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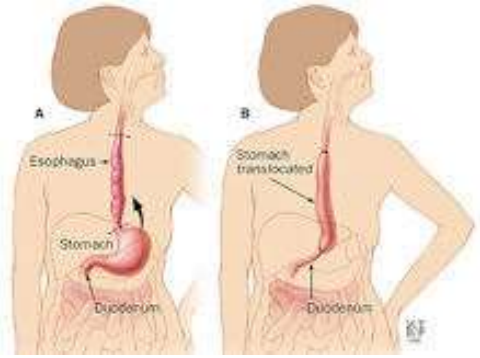
Nutritional Management in Esophageal Cancer

Kurt Boeykens

Nutrition Nurse Specialist



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Are these patients nutritionally at risk?

- If surgery: ‘Major surgery’
- Preoperative treatment
  - Chemotherapy and radiation
- Adaptation period postoperative
- Often inhibited food passage
  - Dysphagia, odynophagia

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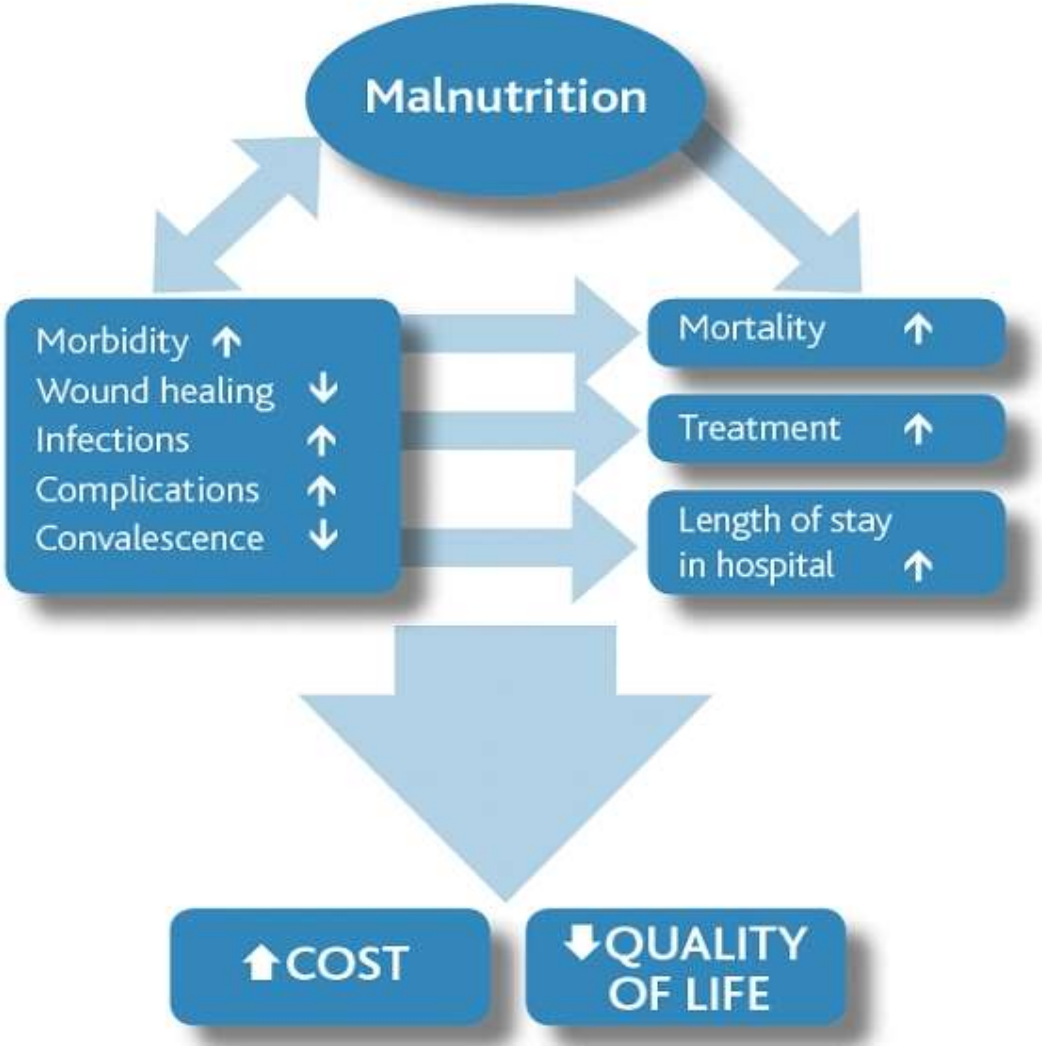
Post-oesophagectomy early enteral nutrition via a needle catheter jejunostomy: 8-year experience at a specialist unit

Aoife M. Ryan*, Suzanne P. Rowley, Laura A. Healy, Philomena M. Flood, Narayanasamy Ravi, John V. Reynolds

Clinical Nutrition (2006) 25, 386–393

Table 1 Nutritional status at diagnosis per morphology in 205 oesophagectomy cases.

Median BMI (kg/m^2) at diagnosis	25.5 (16.0–42.13)
Median weight loss	5.3 (0–40.3%)
Clinically severe weight loss*	34%
Clinically significant weight loss**	8%
Non-significant weight loss	58%
>10% weight loss	29%
Actively losing weight at diagnosis	74%
Subjective global assessment	
SGA severe	6%
SGA mild-moderately malnourished	25%
SGA well nourished	47%
Unavailable	22%
Nutritional risk index	
Not malnourished	47% (96)
Mild malnutrition	16% (33)
Moderate malnutrition	29% (59)
Severe malnutrition	4% (8)


Malnutrition
Morbidity ↑
Wound healing ↓
Infections ↑
Complications ↑
Convalescence ↓
Mortality ↑
Treatment ↑
Length of stay in hospital ↑
↑COST
↓QUALITY OF LIFE

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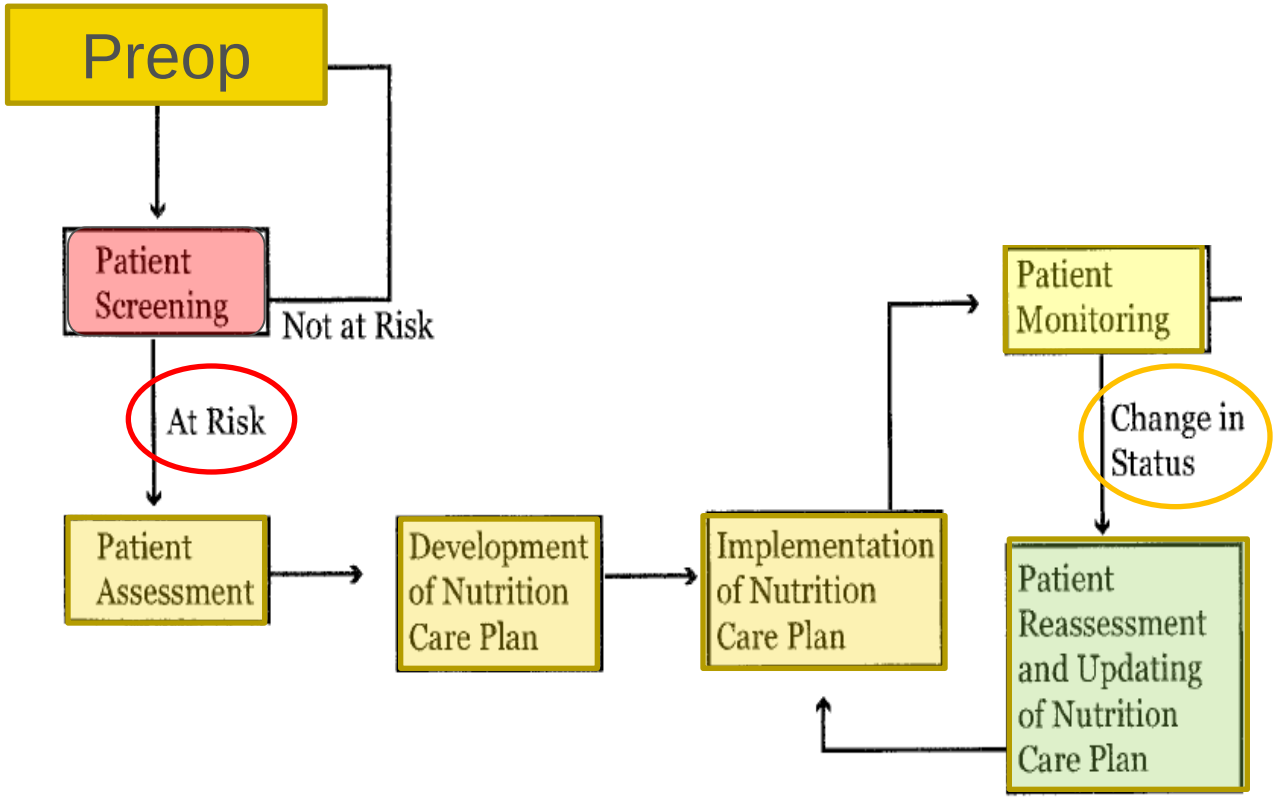
Elective surgery

Esophagectomy

ASPEN: Nutrition Care Process



Preoperative nutrition support

AZ Nikolaas

Translating Evidence-Based Practice Guidelines Into a Summary of Recommendations for the Nutrition Management of Upper Gastrointestinal Cancers

Yangyang Lu and Sharon Carey

Nutr Clin Pract 2014 29: 518 originally published online 6 May 2014
DOI: 10.1177/0884533614532501

Table 4. Key Recommendations for Clinical Practice.

- Patients with upper gastrointestinal (UGI) cancer should undergo nutrition screening and, where found to be at risk, assessed by a dietitian using a validated tool on admission to the hospital.
- Preoperative nutrition support is required only when malnutrition is identified or intake is likely to be greatly reduced.
- Oral or enteral nutrition is recommended to commence within 24 hours of UGI surgery. Parenteral nutrition should be used only when the enteral route is not accessible or requirements are not able to be met by the enteral route alone.
- Nutrition support has a very limited role to play in the patient with UGI cancer who is palliative.
- The patient with UGI cancer should have access to a multidisciplinary health team.

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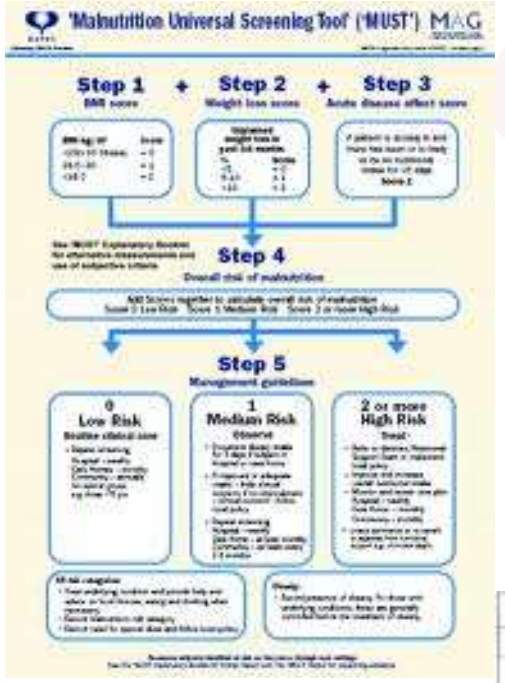

Nutritional Risk Screening 2002 (ESPEN guideline)

Impaired nutritional status		Severity of disease (= requirement/stress-catabolism)	
Mild Score 1	Wt loss >5% in 3 mths Or Food intake <50-75% of normal requirement in preceding week	Mild Score 1	Hip fracture (9). Chronic patients, in particular with acute complications: cirrhosis (11), COPD (12). *Chronic hemodialysis, diabetes, malignant oncology*
Moderate Score 2	Wt loss >5% in 2 mths Or BMI 18.5 - 20.5 + impaired general condition Or Food intake 25-50% of normal requirement in preceding week	Moderate Score 2	Major abdominal surgery (13-15). Stroke (16). *Severe pneumonia, malignant hematology.*
Severe Score 3	Wt loss >5% in 1 mth (= >15% in 3 mths (17)) Or BMI <18.5 + impaired general condition (12) or Food intake 0-25% of normal requirement in preceding week	Severe Score 3	Head injury (18, 19). Bone marrow transplantation (20). *Intensive care patients (APACHE>10)*
Score: +		Score:	= TOTAL SCORE:

Nutritional assessment

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- Weight loss
  - Recent weight loss and UBW
- Handgrip dynamometry
- GI problems
- Swallowing difficulties
- Diet history/intake
- **Laboratory parameters**
- **BMI (Age-Gender BMI percentiles)**

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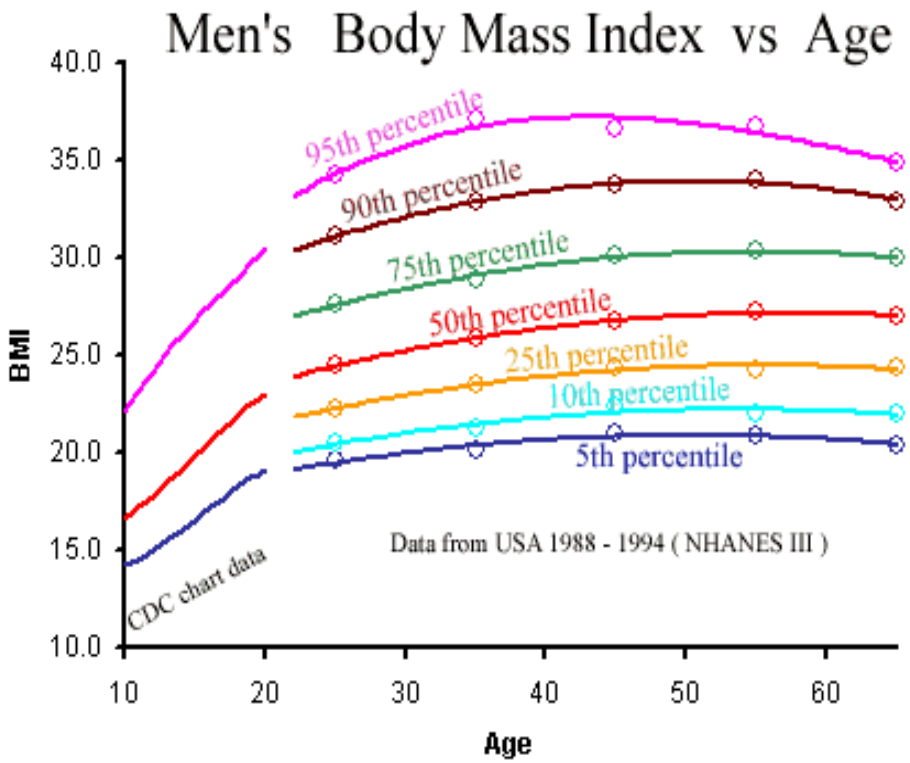
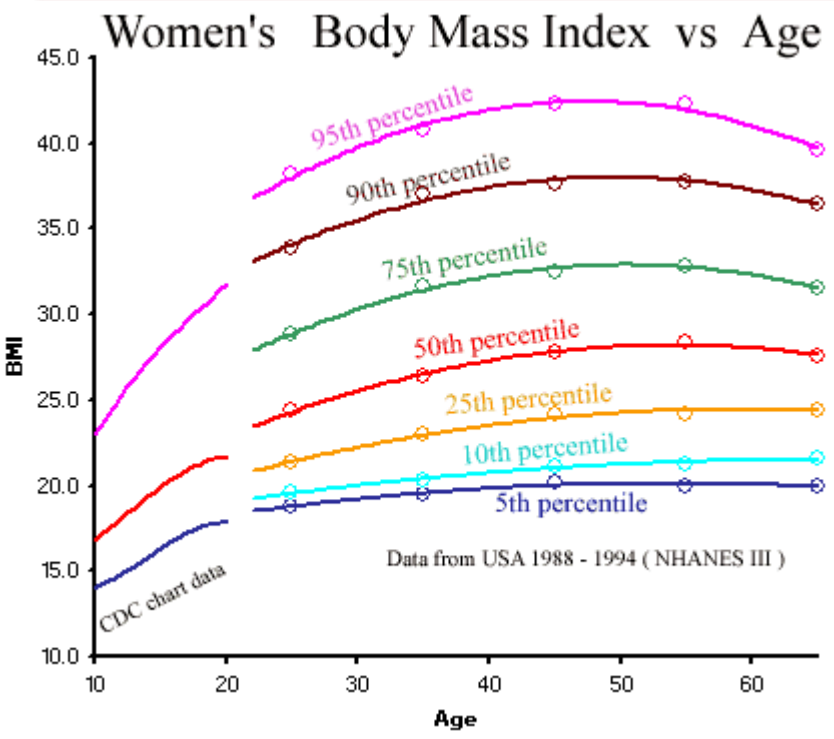

Men's Body Mass Index vs Age
40.0
35.0
30.0
25.0
20.0
15.0
10.0
BMI
10
20
30
40
50
60
Age
95th percentile
90th percentile
75th percentile
50th percentile
25th pergentile
10th percentile
5th percentile
CDC chart data
Data from USA 1988 - 1994 (NHANES III)


Women's Body Mass Index vs Age
45.0
40.0
35.0
30.0
25.0
20.0
15.0
10.0
BMI
10
20
30
40
50
60
Age
95th percentile
90th percentile
75th percentile
50th percentile
25th percentile
10th percentile
5th percentile
CDC chart data
Data from USA 1988 - 1994 (NHANES III)

bmi calculator and body weight comparison

BMI = kg/m^2

This **bmi calculator** calculates **body mass index** from your Weight and Height and also shows how your weight compares to others of the same height

Weight [ ] pounds ▼ *can convert lbs to kg*

Height [ ] inches ▼ or 5' ▼ 6" ▼

Calculate results: **Body Mass Index:** [ ] kg/m^2

"**Male**" is the initial setting on this page.

Age: [ ] years (Adult ▼)

Gender: Male ▼ re-calculate

Women may prefer to bookmark th

Body Description: [ ]

UPDATED -> According to: WHO - CDC ▼

Your Weight is at [ ] compared to others of same Height and Age

If you are at **50th percentile**, you are close to the **average** weight.
At 90th percentile, your weight is greater than 90% of others.
At 20th percentile, then 80% of others weigh more than you.

(Compared to American's weights)

UZ LEUVEN

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Study Type:	Observational	Estimated Enrollment:	650
Study Design:	Observational Model: Cohort	Study Start Date:	July 2013
	Time Perspective: Retrospective	Estimated Study Completion Date:	June 2014
		Estimated Primary Completion Date:	October 2013

Official Title: Age and Gender Corrected Body Mass Index: When Preoperative Weight Loss and Underweight Are Becomming Clinically Significant in Esophagectomy for Cancer.

Groups/Cohorts
AG-BMI < 10 pct Patients who's peroperative BMI is less than the 10th centile
AG-BMI >= 10th pct Patients who's peroperative BMI equals or is greater than the 10th centile

Detailed Description:

Age-Gender specific BMI percentiles are more accurate compared to the current BMI classes in predicting Overall Survival (OS) after esophagectomy for cancer. Furthermore we believe in a more devastating impact on OS from underweight and not from overweight.

By preoperatively identifying risk patients for poorer OS, especially the non-tumoral deaths, this can be a tool to tailor postoperative nutritional strategies to counter further weight loss and bringing postoperative weight to normal ranges.

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Conclusie AG-BMI

Het 10de AG-BMI-percentiel toont een significant **groter aantal patiënten met niet-oncologisch gerelateerde mortaliteit**

- zowel op 1 jaar (13,5% vs. 6,3%; p=0,0086)
- als 3 jaar (30,2% vs. 15,5%; p<0,0001)

na slokdarmresectie

H. Van Veer, MD
Thoraxheelkunde

Albumin

AZ Nikolaas

Preoperative albumin and surgical site identify surgical risk for major postoperative complications
KA Kudsk, EA Tolley, RC DeWitt, PG Janu, AP Blackwell, S Yeary and BK King
JPEN J Parenter Enteral Nutr 2003 27: 1

Mortality by site of surgery and preoperative albumin level

	Albumin category						
	1	2	3	4	5	6	7
ESO	1/1 (100)	—	0/4 (0)	3/11 (27)	1/13 (7.7)	1/25 (4)	1/5 (20)
STOM	2/4 (50)	0/6 (0)	1/16 (6.3)	6/27 (22)	4/33 (12.1)	0/46 (0)	0/8 (0)
PANC	0/1 (0)	2/4 (50)	2/11 (18.2)	3/17 (17.6)	0/32 (0)	0/30 (0)	0/11 (0)
Colon	1/7 (14.3)	3/14 (21.4)	3/19 (16)	4/40 (10)	1/54 (2)	1/68 (1.5)	0/19 (0)
Total	4/13 (31)	5/24 (21)	6/50 (12)	16/95 (17)	6/132 (5)	2/169 (1)	1/43 (2)

Deaths/number per group (percentage of deaths).
Serum albumin categories were defined as follows: 1, 1.75 g/dL; 2, 1.76 to 2.25 g/dL; 3, 2.26 to 2.75 g/dL; 4, 2.76 to 3.25 g/dL; 5, 3.26 to 3.75 g/dL; 6, 3.76 to 4.25 g/dL; 7, >4.25 g/dL.
ESO, esophagus; STOM, stomach; PANC, pancreas.

Albumin

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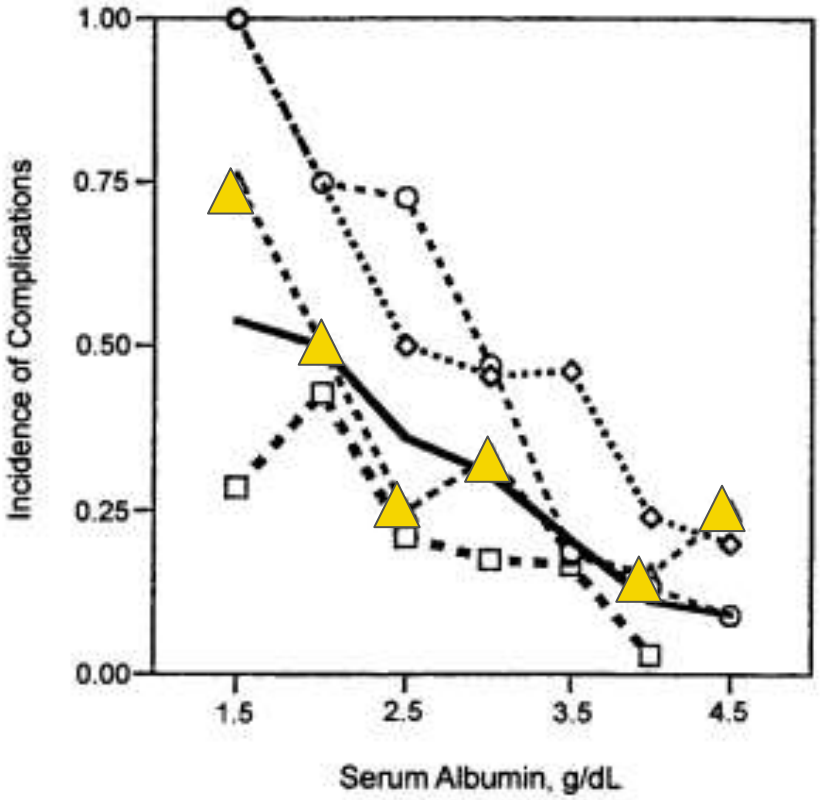


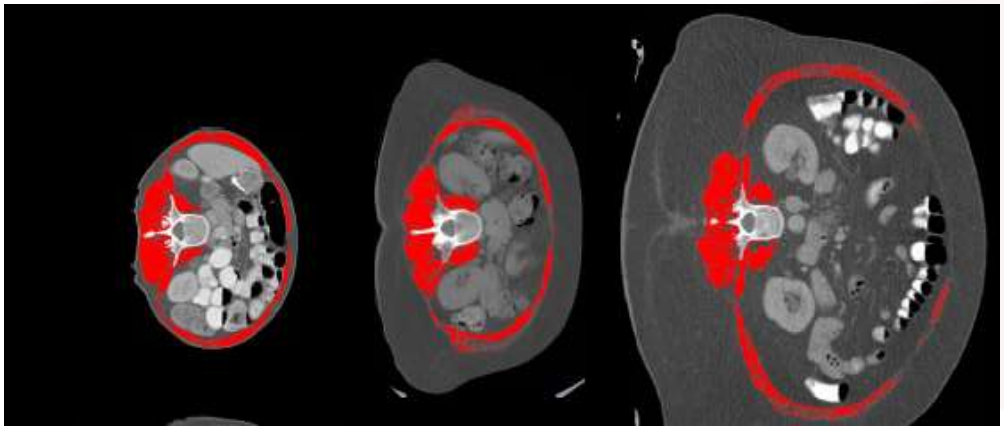
esophagectomy

Preoperative albumin and surgical site identify surgical risk for major postoperative complications
KA Kudsk, EA Tolley, RC DeWitt, PG Janu, AP Blackwell, S Yeary and BK King
JPEN J Parenter Enteral Nutr 2003 27: 1

Sarcopenia

Table 1: Examples of SMI & BMI findings from the analysis of CT images from 1476 patients with solid tumours of the respiratory or gastrointestinal tracts

Subject	**SMI (skeletal mass index)**	**BMI (body mass index)**	**Comment**
B1	29.8 cm^2/m^2	40.2 kg/m^2	Huge variation in BMI with similar SMI
B2	29.8 cm^2/m^2	28.1 kg/m^2	
B3	29.7 cm^2/m^2	15.3 kg/m^2	



Cancer treatment toxicity

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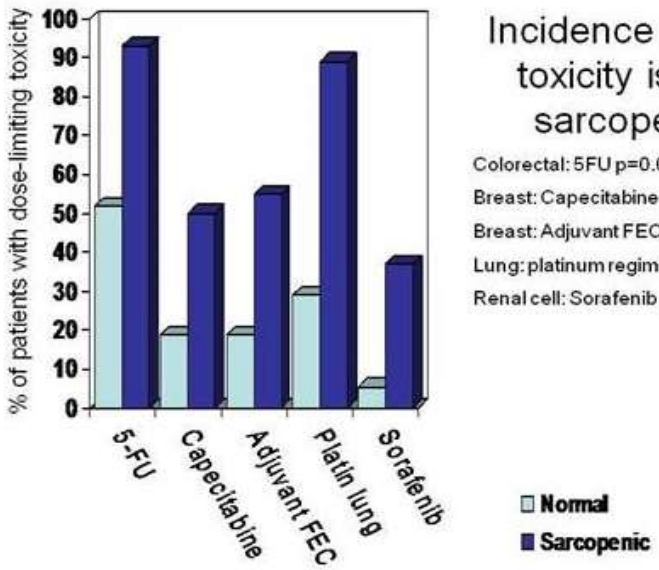
Table 2: Association between sarcopenia incidence of CTT and time to tumour progression (TTP) in metastatic breast cancer patients receiving capecitabine treatment

Parameter	Percentage (%)	Comment
Presence of sarcopenia	Approx 25% of total	Observed in normal weight, overweight & obese patients
Cancer treatment toxicity (CTT)	50% in sarcopenic group 20% in non-sarcopenic group	P=0.03
Time to tumour progression (TTP)	101.4 days in sarcopenic group 173.3 days in non-sarcopenic group	P=0.05



Incidence of dose-limiting toxicity is increased in sarcopenic patients:

Colorectal: 5FU p=0.001

Breast: Capecitabine p=0.039

Breast: Adjuvant FEC p= 0.03

Lung: platinum regimen p=0.000

Renal cell: Sorafenib p=0.04

Preoperative nutrition support

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Translating Evidence-Based Practice Guidelines Into a Summary of Recommendations for the Nutrition Management of Upper Gastrointestinal Cancers

Yangyang Lu and Sharon Carey

Nutr Clin Pract 2014 29: 518 originally published online 6 May 2014
DOI: 10.1177/0884533614532501

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- Nutrition support has a very limited role to play in the patient with UGI cancer who is palliative.
- The patient with UGI cancer should have access to a multidisciplinary health team.

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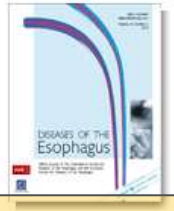
- Energy dense and protein rich food or beverages
  - Milkshakes, smoothies
- Adequate chewing, slowly eating
- Frequent meals
- Soft/pureed/blenderized/liquid meals
  - Increase the volume for adequate intake!
- Meat substitutes
  - Eggs, boneless fish, tofu, cheese,….

Dietician-delivered intensive nutritional support is associated with a decrease in severe postoperative complications after surgery in patients with esophageal cancer



Diseases of the Esophagus
Volume 26, Issue 6, pages 587–593, August 2013

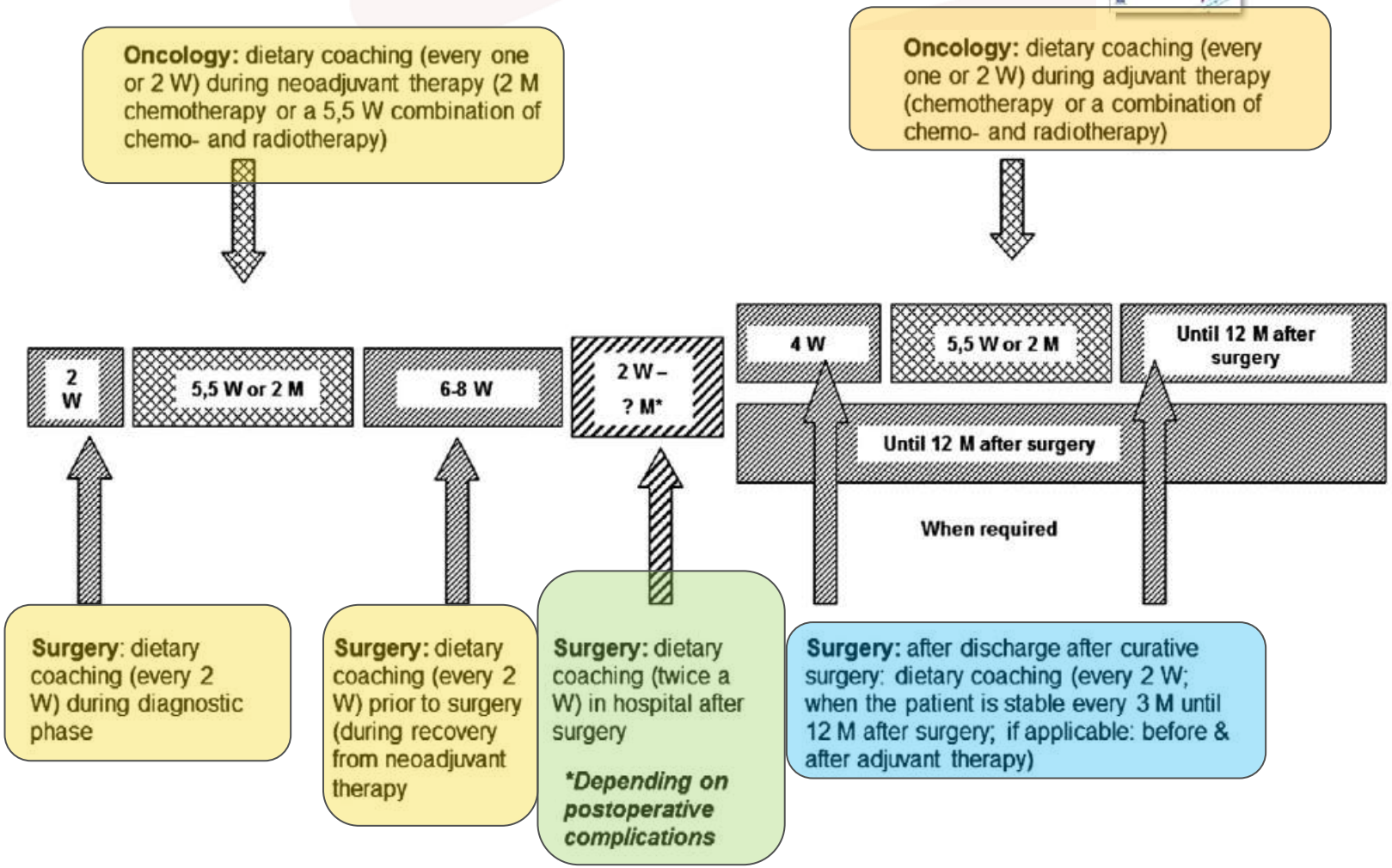


Fig. 1 Logistics of the intensive nutritional support by the dietician. W, week; M, month.

Immunonutrition

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ESPEN Guidelines on Enteral Nutrition: Surgery including Organ Transplantation ☆

Clinical Nutrition (2006) 25, 224–244

ELSEVIER

ESPEN GUIDELINES

Type of formula	In most patients a standard whole protein formula is appropriate.	C
	Use EN preferably with immuno-modulating substrates (arginine, ω-3 fatty acids and nucleotides) perioperatively independent of the nutritional risk for those patients • undergoing major neck surgery for cancer (laryngectomy, pharyngectomy) • undergoing major abdominal cancer surgery (oesophagectomy, gastrectomy, and pancreatoduodenectomy) • after severe trauma.	A
	Whenever possible start these formulae 5–7 days before surgery	C
	and continue postoperatively for 5 to 7 days after uncomplicated surgery.	C

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Immunonutrition

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Consensus Recommendations From the U.S. Summit on Immune-Enhancing Enteral Therapy
JPEN J Parenter Enteral Nutr 2001 25: S61
DOI: 10.1177/014860710102500213

A. Patients undergoing elective gastrointestinal (GI) surgery
   1. Moderately or severely malnourished patients (albumin < 3.5 g/dL) undergoing major elective upper GI procedures on the esophagus, stomach, pancreas (with or without duodenum), and hepatobiliary tree; the greatest benefit will be achieved in patients who are malnourished preoperatively

aspen
American Society for Parenteral and Enteral Nutrition

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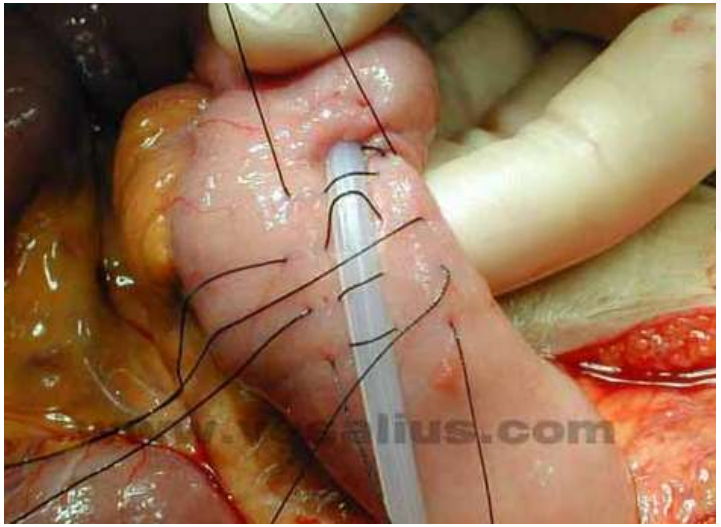
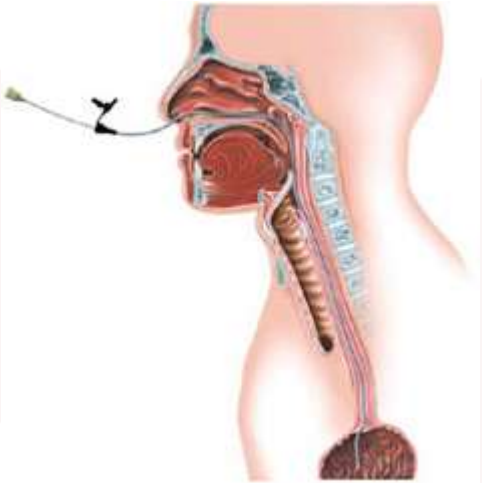
NCP Preop

- Nasogastric feeding tube
- (Surgical/laparascopic/endoscopic) jejunostomy
- PEG?





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Am J Surg. 2014 Mar;207(3):361-5; discussion 364-5. doi: 10.1016/j.amjsurg.2013.10.012. Epub 2013 Dec 19.

Esophagectomy in patients with prior percutaneous endoscopic gastrostomy tube placement.

Wright GP[1], Foster SM[2], Chung MH[3].

Author information

Abstract

BACKGROUND: The impact of preoperative percutaneous endoscopic gastrostomy (PEG) tube placement in patients undergoing esophagectomy is uncertain.

METHODS: A retrospective review was performed in consecutive patients who underwent esophagectomy. Patients were divided into groups based on whether or not they had preoperative PEG placement.

RESULTS: One hundred seventeen patients were studied, 102 without (PEG-) and 15 with PEG+ before PEG tube placement. The overall morbidity and mortality rates were 38% and 3%, respectively. The use of a gastric conduit was similar between groups (94% PEG- vs 87% PEG+, P = .27), and the presence of a PEG before PEG tube placement was not prohibitive in any case. Anastomotic leak rates were similar between groups (11% PEG- vs 15% PEG+, P = .65), and there were no leaks from previous PEG sites.

CONCLUSION: It appears that preoperative PEG tube placement has no adverse effect on the performance of esophagectomy and may be considered in highly selected patients with poor nutritional status.

Endoscopy. 2013 Jul;45(7):526-31. doi: 10.1055/s-0033-1344023. Epub 2013 Jun 18.

Prospective evaluation of malignant cell seeding after percutaneous endoscopic gastrostomy in patients with oropharyngeal/esophageal cancers.

Ellrichmann M[1], Sergeev P, Bethge J, Arlt A, Topalidis T, Ambrosch P, Wiltfang J, Fritscher-Ravens A.

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- 50 patients: oropharyngeal (ENT) and esophageal malignancies
- Need for EN
- 40 pull-through technique/10 direct insertion
- Cytological assessment (brush cytology) at insertion site immediately after placement and after 3-6 months
- With pull technique:
  - 22,5% malignant cells after insertion
  - 9,4 % after 3-6 months only in patients with esophageal cancer
- Use direct access

Esophagectomy

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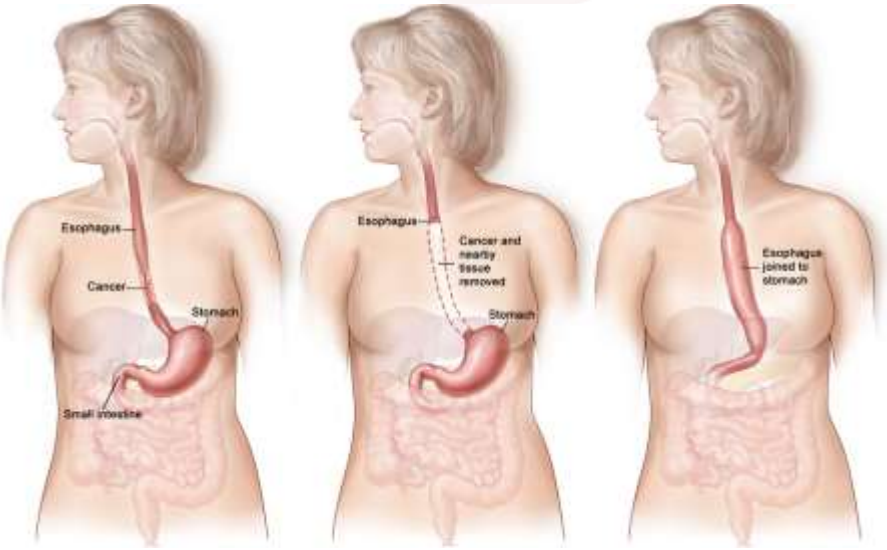

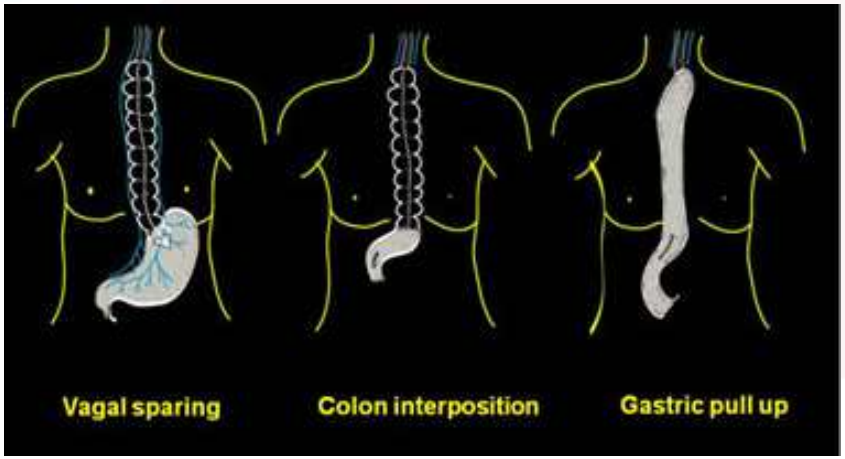

NCP postop

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- Danger anastomotic leak
  - NG tube placed at surgery for decompression
    - Protects esophagogastric anastomosis 5-7 days
- Needle catheter jejunostomy or larger bore jejunostomy
  - Also useful after discharge to prevent further weight loss in the adaptation period (nocturnally) and during adjuvant therapy
  - Or when stricture development at the anastomosis site later

Jejunostomy

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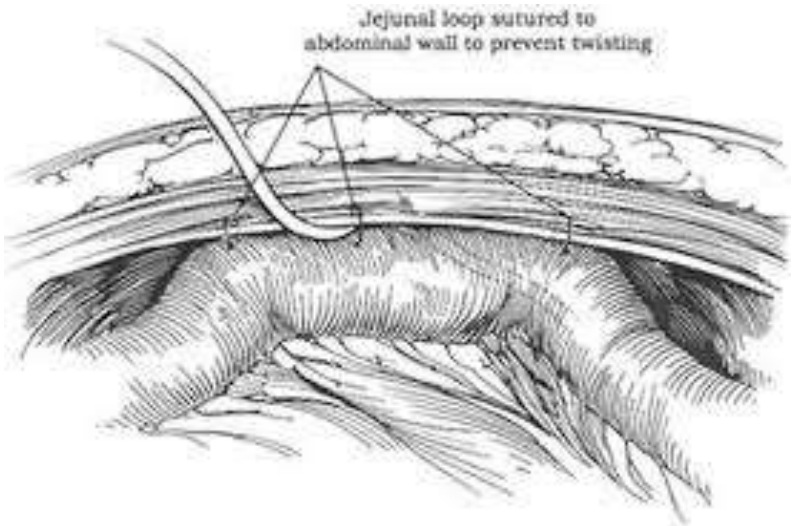

Type of feeding

- Enteral feeding (evt. immunonutrition) can start 12 hours after placement
  - Start at 20 ml/h and advance by 10 ml/h every 12 hours until reaching goal
  - Mostly 1 Kcal/ml
- Flush frequently (ever six hours!)
- Avoid high fibre formula and medications (obstruction of the tube)
- Consider semi-elemental tube feeding with small diameters

Post-oesophagectomy early enteral nutrition via a needle catheter jejunostomy: 8-year experience at a specialist unit

Aoife M. Ryan*, Suzanne P. Rowley, Laura A. Healy, Philomena M. Flood, Narayanasamy Ravi, John V. Reynolds

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Table 2 Nutrition support post-operatively in 205 oesophagectomy cases.

Days on nutrition support	15 (2–112)
Days on full NS	11 (2–112)
Days on part NS	3 (0–48)
Days fasting	0 (0–10)
Days to first BM	5
Peri-op weight loss (kg)	1.5 (0–25.6)
Peri-op weight loss	2.3% (0–26)
Mean weight on discharge (kg)	71 (39–125.7)
Mean BMI on discharge	24.6 (16.3–40.6)
Weight loss classification	
Non-significant weight loss	65% (133)
Significant weight loss	8% (16)
Severe weight loss	24% (56)
Enteral feeding	189 (92%)
Parenteral feeding	16 (8%)
Intravenous fluids only	0 (0%)

NS = nutrition support; BM = bowel motion.

Table 3 Biochemical, gastrointestinal and mechanical complications of jejunostomy feeding in 205 cases.

	Incidence
Electrolyte supplementation	
Phosphate	37% (76)
Potassium	32% (66)
Sodium	8% (16)
Magnesium	20% (42)
Gastrointestinal complications	
Constipation	18% (38)
Laxative requirement	26% (54)
Diarrhoea >3/day	11% (22)
Diarrhoea <3/day	11% (22)
Nausea	16% (33)
Cramps	6% (13)
Abdominal distension	4% (9)
Vomiting	3% (7)
Mechanical complications	
Tube dislodged	2.4% (5)
Tube occlusion	3% (6)
Tube split	0.5% (1)
Infection at entry site	1.4% (3)
Site oozing	1.4% (3)
Bowel obstruction/volvulous	1.4% (3)

Jejunostomy tube feeding in patients undergoing esophagectomy

AZ Nikolaas

Canadian Journal of Surgery

2013;56(6)409-414

Table 4. Jejunostomy complications

Patient	Days to oral intake	Days to jejunostomy tube complication	Complication	Treatment
1	12	7	Jejunal ischemia	Localized resection
2	62	8	Bowel obstruction and perforated jejunum	Localized resection
3	NA*	13	Small bowel leak and localized abscess	Repair of jejunum
4	11	10	Jejunal site infection	Tube removed
5	52	49	Jejunal site infection	Tube removed
6	8	6	Jejunal site infection	Antibiotics

NA = not applicable.
*Patient died on postoperative day 27 without having resumed oral intake.

NCP Postop

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- **<u>Transition to oral intake (if no complications)</u>**
  - Water from D5 (?)
  - Quick progression from clear liquids to soft diet to solid food (= patient specific)
  - Small frequent meals (6-8 per day)
    - Prevents dumping syndrome (abdominal pain, nausea, dizziness, diarrhoea)
  - Later gradually progress to normal diet and 3 meals/d (Patient specific + may take several months)

NCP postop

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- **TPN**
  - First week postop (?)
  - Prolonged ileus
  - Intolerance enteral feeding
  - No jejunostomy present

Postoperative problems

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- Swallowing problems
- Reflux
- Dumping syndrome (nausea, diarrhoea, abdominal cramping,…)
- Excess gas
- Rebound hypoglycaemia
- Suboptimal intake-weight loss
- Delayed gastric emptying

Ann Thorac Surg. 2009 Jun;87(6):1708-13; discussion 1713-4. doi: 10.1016/j.athoracsur.2009.01.075.

Prevention of delayed gastric emptying after esophagectomy: a single center's experience with botulinum toxin.

Martin JT[1], Federico JA, McKelvey AA, Kent MS, Fabian T.

Problem solving

AZ Nikolaas

- Limit fluids during meals
- Avoid alcohol, caffeine (reflux)
- Sit upright 30-60 minutes after eating and two hours before bedtime
  - Bed: upper body 30°
  - Last snack at least two to three hours before going to bed
- Sweets at the end of a meal
- Trial and error

Qol afterwards

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- Potentially influenced by some physical (nutritional related) symptoms
  - Dysphagia
  - Loss of taste
  - Further weight loss
  - Early satiety
  - Reflux
  - Blown up feeling
  - Food not going down
  - Chest pain

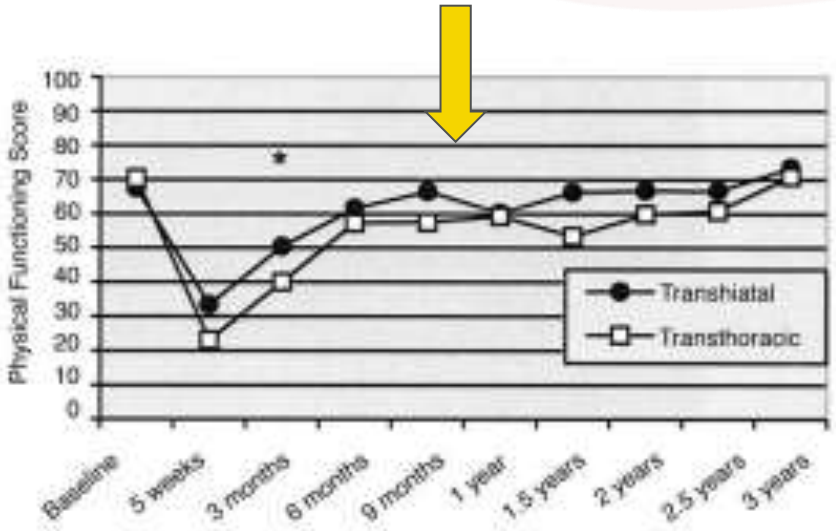
VOLUME 22 · NUMBER 20 · OCTOBER 15 2004

JOURNAL OF CLINICAL ONCOLOGY | ORIGINAL REPORT

AZ Nikolaas

Quality of Life After Transhiatal Compared With Extended Transthoracic Resection for Adenocarcinoma of the Esophagus

A.G.E.M. de Boer, J.J.B. van Lanschot, J.W. van Sandick, J.B.F. Hulscher, P.F.M. Stalmeier, J.C.J.M. de Haes, H.W. Tilanus, H. Obertop, and M.A.G. Sprangers



Physical functioning 9 months to one year to baseline

AZ Nikolaas

Esophageal cancer

Surgery not possible

NCP

- Screening/assessment
- Dietary counceling
- NST
- Nutrition Care plan
- Stenting
- Gastrostomy-jejunostomy
- TPN

Conclusions

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- Multiple reasons and time points for developing nutrition risk or undernutrition.
- Importance of (preoperative) nutritional screening and assessment
- Develop a individual NCP certainly if at risk or undernourished

Conclusions

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- Use preferable oral/enteral nutrition and if not accessible or requirements not met: TPN
- Access to a multidisciplinary team
  - NST
- Patients may need several months to return to their baseline preoperative state.

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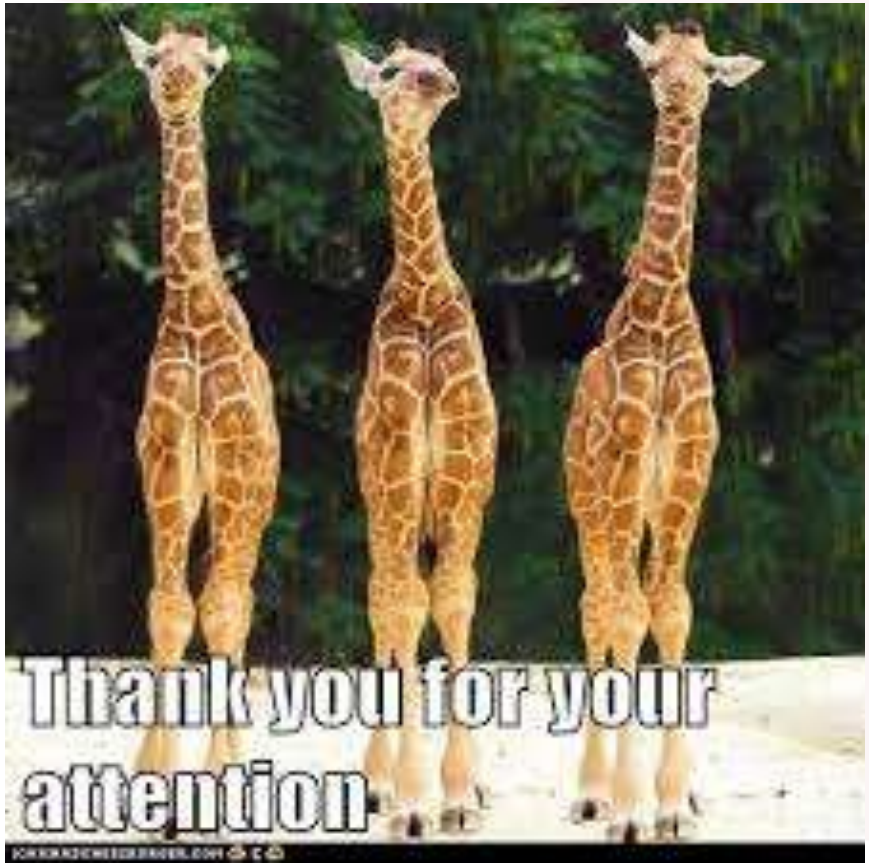

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