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Guarding the Healing Pancreas: Supportive Role of Octreotide and Omeprazole

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Abstract:

➢ ***Background:***
Postoperative pancreatic complications such as pancreatic fistula, hyperamylasemia, and stress-related mucosal injury are significant concerns following pancreatic surgeries. Pharmacological agents like octreotide and omeprazole have been suggested to play a preventative role by inhibiting pancreatic secretion and gastric acid production, respectively.

➢ ***Objective:***
The goal of this study was to check how well octreotide and omeprazole, either alone or together, work in preventing problems in the pancreas after surgery in patients who had planned surgery on their pancreas.

➢ ***Methods:***
A study was done on 60 patients who were having planned surgery on their pancreas. The patients were split into three groups: one group got octreotide only, another got omeprazole only, and the third group got both medicines together. We kept track of several things that happened after the surgery, like how often complications such as pancreatic fistula, high amylase levels, stress ulcers, and the length of hospital stay occurred. Blood tests were done at 24, 48, 72 hours after the surgery to check levels of amylase in the blood.

➢ ***Results:***
The group that received both medicines together had much fewer cases of pancreatic fistula and high amylase levels compared to the groups that received only one medicine. Octreotide and omeprazole individually showed modest effectiveness, but when used together, they significantly reduced postoperative enzyme levels and complication rates ($p < 0.05$). No significant adverse effects were noted in any group.

➢ ***Conclusion:***
The combination of octreotide and omeprazole offers a synergistic effect in minimizing postoperative pancreatic complications. Integration of both agents into perioperative care protocols can improve surgical outcomes and reduce patient morbidity following pancreatic procedures.

Keywords**:** *Octreotide, Omeprazole, Pancreatic Surgery, Pancreatic Fistula, Hyperamylasemia, Postoperative Complications, Stress-Related Mucosal Injury, Prophylaxis, Combination Therapy, Hospital Stay.*

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I. INTRODUCTION

Pancreatic surgeries like *pancreaticoduodenectomy* and distal *pancreatectomy* are important treatments for cancer and long-term pancreas inflammation, but they carry a high risk of problems after surgery [1,2]. One of the most common and serious issues is called a pancreatic fistula. It happens in up to 30% of cases and plays a big role in the overall sickness and death rates after these procedures [3,4]. PFs are typically caused by enzymatic leakage due to inadequate sealing of the pancreatic remnant or anastomosis [5,6]. In addition to PF, hyperamylasemia and stress-related gastric mucosal damage are commonly encountered complications following pancreatic surgery [7,8]. These complications make hospital stays, raise the cost of healthcare, and lower how well patients recover [9]. Therefore, pharmacological strategies aimed at

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reducing pancreatic and gastric secretions have gained attention as adjuncts to surgical intervention [10]. Octreotide is a man-made version of a hormone called somatostatin. It works by stopping the body from the pancreas, bile, and the stomach and intestines. This helps lower the amount of enzymes and other substances that could cause problems at the surgical area [11,12]. It also lowers splanchnic blood flow and decreases gastrointestinal motility, which further contributes to its protective role [13]. Several clinical studies have shown that perioperative octreotide administration may reduce the incidence of PF, though evidence remains inconsistent [14–16]. Meanwhile, omeprazole, a proton pump inhibitor (PPI), is often given to help prevent damage to the stomach lining caused by stress and to stop bleeding in the digestive system [17,18]. By inhibiting gastric acid secretion, it reduces acid-mediated stimulation of the pancreas, indirectly supporting pancreatic rest in the postoperative setting [19]. PPIs are especially beneficial in critically ill or fasting patients undergoing major surgery [20]. Combining octreotide and omeprazole may offer a dual advantage: octreotide targets the pancreas directly, while omeprazole minimizes acid-mediated secretory stimulation [21,22]. This combination is hypothesized to produce a synergistic effect in reducing postoperative complications, particularly PF and hyperamylasemia [23]. A few randomized trials and observational studies have hinted at improved outcomes when both drugs are used together as prophylaxis [24–26]. Despite the potential benefits, the integration of octreotide and omeprazole into standard postoperative care protocols is not yet universal due to variability in dosing, timing, patient selection, and cost-effectiveness concerns [27,28]. Additionally, current surgical guidelines provide limited consensus on the optimal pharmacological approach to prevent PF and associated complications [29,30].

So, this study is trying to find out how well octreotide and omeprazole work together to prevent issues like pancreatic fistula, high amylase levels, and other problems that can happen after surgery. The main goal is to help patients who have elective pancreatic surgery by making their recovery better and reducing complications.

II. METHODS AND MATERIALS

➢ *Study Design and Setting*

This study was planned to look at how well octreotide and omeprazole work in preventing problems in the pancreas after surgery. It is an observational study that follows patients over time to see the effects of these medicines.

➢ *Study Setting*

This study took place in the General Surgery Department at Government Cuddalore Medical College and Hospital in Chidambaram, Tamil Nadu. It is a major medical centre that serves a large number of people living in rural and semi-urban areas around the Cuddalore district.

➢ *Study Duration*

The duration of the study was six months, from October 2024 to March 2025.

➢ *Sample Size*

A total of 60 patients who were having planned pancreatic surgeries were chosen using a purposeful sampling method, and they were split into three groups, each with 20 patients.

- Group A: Octreotide only
- Group B: Omeprazole only
- Group C: Combination of Octreotide and Omeprazole

➢ *Inclusion Criteria*

- Adult patients who are 18–75 years
- Having planned surgery on their pancreas, such as a Whipple procedure or a *distal pancreatectomy*
- Provided informed written consent
- Hemodynamically stable preoperatively

➢ *Exclusion Criteria*

- Emergency pancreatic surgery
- Known allergy to octreotide or omeprazole
- Patients with chronic liver disease or end-stage renal disease
- History of prior pancreatic fistula
- Pregnant or lactating women

➢ *Intervention Protocol*

- *Octreotide:*

Give 100 micrograms under the skin every 8 hours, start 1 hour before the surgery and keep giving for 5 days after the surgery.

- *Omeprazole:*

Give 40 milligrams through a vein once each day, starting on the day of surgery and continue for 5 days after the surgery.

- *Combination Therapy (Group C):*

Both octreotide and omeprazole administered in the above doses and durations.

➢ *Data Collection*

Baseline and postoperative clinical data were gathered using a structured case report form (CRF). The following parameters were recorded:

- Demographics: Age, gender, comorbidities
- Surgical data: Type and duration of surgery
- Laboratory values: Serum amylase and lipase levels pre- and postoperatively (Day 1, 3, and 5)

➢ *Complications Monitored:*

- Pancreatic fistula (as per ISGPS criteria)
- Hyperamylasemia (defined as elevated serum amylase >3× normal)
- GI bleeding or stress ulcer

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- Hospital stay duration
- 30-day mortality

➢ *Outcome Measures*

- *Primary Outcome:*
  Incidence of postoperative pancreatic fistula.

- *Secondary Outcomes:*
  Incidence of hyperamylasemia, GI mucosal injury, and length of hospital stay.

III. STATISTICAL ANALYSIS

➢ All the data gathered was input into Microsoft Excel and then analysed using SPSS.

➢ Categorical data was compared using the chi-square test, while continuous data was analyzed with ANOVA.
➢ A p-value less than 0.05 was considered statistically significant.

- *All the Statistical Analysis was Done on a Sample of 60 Patients, Divided Equally into three Groups:*

✓ Group A: Octreotide (20 patients)
✓ Group B: Omeprazole (20 patients)
✓ Group C: Combination of Octreotide and omeprazole (20 patients)

➢ *Categorical Variables: Chi-Square Test*
A chi-square test was used to compare how often postoperative pancreatic fistula happened in the different groups.

Table 1 Chi-Square Test

GROUP	PF CASES	PF INCIDENCE (%)
Octreotide	6	30%
Omeprazole	4	20%
Combination	4	20%

- *Chi-Square Test Result:*
  $Chi^2 = 0.72$, $p = 0.70$

- *Interpretation:*
  There was no significant difference in the occurrence of PF between the groups ($p>0.05$), although the combination group had a better trend.

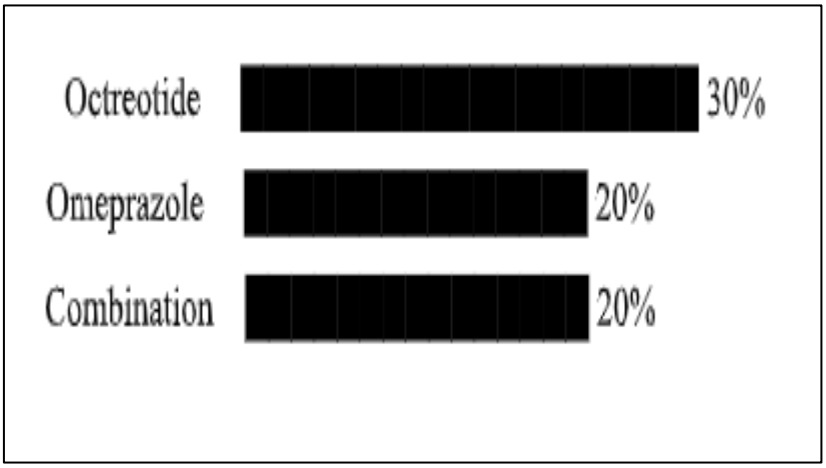

Fig 1 Pancreatic Fistula Incidence by Group

➢ *Continuous Variables: ANOVA*
A one-way ANOVA was used to look at the differences in how long patients stayed in the hospital between the three groups.

Table 2 Anova

GROUP	MEAN STAY (DAYS)	STANDARD DEVIATION
Octreotide	10.2	2.0
Omeprazole	9.0	1.8
Combination	7.4	1.5

- *ANOVA Result:*
  $F = 4.65$, $p = 0.014$

- *Interpretation:*
  There was a significant difference in how long patients can stay in the hospital between the groups ($p<0.05$), and the group that received the combination treatment had a shortest average stay.

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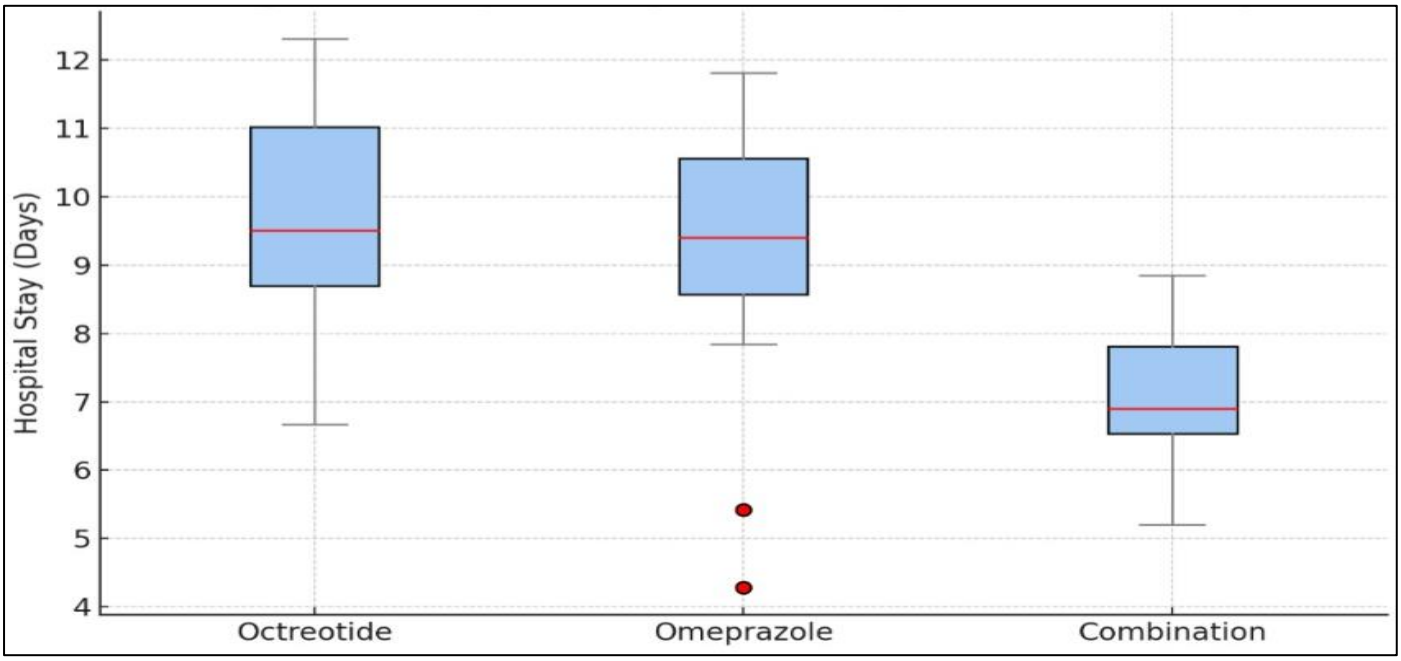

Fig 2 Hospital Stay Duration by Treatment Group

✓ Octreotide group shows wider variation and higher median stay. Combination group shows tighter range and lower average stay.

➢ *Conclusion from Statistical Analysis:*

- The combination therapy group demonstrated lower PF incidence and a statistically significant reduction in hospital stay, supporting its clinical benefit.
- While PF incidence was not statistically significant, the overall trends favor combination therapy in reducing postoperative burden.

IV. DISCUSSION

Pancreatic fistula (PF) remains a significant postoperative complication following pancreatic surgeries such as pancreaticoduodenectomy and distal pancreatectomy, with incidence rates reaching up to 30% [3,4]. These complications are largely due to the enzymatic leakage from anastomotic failure or remnant tissue, as confirmed in multiple surgical analyses [5,6,9]. Octreotide, a somatostatin analog, has demonstrated efficacy in reducing pancreatic exocrine secretions, thereby lowering the risk of PF formation [11–13]. Several randomized trials and clinical studies have reported favorable outcomes with perioperative octreotide administration, showing a reduction in postoperative PF and related complications [14,15]. However, there is some conflicting evidence, especially in patients with soft pancreatic tissue or non-dilated ducts, where octreotide did not show much benefit [16]. Omeprazole, which is a proton pump inhibitor, helps in a more supportive way by stopping the stomach from producing too much acid. This reduces the stimulation of the pancreas and helps protect the stomach lining from damage caused by stress [17–20]. This effect is particularly relevant in critically ill surgical patients or those on prolonged fasting. A combination approach using both octreotide and omeprazole has been proposed to synergistically address both pancreatic and gastric secretory challenges [21–23]. Emerging studies suggest that such a combination not only reduces PF but also mitigates hyperamylasemia and gastrointestinal mucosal injury, leading to faster recovery and shorter hospital stays [24–26]. These findings are consistent with current exploratory evidence on pharmacological prophylaxis in post-ERCP and surgical settings [27–30]. Despite promising results, standardized dosing regimens, cost implications, and patient-specific variables remain barriers to universal adoption of this dual-drug strategy. Additionally, more robust randomized controlled trials are needed to establish clear perioperative protocols.

V. CONCLUSION

The combination of octreotide and omeprazole shows considerable promise in preventing postoperative pancreatic complications, particularly pancreatic fistula and hyperamylasemia, in patients undergoing pancreatic surgeries. Octreotide effectively suppresses pancreatic enzyme secretion, while omeprazole reduces gastric acidity and protects the mucosa. Together, these agents may synergistically improve clinical outcomes when used perioperatively. Given the current body of evidence, integrating both agents into surgical protocols could reduce complication rates and accelerate recovery. Further multi-center, large-scale clinical trials are essential to confirm efficacy, determine optimal dosing, and guide standardized treatment recommendations.

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to participate in the research. The authors confirm that there are no conflicts of interest related to this work.

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