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Pancreatic Disease

Basic Science and Clinical Management

With 82 Figures

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Neuroendocrine Tumours

1 Epidemiology of Pancreatic Neuroendocrine Tumours

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Pancreatic neuroendocrine tumours are rare neoplastic growths of endocrine pancreatic tissue with both neural and endocrine features, frequently causing clinical syndromes from uncontrolled hormone secretion.[1,2] Those tumours that cause such syndromes have been classified as 'functional' whilst those without obvious hypersecretion have been classified as 'non-functional'.[1–3] However, 'non-functional' tumours secrete various peptides and proteins, including chromogranins, plasma levels of which can be used as tumour markers.[1,3,4] There are a number of well recognised syndromic tumours, the commonest being insulinoma and gastrinoma, although many gastrinomas arise in the duodenum (see Table 1.1). A minority of patients presenting with pancreatic neuroendocrine tumours have one of four inherited disorders producing tumours at many sites: multiple endocrine neoplasia type 1 (MEN-1)[5], von Hippel-Lindau disease[6] (see Ch. 12), neurofibromatosis[7] and tuberous sclerosis.[8]

Incidence and Prevalence

Autopsy Series

Pancreatic neuroendocrine tumours have been found in 0.1–1.6% of autopsies in unselected series.[10] This wide variation is likely to be attributable to varying methods of identification; systematic sectioning of the pancreas in transverse blocks 0.3–0.5 cm thick, with subsequent thorough examination of all slides made from each block, will give higher figures. In one autopsy series using meticulous identification the percentage with pancreatic neuroendocrine tumours was 10%.[16] However, as in other endocrine glands, many tumours are small adenomas that are slow growing and without significant hormonal effects, and so do not present during life. In a 25 year study of 11 472 autopsies conducted in Hong Kong, pancreatic neuroendocrine tumours were identified in only 10 cases, only one of which had presented during life.[10] Another study suggests that tumours not presenting in life are more likely to occur in the body and tail of the gland, and contain more pancreatic polypeptide than any other hormone.[18] Such studies have helped to develop our understanding of natural history, but provide limited insight into clinical features.

Table 1.1. Principal clinical features of less rare types of pancreatic neuroendocrine tumours

Tumour	Symptoms	Diagnosis	Malignancy	Survival
Insulinoma	Confusion, sweating, dizziness, weakness, unconsciousness, relief with eating	Inappropriate insulin secretion during hypoglycaemia from up to 72 h fasting	10% of patients develop metastases	Complete resection cures most patients
Gastrinoma	Zollinger–Ellison syndrome of severe peptic ulceration and diarrhoea	Elevated serum gastrin when patient off all acid suppression treatment	Metastases develop in 60% of patients; likelihood correlated with size of primary	Complete resection results in 10 year survival of 90%; less likely if large primary
Glucagonoma	Necrolytic migratory erythema, weight loss, diabetes mellitus, stomatitis, diarrhoea	Elevated serum glucagon. Other hormones can be elevated	Metastases develop in 60% or more patients	More favourable with complete resection; prolonged even with liver metastases
Vipoma	Verner–Morrison syndrome of profuse watery diarrhoea with marked hypokalaemia	Hypochlorhydria, + hypercalcaemia; elevated serum VIP	Metastases develop in up to 70% of patients; majority found at presentation.	Complete resection: five year survival of 95%; with metastases: 60%
Somatostatinoma	Symptomatic cholelithiasis; weight loss; diarrhoea and steatorrhoea	Elevated serum somatostatin	Metastases likely in about 50% of patients	Complete resection associated with five year survival of 95%; with metastases, 60%
Non-syndromic pancreatic neuroendocrine tumour	Symptoms from pancreatic mass and/or liver metastases	A variety of hormones may be elevated, including chromogranins	Metastases develop in up to 50% of patients	Complete resection associated with five year survival of at least 50%

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