

ORIGINAL ARTICLE

Surgery for secondary tumors of the pancreas

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Abstract

Background. The majority of pancreatic tumors are primary. The pancreas can however be the site of metastasis from renal cell cancer, lung, colon and breast cancers. The value of surgical treatment is unclear in such situations. The aim of this study was to evaluate the outcome of surgical therapy in patients with isolated metastases to the pancreas. **Methods.** All patients who underwent pancreatic surgery for malignant disease from 1999 to 2005 ($n=338$) at the department of hepatobiliary and pancreatic surgery, the Royal London Hospital, London, were evaluated from a retrospective pancreatic database. Five patients had metastatic pancreatic cancer. Surgical outcome and survival were examined in this subset of patients. **Results.** The primary cancer was renal cell carcinoma ($n=2$), breast ($n=1$), colon ($n=1$) and ovarian ($n=1$). The two patients with renal cell carcinoma developed pancreatic metastases years from the primary diagnosis. Both patients are alive 56 and 36 months post surgery. Two patients with breast and ovarian primary presented years after diagnosis of the primary but had advanced unresectable disease. There was one patient with colonic primary and synchronous pancreatic metastasis, and had a colectomy and Whipple's operation, and is alive 64 months postoperatively. **Conclusion.** The pancreas is an uncommon site for metastasis. Patients can present years after the treatment of primary. Long-term survival can be achieved with pancreatic resection in a highly selected subset of patients, and patients with primary renal cell carcinoma seem to have a favorable prognosis.

Key Words: *pancreatic metastasis, pancreatic resection, secondary tumors*

Introduction

The vast majority of pancreatic tumors are primary pancreatic adenocarcinoma; the pancreas can however be the site of metastases from renal cell cancer along with lung, breast, and colon or skin tumors [1]. Metastatic carcinoma to the pancreas from another site is uncommon and accounts for approximately 2% of pancreatic malignancies [2]. In large autopsy series the prevalence of pancreatic metastases has been described to be as high as 6 to 11%, and renal cell carcinoma appears to be the most common primary tumor to cause secondary pancreatic tumors [3]. The metastases may be single or multiple, synchronous or metachronous (some time occurring very late). Pancreatic metastases must be distinguished from locoregional invasion of malignant gastrointestinal tumors [4].

Although isolated metastatic disease to the pancreas is relatively uncommon, there are select cases in which this process does occur. Unfortunately, experience

with pancreatic resections for the treatment of isolated metastatic lesions is very limited [5]. As a result there are few guidelines that exist regarding the appropriate management of such lesions. We report a series of five cases of metastatic pancreatic tumors and the outcome of surgical treatment with a review of the literature.

Patients and methods

All patients who underwent pancreatic surgery for malignant disease from 1999 to 2005 ($n=338$) at The Royal London Hospital, were evaluated from a retrospective pancreatic database. Patient demographics and clinical variables including the type of pancreatic resection, primary histopathology and disease free interval (the interval from the presentation of the primary and development of pancreatic metastases) were examined. Five patients had metastatic pancreatic cancer. Surgical outcome and survival were examined in this subset of patients.

Results

The primary cancer was renal cell carcinoma ($n=2$), breast ($n=1$), and ovarian ($n=1$). The two patients with renal cell carcinoma developed pancreatic metastases 8 and 14 years from the primary diagnosis. One underwent distal pancreatectomy, and the other distal pancreatectomy and splenectomy. Both patients were alive 56 and 36 months post surgery (see Table I). One patient with breast cancer presented nine years after her primary was diagnosed. She was explored with curative intent, but she had widespread pancreatic and liver disease, so had a palliative bypass. She survived six months postoperatively. One patient with ovarian primary was diagnosed eight years after the primary diagnosis. She had a solitary pancreatic metastasis, but it was irresectable, so she had palliative bypass. She is alive 65 months postoperatively; she had cisplatin chemotherapy. There was one patient with colonic primary and synchronous pancreatic metastasis, and had colectomy and Whipple's operation. He is alive 44 months postoperatively (see Table I).

Discussion

The pancreas is an unusual but occasionally favored site for metastases, notably from carcinoma of kidney and lung [6]. In a clinical series of patients with pancreatic tumors, 4.5% of the cases were found to be metastases, and that figure increased to 42% among patients with previously diagnosed primary cancers and a solitary mass of the pancreas [7,8].

The symptoms from neoplasms of the pancreas include pain, weight loss and obstructive jaundice. Upper gastrointestinal bleeding and acute pancreatitis are less common but well-recognized in patients with primary pancreatic cancer. Although many patients with pancreatic metastasis have widespread disease, isolated metastases can be found [9]. If isolated metastases in the pancreas become symptomatic, they are often misdiagnosed as primary pancreatic adenocarcinoma.

Preoperative diagnosis is based on imaging. CT scans and MRI support the diagnosis, especially if multiple tumors are noted. Highly vascular tumors, as indicated by contrast enhanced CT scan, MRI, or angiography, are more likely to be metastases than primary pancreatic cancers, which tend to be relatively hypovascular. These findings are particularly applicable to renal cell carcinoma.

Recently, an improvement in hospital perioperative morbidity and mortality rates for pancreaticoduodenectomies has been documented and resections of metastatic tumors have been reported [10,11].

Although isolated metastases from renal cell carcinoma are rare, their behavior is often unusual because some patients have an indolent natural history, with presentation of metastatic renal cell carcinoma many years after treatment. Two patients in our series presented eight and 14 years after the diagnosis of primary renal cell carcinoma. Similar findings were noted by Sohn [2] and Law et al. [12] It is estimated that between 2 and 6% of patients with renal cell carcinoma are amenable to surgical resection [13]. Aggressive surgery for these isolated metastases has been shown to significantly improve survival [2,5,7,14].

Metastases are solitary in fewer than 10% of the patients with metastatic renal cell carcinoma. Resection of isolated metastases may contribute to prolonged survival in a small group of these patients [15,16]. It is difficult to determine long-term survival following pancreatic resection accurately for metastatic renal cell carcinoma. However, the results of different case reports are encouraging with most patients living more than one year after resection. Our two patients are alive three and 4.5 years after resection. Z'graggen et al. [7] have reported that three patients were surviving for more than 20 months. Sahin et al. [17] have reported that patients were surviving for 18 and 22 months after pancreatic resection.

One patient with colorectal primary in our series presented with a synchronous lesion in pancreatic

Table I. Patient demographics and clinical variables.

No	Age and sex	Site of primary tumor	Interval between treatment of primary and metastases	Tumor characteristics	Procedure performed	Status	Survival (months)
1	58/Male	Renal cell carcinoma	8 years	Solitary tumor, body of pancreas	Distal pancreatectomy	Alive	56
2	64/Male	Renal cell carcinoma	14 years	Solitary tumor, body and tail of pancreas	Distal pancreatectomy + splenectomy	Alive	32
3	76/Female	Breast cancer	9 years	Pancreatic + liver metastasis	Palliative bypass	Dead	6
4	70/Female	Ovarian cancer	8 years	Large solitary tumor, invading vessels	Palliative bypass	Alive	65
5	67/Male	Colon cancer	Synchronous lesion	Colon + pancreatic head	Bowel resection + Whipple's	Alive	44

head and had synchronous colectomy and Whipple's operation. He is alive 44 months postoperatively. There is little evidence in the literature to support synchronous bowel and pancreatic resection.

Two patients with breast and ovarian primary presented after a long disease free interval, but preoperatively found to have more extensive disease, so were not suitable for pancreatic resection. Crippa et al. [9] have reported three patients having pancreaticoduodenectomy for metastatic breast cancer associated with more than 20 months of survival after pancreatectomy.

A notable finding in our series was a long disease free interval. This was particularly the case with renal cell carcinoma patients. So the presence of pancreatic mass or masses in a patient with previous history of extra-pancreatic cancer is highly suggestive of pancreatic metastatic dissemination. Patients with isolated renal cell carcinoma metastases to the pancreas, whether synchronous or metachronous, represent a select group of patients with more indolent renal cell carcinoma. A history of previously resected metastases should not discourage pancreatic resection, providing the pancreas is the only site of metastases at the time of surgery.

In summary, the pancreas is an uncommon site for metastasis. Patients can present years after the treatment of primary disease. Long-term survival can be achieved with pancreatic resection in a highly selected subset of patients, and patients with primary renal cell carcinoma seem to have a favorable prognosis.

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