



COMPARATIVE STUDY BETWEEN OMEGA 3 FATTY ACID INFUSION VERSUS OCTREOTIDE INFUSION IN ACUTE PANCREATITIS

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Abstract

Introduction: Acute pancreatitis (AP) is a sudden inflammation of the pancreas that can range from mild discomfort to a life-threatening condition.

Objective: The basic aim of the study is to find the comparison between omega 3 fatty acid infusion versus octreotide infusion in acute pancreatitis.

Methodology of the study: This comparative study was conducted at Department of General Surgery, S S institute of Medical Sciences Davangere Karnataka during May 2022 and Feb 2024. Data were collected from 220 patients suffering from acute pancreatitis. Patients in group A were receive a daily infusion of omega-3 fatty acids (EPA and DHA) at a dose of 1.5 g/kg body weight. The infusion was administered intravenously over a period of 4 hours for 7 consecutive days or until discharge, whichever comes first. Patients in group B were receive a daily infusion of omega-3 fatty acids (EPA and DHA) at a dose of 1.5 g/kg body weight.

Results: A total of 220 patients were enrolled in the study, with 110 patients randomly assigned to the omega-3 fatty acid infusion group and 110 patients assigned to the octreotide infusion group. At baseline, CRP levels were comparable between the two groups (150.4 ± 35.2 mg/L vs. 148.6 ± 34.8 mg/L, $p=0.72$). By Day 3, the omega-3 group showed a greater reduction in CRP levels (95.8 ± 28.4 mg/L) compared to the octreotide group (112.6 ± 30.1 mg/L), with a statistically significant difference ($p<0.01$).

Conclusion: It is concluded that omega-3 fatty acid infusion is superior to octreotide infusion in the management of acute pancreatitis. Omega-3 fatty acids significantly reduce inflammation, shorten hospital stays, and lower the incidence of complications.

Introduction

Acute pancreatitis (AP) is a sudden inflammation of the pancreas that can range from mild discomfort to a life-threatening condition. The management of AP remains a Clinical challenge as the pathophysiology of this condition is intricate and there's no intervention that can specifically suppress the inflammatory process leading to complications to the gland [1]. Experimental research in the past few years has in a way uncovered the mechanisms of inflammation and oxidative stress in the development of AP and thus potential therapeutic targets [2]. Two such agents are omega-3 fatty acid infusion and octreotide infusion. Acid, omega-3-Polyunsaturated fatty acids that have an anti-inflammatory effect and have been proved to affect the inflammation process in different clinical situations. The ability to attenuate the degree of inflammation and impact clinical management of patient with AP is an active field of research. Omega-3 fatty acids act on cells by replacing them, lowering the synthesis of eicosanoids, and by increasing the synthesis of anti-inflammatory substances [3].

On the other hand, octreotide which is somatostatin like substance is documented to have been used in the management of many gastrointestinal disorders including AP. Octreotide possesses the action of the reduction of secretion of pancreatic enzymes and gastrointestinal hormones hence minimizes the pancreatic exocrine function and may help in decreasing the inflammatory reaction in AP [4]. Acute pancreatitis is clinical divided in to mild and severe types. Most of the patients have mild acute pancreatitis, a condition that is tends to be brief and can easily be managed through simple intervention. Primarily, acute pancreatitis does not evolve into severe disease in up to 20 percent of the patients, but rather it becomes severe and involves pancreatic as well as extra pancreatic necrosis [5]. Therefore, in severe acute pancreatitis, patients develop systemic complication and this category of patient has 10–50% mortality despite the best medical management in form of pharmacological and intervention [6]. For a patient to be diagnosed with AP, they must have at least two of the following three features: abdominal pain compatible with AP acute onset of severe, persistent epigastric pain that may radiate to the back elevated serum lipase (or amylase) activity that is at least three times the ULN characteristic imaging findings compatible with AP on CECT and less frequently, MRI or trans-abdominal US [7].

Acute appendicitis is believed to be one of the most common surgical emergencies in the world, however, diagnosing and treating of appendicitis in pregnancy has some challenges. It showed that the alterations of the physiological and anatomical condition during pregnancy might obscure the usual appendicitis symptoms and therefore postpone the diagnosis [8]. In addition, the risks are more sensitive since they involve the woman and her unborn child; hence, the approach should be delicate and precise [9]. The application of octreotide in the management of AP has been examined in a number of controlled clinical trials and observational investigations. Two analyses claimed a decrease in the severity of AP and the complication rate, whereas the others did not find significant clinical advantages. Some studies identified that octreotide is more useful in some patients with severe AP or in those with high risk factors. They believe that the variations in study results may be brought by variations in the approaches used in the research studies such as the populations involved in the research studies and the dosages administered in the course of those research studies [10]. Therefore, based on the present studies, further research is needed to clarify the role of octreotide in the treatment of AP, whereas it is still useful in the case of severe AP or if the patient does not show any reactions to the standard medications [11].

Objective

The basic aim of the study is to find the comparison between omega 3 fatty acid infusion versus octreotide infusion in acute pancreatitis.

Methodology of the study

This comparative study was conducted at Department of General Surgery, S S institute of Medical Sciences Davangere Karnataka during May 2022 and Feb 2024. Data were collected from 220 patients suffering from acute pancreatitis.

Inclusion Criteria:

- Patients aged > 18 years and diagnosed with acute pancreatitis based on clinical symptoms, serum amylase or lipase levels more than three times the upper limit of normal, and/or imaging findings consistent with AP.
- Onset of symptoms within 48 hours before enrollment.

Exclusion Criteria:

- Pregnant or lactating women.
- Known allergies to omega-3 fatty acids or octreotide.
- Severe comorbid conditions.

Data collection

Baseline data, including demographic information, medical history, and clinical presentation, were collected through patient medical records. Data were collected into two groups:

Group A: omega-3 fatty acid infusion

Group B: octreotide infusion

Patients in group A were receive a daily infusion of omega-3 fatty acids (EPA and DHA) at a dose of 1.5 g/kg body weight. The infusion was administered intravenously over a period of 4 hours for 7 consecutive days or until discharge, whichever comes first. Patients in group B were receive a daily infusion of omega-3 fatty acids (EPA and DHA) at a dose of 1.5 g/kg body weight. Blood samples were drawn to measure serum amylase, lipase, and C-reactive protein (CRP) levels. Imaging studies, such as ultrasound or CT scans, were performed to confirm the diagnosis and assess the severity of pancreatitis. Throughout the 7-day treatment period, daily assessments were conducted, including monitoring of vital signs, clinical symptoms, and any adverse events. Laboratory tests were repeated daily to track changes in inflammatory markers and organ function.

Statistical Analysis

Data will be analyzed using SPSS v29. The primary outcome will be compared between the two groups using an independent t-test.

Results

A total of 220 patients were enrolled in the study, with 110 patients randomly assigned to the omega-3 fatty acid infusion group and 110 patients assigned to the octreotide infusion group. The demographic and baseline characteristics of the patients were well-balanced between the two groups, as shown in Table 1.

Table 1: Baseline Characteristics of Patients

Characteristic	Omega-3 Group (n=110)	Octreotide Group (n=110)
Age (years)	45.8 ± 12.3	46.2 ± 11.9
Male/Female	58/52	60/50
Severity of AP (Mild/Moderate/Severe)	40/50/20	38/52/20
BMI (kg/m ²)	26.5 ± 4.1	26.8 ± 3.9
Time since symptom onset (hours)	24.3 ± 9.5	23.7 ± 9.8
Serum amylase (U/L)	856 ± 350	870 ± 360
Serum lipase (U/L)	1024 ± 410	1036 ± 420

At baseline, CRP levels were comparable between the two groups (150.4 ± 35.2 mg/L vs. 148.6 ± 34.8 mg/L, p=0.72). By Day 3, the omega-3 group showed a greater reduction in CRP levels (95.8 ± 28.4 mg/L) compared to the octreotide group (112.6 ± 30.1 mg/L), with a statistically significant difference (p<0.01). This trend continued through Day 7, with the omega-3 group exhibiting significantly lower CRP levels (50.2 ± 20.5 mg/L) compared to the octreotide group (75.4 ± 25.7

mg/L, $p < 0.001$), indicating a more effective anti-inflammatory response with omega-3 fatty acid infusion.

Table 2: Change in CRP Levels

Time Point	Omega-3 Group (mg/L)	Octreotide Group (mg/L)	p-value
Baseline	150.4 ± 35.2	148.6 ± 34.8	0.72
Day 3	95.8 ± 28.4	112.6 ± 30.1	<0.01
Day 7	50.2 ± 20.5	75.4 ± 25.7	<0.001

Pancreatic necrosis occurred in 12 patients (10.9%) in the omega-3 group versus 21 patients (19.1%) in the octreotide group, with a p-value of 0.05, indicating a borderline significant difference. Infections were significantly fewer in the omega-3 group (8 patients, 7.3%) compared to the octreotide group (17 patients, 15.5%), with a p-value of 0.03. Organ failure was less common in the omega-3 group (5 patients, 4.5%) than in the octreotide group (9 patients, 8.2%), although this difference was not statistically significant ($p = 0.22$).

Table 3: Incidence of Complications

Complication	Omega-3 Group (n=110)	Octreotide Group (n=110)	p-value
Pancreatic Necrosis	12 (10.9%)	21 (19.1%)	0.05
Infection	8 (7.3%)	17 (15.5%)	0.03
Organ Failure	5 (4.5%)	9 (8.2%)	0.22

Mortality rates were lower in the omega-3 group, with 3 patients (2.7%) compared to 7 patients (6.4%) in the octreotide group, though this difference was not statistically significant ($p = 0.18$). Additionally, the need for surgical intervention was reduced in the omega-3 group, with 6 patients (5.5%) requiring surgery versus 13 patients (11.8%) in the octreotide group, approaching statistical significance with a p-value of 0.09.

Table 4: Overall Patient Outcomes

Outcome	Omega-3 Group (n=110)	Octreotide Group (n=110)	p-value
Mortality	3 (2.7%)	7 (6.4%)	0.18
Surgical Intervention	6 (5.5%)	13 (11.8%)	0.09

Discussion

The findings of this study provide compelling evidence that omega-3 fatty acid infusion is superior to octreotide infusion in managing acute pancreatitis (AP). The comparative analysis of the two treatment groups reveals significant differences in key clinical outcomes, including the reduction of inflammation, length of hospital stays, incidence of complications, and overall patient outcomes. The primary outcome measure, reduction in C-reactive protein (CRP) levels, showed a significantly greater decrease in the omega-3 fatty acid group compared to the octreotide group [12]. This suggests that omega-3 fatty acids have a more potent anti-inflammatory effect in patients with AP. The mechanisms underlying this effect likely involve the incorporation of omega-3 fatty acids into cell membranes, leading to reduced production of pro-inflammatory eicosanoids and increased production of anti-inflammatory mediators such as resolvins and protectins [13]. These findings align with previous studies that have demonstrated the anti-inflammatory properties of omega-3 fatty acids in various inflammatory conditions. The omega-3 fatty acid group had a significantly shorter median length of hospital stay (8.2 days) compared to the octreotide group (10.4 days). This reduction in hospitalization duration not only benefits patients by reducing their exposure to hospital-related complications but also has significant implications for healthcare costs and resource utilization [14]. The shorter hospital stay in the omega-3 group can be attributed to the more rapid resolution of inflammation and possibly a faster clinical recovery. The incidence of complications such as pancreatic necrosis and infection was lower in the omega-3 fatty acid group. Pancreatic

necrosis is a severe complication of AP that can lead to systemic inflammatory response syndrome (SIRS), multi-organ failure, and increased mortality [15]. The anti-inflammatory and antioxidant effects of omega-3 fatty acids likely contribute to the prevention of pancreatic necrosis and infection by reducing oxidative stress and stabilizing cellular membranes. These results highlight the potential of omega-3 fatty acids to improve the clinical course of AP and prevent the progression to more severe forms of the disease [16]. Overall patient outcomes were better in the omega-3 fatty acid group, with lower mortality rates and a reduced need for surgical intervention. Although the differences in mortality and surgical intervention rates did not reach statistical significance, the trends favor the omega-3 group. These findings suggest that omega-3 fatty acids may confer a survival benefit and reduce the need for invasive procedures in patients with AP [17]. The improved outcomes in the omega-3 group may be due to the combined effects of reduced inflammation, fewer complications, and faster recovery. Despite the promising results, this study has several limitations. The sample size, although sufficient to detect significant differences in primary outcomes, may not be large enough to detect smaller differences in secondary outcomes such as mortality and surgical intervention rates. Additionally, the study was conducted over a relatively short duration, and long-term follow-up data were not collected. Future studies with larger sample sizes and extended follow-up periods are needed to confirm these findings and evaluate the long-term benefits and safety of omega-3 fatty acid infusion in AP.

Clinical Implications

The results of this study have important clinical implications for the management of acute pancreatitis. Omega-3 fatty acid infusion appears to be a more effective therapeutic strategy compared to octreotide infusion, offering significant benefits in reducing inflammation, shortening hospital stays, and preventing complications. Clinicians should consider incorporating omega-3 fatty acids into the treatment regimen for patients with AP, particularly those with moderate to severe disease.

Conclusion

It is concluded that omega-3 fatty acid infusion is superior to octreotide infusion in the management of acute pancreatitis. Omega-3 fatty acids significantly reduce inflammation, shorten hospital stays, and lower the incidence of complications. These findings suggest that omega-3 fatty acids should be considered a preferred therapeutic option for patients with acute pancreatitis.

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