A novel surgical strategy for the resection of duodenal gastrointestinal stromal tumours located close to the duodenal ampulla: a case report

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ABSTRACT

Although the optimal surgical procedure for the resection of duodenal gastrointestinal stromal tumours has not yet been characterised due to the low prevalence of these tumours and the anatomical complexity of the duodenopancreatic region, difficult surgical procedures such as pancreaticoduodenectomy are often proposed for stromal tumours located in the second portion of the duodenum. Our case report highlights a novel surgical strategy that can be implemented as an alternative to pancreaticoduodenectomy for such tumours close to the duodenal ampulla. A 70-year-old man incidentally diagnosed with a stromal tumour close to the duodenal ampulla in the second portion of the duodenum underwent local resection guided by an endoscopic nasobiliary drainage tube with primary closure. This tube was converted to a percutaneous trans-small intestinal biliary drainage tube during the procedure to prevent biliary leakage biliary stasis due to swelling of the duodenal ampulla. He also underwent a simple distal gastrectomy with Roux-en-Y reconstruction. This resulted in successful R0 resection. There were no procedure-related complications or post-surgery weight changes. Our simple novel surgical strategy may therefore be useful for avoiding pancreaticoduodenectomy and maintaining quality of life in patients with stromal tumours close to the duodenal ampulla.

KEYWORDS

Duodenum – Gastrointestinal stromal tumour – Pancreaticoduodenectomy – Surgery

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Introduction

Complete local resection without lymph node dissection is recommended for gastrointestinal stromal tumours,¹ and has been adopted for duodenal gastrointestinal stromal tumours.^{2,3} However, the optimal surgical procedure for duodenal gastrointestinal stromal tumours remains unclear because of their low prevalence and the complex anatomy of the duodenopancreatic region. Pancreaticoduodenectomy has often been performed for tumours located at the medial wall of the second portion of the duodenum and involving the duodenal ampulla.⁴ However, as pancreaticoduodenectomy is an invasive procedure, it should be avoided for duodenal gastrointestinal stromal tumours if possible. We report a case wherein a novel surgical strategy was successfully employed for the resection of a duodenal gastrointestinal stromal tumour close to the duodenal ampulla. We recommend that this approach be considered an alternative to pancreaticoduodenectomy in similar cases.

Case history

A 70-year-old man with no symptoms suggestive of a duodenal gastrointestinal stromal tumour underwent computed tomography (CT) during a medical examination at another institution. His medical history included hypertension, and he had no family history of gastrointestinal stromal tumour. He was referred to our hospital after abdominal CT showed a calcified tumour approximately 35 mm in diameter in the second portion of the duodenum (Fig 1a).

Esophagogastroduodenoscopy revealed a submucosal tumour with central ulceration located close to the duodenal ampulla (Fig 1b). Endoscopic ultrasound showed that the tumour was 36 × 32 mm in size, had an ambiguous border and was hypervascular. KIT-positive spindle cells were detected on histopathological examination of a duodenal biopsy specimen obtained by endoscopic ultrasound-guided fine-needle aspiration, and the tumour was diagnosed as a gastrointestinal stromal tumour. The levels of

Figure 1 (a) Abdominal computed tomography showing a tumour in the second portion of the duodenum. The white arrow indicates a calcified tumour approximately 35 mm in diameter. (b) Oesophagogastroduodenoscopy revealing the positional relationship between the tumour and duodenal ampulla. The tumour was located close to the duodenal ampulla (white arrow).

tumour markers, such as carcinoembryonic antigen and carbohydrate antigen 19-9, were within normal limits.

An endoscopic nasobiliary drainage tube was inserted preoperatively because the tumour was close to the duodenal papilla. We then performed open surgery to remove the tumour, with pancreatic preservation. The duodenum was mobilized using Kocher's manoeuvre (Fig 2). The wall around the tumour was cut, using the drainage tube for guidance (Fig 3a). The tumour was resected, preserving the duodenal ampulla (Fig 3b) and tumour margin, after which primary closure was performed. Finally, distal gastrectomy without lymphadenectomy was performed with Roux-en-Y reconstruction to provide separate passages for food and digestive fluids. The drainage tube was converted to a percutaneous trans-small intestinal biliary drainage tube during the procedure to prevent stasis of digestive fluid from swelling of the duodenal ampulla (Fig 4). Operative time was 295 minutes and estimated blood loss was 120 ml.

Histological examination of the 45 × 35-mm resected specimen revealed a mitotic count of 0/50 high-power fields and a Ki-67-positive proportion of ≤ 1%. The tumour was classified as low-risk according to the modified Fletcher classification system. The surgical margins were clear. The patient was discharged on postoperative day 22 after favourable progress, and the drainage tube was removed on postoperative day 34. The patient has been followed-up without recurrence for seven months. Currently, the patient's dietary intake and body weight are unchanged from his preoperative condition.

Discussion

Although R0 local resection without lymph node dissection is principally recommended for gastrointestinal stromal tumours,¹ and has been applied to duodenal gastrointestinal stromal tumours,^{2,5} the optimal surgical procedure for the latter remains controversial. Four main

surgical procedures are generally performed for duodenal gastrointestinal stromal tumours, depending on the tumour size and the positional relationship with the duodenal ampulla, including wedge resection with primary closure, segmental resection with side-to-end or end-to-end duodenojejunostomy, partial resection with Roux-en-Y duodenojejunostomy,⁵ and pancreaticoduodenectomy.⁴ For large tumours or those close to the duodenal ampulla, pancreaticoduodenectomy is often performed. However, as this procedure requires advanced surgical skills and is more invasive, we believe that pancreaticoduodenectomy should be avoided for duodenal gastrointestinal stromal tumours if possible.

In the present case, partial resection with primary closure and simple distal gastrectomy were successfully performed; hence, pancreaticoduodenectomy could be

Figure 2 Intraoperative findings after Kocher's mobilisation. The white arrow shows the tumour.

avoided. This surgical procedure included three key points. First, the endoscopic nasobiliary drainage tube was inserted preoperatively, and the location of the

duodenal ampulla could be clearly identified, thus allowing tumour resection without excessive surgical margins and preserving the duodenal papilla. In this case, we

selected an endoscopic nasobiliary drainage tube instead of a simple internal biliary stent because we thought that it would be easier to guide this tube intraoperatively. Second, primary closure was via simple distal gastrectomy because of separation of the passages for food and digestive fluids. This is advantageous because Roux-en-Y distal gastrectomy does not require highly specialised surgical skills and can thus be performed by general surgeons. Alternatively, partial resection with Roux-en-Y duodenojejunostomy may be performed to create a safe anastomosis, depending on the extent of the defect resulting from resection and its distance from the duodenal ampulla.⁵ Finally, the endoscopic nasobiliary drainage tube was converted to a percutaneous trans-small intestinal biliary drainage tube during the operation to prevent stasis of digestive fluid. In this case, we selected a percutaneous trans-small intestinal biliary drainage tube rather than a t-tube because the purpose of tube insertion was not only to divert biliary flow but also to prevent stenosis of the duodenal ampulla due to swelling.

A previous study comparing outcomes between pancreaticoduodenectomy and local resection for duodenal gastrointestinal stromal tumours highlighted the advantages of the latter approach. In particular, the operative times, postoperative hospital stay and complication rates were greater with pancreaticoduodenectomy than with local resection.² Additionally, a review indicated that morbidity was higher with pancreaticoduodenectomy than with local resection.⁵ In the present case, the operative and postoperative hospital stay times were appropriate and there were no postoperative complications. However, most previous reports

have not discussed postoperative quality of life, which is an essential factor in deciding the surgical treatment for duodenal gastrointestinal stromal tumours. Our surgical strategy contributed to the patient's good postoperative condition. However, we acknowledge that oncological outcomes are important, and future observation is required as the short follow-up period is insufficient to draw any conclusions.

Conclusion

Resection of a duodenal gastrointestinal stromal tumour close to the duodenal ampulla is a novel surgical strategy. This strategy not only avoids pancreaticoduodenectomy but also achieves R0 resection and maintains the patient's quality of life. It should thus be considered as an alternative to pancreaticoduodenectomy when appropriate.

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