upper limit of normal, supports the diagnosis of acute pancreatitis. Its activity rises quickly within the first 12 hours after the onset of symptoms and returns to normal within three to five days. In our study we found that serum amylase levels elevation is as follows majority of the patients i.e.32(53.3%) ranging from 200-450, 22(36.7%) ranging from 450-900,6(10%) of patients were within the range of 140-200 IU/L. This elicit over activation of the amylase enzyme within the acinar cells and causing auto digestion which was supported by W R Matull *et.al.* [18]

Compared with serum amylase, serum lipase activity remains increased for

longer (up to 8 to 14 days), and thereby giving greater sensitivity in patients with a delayed presentation. In our study we also found that serum lipase levels elevation i.e. majority of the patients 29(48.4%) ranging from 200-450, 18(30%) ranging from 450-900 13(21.6%) were within the range of 160-200 IU/L. This also indicates over activation of the lipase enzyme within the acinar cells and causing auto digestion of pancreas which was supported by Heidar Ali esmaili *et.al.* [19]

Ultra sound is the first imaging technique used to make an image of a person's internal body structures. AP diagnosis is usually made based on increase in the pancreatic volume and changes in the structure i.e. bulky pancreas using ultra sound abdomen.

In our study we traced out the following findings during the study period bulky pancreas 40(67%), peripancreatic fluid collection 6(10%), altered echo texture 27(45%), fatty liver 6(10%), gall bladder stones 3(5%), ascetics 10 (16%), pleural effusion 6(10%), USG has not performed in 2(3%). This denotes the patients with bulky pancreas, altered echo texture is leading when collate to other findings, it shows these two finding are commonly present in AP which can be diagnosed by Ultrasonography with high sensitivity which was supported by Adarsh P Shah *et al.* [20]

According to Richard A.*et al* Ascites simply denotes a leak of pancreatic juice into the peritoneal cavity, whereas a pseudo cyst occurs when the pancreatic body walls off that pancreatic leak are the common complications in AP. We noticed the following complications during our study period pesudocyst 2(3.3%), pancreatic necrosis 3(5%), pleural effusion 2(3.3%), ascites 9(15%), diabetes 3(5%), fatty liver 6(10%). This exploit that ascites and fatty liver are the most frequently observed complications compared to other complication mentioned above which was supported by Jayesh Kumar *et.al.* [17]

Etiology of AP varies considerably across the globe. To understand and rule out the particular etiological factor we lay outed the etiology assessment scale. Smoking and alcohol consumption are the established risk factors for AP. The close interaction between tobacco consumption and alcohol intake renders the relative pathogenetic role of two factors leading to pancreatic parenchyma injury. In our study alcohol and smoking is exclusively found in 33(55%), 24(23.3%) patients cause for A.P is only alcohol intake, 3(5%) patients with gall stones, We have also verified for other causes like infection, Post ERCP, injury to abdomen and hyperlipidemia but no such causes were found during the entire period of our study. This indicates alcohol with smoking is the major cause for acute pancreatitis and next to this only alcohol intake is another major cause compare to gall stones which was supported by Angelo Andriulli *et.al.* [21]

Our present study demonstrates that the severity of AP according to the 2012 revised Atlanta classification was mild (no organ failure & with no local or systemic complications), moderate (Transient OF & Complications) and severe (Persistent OF {single or multiple}). We found that 42 (70%) patients were mild and 18 (30%) patients were moderate, no patients with severe acute pancreatitis were admitted to the hospital during our study period. This indicates the patients with no organ failure is more when collate to the patients with the complications which was supported by Supot Pongprasobchai *et.al.* [22]

Non operative strategies like ACG-AGIP guidelines are gaining preference in the management of patients with acute pancreatitis. In our study we have given treatment based above guidelines.42 (70%) patients whose clinical condition is mild were treated with NBM & hemodynamic, Serum parameter monitoring, Fluid replacement, Antibiotic, Surgery, Enteral nutrition support. 18(30%) patients whose clinical condition is moderate were treated with all of above strategies along with Anticholinergics and treatment based on the complication. We have observed very good

response with above treatment guidelines from our patients. This indicates use of ACG-AGIP guidelines in management of AP can reduces morbidity and mortality within a short duration of time which was supported by Scott Tenner MD, *et.al.* [7]

Acute pancreatitis is an acute inflammatory disease of the pancreas which can lead to a systemic inflammatory response. Deterioration in the acute pancreatitis despite effective and efficient conservative treatment was another criterion of outcome. The treatment of mild and moderate acute pancreatitis with conservative and supportive therapy leads to the better out comes and reduces the length of the stay. The median length of the stay in the hospital was 6, 9, 13 days i.e. better control, moderate control, poor control. In our study we found that 23 (38.3%) patients were under category of better control, 25(41.6%) patients were under moderate category, 7(11.6%) patients under category of poor control and 5 (8.3%) were not found on the bed. This attests that superiority lies with better and moderate control. The major outcomes of AP in the present study were similar to those in most guidelines which was supported by Arshad M. Malik *et.al.* [23]

In our study we have also estimated serum amylase and serum lipase levels during the time of admission to the time of discharge is as follows, The mean of serum amylase levels at base line (437.71) and final (148.55) respectively, which was observed at the time of admission and at the time of discharge. Extremely statistical significant difference ($P < 0.000003$) was observed between Base line values Vs final values of serum amylase.

The mean of serum lipase levels at base line (365.80) and final (158.65) respectively, which was observed at the time of admission and at the time of discharge. Extremely statistical significant difference ($P < 0.00000005$) was observed between Base line values Vs final values of serum lipase which was also supported by HS Batra *et.al.* [24]

CONCLUSION

The highest incidence of acute pancreatitis was found in adults and middle aged patients. It was relatively less common in the extremes of age groups. Gender wise incidence of acute pancreatitis was found more in males compared to females. This is due to effect of alcohol addiction in males. Alcohol and smoking, alcoholism and biliary tract diseases are the commonest factors in etiology of acute pancreatitis. Early assessment of the clinical severity and identification of patients at risk is important for early intensive therapy and timely intervention and to improve quality of life, prognosis and survival. So, it is mandatory to assess the clinical severity using different scoring systems. Treatment based on ACG-AGIP Guidelines for patients with mild, moderate, severe conditions can give very good response. Use of anti- cholinergic drugs in AP will give rapid response with less length of stay. The clinical course and outcomes of acute pancreatitis are the high level clinical concerns can be measured using length of stay in the hospital bed. Therefore, finally we are concluded that for safe and effective management of acute pancreatitis patients there is need to evaluate cause, clinical severity, appropriate treatment based on guidelines and outcome using length of stay in hospital.

The portrayal of the clinical pharmacist was to appraise the cause and severity; we advocate the appropriate therapy and deliberate outcomes. Secondly we provide empathetic counseling regarding the cessation of alcohol and smoking, life style endorsement, dietary approbations.

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