

Management of Acute Pancreatitis with Search for Reliable Prognostic Indicators

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Abstract Acute pancreatitis is quite common in Nepal. It afflicts male, female, adolescent and old equally. With advent of newer diagnostic tool, medical knowledge, and health awareness the thrust is on controlling the morbidity and mortality, hence search for reliable prognostic indicators. The prospective study was taken up to find out the reliable prognostic indicators from the clinical, biochemical and radiological parameters amongst the patients of acute pancreatitis with a view to optimize treatment protocol. A Cohort of 402 cases treated at Manipal Teaching Hospital from January 2006 to September 2015 were followed up. Age, sex, clinical findings were recorded. Serum amylase, LDH, Total Leucocytes Count (TLC), complete blood count (CBC), blood sugar, serum calcium, pO₂, X-ray abdomen (AXR), X-ray chest (CXR), ultra sonogram (USG), and computed tomography (CT) scans were analyzed. Treatment protocol was formulated. Patient's age ranged from 7–89 years (mean age 48 years; males were 189(47.014%), female 213(52.985%) with M:F ratio1:1.12. Precipitating causes were alcohol 116(28.855%), gall stone 78(19.402%), idiopathic 196(48.756%), mumps 6, ascariasis 4, trauma 1, postoperative 1 (Caesarian). Clinical findings were, pain in the epigastrium radiating to back in 190(47.263), pain abdomen without radiation in 212, (52.736%) vomiting in 186(46.268%) patients. Cullen's sign was present in one, TLC was raised in 54(13.432%), serum amylase in 378(94.029%), LDH in 70.652% of cases, AXR was noncontributory, CXR showed pleural effusion in 10.778% of cases, USG abdomen done in 389 cases showed AP lesion in 241(61.93%). computed tomography (CT) and contrast enhanced computed tomography (CECT) done in 160 cases showed AP lesion in 159 (99.375%). CECT is probably the best diagnostic tool and indicator; complications encountered were renal failure in 4, ileus in 5, pseudo pancreatic cysts in 3, splenic vein thrombosis in one. Death occurred in 4 cases, Laparotomy was done in one. Diagnostic difficulty was experienced in 4 cases. Average hospital stay was 5 days (prolonged in cases those underwent cholecystectomy). Most of the cases being of mild form could be treated conservatively. Prophylactic antibiotic with cefuroxime was found to be useful. CECT probably is the best form of diagnostic tool as well as prognostic marker.

Keywords: Acute pancreatitis, Contrast Enhanced Computed Tomography, Serum Amylase

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1. Introduction

Acute pancreatitis (AP), in Nepal, is mainly due to gallstone disease, alcohol abuse and idiopathic cause. Imaging technique, biochemical markers play the major role in diagnosis although clinical diagnosis remains the initial diagnostic tool. In AP the pancreas heals without fibrosis. Acute pancreatitis is of two types, mild and severe. In the mild form there is inflammation of the pancreas and it becomes edematous, but its microcirculation remains intact. In the severe variety microcirculation is lost leading to ischemia and necrosis. Most of the cases are of the milder variety but two to four

percent turn out to be severe. The severe ischemic/necrotic variety has high morbidity and mortality rate, hence needs more attention and admission in high density unit [1]. Severity needs to be assessed for optimal care and survival chances, and there are many scoring systems evolved, none of which can be regarded as absolute. Morbidity and mortality arises from systemic complications commonly ARDS (Acute Respiratory Distress Syndrome), ARF (Acute Renal Failure), DIC (Disseminated Intravascular Coagulopathy), MI (Myocardial Infarction) etc and local complication like abscess of the necrotic pancreatic tissue by the translocated gut bacteria. All the cases of AP presents with severe pain abdomen, which in nearly half of the cases radiates to the back often accompanied by vomiting and shock like features. Raised values of serum

amylase and LDH and positive CT finding helps in diagnosing the AP. Treatment is conservative unless there is complication.

2. Material and Methods

The prospective cohort study of 402 diagnosed cases of AP admitted and treated at Manipal Teaching Hospital, Pokhara, Nepal from January 2006 to September 2015.

2.1. Inclusion Criteria

All cases diagnosed as AP clinically, biochemically and by imaging techniques.

2.2. Exclusion Criteria

All other cases of pain abdomen ruled out as AP.

2.3. Ethical Clearance

Institutional Ethical committee’s prior permission to study the cases and formulate a suitable treatment protocol was obtained. Informed consent of the patients was obtained for any surgical or invasive intervention.

2.4. Methodology

Initial diagnosis of AP was made on the basis of history, clinical examination, CBC, raised serum amylase and USG abdomen. Further investigations like CXR, AXR, ECG, serum electrolytes, LDH, blood urea, serum creatinine, serum calcium were carried out.

Intensive care was provided in the post operative surgical ward. Hourly or 2 hourly vitals and oxygen saturation were monitored. Resuscitation with IV fluid (lactated Ringers, normal saline, dextrose normal saline) was started and hourly urine output was measured by indwelling Foleys catheter. CVP line was placed wherever necessary to monitor fluid supplementation. Patient was kept nil per oral for 24 to 48 hours. Tramadol IV was mostly used to alleviate pain. The stomach was kept deflated by naso-gastric tube. After 12 to 24 hours a CT scan or CECT was carried out.

Ceftriaxone, Cefuroxime, metronidazole were used as prophylactic antibiotic and imipenem in cases of necrosis or abscess of the pancreas [2].

Early enteral feeding was started as soon as the patient could tolerate bland fluids (without vomiting or relapse of pain). Hemodynamically stable patients were admitted to the general surgical ward from the beginning.

Multimodal approach in consultation with the physician and anesthetist was made for patients needing hemodialysis or ventilator support. Before discharge all cases of alcoholic pancreatitis were provided with free psychiatric consultations. Cholecystectomies were done for biliary pancreatitis preferably before discharge. In one case laparotomy was done as the diagnosis was uncertain.

2.5. Statistical Analysis

For all cases of diagnosed AP have been included in the cohort and descriptive statistics has been used in collating DATA.

3. Results

Total no of cases of AP admitted and treated were 402 (n=402).

Age ranged from 7 years to 89 years. Mean age was 48 years. Sex – males were 189 (47.01%) and females 213 (52.98%) with Ratio M:F: 1: 1.12 (Table 1).

Table 1. Showing Age and Sex Distribution

| Age in Years | Male | Female |
|--------------|------|--------|
| 1 - 15 | 2 | 10 |
| 16-30 | 32 | 31 |
| 31-45 | 67 | 62 |
| 46-60 | 72 | 52 |
| 61-75 | 12 | 45 |
| 76-90 | 4 | 13 |
| Total | 189 | 213 |

The Precipitating Causes of Acute Pancreatitis is depicted in Figure 1.

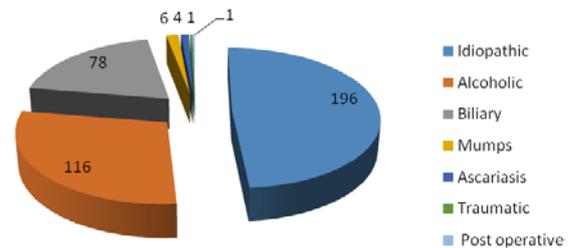


Figure 1. Showing The Precipitating Causes of Acute Pancreatitis

The precipitating causes were, biliary 78 (19.4%), alcoholic 116 (28.86%), idiopathic 196 (48.76%), mumps 6, ascariasis 4, postoperative 1 following LSCS, and due to blunt abdominal trauma -one

3.1. Biochemical Parameters

Serum amylase was raised in 378 (94.03%) cases, LDH raised in 195 (70.65%) cases. There has been no appreciable fall in serum calcium in any of the cases. Blood urea and serum Creatinine was raised in eight cases. CRP was done in 84 cases and was raised in 68 cases. There was leucocytosis in 54 cases out of 402 TLC. AXR done in 320 and CXR was done in 167 cases. USG was done in 389 cases, was suggestive of AP in 241 cases, and inconclusive in 148 numbers of cases. CT/ CECT was done in 160 and was positive for AP in 159 cases (Table 2).

Table 2. Showing Biomarkers and Imaging

| Biomarkers | No | +ve | -ve | Imaging | No | +ve | -ve |
|---------------|-----|-----|-----|---------|-----|-----|-----|
| Serum amylase | 402 | 378 | 24 | AXR | 320 | 0 | 320 |
| LDH | 276 | 195 | 81 | CXR | 167 | 18 | 149 |
| CRP | 84 | 68 | 16 | USG | 389 | 241 | 148 |
| TLC | 402 | 54 | 348 | CE/CECT | 160 | 159 | 1 |

Hemodialysis was done in 4 cases, ventilator support in 4 cases. Laparotomy was done in one case. Pancreatic abscess was treated conservatively in one case.

3.2. Complications

There were 4 cases of ARF and 4 cases of ARDS, one case of splenic vein thrombosis. There were 4 deaths. Four cases discharged themselves against medical advice. Average length of hospital stay was of 5 days.

4. Discussions

Maximum number of cases 283 (70.367%) out of 402 cases (169 males and 114 females) are in the age group between 31 -60.

Abdominal pain was present in 100% of case half of which radiates to the back and is path gnomic of the affliction. The role of clinical diagnosis on the basis of epigastric pain (radiating to back in 50% of cases), vomiting and raised serum amylase has been key to most of the case diagnosis. We have relied on serum amylase as an immediate reckoner though in many cases of late admissions it was normal and the diagnosis was made by CT scan. Serum lipase is more reliable [3], but only serum amylase is being done in our set up [4]. Thus biomarkers are less reliable than CT [5]. Similarly, AXR and CXR have little role in diagnosis of AP. Yet it can rule out gas under the diaphragm, and CXR can show pleural effusion as CT is usually done after 12 – 24 hrs.

USG is faster and cheaper than CT in the sense it can be done within hours of admission. It can show if there is calculus in the gall bladder or CBD. Our experience with USG is that, it is less sensitive than CT and CECT. Most of the time the pancreas is obscured by intestinal gas shadows and is not visualized in USG.

CT scan/ CECT show whether there is edema or necrosis of the pancreas and any peri-pancreatic collection. At the same time it can show pleural effusion. Thus CT scan with CECT has become the most effective investigation for diagnosing AP and stratifying the disease severity. However CT costs US \$ 73 whereas USG costs US \$ 8 and per capita income of a Nepali is < US \$ 5.

More cases of AP are being diagnosed due to advance in sophistication of diagnostic tool. It is seen that biliary pancreatitis is more in females whereas alcoholic pancreatitis is more in males. There is minimal higher incidence of AP in females (1.12:1 F:M), as traditionally the females in Nepal also drink; home brewing of alcohol is permitted. Youngest patient in the series is 7 years female who suffered from mumps parotitis with AP [6].

An early admission ensures timely rehydration which is so important for restoring blood pressure and thereby perfusion [7] to prevent further ischemic damage to pancreas and acute tubular necrosis and gut ischemia that causes translocation of bacteria. Ringer lactate has been advocated as the best IV fluid [8] but we have used saline and DNS as well (without any detrimental effect of SIRS.) [9,10].

Tramadol, ketorolol, diclofenac were used to control pain and morphine was avoided. Threshold of pain is quite high in Nepalese (failure to tolerate pain is looked down upon). This necessarily causes late admission in some cases other reasons being difficult terrain, distance and at times lack of conveyance.

The severity of the disease has to be determined for effective or appropriate treatment. There are a number of scoring systems like Ranson' [11], Glasgow [12], APACHEE II [13,14], Bedside Index for severity in Acute Pancreatitis (BISAP) [15], Imrie modification of BISAP [16], Japan Severity Score (JSS) [17,18] or Harmless Acute Pancreatitis Score (HAPS) [19] etc. to quantify the severity. However Ranson, Glasgow are time consuming and APACHE II is cumbersome. Similarly, JSS is less helpful as there is no difference in the mortality rate

amongst its mild, moderate and severe variety. It relies on 18 prognostic factors making it more complex. BISAP has five variables as risk stratification tool (Blood Urea Nitrogen>25mg/dL, impaired mental status, systemic Inflammatory Response syndrome (SIRS), age>60years, and pleural effusion) [15]. Age and mental status are less of objective factors. HAPs rely on only 3 factors, i.e., no guarding or rebound tenderness, normal hematocrit and normal serum Creatinine [19]. This is simplistic and 98% of AP being of mild variety can be covered by HAPs. It has not been possible to adhere to many of the scoring systems strictly but certain investigations from these scoring systems are incorporated in conjunction with other factors. Pancreatic tissue necrosis associated with leucocytosis or pleural effusion or abnormal renal function tests herald SIRS to start of multi organ failure (MOF) [20,21] and mandates extra caution like prophylactic antibiotic. Necrosis is the key factor for morbidity and mortality and can only be seen in CECT. Percentage of pancreatic tissue necrosis seen in CT is severity index (CTSI) [22,23,24]. Hence we regard CECT as the best diagnostic and prognostic tool with almost 100% reliability. Four of our cases had successful hemodialysis for renal failure and four of our cases had ventilator support for ARDS. A close monitoring of the cases, system wise, at times are needed more than anyone scoring system. Lastly, majority of cases in the present cohort were of mild AP that fall in HAP scoring [19] with less than 1% mortality.

5. Conclusion

Over a period of time a management protocol has been evolved. In most of the cases being of mild form they could be treated conservatively. Prophylactic antibiotic with cefuroxime was found to be useful. CECT is probably the best form of diagnostic tool as well as prognostic marker.

Abbreviations

ARF: Acute Renal Failure

ARDS: Acute Respiratory Distress Syndrome

APACHE: Acute Physiology and Chronic Health Evaluation

BISAP: Bedside Index of Severity scoring in Acute Pancreatitis

JSS: Japanese Severity Score

HAP: Harmless Acute Pancreatitis

Declaration of Conflicting Interests

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