

Three Years After a Whipple Pancreaticoduodenectomy: Case Report and Review of Clinical Evolution

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ABSTRACT

Three years after a Whipple pancreaticoduodenectomy, a 62-year-old male patient presented with progressive obstructive jaundice, pruritus, dark urine, and weight loss. Imaging revealed a 4-cm mass in the second portion of the duodenum causing obstruction of the bile and pancreatic ducts. Biopsy confirmed moderately differentiated duodenal adenocarcinoma. The patient underwent classical Whipple pancreaticoduodenectomy with R0 resection. The postoperative course was notable for delayed gastric emptying, which was managed conservatively. Histopathology confirmed pT3N1M0 disease, and adjuvant fluoropyrimidine-based chemotherapy was administered for six months. During 36 months of follow-up, the patient remained free of tumor recurrence, with preserved functional status (ECOG 1), manageable exocrine pancreatic insufficiency, and controlled pancreatogenic diabetes. Duodenal adenocarcinoma is a rare malignancy that often presents with nonspecific symptoms until periampullary obstruction occurs. Complete resection with negative margins is the key prognostic factor. This case demonstrates that careful patient selection, surgery performed in specialized centers, and adjuvant therapy can lead to favorable long-term oncologic and functional outcomes. The Whipple procedure, although technically demanding and associated with both early and late complications, remains the standard curative-intent treatment for resectable duodenal adenocarcinoma. Long-term surveillance is essential to detect recurrence and manage metabolic and nutritional complications, ensuring improved survival and quality of life.

KEYWORDS: Whipple procedure, pancreaticoduodenectomy, duodenal adenocarcinoma, long-term outcomes, surgical complications, R0 resection.

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INTRODUCTION

The Whipple pancreaticoduodenectomy, first described in 1935 by Allen Oldfather Whipple, is one of the most complex surgical procedures in digestive surgery. Its main indication is periampullary tumors, especially pancreatic head adenocarcinoma, although it is also used in benign or

premalignant lesions of the duodenopancreatic region. Over the past decades, advances in surgical techniques, anesthesia, and perioperative care have significantly reduced the initial morbidity and mortality associated with this procedure. While mortality rates in the first half of the 20th century

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approached 25%, current hospital mortality in high-volume centers is reported at less than 5%.¹

Despite these advances, the Whipple procedure continues to be technically and physiologically demanding. The most common early complications include pancreatic fistula, delayed gastric emptying, and intra-abdominal infections. In the medium- and long-term follow-up, patients may present with nutrient malabsorption, weight loss, pancreatogenic diabetes, and, in oncologic cases, tumor recurrence. These sequelae directly impact quality of life and survival, making close clinical monitoring essential after surgery.²

In oncology, survival following pancreaticoduodenectomy depends mainly on tumor stage and the achievement of negative resection margins (R0). Literature reports overall five-year survival ranging from 10% to 30% for pancreatic adenocarcinoma, although survival rates are significantly higher in benign or low-grade lesions. Furthermore, the role of adjuvant chemotherapy and recent advances in personalized medicine have modified prognosis in some patient subgroups.³

In this context, the evaluation of long-term clinical outcomes in patients undergoing Whipple surgery is highly relevant, not only to assess the efficacy of surgical treatment but also to identify chronic complications and the need for specialized follow-up.⁴

This article describes the case of a patient who underwent Whipple pancreaticoduodenectomy with three years of clinical follow-up, analyzing surgical and oncological outcomes, as well as the complications observed during surveillance. Additionally, we provide a brief literature review regarding survival and quality of life after this procedure, with the aim of contributing useful clinical evidence for surgical practice.⁴

CASE REPORT

We present the case of a 62-year-old male patient with a medical history of systemic arterial hypertension of ten years' duration, managed with losartan, without diabetes mellitus, chronic liver disease, or family history of cancer. The clinical picture began four months before diagnosis with nonspecific epigastric abdominal pain of moderate intensity, associated with postprandial fullness, anorexia, and weight loss of approximately 8–10 kg. Weeks later, he developed progressive jaundice, generalized pruritus, dark urine, and acholic stools, prompting medical evaluation.

On admission, physical examination revealed a thin, conscious patient with jaundiced skin and mucosa, scleral icterus, and a soft, depressible abdomen without tenderness. A distended, non-tender, tense gallbladder was palpated, consistent with Courvoisier's sign. No ascites or visceromegaly were detected.

Laboratory tests showed total bilirubin of 12.8 mg/dL (direct 10.9 mg/dL), alkaline phosphatase 580 U/L, mildly elevated transaminases, normal blood glucose, and tumor marker CA 19-9 of 95 U/mL. Abdominal ultrasound revealed dilation of intra- and extrahepatic bile ducts, with a common bile duct measuring 12 mm. Contrast-enhanced abdominal CT demonstrated a heterogeneous solid mass of approximately 4 cm located in the second portion of the duodenum, causing obstruction of the distal bile duct and main pancreatic duct, without evidence of major vascular invasion or distant metastases. Upper endoscopy confirmed an ulcerated, exophytic, stenosing lesion in the medial wall of the second duodenal portion, near the ampulla of Vater, preventing passage of the endoscope. Biopsies reported moderately differentiated adenocarcinoma of duodenal origin.

Following tumor board discussion and in the absence of metastases, curative-intent surgery was indicated. Under general balanced anesthesia, laparotomy was performed through a bilateral chevron incision. Abdominal exploration revealed no peritoneal or hepatic spread. The duodenal mass measured approximately 4 cm, infiltrating the duodenal wall and closely related to the pancreatic head and distal bile duct, without major vascular involvement. A classic Whipple pancreaticoduodenectomy was performed. Kocher's maneuver was carried out to mobilize the duodenum and rule out retroperitoneal extension. The common hepatic artery and gastroduodenal artery were identified, with the latter ligated and divided after confirming adequate hepatic perfusion. Retrograde cholecystectomy and bile duct dissection were performed, dividing the duct proximal to the hepatic hilum. The stomach was divided at the distal antrum with a linear stapler, followed by jejunal transection 10 cm distal to the ligament of Treitz. The pancreatic head was carefully dissected from the superior mesenteric and portal veins, and the pancreatic neck was divided with meticulous hemostasis. The resected block included the pancreatic head, duodenum, distal antrum, proximal jejunum, gallbladder, and distal bile duct.



Figure 1, 2: Specimen from pancreaticoduodenectomy.



Figure 3: Duodenal tumor.

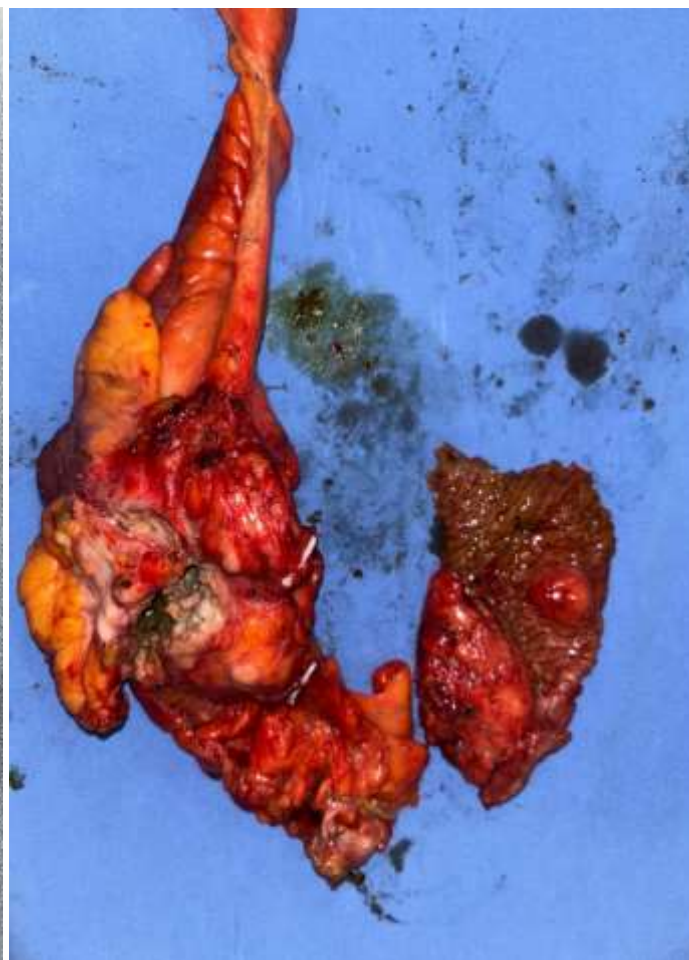


Figure 4: Specimen from pancreaticoduodenectomy

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Reconstruction included three anastomoses: a duct-to-mucosa pancreaticojejunostomy reinforced with parenchymal sutures, a termino-lateral hepaticojejunostomy with absorbable sutures, and a retrocolic gastrojejunostomy using a linear stapler reinforced manually. Closed suction drains (Jackson-Pratt) were placed near the pancreatic and biliary anastomoses. Total operative time was seven hours, with an estimated blood loss of 900 mL, and no transfusion was required.

Postoperatively, the patient was admitted to the intensive care unit for 48 hours, remaining hemodynamically stable. He developed delayed gastric emptying with oral intolerance and

vomiting, managed conservatively with parenteral nutrition, prokinetics, and nasogastric decompression, with gradual oral intake progression. He was discharged on postoperative day 14 in good general condition.

Final pathology confirmed moderately differentiated duodenal adenocarcinoma infiltrating into the muscularis propria and subserosa, with complete resection and negative margins (R0). Lymphovascular invasion was present, with two of 18 lymph nodes positive for metastases. Pathologic staging was pT3N1M0 according to the 8th AJCC classification.

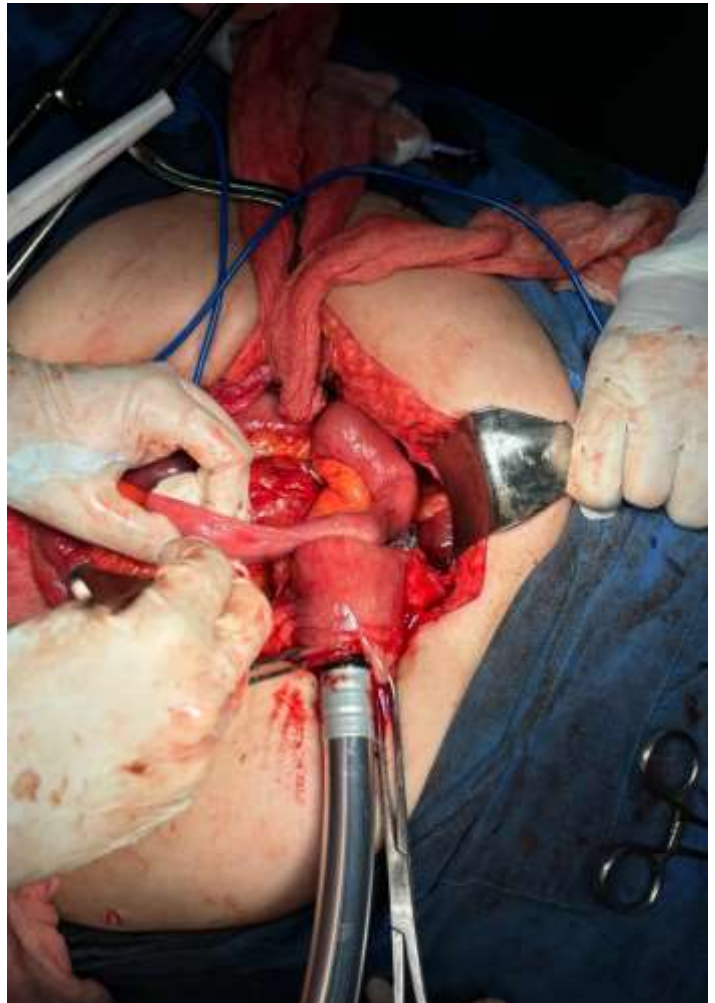


Figure 5, 6: Intestinal anastomoses.

Adjuvant chemotherapy with a fluoropyrimidine-based regimen was administered for six months, well tolerated by the patient. Surveillance included clinical and imaging controls every three months during the first year and every six months thereafter. Follow-up imaging revealed no tumor recurrence, and tumor markers remained within normal ranges. Long-term complications included intermittent steatorrhea, effectively managed with pancreatic enzyme replacement, a total weight loss of 10 kg, and pancreatogenic diabetes, controlled with basal insulin.

At 36 months after surgery, the patient remains alive, with ECOG performance status 1, fully independent in daily

activities, with adequate tolerance to enzyme replacement, good metabolic control, and no clinical or radiological evidence of recurrence.

DISCUSSION

Duodenal adenocarcinoma is a rare gastrointestinal malignancy, representing less than 1% of all digestive tract tumors and approximately 30–45% of small bowel neoplasms. The most common location is the second duodenal portion, near the ampulla of Vater, which influences both clinical presentation and surgical options. Unlike pancreatic adenocarcinoma, duodenal adenocarcinoma

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generally has a more favorable prognosis when complete resection with negative margins is achieved.⁵

The clinical presentation is typically insidious and nonspecific, including abdominal pain, weight loss, and altered bowel habits. However, when the tumor is periampullary, obstructive jaundice often becomes the cardinal symptom, as in this case. Progressive jaundice associated with dark urine and acholic stools guided suspicion toward a neoplasm of the pancreatoduodenal region and prompted imaging studies that characterized the lesion.⁶ Computed tomography remains the diagnostic modality of choice for duodenal tumors, as it allows assessment of local extension, vascular involvement, and distant metastases. In this case, the absence of major vascular infiltration and distant disease supported surgical resection. Endoscopy and biopsy remain essential for histological confirmation, though tissue sampling may be limited by tumor stenosis.⁷

The Whipple pancreaticoduodenectomy is the treatment of choice for duodenal neoplasms located in the second portion, as it ensures en bloc resection and adequate margins. Although technically demanding, mortality has decreased to below 5% in high-volume centers. The most frequent complications are delayed gastric emptying, pancreatic fistula, and intra-abdominal infections. In our case, the patient developed only delayed gastric emptying, which resolved conservatively, consistent with reported rates of 20–30%.⁸ Oncologically, R0 resection remains the most important prognostic factor. The finding of two metastatic lymph nodes (N1) staged the disease as pT3N1M0. In such cases, adjuvant chemotherapy with fluoropyrimidines is recommended, as it improves disease-free and overall survival. The patient's favorable outcome, with no recurrence at 36 months, aligns with literature reporting 5-year survival rates of 40–60% in cases with complete resection and adjuvant therapy.⁹

Long-term complications include pancreatic exocrine insufficiency and pancreatogenic diabetes, both present in this case but well controlled with enzyme replacement therapy and endocrinologic management. These conditions significantly impact quality of life, necessitating long-term multidisciplinary follow-up.¹⁰

This case highlights that, despite the rarity of duodenal adenocarcinoma, timely diagnosis, appropriate patient selection, and performance of Whipple surgery in specialized centers yield favorable outcomes in terms of survival and long-term quality of life. Additionally, close surveillance is essential for early detection and management of metabolic complications or tumor recurrence.

CONCLUSION

The Whipple pancreaticoduodenectomy remains one of the most complex surgical procedures in digestive surgery and continues to be the standard curative-intent treatment for periampullary neoplasms, including duodenal adenocarcinoma. Although its main indication is pancreatic head cancer, it is also justified in duodenal adenocarcinomas,

ampullary tumors, distal cholangiocarcinomas, and some high-risk benign conditions, such as mucinous cystadenomas or intraductal papillary mucinous neoplasms. In all cases, the prerequisite is the possibility of complete resection with negative margins (R0), the most important determinant of long-term survival.¹¹

Absolute contraindications include unresectable major vascular involvement (superior mesenteric artery or celiac trunk) and the presence of hepatic or peritoneal metastases. Additionally, poor functional status, severe malnutrition, or comorbidities that preclude tolerance of major surgery are considered contraindications, as this demanding procedure requires sufficient physiologic reserve.¹²

Despite advances in surgical technique, anesthesia, and critical care, pancreaticoduodenectomy remains associated with significant morbidity. Early complications include pancreatic fistula (the most serious, with an incidence of up to 20%), delayed gastric emptying, wound infection, and intra-abdominal collections. Postoperative hemorrhage and bile leak, though less frequent, are serious complications requiring close monitoring and sometimes reintervention.¹²

Long-term complications are equally relevant. Exocrine pancreatic insufficiency affects a significant proportion of patients, causing diarrhea, steatorrhea, and weight loss, requiring lifelong enzyme replacement therapy. Pancreatogenic diabetes, resulting from pancreatic tissue loss and endocrine dysfunction, tends to be more unstable than type 2 diabetes and requires specialized management. Additionally, patients may develop malabsorption syndromes and nutritional deficiencies, particularly of fat-soluble vitamins and micronutrients, underscoring the need for nutritional follow-up.¹³

This clinical case underscores the relevance of pancreaticoduodenectomy as a potentially curative therapeutic option for duodenal adenocarcinoma. The patient's favorable outcome, with no recurrence at three years, demonstrates that careful patient selection, performance of the procedure in specialized centers, and integration of adjuvant therapy when indicated can achieve prolonged survival, even in rare conditions such as duodenal tumors. It also emphasizes the importance of long-term surveillance, not only to detect recurrence but also to identify and manage chronic complications that significantly affect quality of life.^{14,15}

In conclusion, the Whipple pancreaticoduodenectomy is a technically demanding operation with inherent risks, yet it remains the only curative option for resectable duodenal and periampullary tumors. A thorough understanding of its indications, contraindications, and potential complications is essential to optimize outcomes and ensure that oncological benefit translates into improved survival and acceptable quality of life for patients.

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