

Spectrum and Outcomes of Postoperative Complications After Whipple Procedure: A Retrospective Analysis at a Tertiary Care Center

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Abstract: **Background:** The Whipple procedure (pancreaticoduodenectomy) is the standard surgical treatment for resectable periampullary malignancies. Despite improvements in technique and perioperative care, it carries substantial morbidity and mortality. **Objective:** To evaluate the profile and frequency of postoperative complications in patients undergoing Whipple procedure at ASRAM Hospital between January 2024 and June 2025. **Methods:** We retrospectively reviewed medical records of 18 patients and obtained follow-up information via telephonic interviews with patient attendants. Complications were classified according to International Study Groups definitions for pancreatic fistula and delayed gastric emptying. **Results:** Anastomotic leak occurred in 3 patients (16.7%), all progressing to peritonitis, sepsis, septic shock, and death. Three patients (16.7%) died of multi-organ dysfunction syndrome, and three (16.7%) died of intra-abdominal abscess. Among survivors, delayed gastric emptying was noted in 3 (16.7%), fistula formation in 4 (22.2%), and surgical site infection in 2 (11.1%). Overall mortality was 9/18 (50.0%). **Conclusion:** Infectious and anastomotic complications remain the leading causes of death following Whipple procedure. Early detection and standardized management protocols are essential to reduce morbidity and mortality.

Keywords: Whipple procedure; Pancreaticoduodenectomy; Postoperative complications; Anastomotic leak; Delayed gastric emptying

1.Introduction

Pancreaticoduodenectomy, or Whipple procedure, is the cornerstone for treating head-of-pancreas and periampullary tumors, providing the most favourable prognosis for long-term survival. Despite refined surgical techniques and perioperative care, reported mortality ranges from 2% to 5% in high-volume centers, while morbidity remains as high as 40%-50%. Anastomotic leakage, delayed gastric emptying, and infectious complications are the most common adverse events and major contributors to prolonged hospitalization and death.

The present study analyses the complication spectrum and outcomes in our institution, aiming to highlight areas for improvement in perioperative management and to benchmark our results against published series.

2.Materials and Methods

Study Design and Setting

We conducted a retrospective observational study at ASRAM Hospital, Eluru.

Study Population and Period

Eighteen consecutive patients who underwent the Whipple procedure from January 2024 to June 2025 were included. Exclusion criteria comprised aborted procedures and incomplete records.

Data Collection

Demographic, perioperative, and postoperative data were extracted from electronic medical records. Details regarding complications were verified through structured telephone interviews conducted with the patients' primary caregivers or family members. Definitions of pancreatic fistula and delayed gastric emptying were based on the guidelines established by the International Study Group.

Ethical Approval

The Institutional Ethics Committee of ASRAM Hospital approved this study.

Statistical Analysis

Data were summarized using descriptive statistics. Categorical variables are presented as frequencies and percentages.

3.Results

Complication	No. of Cases (%)	Outcome
Anastomotic leak	3 (16.7%)	Peritonitis → Sepsis → Septic shock → Death
Multi-organ dysfunction (MODS)	3 (16.7%)	Death
Intra-abdominal abscess	3 (16.7%)	Death
Delayed gastric emptying	3 (16.7%)	Managed prokinetic agents and supportive care
Fistula formation	4 (22.2%)	Prolonged recovery
Surgical site infection	2 (11.1%)	Treated with antibiotics and wound care

Total mortality was 9/18 (50.0%). Infectious and anastomotic complications accounted for all deaths.

4. Discussion

Our overall mortality of 50% exceeds the 2%-5% benchmark reported in high-volume centers, likely reflecting our early institutional experience with pancreaticoduodenectomy. Anastomotic leak—occurring in 16.7%—remains the single most lethal complication, consistent with international reports citing rates from 5% to 20% and a significant association with mortality. Intra-abdominal abscess and MODS each caused 16.7% of deaths, underlining the need for stringent infection control and early drainage protocols.

Delayed gastric emptying affected 16.7% of survivors, aligning with ISGPS-defined rates of 10%-30%. Fistula formation and surgical site infections occurred in 22.2% and 11.1%, respectively, highlighting the critical role of precise surgical execution and perioperative antibiotic prophylaxis.

To improve outcomes, we recommend:

- Standardized anastomotic reinforcement techniques
- Routine use of somatostatin analogues for fistula prevention
- Early enteral nutrition via feeding jejunostomy
- Enhanced recovery pathways to reduce length of stay and complications

5. Conclusion

Postoperative morbidity and mortality following Whipple procedure at our center remain high, driven predominantly by anastomotic and infectious complications. Adopting evidence-based perioperative protocols and gaining surgical experience are critical steps toward improving patient outcomes.

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