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COMPARATIVE ANALYSIS OF EARLY NECROSECTOMY VS CONSERVATIVE MANAGEMENT ON PATIENT OUTCOMES OF ACUTE NECROTIZING PANCEREATITS

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Abstract

Objective: *The purpose of the research is to find out the comparative analysis of early necrosectomy vs conservative management on patient outcomes of acute necrotizing pancreatitis*

Study Design: *Comparative Cross-Sectional study*

Study Duration: *06 months from February 2024-August 2024*

Study Place: *Department of General Surgery, CMH Abbottabad*

Methods: *This was a cross-sectional comparative study, that compared the results of early necrosectomy and conservative management in patients who have acute necrotizing pancreatitis and are in a tertiary care facility (n=105). The patients were clustered according to their treatments and the results such as mortality, complications, stay, and ICU admission were compared using basic statistical tools. SPSS 26 was used for data analysis and p-value less than .05 was taken as significant.*

Results: *A total of105 patients were included and were divided into 2 groups. Group A comprised of 52 patients who underwent early necrosectomy, and Group B involved 53 patients with conservative management. Average age was 49.6 years and male population was 68.6%. gallstone was most common eitiology of pancreatitis. A higher rate of procedure related complications (bleeding and pancreatic fistula), increase in length of hospital and ICU stay, and an observed trend of increased mortality were linked to early necrosectomy. On the other hand, conservative management of patients who had a stable clinical presentation had a decreased number of adverse events and more positive overall results. Mean hospital stay and average ICU admission rate in group B was 15.2 and 22 respectively lesser than group A*

Conclusion: *The conservative treatment of acute necrotizing pancreatitis yields superior outcomes, such as reduced complications, and the necessity of invasive treatment as opposed to early necrosectomy. More dangerous conditions of early surgery include bleeding, fistulae, and infections, and should be used only in case*

of an infected necrosis or continuing organ failure in patients.

INTRODUCTION

Acute pancreatitis is a frequent gastrointestinal emergency that has a mild, self-limiting disease to severe life-threatening clinical course. Acute necrotizing pancreatitis (ANP) is a type of acute pancreatitis that is widely spread (1020% of cases) and causes most of the morbidity and mortality in patients with acute pancreatitis. It is marked by a pancreatic parenchymal and/or peripancreatic necrosis that is regularly accompanied by systemic inflammatory response syndrome (SIRS), multi-organ failure, and bacterial complications.[1]

ANP management is still a difficult one and has undergone significant changes during the last 20 years. The first-line approach has traditionally been associated with conservative management, which is made up of aggressive fluid resuscitation, pain management, nutritional support (preferably enteral), close monitoring, and organ support. Most of the patients with no infected necrosis or chronic organ failure can be effectively managed without the invasive intervention. It has been demonstrated that waiting until necrosis is walled-off other helps to decrease the procedure-related complication and death.[2]

The presence of infected pancreatic necrosis, as well as ongoing clinical deterioration, however, requires interventions, most typically in the form of necrosectomy. In the past, early open surgical necrosectomy was performed with a high complication rate, such as bleeding, forming of fistulas and mortality. It resulted into a paradigm shift to delayed and minimally invasive methods, including a percutaneous, endoscopic or step-up necrosectomy technique.[3]

Although these advances have been achieved, there is still a controversy on the best time to use necrosectomy. Early necrosectomy, which takes place during the first two to three weeks of disease, can have hypothetical benefits of controlling sepsis, lowering the load of inflammation, and avoiding further deterioration to multiple organ failure. Advocates believe that the early intervention might benefit the selected patients of infected necrosis and clinical instability. Critics on the other hand point to the risks involved in working on ill-defined necrotic tissue, such as, more surgical trauma, a higher morbidity and worse results than when the condition is treated promptly.[4]

The existing global practices tend to suggest delaying necrosectomy when possible, but the practice of necrosectomy in the real world frequently demands the use of a case-by-case approach according to the severity of the disease, the presence or absence of infection, and the response of the individual patient to non-surgery. There is limited and contradictory evidence on the subject of early necrosectomy, which has led to inconsistency in clinical practice, especially in resources-constrained locations.[5]

In this respect, an early necrosectomy versus conservative management should be compared to gain a better idea of the outcomes of the interventions in respect of patient outcomes. The purpose of this study is to compare morbidity, mortality, length of stay, and complication rates between the patient groups who received early necrosectomy and those patients who received conservative treatment of acute necrotizing pancreatitis in efforts to inform clinical decision-making and maximize the treatment of patients.

Methodology:

This cross-sectional comparative analytical research was carried out in order to assess the patient outcomes of early necrosectomy and conservative management against the background of acute necrotizing pancreatitis. The case study was conducted in the Department of General Surgery of a tertiary care teaching hospital Abbottabad during a time span of 06 months, between Feburary 2024 to August 2024. The institutional review board provided ethical approval and informed consent was secured orally in writing before the enrolment of all the participants or their legal guardians. The 105 patients diagnosed with acute necrotizing pancreatitis were recruited in the study through a non-probability consecutive method. The diagnosis was made using clinical presentation, laboratory, and on radiological findings of pancreatic and/or peripancreatic necrosis on contrast-enhanced

computer tomography (CECT) in the abdomen according to the Revised Atlanta Classification.

The two groups were formed by patients according to the management approach used:

- Group A (Early Necrosectomy Group): Patients who had necrosis or clinical worsening infected with the disease and underwent necrosectomy less than 1421 days after the onset of the disease.
- Group B (Conservative Management Group): The patients were first treated by non-operative interventions, such as supportive treatment, and antibiotics when needed and only in case of clinical need was delayed intervention implemented.

Inclusion Criteria

The following criteria were used to include the patients in the study:

1. Age ≥18 years
2. Acute necrotizing pancreatitis confirmed in CECT abdomen.
3. Pancreatic and/or peripancreatic necrosis is present.
4. Hospitalization during the acute stage of the disease.
5. Patients subjected to either early necrosectomy or conservative treatment.
6. Preadmission readiness to give informed consent.

Exclusion Criteria

Patients were not eligible in case they satisfied the following criteria:

1. Mild or interstitial non-necrotic edematous pancreatitis.
2. Asthmatic pancreatitis or cancer of the pancreas.
3. Past pancreatic surgery.
4. Pregnancy
5. Patients at high risk of other comorbidities (not related to pancreatitis) which may affect the results on their own (e.g. advanced malignancy, end-stage liver disease)
6. Loss to follow-up patients or patients who refused consent.

Conservative treatment involved vicious intravenous fluid replacement therapy, analgesia, nutrition (ideally enteral nutrition), antibiotics in case of possible or confirmed infection, and intensive care as necessary. Early necrosectomy was undertaken according to clinical deterioration, continued organ failure or evidenced infected necrosis, with an open, or minimally invasive approach being the one considered worthy by the surgical team. The baseline data included demographic information, etiology of pancreatitis, laboratory parameters, radiological data, and the severity scores. Patients were monitored during the period of stay in hospital to record the outcomes of the treatment. Death rates and general complication rates were the main outcomes. Secondary outcomes included length of stay, organ failure, intensive care unit admission and procedure outcomes including bleeding, fistula formation or secondary infections. The analyses were performed with the help of SPSS 26. Continuous variables were represented by the mean standard deviation, whilst the categorical variables were represented in frequencies and percentages. The independent t-test of continuous variables was used to compare the two groups and the chi-square test was used to compare the two groups as far as categorical variables were concerned. A p-value of less than 0.05 was said to be statistically significant.

Results:

The study used 105 patients with acute necrotizing pancreatitis. Among them, the 52 patients (49.5% affected by early necrosis) underwent early necrosectomy (Group A), and 53 patients (50.5% affected by early necrosis) were treated conservatively (Group B). The average age of the study sample was 49.6±13.8 years, and the proportion of men was 68.6%. There were also no statistically significant differences in terms of baseline demographic or clinical characteristics between the two groups.

In the early necrosectomy group, the chance of mortality was more than the conservative management group, but not statistically significant. Group A patients had high rate of procedure related complications. The hospital stay duration of the patients that received early necrosectomy was considerably higher. Group A had more patients admitted to intensive care unit (ICU). In patients suffering early necrosectomy, bleeding and pancreatic fistula were the most related complications. There

were less intervention-related adverse events related to conservative management.

Early necrosectomy was linked to increased complication rates, duration of stay in hospital and ICUs as well as a tendency to more mortality than conservative management. In patients with stable clinical conditions with no progressive organ failure, conservative treatment had better results.

Table 1: Baseline Demographic and Clinical Characteristics

Variable	Group A (Early Necrosectomy) n=52	Group B (Conservative) n=53
Mean age (years)	50.2 ± 14.1	49.1 ± 13.6
Male gender, n (%)	36 (69.2)	36 (67.9)
Gallstone etiology, n (%)	21 (40.4)	24 (45.3)
Alcohol-related, n (%)	17 (32.7)	16 (30.2)
Mean CTSI score	8.1 ± 1.2	7.9 ± 1.3
Infected necrosis, n (%)	31 (59.6)	14 (26.4)

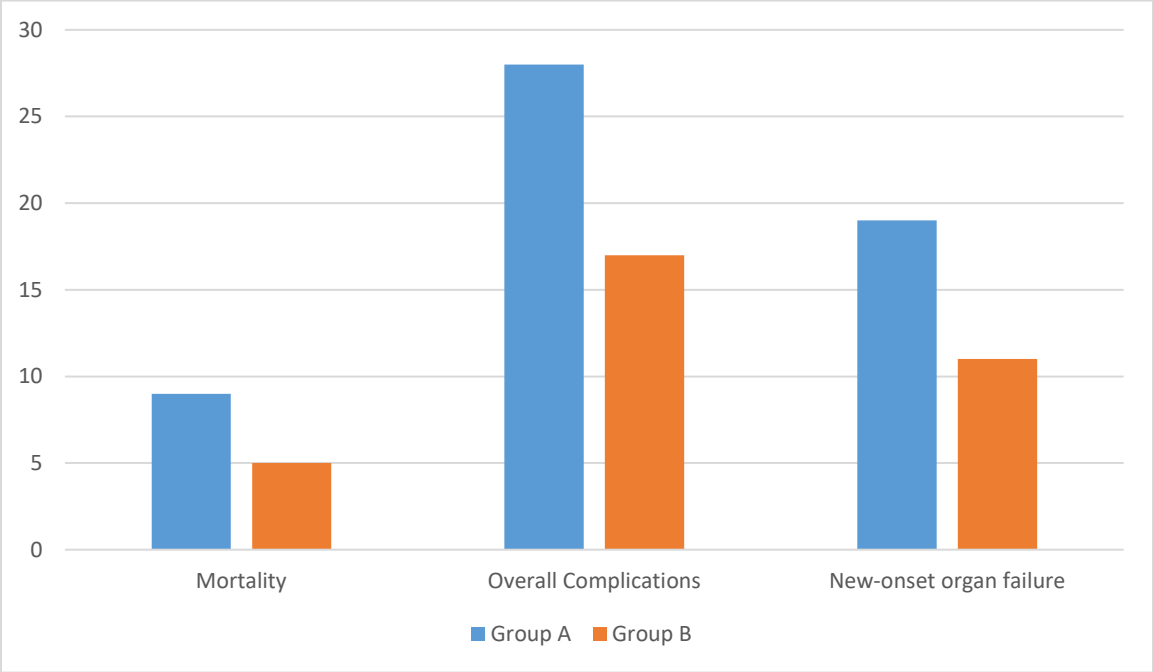

Chart 1.2: Comparison of Primary Outcomes

Table 1.3: Secondary Outcomes in both groups

Variable	Group A	Group B
Mean hospital stay (days)	21.4 ± 6.8	15.2 ± 5.1
ICU admission, n (%)	34 (65.4)	22 (41.5)
Mean ICU stay (days)	6.3 ± 2.7	4.1 ± 1.9

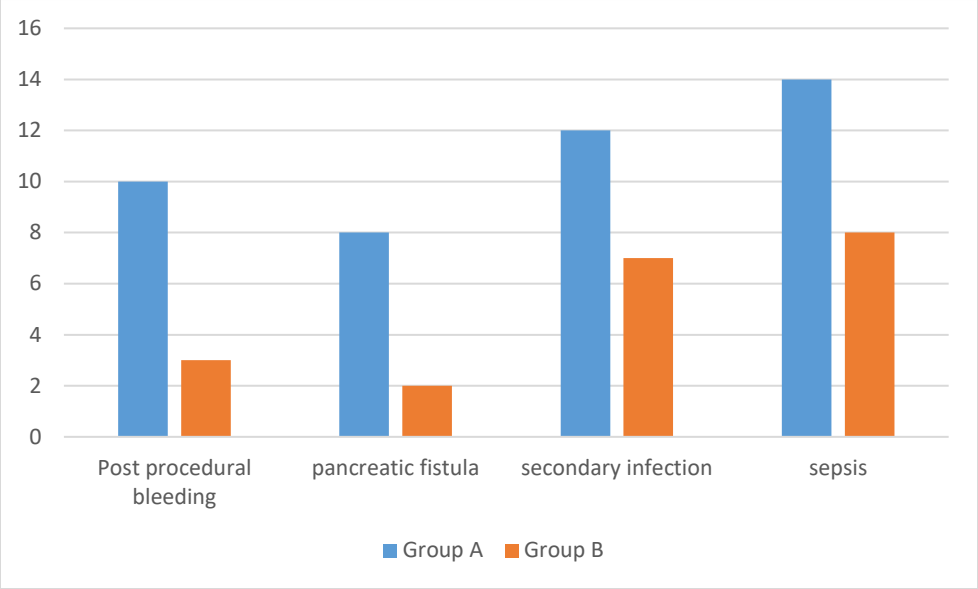

Chart 1.4: Complications Profile of both groups

Discussion:

ANP is a challenging clinical problem given its unpredictable nature, high complication rates, and high mortality. The most effective time and need of necrosectomy remains a contested one especially regarding the changing conservative and the minimally invasive approach to management. This paper makes a comparative study of early necrosectomy and conservative management, and important differences in patient outcomes are discussed.[6]

In the current study, early necrosectomy was linked to the increased overall complication rates, the increased rates of new-onset organ failure and more prolonged hospital and intensive care unit stays in comparison to conservative management. Even though the number of people dying was higher in the early necrosectomy group than in the other group, the difference was not statistically significant. These data add the increasing evidence of the benefit of conservative management first in patients with acute necrotizing pancreatitis when it is possible in a clinical respect.

Traditionally, early surgical intervention was usually conducted in the patients with the severe pancreatitis but various studies have revealed that early necrosectomy and especially the open surgical necrosectomy is linked to high morbidity and mortality. The necrotic tissue which is inflamed and poorly demarcated in early stages of the disease predisposes the individual to bleeding, fistula and iatrogenic injury. These findings are supported in our study because the patients who received early necrosectomy had much greater rates of procedure related complications such as bleeding and pancreatic fistula formation.[7,8]

Increased rate of infected necrosis in the early necrosectomy group is indicative of clinical decision-making in the real-world, as early intervention is usually due to sepsis or worsening of the patient. However, even in this setting, conservative management showed better results in the areas of complication and resource usage. These results are corroborated by the historic PANTER trial, which showed a step-up technique has less morbidity and mortality than an open necrosectomy.[9]

The early necrosectomy group had a substantial length of hospital stay and ICU admission rates. Extended stay in the hospital does not just indicate more disease severity and complications but also adds to the burden of costs and patients. The use of supportive care, close monitoring, and delayed intervention, which are the conservative management, enabled a high percentage of the patients to heal without invasive procedures, thus,

minimizing hospital admission and the use of ICUs.[10]

Nevertheless, recent international practice has advised postponement of the necrosectomy until the necrosis is walled-off, usually after four weeks, unless there is an evident infected necrosis with clinical deterioration. These suggestions are supported by the findings of this research as they reveal that premature intervention can eliminate the possible advantages of necrosectomy because they expose the patient to unnecessary surgical events. Innovations in the field of critical care, nutritional support and the development of least invasive methods of drainage have further reinforced the role of conservative management as a first-line method of treatment.[11]

Although these results were obtained, early necrosectomy could still be used in a narrow group of patients. Persistent organ failure, refractory sepsis, or the inability to respond to the maximum conservative treatment may force an individual to undergo intervention sooner before things get worse. Thus, management choices must be personal in consideration of the severity of the disease, radiographic evidence, and the general clinical condition of the patient.

The positive aspects of the study are its nature of a comparison study, standardization of diagnostic criteria that relied on the Revised Atlanta Classification, and exhaustive evaluation of both primary and secondary outcomes. Nevertheless, there are a number of shortcomings that must be admitted. The research was carried out in one center and this could be a limitation to generalization. This non-randomized patient assignment creates the risk of selecting bias since sicker patients were more likely to be subjected to early necrosectomy. Also, results were not compared according to the type of surgical or the type of minimally invasive procedures performed to achieve necrosectomy results, which might affect the incidence of complications.[12,13]

Multicenter randomized controlled trials on the comparisons between conservative management and various interventions in terms of timing and modalities, especially the least invasive and endoscopic modality, should be targeted into future research. Severity scoring systems and long-term follow-up which have been validated would be of importance to enrich the knowledge of the best management strategies.[14]

Acute necrotizing pancreatitis is one of the serious and potentially fatal conditions that should be managed individually. The results of the current paper show that conservative management is related to more positive patient outcomes than early necrosectomy in most cases. Conservatively treated patients had lower rates of overall complications, less cases of new-onset organ failure, and much less hospital and intensive care unit stay. Early necrosectomy did not prove to be statistically superior when compared to the control group with regard to mortality although it was higher in the early necrosectomy group, which could indicate that the early surgical intervention does not provide a survival advantage during the acute stage of the disease.[15]

Early necrosectomy was also linked with high complications associated with the procedure and included bleeding, formation of pancreatic fistulas and subsequent infections. Such poor outcomes are probably due to technical difficulties of working in inflamed, ill-defined necrotic tissue in the early phases of acute necrotizing pancreatitis. On the other hand, conservative management gives time to stabilization, demarcation of necrosis, and spontaneous resolution in a significant percentage of patients, hence less invasive intervention is necessary.[16]

The findings of the conducted research are consistent with existing international recommendations that suggest a late and gradual intervention strategy and leave necrosectomy to those patients having infected necrosis, continuing organ failure, or non-response to conservative care. The use of early intervention should be limited to selected patients who have been closely critically assessed in terms of clinical and radiological examination.

Conclusively, conservative management is the treatment mode to go in the first line of patients with acute necrotizing pancreatitis, and early necrosectomy only used in selected clinical signs. The implementation of a personalised, evidence-based practice can assist in reducing morbidity, maximising the use of available resources, and increasing the overall patient outcomes.

Limitation of Study:

It is single center study, with low sample size and limited study duration, hence its results cannot be generalized to population level or certain portion of population. To get better results, a large multi center trial and with more number of patients is required.

Conclusion:

Acute necrotizing pancreatitis is one of the serious and potentially fatal conditions that should be managed individually. The results of the current paper show that conservative management is related to more positive patient outcomes than early necrosectomy in most cases. Early necrosectomy was also linked with high complications associated with the procedure and included bleeding, formation of pancreatic fistulas and subsequent infections. Conservative management gives time to stabilization, demarcation of necrosis, and spontaneous resolution in a significant percentage of patients, hence less invasive intervention is necessary. The findings of the conducted research are consistent with existing international recommendations that suggest a late and gradual intervention strategy and leave necrosectomy to those patients having infected necrosis, continuing organ failure, or non-response to conservative care. Conclusively, conservative management is the treatment mode to go in the first line of patients with acute necrotizing pancreatitis, and early necrosectomy only used in selected clinical signs.

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