Intestinal failure and transplantation
Necker-Enfants malades, Paris

- **Medical management of intestinal failure**

Florence Lacaille, and the whole team

Where I have been in Turkey

All the places where the tourists go

+ : Taşucu, Bingöl, Trabzon, Edirne, Hopa, Diyarbakir, Konya, Antakya, Harran, Erzurum, Amasya, Cannakale, Adana, Mardin, Nimrut Dag, Gaziantep, Manisa, Tarsus, Iskenderun, Malatya, Kirikkale, Mersin, Gallipoli, Urfa, Karaman …

Teşekkür ederim

… beni misaafis etiniz için !

And from :

Ibrahim, Oktay, Hasan, Murat : Tx for microvillous atrophy

Mina, Muhammet : microvillous atrophy

Ozan : Tx for tufting enteropathy

Cem : waiting list for Tx, extensive Hirschsprung

What is intestinal insufficiency / failure ?

The gastrointestinal tract is unable to provide

enough digestion and absorption capacities

for nutritional requirements

for growth and development

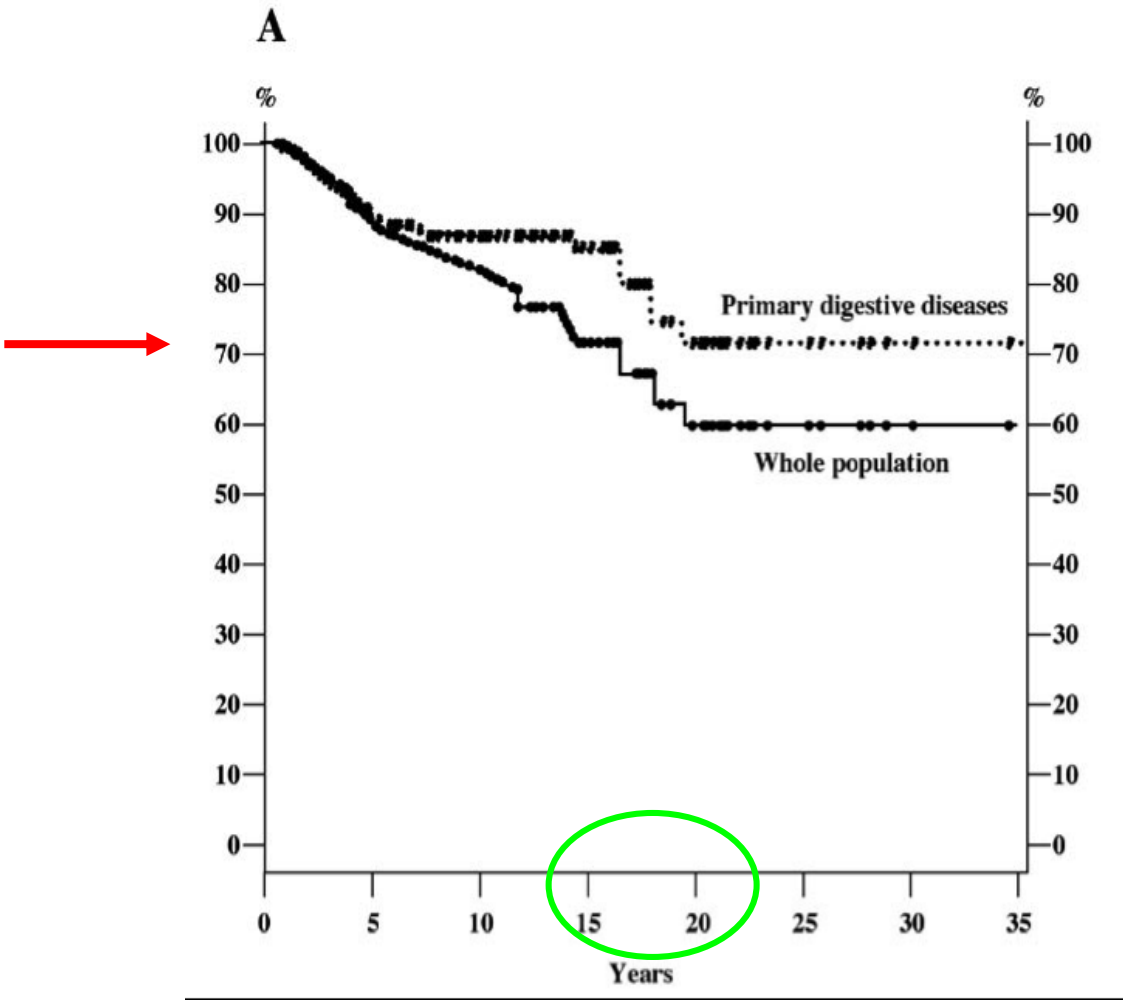
IF : medico-surgical management

- Gastroenterology-Nutrition
  - parenteral nutrition (PN)
  - prevention of complications
  - home PN
- Surgery
  - neonatal surgery
  - non transplant (reconstructive) surgery
  - intestinal transplantation

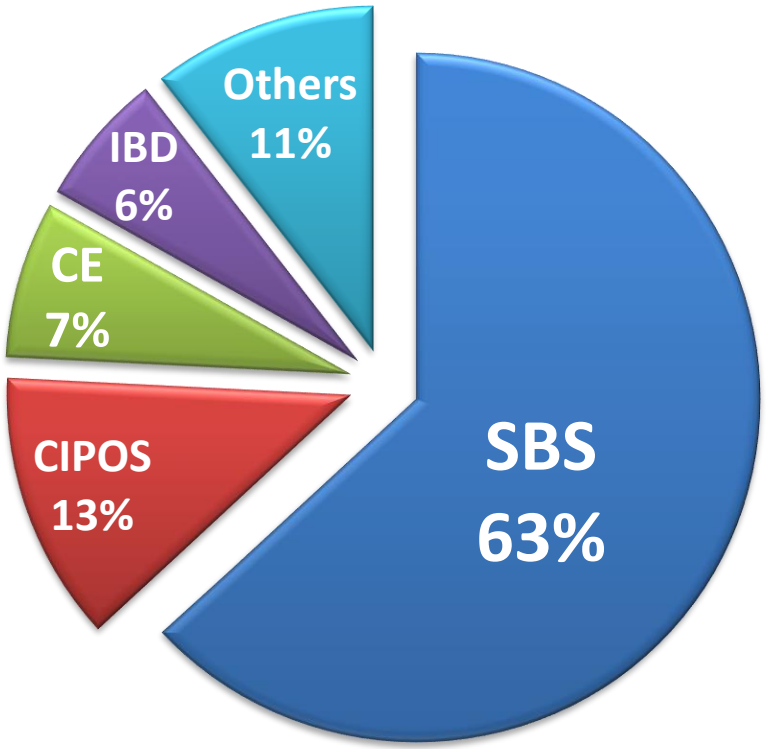
Aims of medical management

- Feed the child !
  - growth and development with PN
- Oral > enteral nutrition
- Promotion of intestinal adaptation
- Prevention / treatment of complications
  - infections ; thrombosis ; IFALD ; bone
  - quality of life

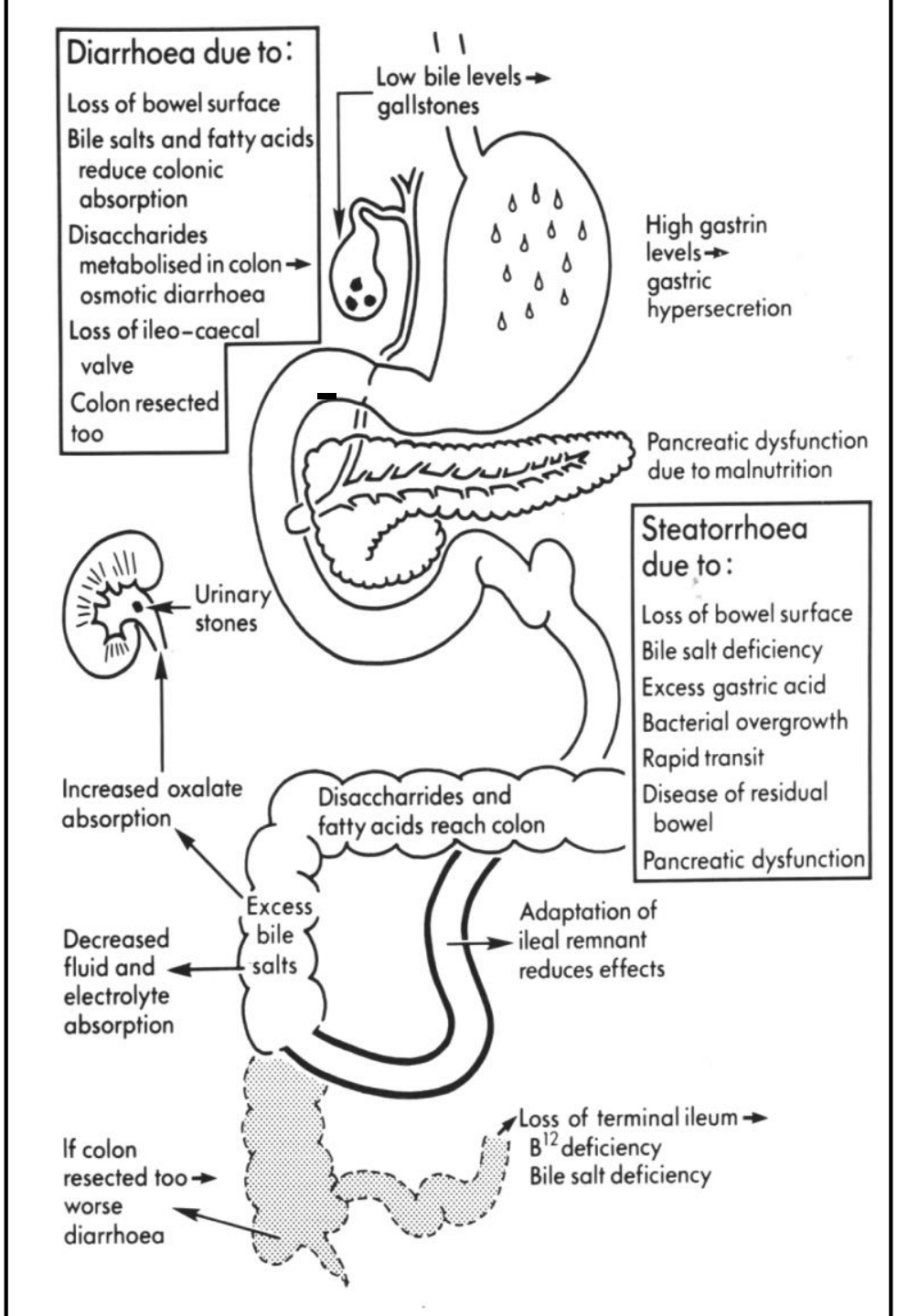
Home PN 1980-99, n = 302



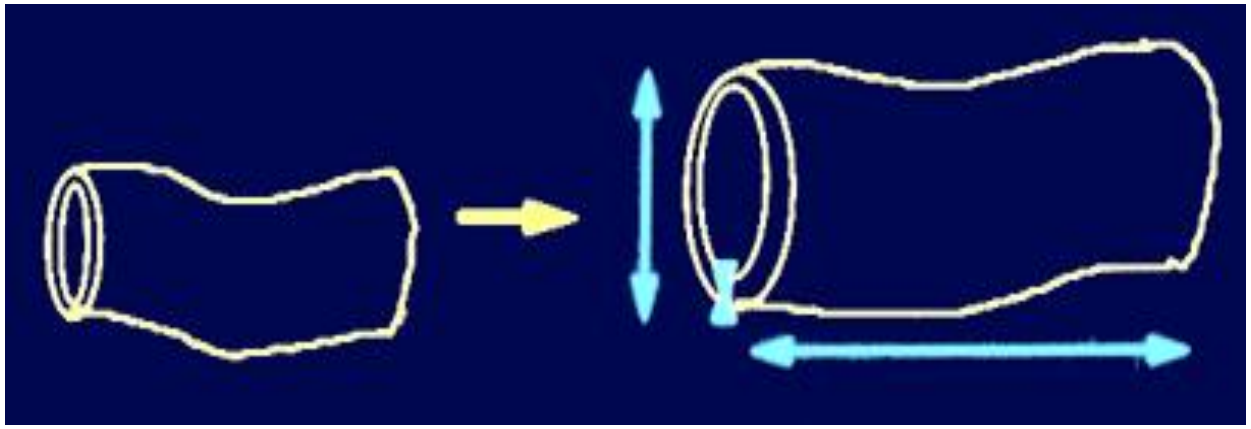
Home PN Necker 2000-2010 : n = 251



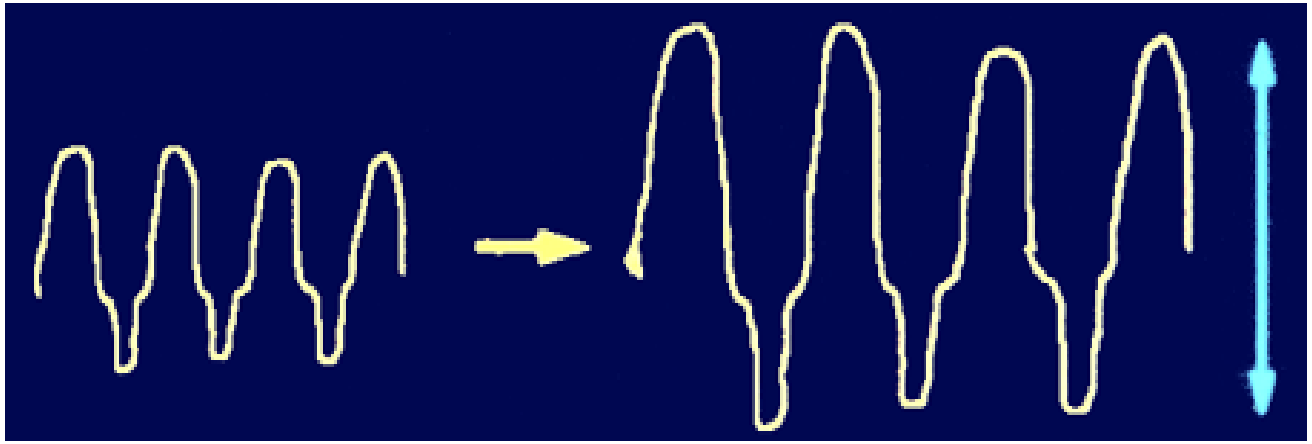
Consequences of bowel resection



Adaptation :
intestinal hypertrophy and villous hyperplasia

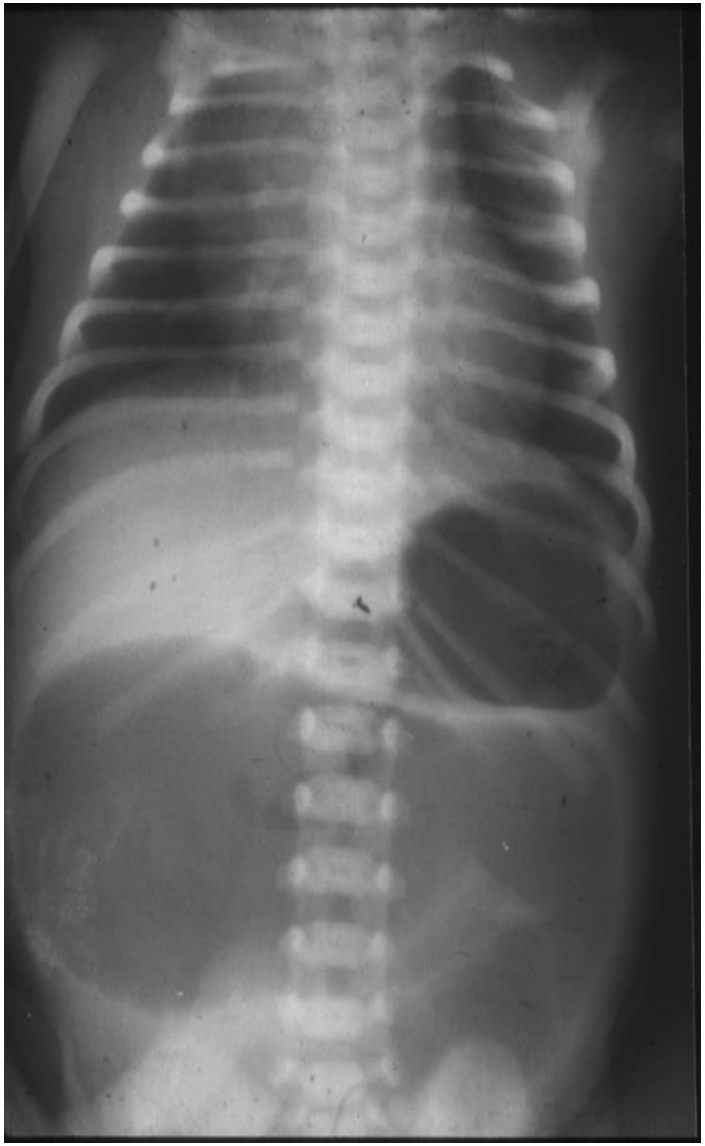


Dilatation, muscular hypertrophy, lengthening



Hyperplasia of the intestinal mucosa

Short bowel syndrome



- Disturbed motility
- Bacterial overgrowth
  - *mucosal injury*
  - *bacterial translocation*
- Liver disease

First aim : feed the child

Parenteral nutrition

- Nutritional status
- Avoid gut overload
- Cyclic PN intake
- Complications
- Home

Feeding management

Parenteral nutrition

- Nutritional status
- Avoid gut overload
- Cyclic PN intake
- Complications
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Oral feeding

- Physiological
- EGF from salivary glands
- Self-regulation of intakes
- Digestive secretions
- Prevents eating disorders

Feeding management

Parenteral nutrition

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Oral feeding

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Continuous enteral tube feeding ?

Feeding management

- Most physiological : oral
- Protein hydrolysate (MCT)
  - consider AA solutions
- Promotion of colon function

- No evidence-based recommandations

ESPGHAN-ESPEN Guidelines 2005
Parenteral nutrition : energy

- Maximal glucose oxidation rate : 18 g/ kg/d
- Maximal lipid oxidation rate : 3-3.5 g/kg/d
- Inverse relation glucose / lipid oxidation
- Ratio glucose / lipid : 60-75% / 25-40%

Commonly used protein intakes in unstressed children

Age group	*Amino acid requirement* $g.kg^{-1}.d^{-1}$	*Nitrogen requirement* $gN\ kg^{-1}.d^{-1}$	*Kcal/gN*
Very low birth weight infant (<1.5kg)	3.5	0.560	200-250
Term infant	2.0-2.5	0.320-0.400	250
Child	1.5-2.5	0.240-0.400	200-250
Adult	1.0-1.2	0.160-0.190	120-150

IF-associated liver disease

- Limiting factor for bowel adaptation
- Major cause of death

IF-associated liver disease
Patient-related risk factors

- Age and immaturity
- Bowel rest with total PN
- Dysruption of entero-hepatic cycle
  - short bowel, proximal stoma, ileal resection
- Intestinal stasis and bacterial overgrowth
  - motility disorder, no ileocaecal valve
- Infections

Prevention: patient-related factors

- Prevention of catheter-related sepsis
- Prevention of bacterial overgrowth
- Stimulation of digestive function
- Promote oral > continuous tube feeding

Prevention : PN-related factors

- Balanced protein-energy supply
- Use of paediatric amino acid solutions
- Early cyclical parenteral nutrition
- **Use of fish oil-based lipid emulsions**

Fish oil

EPA (20: 5n-3)
DHAA (22: 6n-3)

Soybean oil

ARA (20: 4n-6)

Increase inflammation
Decrease antioxidant activity
Increase phytosterols
Decrease bile flow

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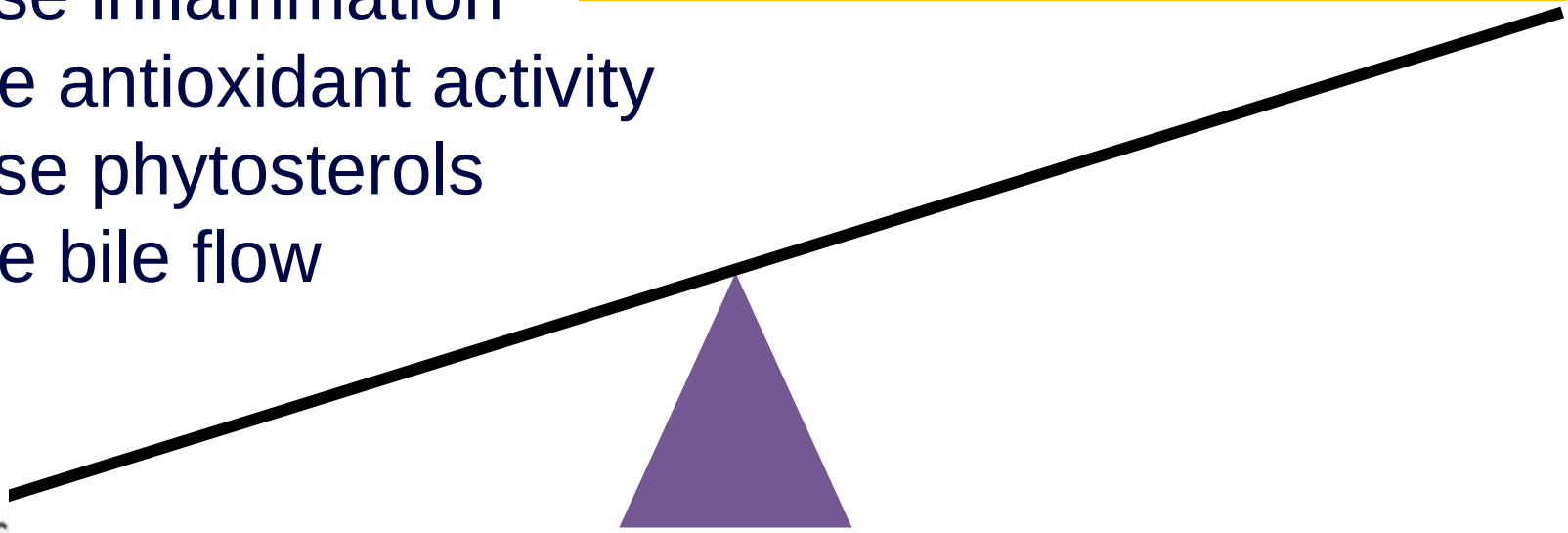


PARIS DESCARTES

Available lipid emulsions in Europe

	Intralipid	Medialipid	ClinOleic	SMOF	Omegaven
Soybean %	100	50	20	30	0
MCT %	0	50	0	30	0
Olive oil %	0	0	80	25	0
Fish oil %	0	0	0	15	100
Phytosterols mg/l	348±33	200±40	327±8	47.6	0
α-tocopherol mg/l	38	< 30	200	200	150-296
ω-3	+	±	+	++	+++
ω-6					

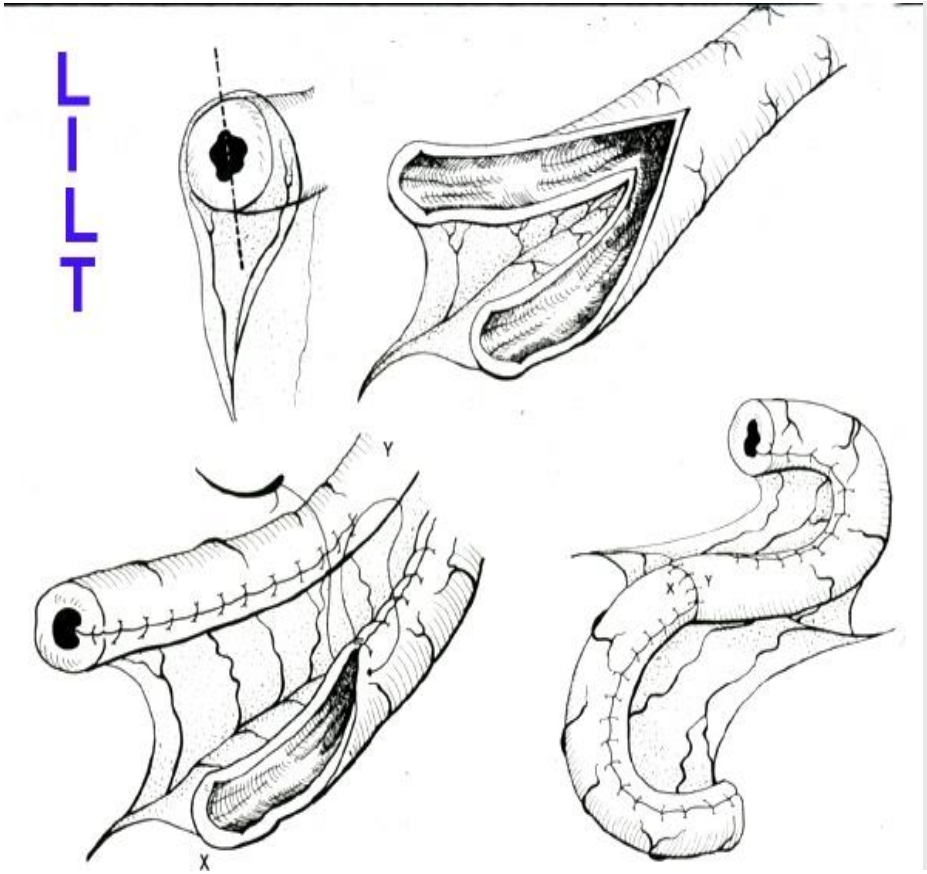
Pre- , pro- , and anti-biotics

- !!! Large-spectrum antibiotics
  - microbiota
  - resistances
  - do not change distension / motility
- Trial of metronidazole
- Probiotics : maybe, but which one ?

Surgery in short bowel syndrome

- Dilatation of bowel is normal / adaptation
- Risk of motility disorder / bacterial overgrowth
  - Long dilated segments : tapering
  - Short dilated segments : lengthening
    - Serial transverse enteroplasty (STEP)
    - Longitudinal intestinal lengthening

Lengthening techniques



Outcome after neonatal small bowel resection

- 73% : definitively weaned from PN
- 15% : recurrent nutritional support
- 12% : partial intestinal failure

Hormonal treatment

Non-transplant surgery

Intestinal transplantation ?

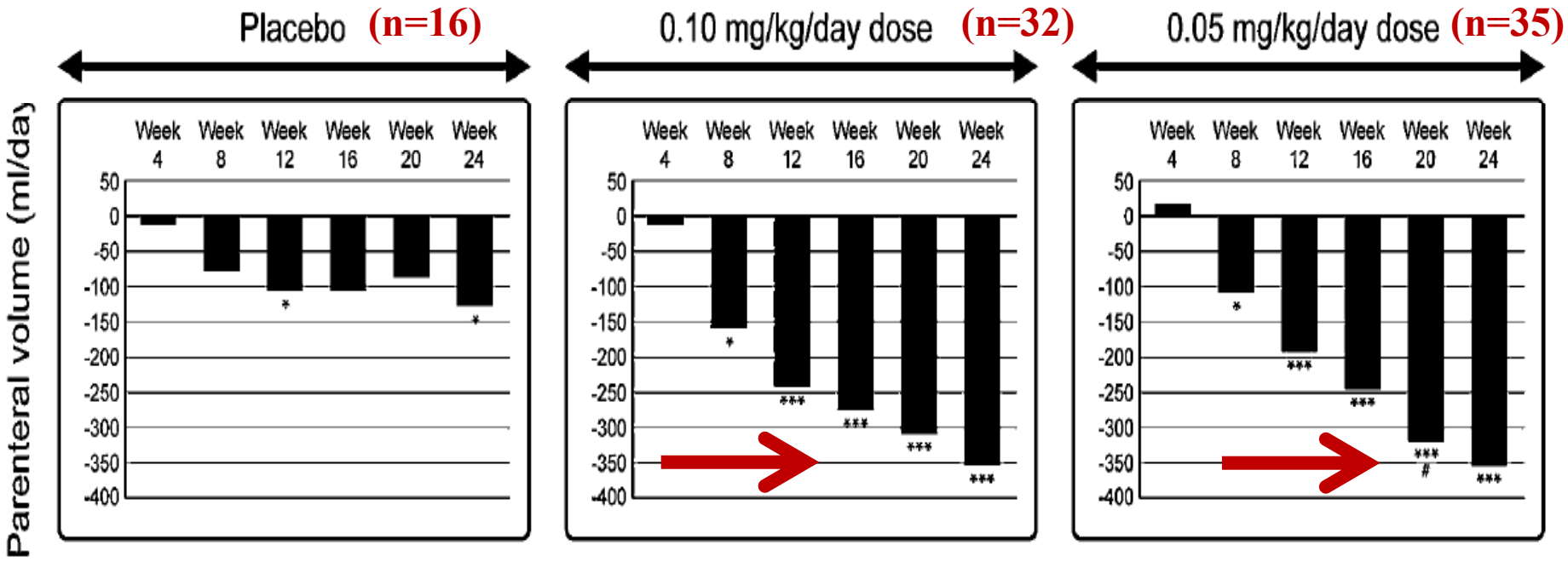
Future ?

- Growth hormone and IGF-1
- Glucagon-like peptide 2
- Epidermal growth factor (EGF)
- Tissue engineered intestine
- Transfection of Na/glucose pump
- Parenteral butyrate

Randomised placebo-controlled trial of teduglutide in reducing parenteral nutrition and/or intravenous fluid requirements in patients with short bowel syndrome

P B Jeppesen,[1] R Gilroy,[2] M Pertkiewicz,[3] J P Allard,[4] B Messing,[5] S J O'Keefe[6]

Reduction of volume of PN



Gut 2011;**60**:902—914. doi:10.1136/gut.2010.218271

Complications of home PN

- Home PN is impossible
- Extensive vascular thrombosis
- Multiple infections
- Progressive IF-associated liver disease
- Growth failure
- Psychological intolerance / HPN

Discussion of transplantation ?

Total AND definitive intestinal failure

AND

complications of home parenteral nutrition

= nutritional failure

Teşekkür ederim bene dilnediniz için !