

Heelkunde van de Pancreas en de Nazorg

Alumni Geneeskunde – Gent, 7 maart 2018



Introduction

- ▶ What types of pancreatic resections: anatomical refreshment
- ▶ Complications and outcomes
- ▶ After care: recovery, endo- & exocrine insufficiency and chemotherapy

Types of surgery

Total pancreatectomy

Pancreaticoduodenectomy

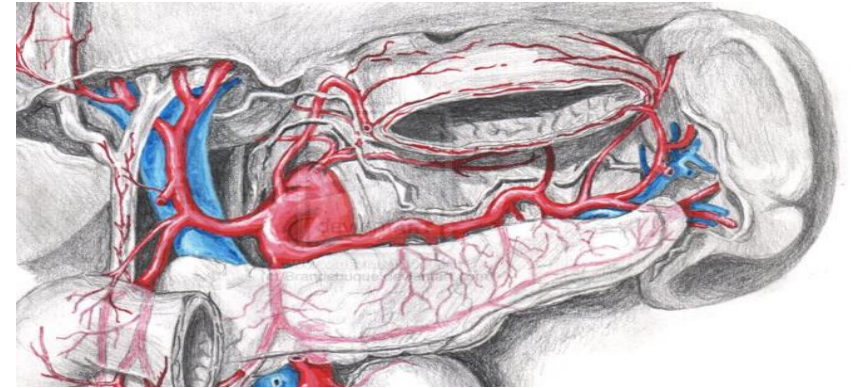
Middle pancreatectomy / body resection

Distal pancreatectomy

With splenectomy

Without splenectomy

Enucleation



Minimal invasive therapies

Laparoscopic pancreatic resections

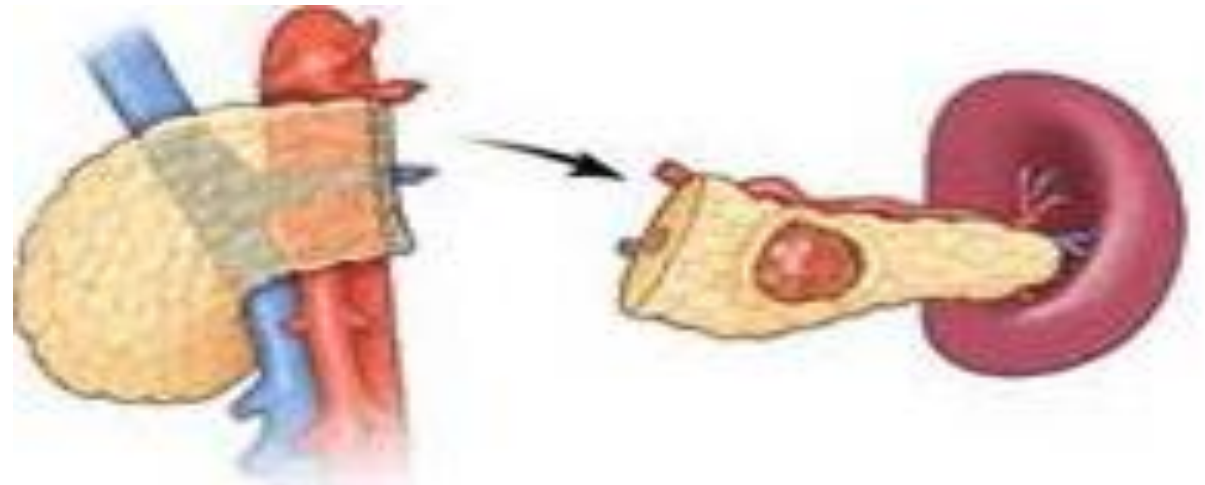
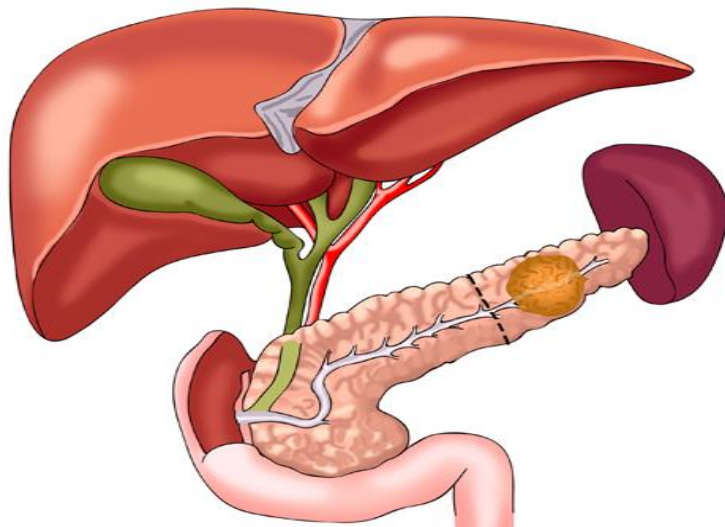
Robotic (assisted) pancreatic surgery

- ▶ Mostly distal pancreatectomies
 - ❖ Proven feasible and safe
 - ❖ Decreased hospital stay
 - ❖ Decreased wound morbidity.....

But: relatively high fistula rate (>95% conservative therapy)

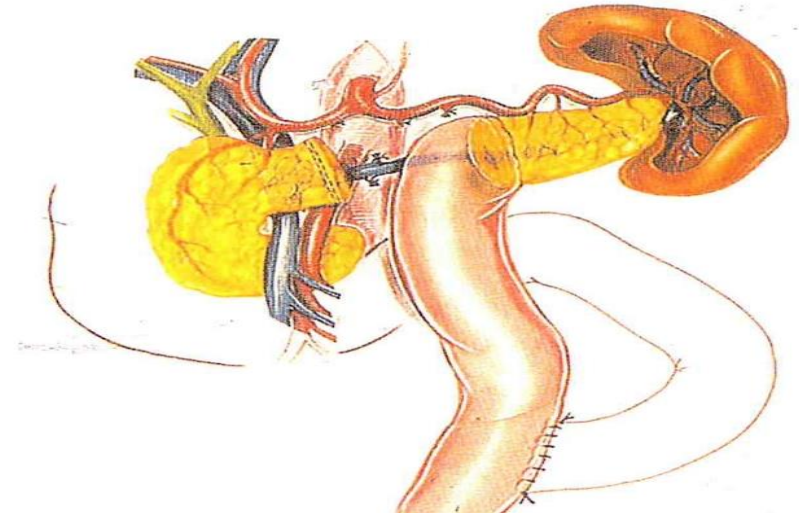
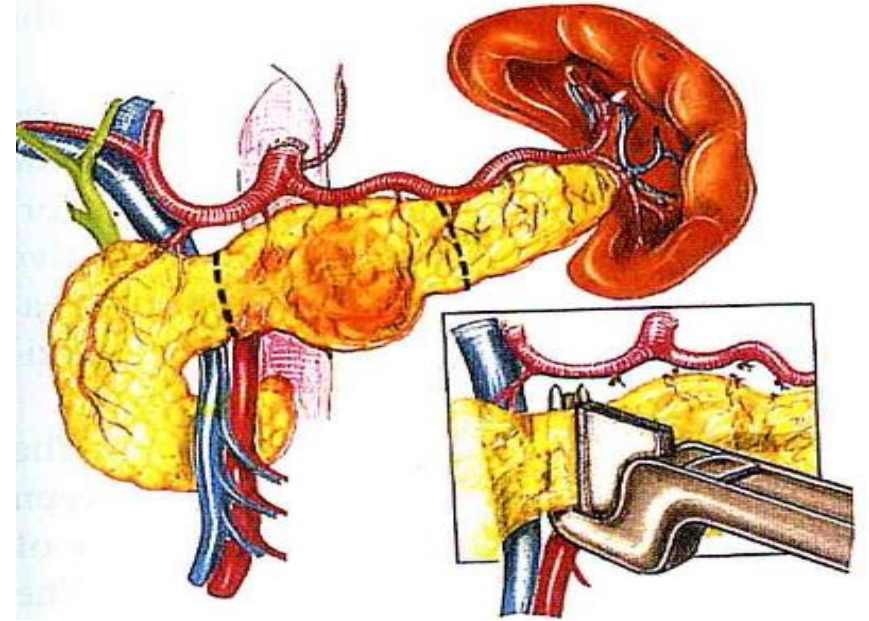
Distal pancreatectomy

- ▶ Benign or premalignant lesions: without splenectomy when technically feasible....
- ▶ Malignant lesions: with splenectomy and complete splenic vessels resection
Warshaw technique
Kimura technique



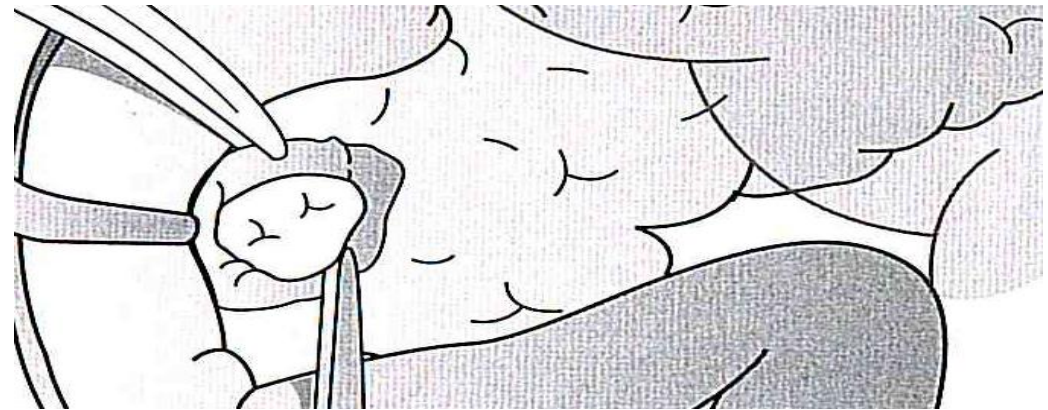
Pancreatic body resection

- ▶ Central pancreatectomy
- ▶ Middle pancreatectomy
- ▶ More complex surgery
 - ❖ Atrophy of tail
 - ❖ Quality of parenchyma



Enucleation

- ▶ Maximally parenchyma saving technique (e.g. NET)
 - ▶ Technically tricky
 - ▶ Mainly for exophytic lesions
- ❖ Rather high fistula rate due to possible connection with pancreatic duct (20-30%)

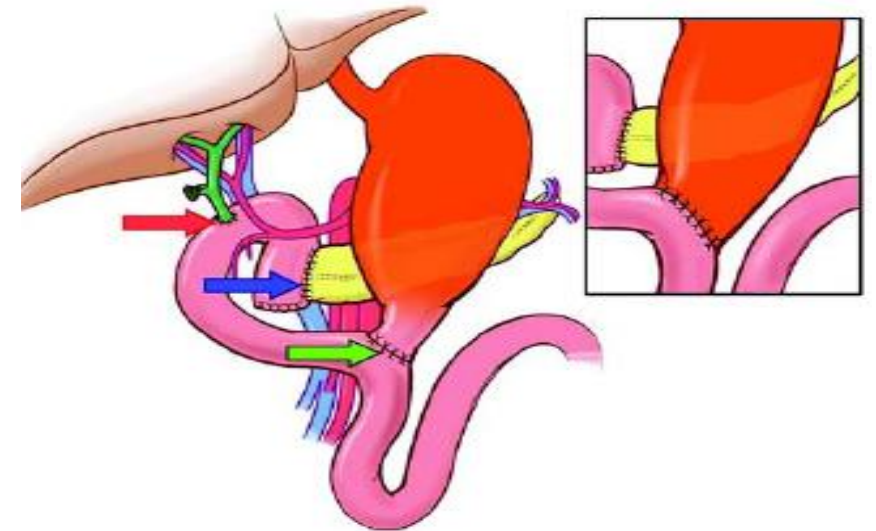


Total pancreatectomy

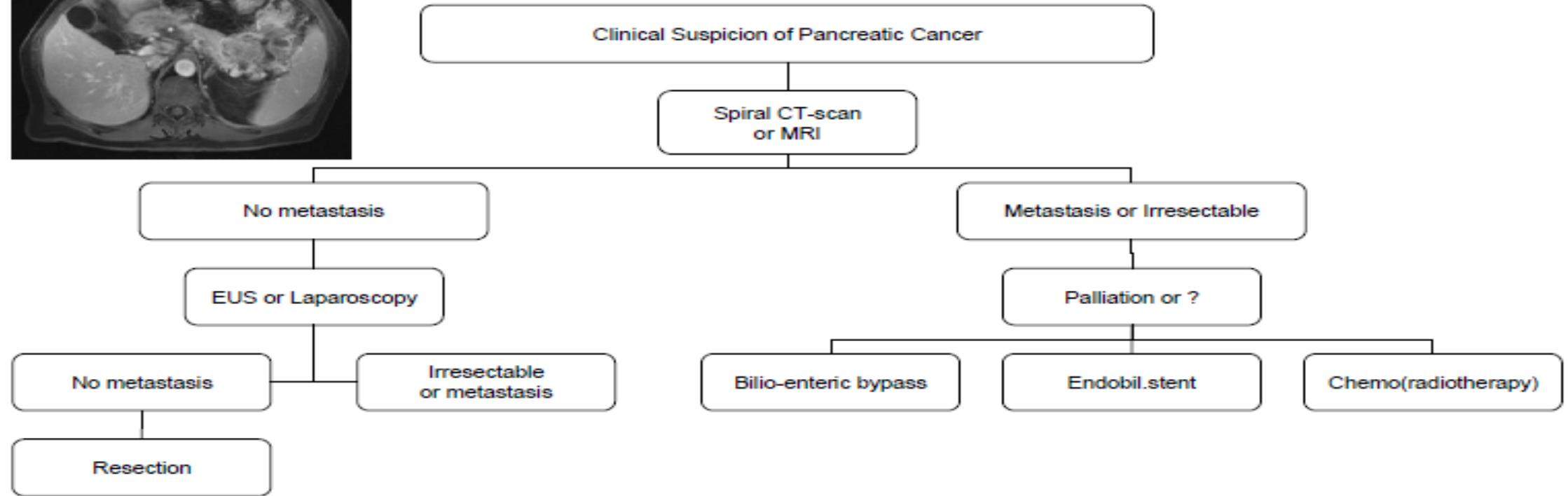
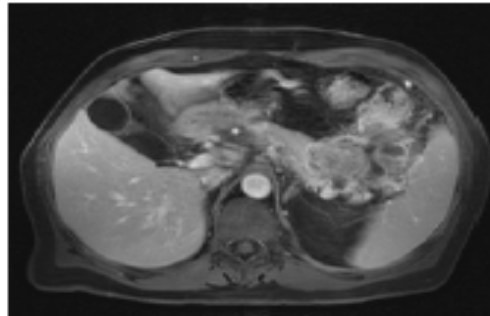
- ▶ Hardly ever indicated, but to be considered for:
 - ❖ Main duct IPMN spread all over the gland
 - ❖ Multifocal lesions
- ▶ Consider the benefits of potentially curable disease versus morbidity and quality of life
 - ❖ Age of the patient, life expectancy
 - ❖ Tumor size
 - ❖ Co-morbidities

Pancreaticoduodenectomy

- Geschiedenis:
 - Alessandro Codivilla (1898)
 - Walther Kausch (1909)
 - Allen Oldfather Whipple (1881 – 1963)
- Lesions in the pancreatic head
- Periapillary lesions



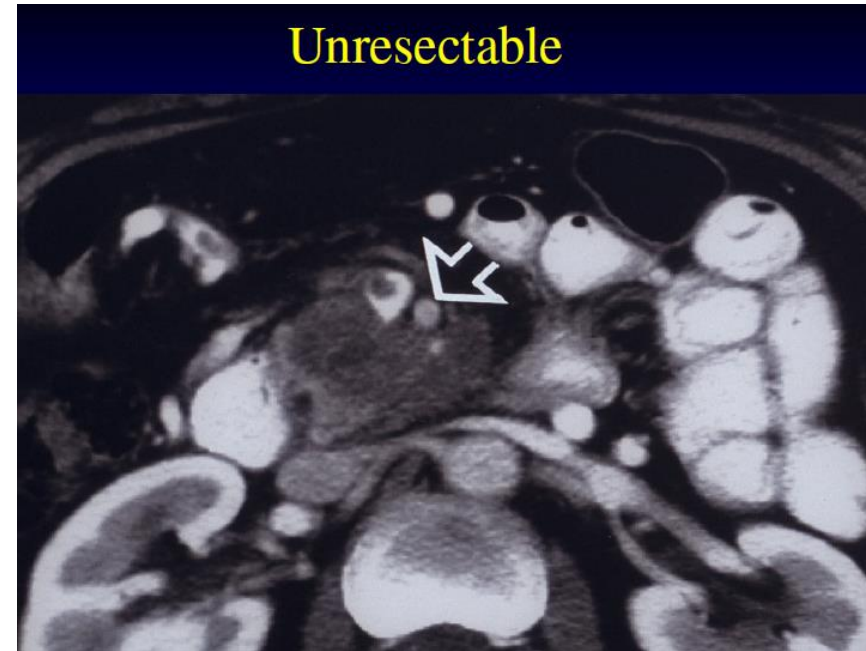
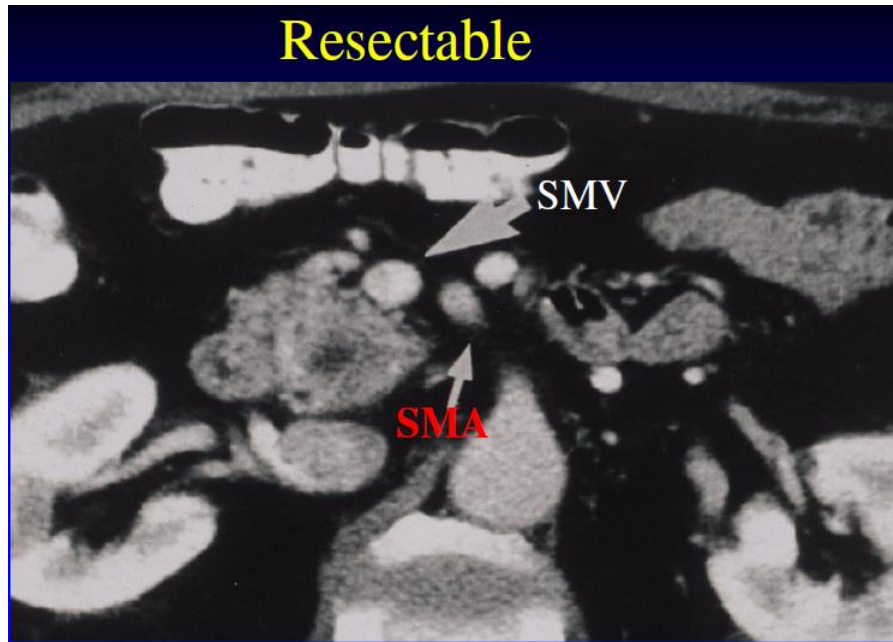
Diagnosis

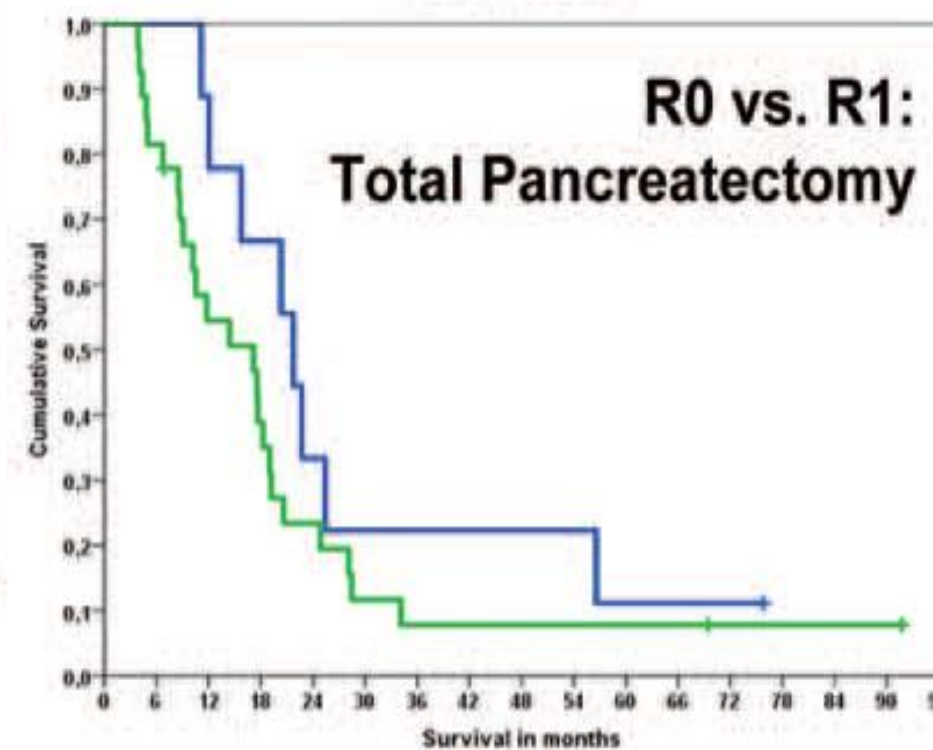
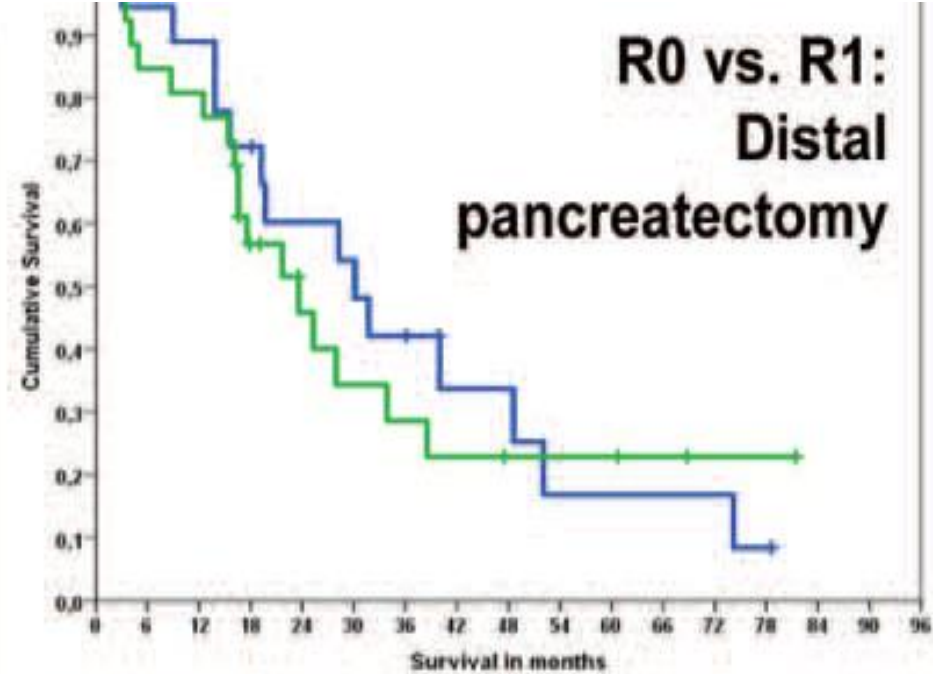
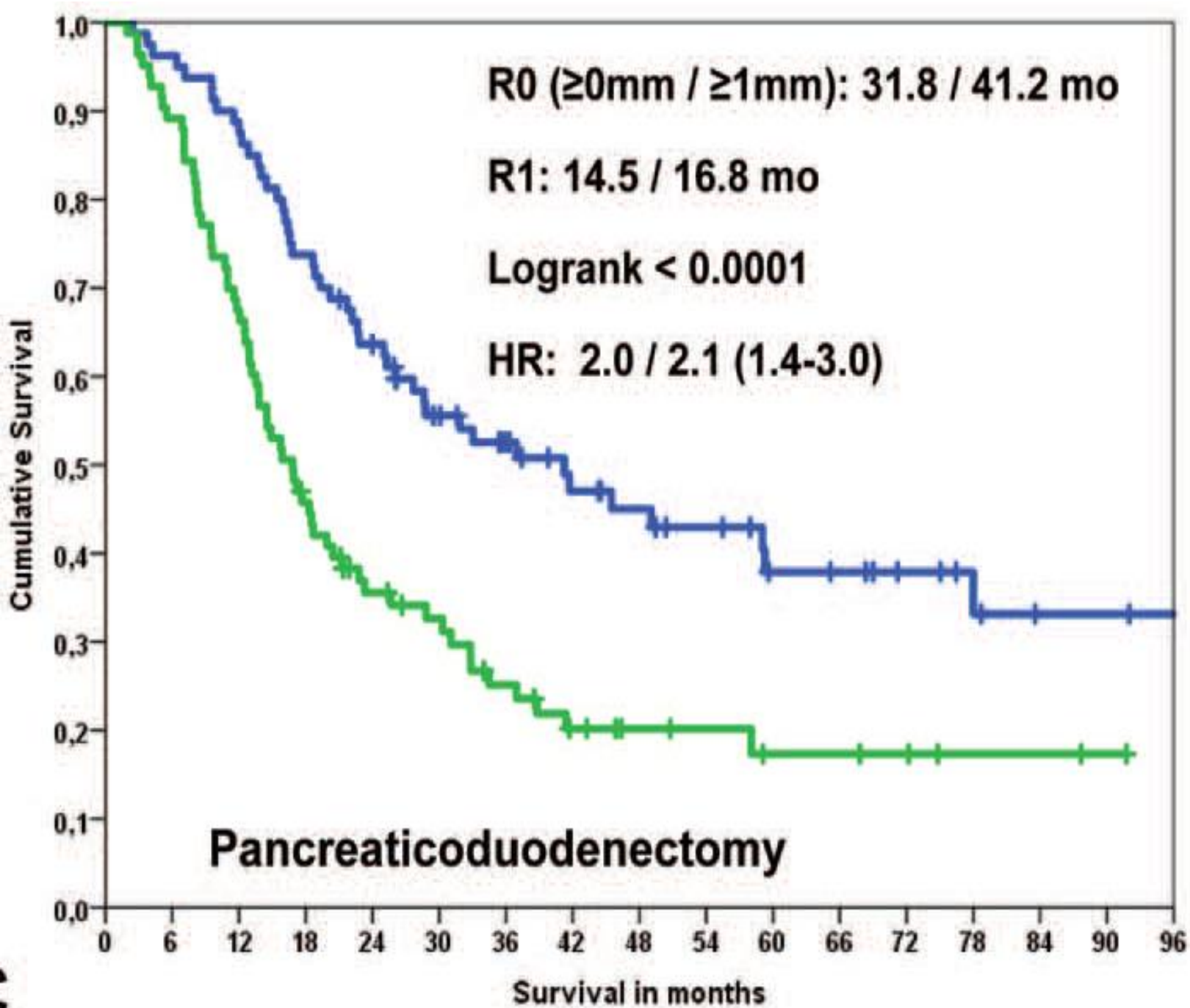


General intentions for MDT:

- ▶ Main decision reached at MDTs is usually whether a pancreatic resection should be attempted or not.
- ▶ The discussion, largely informed by imaging, is to decide the likelihood of resecting the cancer with negative surgical margins.
- ▶ These decisions are crucial because the stakes are high. A resection with negative margins (R0) offers the prospect of cure.

Indications for surgery

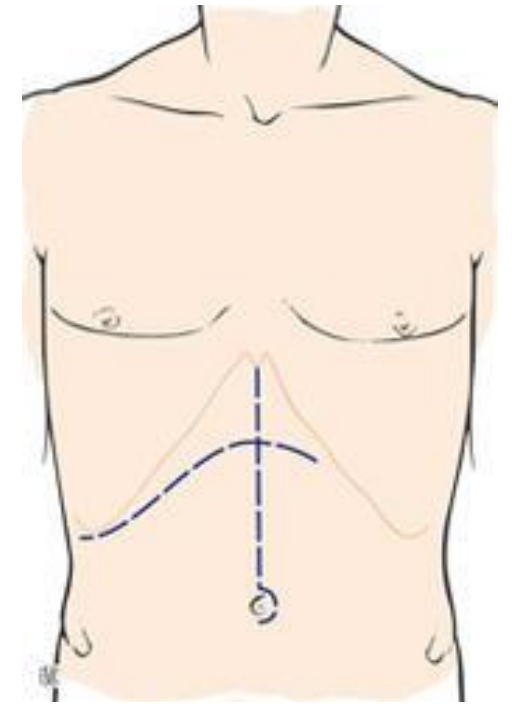
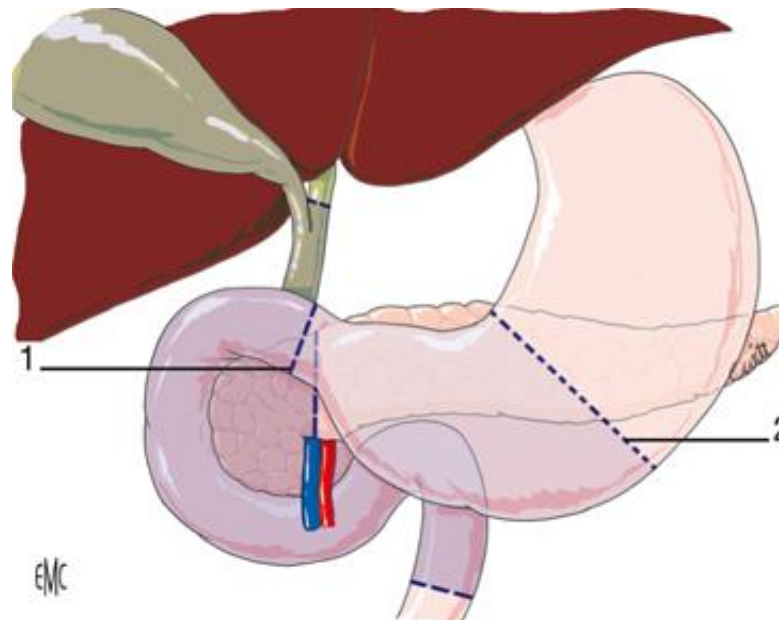


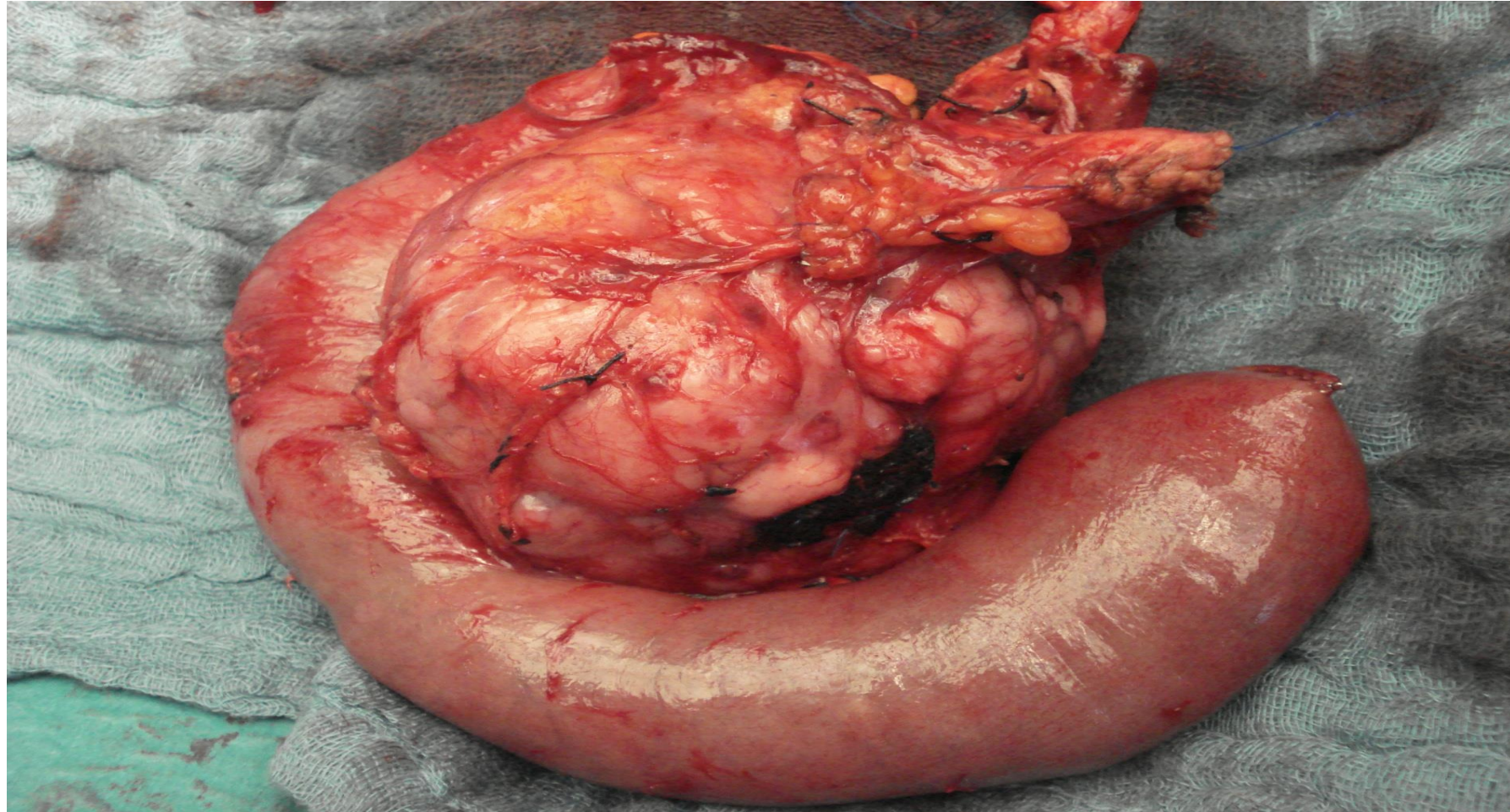


Surgical procedure

Resection:

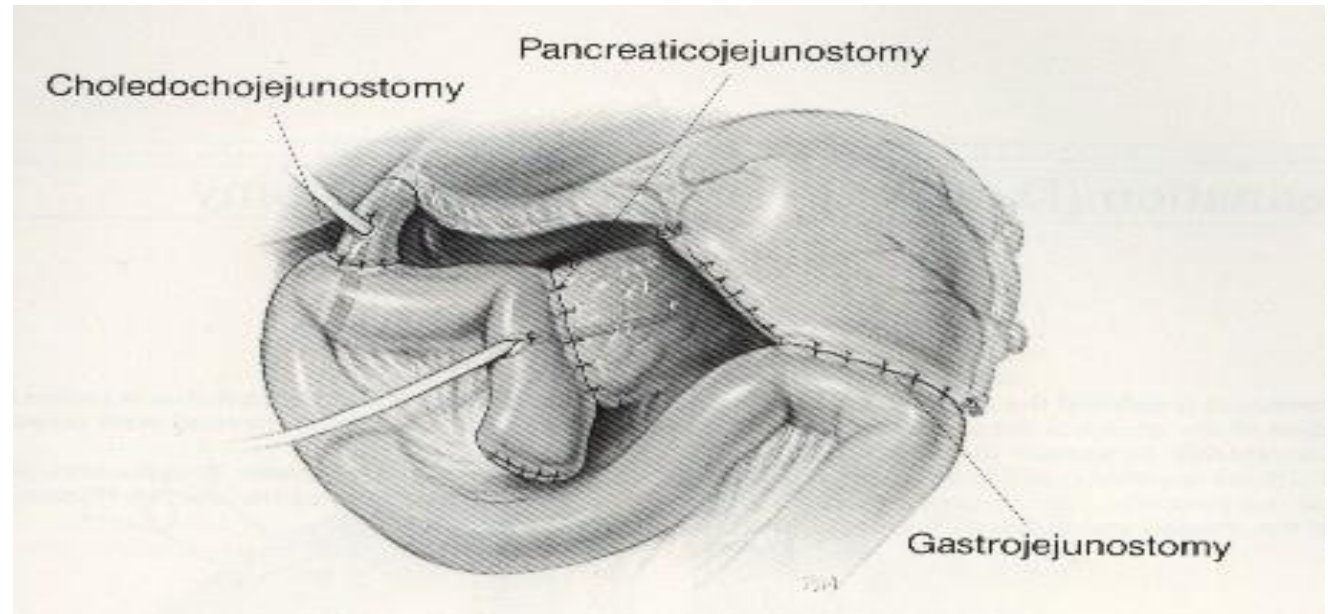
1. Stomach – antrum (except Pylorus-preserving resection)
2. Distal common bile duct
3. Duodenum
4. Head of the pancreas

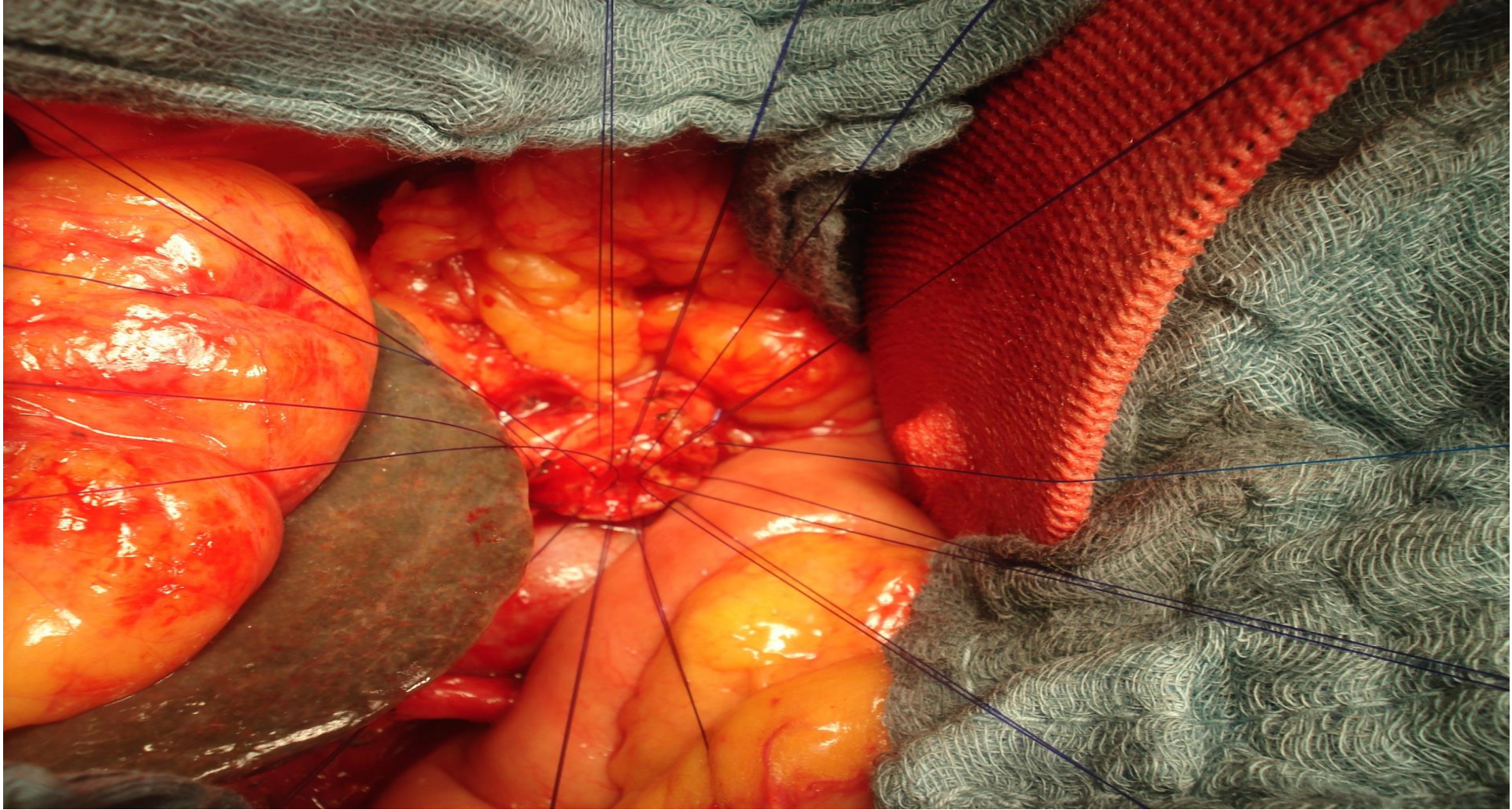




Reconstruction

1. Pancreaticojejunostomy (pancreaticogastrostomy)
2. Hepaticojejunostomy
3. Gastrojejunostomy





Post-surgical drainage

- ▶ Gastric tube
- ▶ Wounddrains (2 drains, 1 penrose)
 - Bile duct anastomosis
 - Pancreatic anastomosis
 - Penrose drain below pancreatic anastomosis
 - (Feeding jejunostomy)



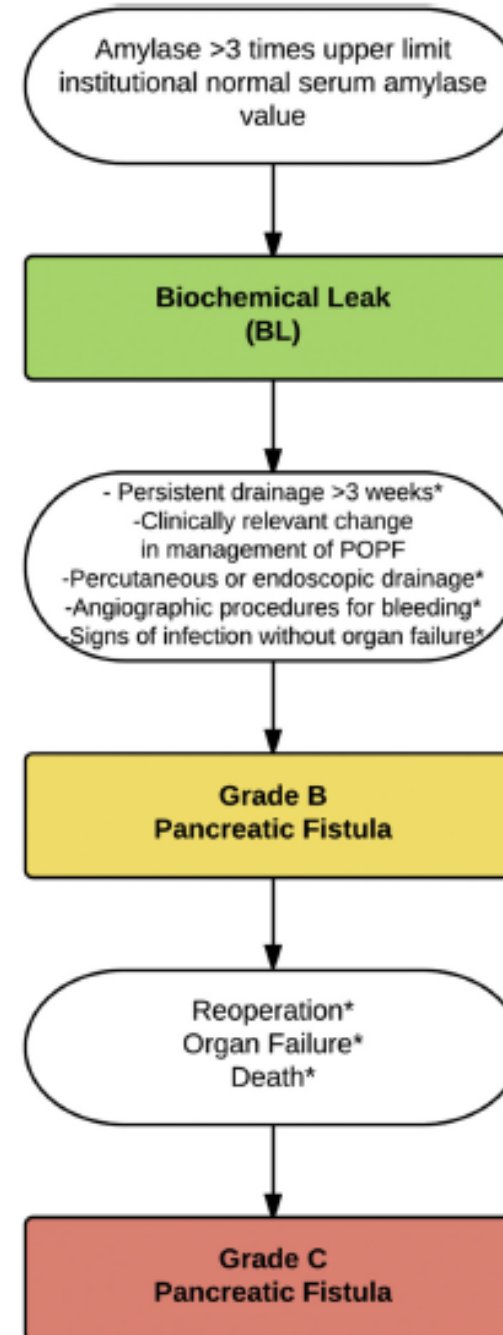
Fast track protocol

- **Dag 1 op kamer:** Opstarten TPN smofkabiven 12 N.
- **Dag 2 op kamer:** Laterale drain rechts verwijderen, MS 10 cm terugtrekken en slokje H2O, PCEA en blaassonde verwijderen.
- **Dag 3 op kamer:** MS verwijderen. Lipase op penrose en drain bepalen. Indien lipase negatief: Drain rechts mediaal uit en penrose mobiliseren. Indien lipase positief: Penrose herfixeren en sandostatine LAR 30 mg toedienen. Start met H2O en yoghurt.
- **Dag 4 op kamer:** Start opklimmende voeding. Start Primperan 3 x 1 ampulle per dag (tenzij contra indicatie).
- **Dag 5 op kamer:** Verder opklimmende voeding.
- **Dag 6 en verder:** Patiënt verder mobiliseren en verder opklimmende voeding tot ontslag.

Complications

- ▶ Early:
 - ❖ Hemorrhage
 - ❖ Bile leak
 - ❖ Pancreatic fistula
 - ❖ Delayed gastric emptying

- ▶ Late:
 - ❖ Diabetes
 - ❖ Steatorrea
 - ❖ Biliary stricture
 - ❖ Wirsung stenosis
 - ❖ Incisional hernia
 - ❖ Recurrence of disease



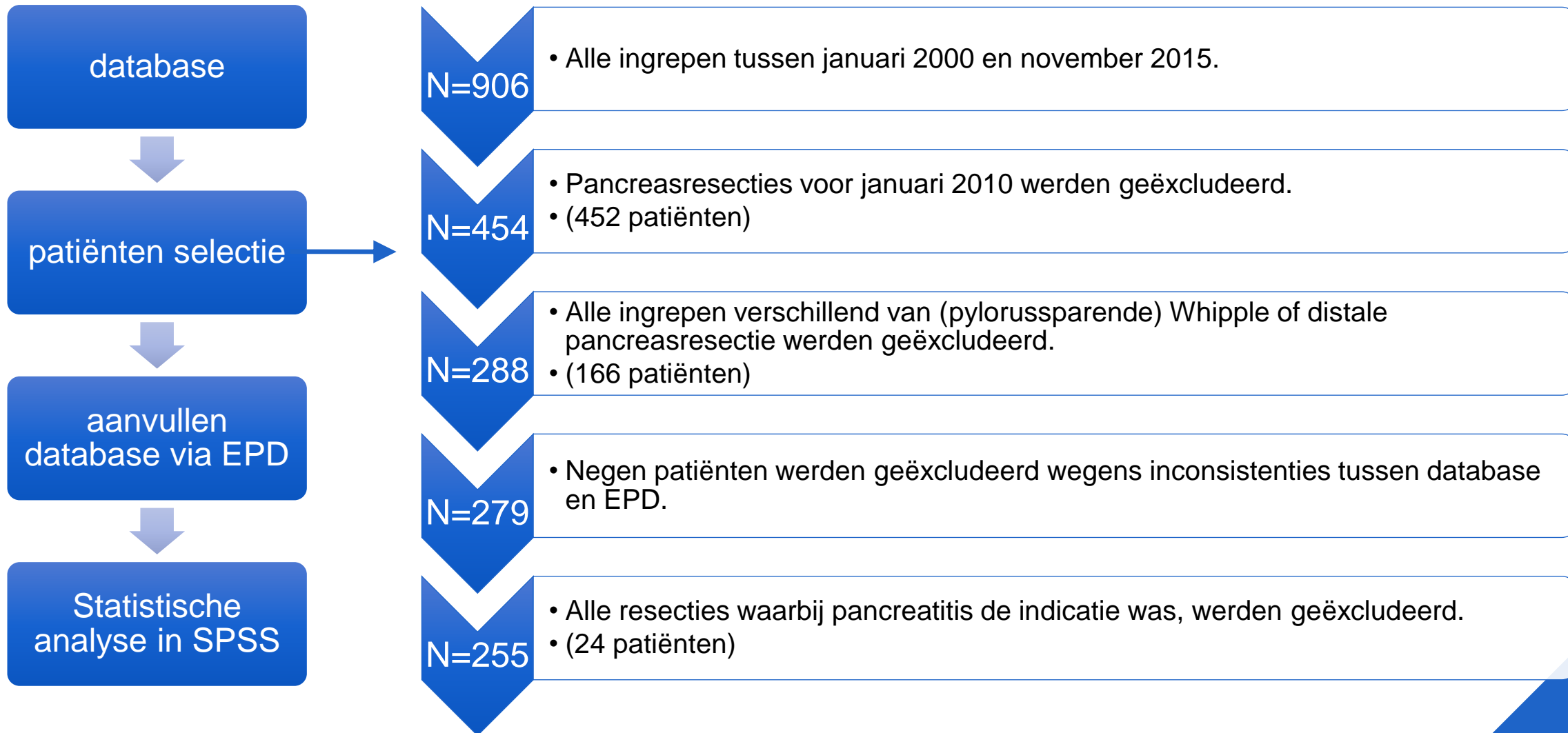
Masterthesis Geneeskunde 2017

Nick de Wever & Sybren van Wynaesberghe

Postoperatieve fistels en andere complicaties bij pancreaschirurgie: een retrospectieve analyse van 255 pancreasresecties

- ❖ Evalueren van de incidentie van postoperatieve pancreasfistels (POPF)
- ❖ Analyseren van risicofactoren voor het ontstaan van POPF
- ❖ Evalueren van de incidentie van vertraagde maaglediging en postoperatieve bloedingen na pancreaschirurgie in UZ Gent

Patiënten en methoden



Resultaten en discussie

McMillan et al. (2016): 15% CR-POPF
Ecker et al. (2017): 15.1% CR-POPF

Postoperatieve pancreasfistels	Alle patiënten (n = 255)	(pylorussparende) pancreaticoduodenectomie (n = 198)	Distale pancreasresectie (n = 57)
Alle graden n(%)	53 (20.8%)	24 (12.1%)	29 (50.9%)
Klinisch relevante POPF n(%)*	18 (7.1%)	8 (4.0%)	10 (17.5%)
Graad A n(%)	35 (13.7%)	16 (8.1%)	19 (33.3%)
Graad B n(%)	17 (6.7%)	7 (3.5%)	10 (17.5%)
Graad C n(%)	1 (0.4%)	1 (0.5%)	0 (0%)

* Graad B en C POPF zijn klinisch relevant terwijl graad A fistels als biochemische lekkage zonder klinische relevantie worden beschouwd.

Resultaten en discussie

Risicofactoren voor POPF na (pylorussparende) Whipple procedure

Predictieve factoren	Geen fistel (n=174)	Graad A, B of C POPF (n=24)	P-waarde
Geslacht (Man/Vrouw)*	98/76 (1.29)	13/11 (1.18)	0.842
Body mass index (kg/m ²)‡	24.6 ± 4.22	25.5 ± 3.18	0.392
Diabetes (%)*	17.2%	16.7%	1
Leeftijd (jaar)‡	65.3 ± 11.07	65.6 ± 8.72	0.747
Neoadjuvante therapie (%)*	4.1%	4.2%	1
Drain perdu (%)*	22.2%	37.5%	0.101
Textuur pancreas (hard/zacht)*	74/58 (1.28)	2/16 (0.13)	<0.001
DGE (%)*	17.8%	25%	0.408
PPH (%)*	5.8%	0%	1

* Chi-Kwadraat test of Fisher's Exact test (waar nodig)
‡ Mann-Whitney U test (na het uitvoeren van normaliteitstesten)
Data zijn voorgesteld als gemiddelde ± standaarddeviatie (SD) tenzij anders aangegeven.

Resultaten en discussie

Risicofactoren voor POPF na distale pancreasresectie

Predictieve factoren	Geen fistel (n=28)	Graad A, B of C POPF (n=29)	P-waarde
Geslacht (Man/Vrouw)*	15/13 (1.15)	18/11 (1.64)	0.516
Body mass index (kg/m ²)‡	23.4 ± 3.84	26.1 ± 2.75	0.034
Diabetes (%)*	32.1%	10.3%	0.044
Leeftijd (jaar)‡	61.2 ± 13.35	63.8 ± 11.13	0.523
Neoadjuvante therapie (%)*	3.6%	3.4%	1
Textuur pancreas (hard/zacht)*	3/3 (1)	6/4 (1.5)	1
DGE (%)*	10.7%	24.1%	0.297
PPH (%)*	2.1%	0%	1

* Chi-Kwadraat test of Fisher's Exact test (waar nodig)
‡ Mann-Whitney U test (na het uitvoeren van normaliteitstesten)
Data zijn voorgesteld als gemiddelde ± standaarddeviatie (SD) tenzij anders aangegeven.

Resultaten en discussie

Postoperatieve complicaties na pancreaschirurgie

Postoperatieve complicaties	Alle patienten (n=255)	(pylorussparende) Whipple (n=198)	Distale pancreasresectie (n=57)	P-waarde
Complicaties* n(%)	65 (25.6%)	17 (29.8%)	48 (24.4%)	0.406
DGE n(%)	47 (18.5%)	37 (18.8%)	10 (17.5%)	0.832
PPH n(%)	12 (4.7%)	11 (5.6%)	1 (1.8%)	0.310

* Dit omvat patienten met klinisch relevante POPF en/of DGE en/of PPH.

El Nakeeb et al. (2015): 17.9% DGE na PD
Liu et al. (2016): 36.2% DGE na PD
Yamamoto et al. (2012): 9% DGE na DP
Glowka et al. (2016): 24% DGE na DP

Wellner et al. (2014): 7,2% PPH
Chen et al. (2015): 8,8% PPH
Manas-Gomez et al. (2011): 16,8% PPH

Hospital length of stay

- ▶ Mean hospital stay 11 days, range depending on complications
- ▶ Main issues:
 - ❖ Fatigue, generally weak
 - ❖ Loss of appetite
 - ❖ Slow transit (>> stomach)
 - ❖ Steatorrea
 - ❖ Diabetes
- ▶ Recommendations:
 - ❖ Eat calories, no matter what kind, unless diabetic
 - ❖ Fluids go smoother than solid food, so high energy drinks associated
 - ❖ Anything a patient likes, eat it (more than once a week...)



Outpatient clinic and follow-up

- ▶ Three weeks after surgery
- ▶ Check weight, general condition, appetite, lab, physical exam
- ▶ Consider calorie intake (association of high calorie drinks)
- ▶ Ask for constitution of stools (treat possible endo- and exocrine insufficiency)
- ▶ Discussion of MOC advice

- ▶ Further follow-up needed?
 - ▶ Local
 - ▶ Referring gastro-oncologist
 - ▶ General practitioner (psychological motivation)

Adjuvant therapy

- ▶ **Pancreas carcinoma:** Gemcitabine (5FU)
 - ▶ 6 months, weekly

- ▶ **Cholangiocarcinoma:** No standard, case by case discussion

Pancreatic Exocrine Function

- ▶ Normal post-prandial pancreatic secretion is $\pm 70\%$ of maximal secretory capacity or 4–5 times the basal rate
- ▶ Post-prandial secretion lasts for about 4 hours
- ▶ Total intraduodenal lipase output varies from 300,000 to 500,000 U / meal
- ▶ Minimum pancreatic function of 10% of normal is necessary for adequate lipid digestion, corresponding to $\pm 30,000$ –50,000 U lipase in the duodenum
- ▶ Amount of lipase, to be added to meals, varies depending upon degree in insufficiency and degree of gastric/duodenal denaturation

SYMPTOMATOLOGY OF EXOCRINE INSUFFICIENCY

▶ **Steatorrhea** causes:

❖ **Abdominal complaints:**

- ❖ Bloating
- ❖ Pain
- ❖ Cramps
- ❖ Urgency
- ❖ Diarrhea
- ❖ Foul smelling stools



Pale and smelly stools

❖ **Generalised symptoms:**

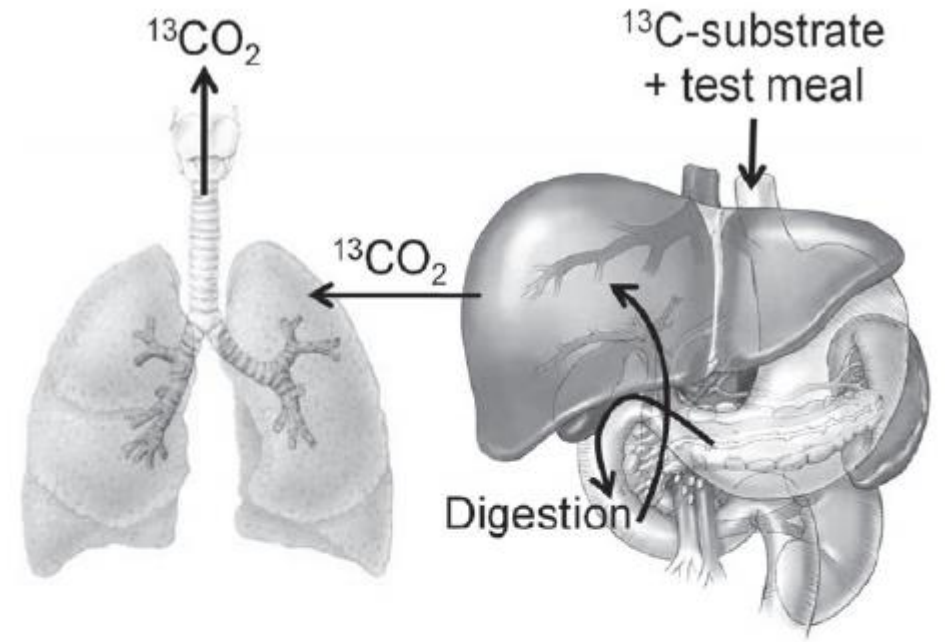
- ❖ Weight loss
- ❖ Fatigue, loss of energy
- ❖ Symptoms related to vitamin deficiencies

Indications for Pancreatic Enzyme Therapy

- ▶ Exocrine pancreatic insufficiency causing
 - any moderate / severe steatorrhea
 - any steatorrhea with weight loss
 - chronic / watery diarrhea
 - dyspeptic symptoms

Breath Test

- Feed substrate with labeled C during stimulation meal
- Collect breath-out air in a bag
- Analyse in a MS or IR device



Microsphere Pancreatic Enzyme Preparations

	Lipase	Amylase	Protease	sphere diam.
Creon	8,000	9,000	450	1.4 (1.2–1.7)
Pancrease	5,000	2,900	330	2.0 (1.7–2.2)
Panzytrat	25,000	22,500	1,250	2.0
Creon forte	25,000	18,000	1,000	1.4 (1.2–1.8)

- ▶ microspheres larger than 1.4 mm empty more slowly than solid phase of the meal
- ▶ release of enzymes from microspheres is slow, depending upon pH and ionic strength of medium

Dosage recommendations

- ▶ Enzyme supplementation during all meals
- ▶ Main meal: 25.000 to 75.000 FIP units lipase of EC preparation
- ▶ In-between snacks: 5.000 to 25.000 FIP lipase of EC preparation
- ▶ Dosage should be adjusted for individual patient
- ▶ Addition of H₂-receptor blocker or protonpump inhibitor

Aansluitingsnummer: _____

Aanvraag

Ik, ondergetekende, dokter in de geneeskunde vraag de terugbetaling van Creon® 10.000 / Creon® 25.000 / Creon® 40.000 voor de behandeling van bovenvermelde patient met,

- Mucoviscidosis (Af) (Hoofdstuk IV-§ 70100)
- Syndroom van Schwachmann (Af) (Hoofdstuk IV-§ 70200)
- Een totale pancreatectomie (Af) (Hoofdstuk IV-§ 70400) en voeg hierbij het operatieverslag
- Een chronisch verminderde exocriene pancreasfunctie (Bf) (Hoofdstuk IV-§ 70300), welke aangetoond wordt met minstens 2 criteria uit de volgende lijst:
 - Beeldvormende technieken van chronisch pancreaslijden
 - Steatorree aangetoond door meer dan 7 g vet over 24 uur
 - Steatorree aangetoond door meer dan 31 % vetlaag met zure steatocriet-methode in 1 stoelgangstaal
 - Mengtriglyceriden-ademtest met radioactief koolstof (C14) of stabiel koolstofisotoop (C13), waarbij minder dan 23 % van de toegediende dosis wordt gerecupereerd

Voor een aanvangsperiode van 12 maanden
Voor een verlenging van 60 maanden

Dienst voor Algemene en HPB Heelkunde



Pancreatic Surgery

Prof Dr Frederik Berrevoet
Dr Aude Vanlander
Dr Luis Abreu de Carvalho
Dr Ortwin Uyttebroek
Prof Dr Xavier Rogiers
Prof Dr Roberto Troisi

Thank you