PANCREATIC TUMORS

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Anatomy and Physiology
The image shows an anatomical diagram of the abdominal region, highlighting several structures:

- **Pancreas**
- **SMA (Superior Mesenteric Artery)**
- **MCA (Middle Colic Artery)**
- **Left renal vein**
- **Uncinate process of pancreas**
- **Third portion of duodenum**
- **Transverse mesocolon**
- **Transverse colon**
- **Small intestine**
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<tr>
<th></th>
<th>Head</th>
<th>Body</th>
<th>Tail</th>
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<tbody>
<tr>
<td>Classen et al. (1973)</td>
<td>4.8 mm</td>
<td>3.5 mm</td>
<td>2.4 mm</td>
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<td>Kasugai et al. (1972)</td>
<td>2.6–3.5</td>
<td>2.0–2.1</td>
<td>1.0–1.7</td>
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<td>*Kreel &amp; Sandin (1973)</td>
<td>3.2–5.3</td>
<td>2.4–4.0</td>
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<td>*Millbourn (1960)</td>
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<td>(age 16–50)</td>
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<td>(age 51–92)</td>
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<td>Nebel &amp; Fornes (1973)</td>
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<td>Ogoshi et al. (1973)</td>
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<td>2.9</td>
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<td>Oi (1972)</td>
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<td>2.7</td>
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<td>Sivak &amp; Sullivan (1976)</td>
<td>3.20</td>
<td>2.3</td>
<td>1.2</td>
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<td>Varley et al. (1976)</td>
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*Autopsy specimens
The incidence of pancreatic ca is 10:100000 population per year
*The disease is a disease of ageing.
Male=Female
*Approximately 80-90% of pancreatic cancer arise from the ductules (Adenoca)
*80% of pancreatic ca patients at first presentation have a tumor advanced unresectable.

*40% will exhibit local spread.

*50% demonstrate distant metastasis
Predisposing factors

*Tobacco smoking (3-4) folds.
*Chronic pancreatitis
*5-8% of pancreatic ca are familial
Pathology

* > 85% of cases ductal cell adenocarcinoma.
* 2/3 of pancreatic adenocarcinoma occur at head of pancreases.
* 15-20% arise in the body and tail.
* 20% diffusely involved the entire pancreas.
* The importance of the pathology is that some tumors have a prolonged natural history, for instance, the cystadenocarcinoma, while those with an ampullary tumor or neuroendocrine have an increased survival after resection.
Clinical feature

--* The most frequent symptoms are non-specific:

1- Epigastric pain & discomfort 75%
Transmission of painful sensation (T5-T11)sympathetic celiac ganglia
2- Anorexia
3- Weight loss
4- Jaundice

*Mild initial symptoms are dismissed both by doctor and patient

*Jaundice is the commonest sign & symptoms which bring the attention of the patient
*85%------→painless jaundice associated with nausea & epigastric discomfort.
*Change in bowel habit is rare
There is frequent evidence of weight loss
Palpable liver
**palpable G.B (Courvoisier's law).**
Obstructed palpable G.B found in 1/4-1/2 of cases at presentation and it’s presence doesn’t implicate non-resectability.
**Metastatic L.N in neck (Trosier’s sign).**
Other signs of intra-abdominal malignancy should be looked for with care, such as a mass, ascites, & tumor deposits in the pelvic
Investigations

* Blood tests  Ca 19-9
* Ultrasound: look for C.B.D Head of pancreas
* Contrast enhanced spiral C-T scan (Pancreatic protocol)
* ERCP (DX & TX)
* Endoscopic U/S:
  Assess the relationship between tumor and major vessels (SMA, SMV, Portal vein)
  - Determine the location of the tumor
Endoscopic U/S
Finding in C-T scan suggest unresectable tumor:

1-Presence of extra-pancreatic disease
2-Tumor extension to SMA or Celiac plexus.
3-No fat plane between the tumor and these structures
4-Occlusion of SMV-Portal vein junction
Management

*90-95% of patients are unsuitable for resection because of either local spread to SMV & SMA, Para-aortic L.N or mesentric L.N or liver mets
(Percutaneous True-cut biopsy must be taken)

*Assessment of operability and resectability
Inoperable case-----→ palliative treatment should be offered

1-Jaundice is relieved by stent(metallic)

2-15% duodenal obstruction----→ surgical bypass in early stage (gastro-jejunostomy)

Late phase------→ stenting because prolonged delayed gastric emptying post surgery
*PTC once ERCP or Stenting contraindicated
*Neurolytic celiac plexus block to treat refractory pain (3-6) months
**The role of CTX in the management of pancreatic cancer remains ill defined**

*< 3% of pancreatic tumor (lymphoma) → CTX in beneficial therapy.*

*In case of adenocarcinoma → 5 F.U or Gemcitabine produce a remission 15-25%*  
*No long-term cures have been described*  
*Neo-adjuvant or adjuvant RTX to reduce rate of local recurrence.*
Pre-op assessment

Assessment of patients general condition. Decision to abort jaundice pre-op or not depend on:

1-If period of jaundice is short (2 weeks) it’s safe to proceed to operation

2-If period of jaundice is prolonged → stent

*The clotting time should be carefully checked pre-operatively & adequate hydration must be insured
If a cystic tumor is encountered, no matter how large, most of these can be removed surgically with a reasonable chance of cure.

*Patients with duct cell cancer which <4 cm in diameter not encasing SMV,A,Portal vein without metastasis---------surgical resection.

*PPPR-pyloric preserving pancreatico dudenectomy with local lymphadenectomy

(Whipple Procedure)

Mortality rate(3-5%)
Morbidity remains high with 40% complications:
1-Anastamotic leak (10%)
2-Infection-abscess
3-Dumping syndrome

Post-op---------→Adjuvant RTX and CTX with resection has not been elucidated
Advantages of PPPR

1- Delayed gastric emptying is found to be twice
2- Nutritional advantages
3- Decrease post-op dumping syndrome and bile reflux gastritis
The overall median survival for patients with pancreatic cancer is 20 weeks
*5 year survival 5%
* The islets of Langerhans occupying 2% of pancreatic mass.
* The islets of Langerhans contain three types of cells:
  1. α-cells (5-20%) produce glucagon.
  2. β-cells (50-80%) produce insulin.
  3. δ-cells (5%) produce VIP.
  4. PP cells (10-35%).

*B-cells is the most prevalent.
*Tumors of these endocrine cells comprise 1% of all pancreatic tumors.
**MEN syndrome** may be associated with tumors in other endocrine glands specially anterior pituitary, the parathyroid and adrenal cortex.

*NET may secrete hormones which give rise to the following types:
- Insulinoma.
- Gastrinomas.
- Glucagonoma.
- Somatostatinoma.
- CCKoma.
- Acth ectopic
- Carcinoid syndrome (5HT)
The most common islet cell tumor (5-10%) accompany the MEN1 syndrome.
Most are benign
Attacks of hypoglycemia occur at irregular interval.
Symptoms:
Epigastric discomfort, Nervousness (odd behaviour)
Trembling
Sweating
Dizziness
*Whipple triad:
1-Signs & symptoms of hypoglycemia induced by fasting
2-Blood glucose < 45 mg/dl
3-Ameliorate the symptoms by administration of glucose.

*Increase serum insulin > 6 I.U./dl
*Increase c-peptide
Localization of the tumor

It has been founded equally distributed across the head, body, and tail of the pancreas.  
*2/3 are located to the left of SMA.
- Intra-op U/S with palpation of the pancreas
- Endoscopic U/S
- C-T scan
- Selective angiography (rich in vascularity)
- Selective arterial ca injection with hepatic venous sampling — (APUD) sensitivity 90%
Extirpation of the tumor
Intra-op U/S ------to localize the tumor
Enuculation (Procedure of choice)
*ZES produces excessive amount of gastrin thereby stimulating gastric acid secretion & causing ulcer diathesis.

*Highly suspected if the patient had P.U.D or G.E.RD in association with diarrhea.

*80-90% of gastrinoma located in gastrinoma triangle.

Duodenum is the primary site (45-60%) of the patients.

70% of duodenal gastrinoma located in the 1st part
75-80% are sporadic

20% are inherited associated with MEN1

60% are malignant
L.Ns, liver & distant mets are common

*Intractable P.U.D at very young age group.
*Virulent P.U.D occurs in unusual sites like jejunum, unexplained diarrhea, coexistent parathyroid disease or family history
Diagnosis

2/3 of patients with MEN1 have pancreatic neuroendocrine tumors.

**Symptoms:** abdominal pain, secretory diarrhea relieved by N-G suction, reflux & dysphagia

90% of gastrinomas express receptors for somatostatin

Therefore, somatostatin receptor scintigraphy (test of choice) to localize the tumor
Surgical resection
Octereotide
Curability post surgery 30%
Glucagon acts primarily to counter regulate insulin in glucose homeostasis.

* Glucagon cleared by liver

* Target organs for the effects of glucagon are the liver and adipose tissue.

* Glucanoma are usually malignant (body and tail)

* If glucagon level > 1000 pg/ml ----> diagnostic

* Also increase the level of chromogranin
*Glucagonoma syndrome:*
- Diabetic mellitus
- Migrating skin rash
  - Necrolytic migratory erythema)
- Hypoaminoacidemia
- Malnutrition

**Those patients are at high risk for development D.V.T  ----→ give them prophylactic
Management

To localize the tumor:

1-C-T scan
2-Somatostatin receptor scintigraphy

Pre-op RX:
Somatostatin analouge & nutrition supplementation
**Somatostatinoma**

*Rare tumour*
*Neuro-endocrine tumour of D-cells*
*Located in the pancreas or duodenum.*
*50% have L.Ns & liver metastasis at time of diagnosis*

*Associated with somatostatinoma syndrome:*
1-D.M
2-Cholelithiasis
3-Diarrhea with or without steatorrhea

Pre-op check plasma levels of somatostatin

Rx---------→ Pancreatico-duodenectomy
Vipoma

*Rare tumor
* Neuroendocrine

*Called Verner-Morrison’s syndrome (WDHA)----watery diarrhea, hypokalemia, achlorhydria-alkalosis, flushing.

*Symptoms:
Ix: Elevated fasting level of VIP with secretory diarrhea>700 ml/day
*Localization of the tumor by C-T scan somatostatin scintigraphy

Rx---Volume resuscitating
   Rx of hypokalemia
   Octreotide
   Complete surgical resection
Cystic neoplasm of pancreas

* Are common in F>M
* 5\textsuperscript{th} & 6\textsuperscript{th} decades of life
* Most of them asymptomatic
Serous cystic neoplasm

*1-2%
*Homogenous appearance
*Can be radiologically differentiated from malignant (serous cystadenocarcinoma)
*2/3 located in body and tail
*Honeycomb-like cysts <2 cm
*Central satellite scar (sunburst calcification)
  By EUS
Treatment

If asymptomatic cyst <5 cm ---- → repeat imaging IN 3 MONTHS

Rx--------→ EUS or C-T guided aspiration
Mucinous
* Premalignant disease
* F=M
* < 2% of pancreatic neoplasm.
The spectrum of disease presentation ranging from the completely benign mucin producing tumour to those having insitu adenocarcinoma or invasive adenocarcinoma.
* Symptoms & signs: Obstructive jaundice, pancreatitis, abdominal pain, heavy mucin secretion, may present as diarrhea
** mucous emanates from ampulla
* K-ras (non-specific marker for the disease)
Rx---------surgical resection(frozen section – ve margin)
10% of IPMN harbor another malignancy like CRC
Figure 3. Endoscopic image of the duodenal papilla shows mucus (*) protruding from the patulous orifice (arrows).
Thank you