Managing the complications of severe malabsorptive procedures

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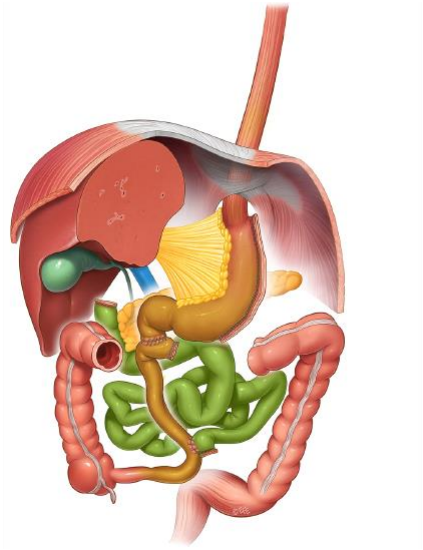
I have no potential conflict of interest to report

Achieve a healthier weight
Reduce obesity related comorbidities
Prevent excess loss of lean tissue
Improve nutritional intake
Establish good eating behaviours
Maintain good nutritional status
Improve quality of life
Improve mobility

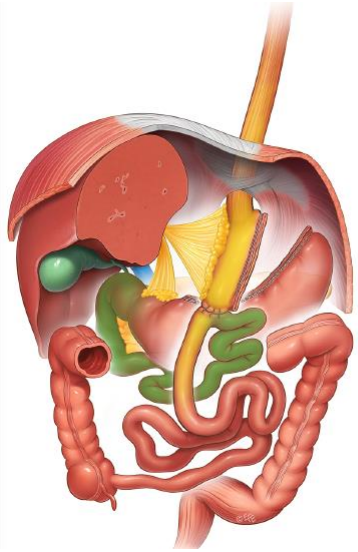
Protein malnutrition
Vitamin and mineral deficiencies
Anaemia
Osteoporosis
Night blindness
Neuropathy
Steatorrhoea
Hair loss
Poor wound healing
Wernicke's encephalopathy

Malabsorptive procedures: Impact on nutrition

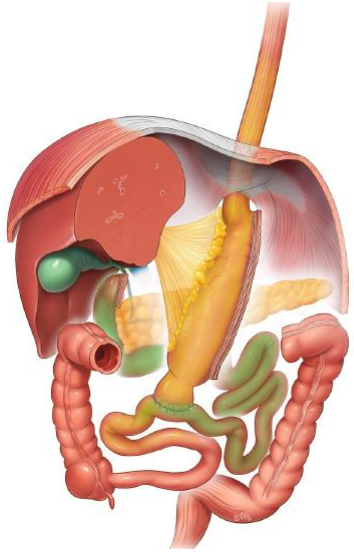
Duodenal Switch (DS)



One Anastomosis Gastric Bypass (OAGB)*



Single Anastomosis Duodeno-Ileal Switch (SADIS)



Malabsorption –iron, vitamin B12**, protein, fat, calcium, vitamin D, fat-soluble vitamins, zinc, copper & selenium**

*Biliopancreatic limb >150 cm

Protein absorption and malabsorptive procedures

- Biliopancreatic diversion – 30% protein and 32% fat not absorbed (Scopinaro et al. Obes Surg. 2000;10:436-41). 10 % incidence of protein malnutrition. (Scopinaro et al. Obes Surg. 2012;22:427-32)
- Duodenal Switch. Protein malnutrition requiring revisional surgery – 4% (Sethi et al. Surg Obes Relat Dis. 2016;12:1697-1705)
- SADIs. Protein malnutrition – up to 34% of patients (Shoar et al. Obes Surg. 2018;28:104-113)
- One anastomosis gastric bypass. Severe protein deficiency: Two readmitted at 10 and 11 months (180 cm and 250 cm BPL); one death at 12 months (250 cm BPL) (Ahuja et al. Obes Surg. 2018;28:3439-3445)

Protein –energy malnutrition / protein malnutrition

- Food intolerance /maladaptive diet
- Eating habits / culture / religion
- Adherence / affordability
- Anorexia /loss of appetite
- Malabsorption
- Protein malnutrition may present several years post surgery

Protein –energy malnutrition / protein malnutrition following malabsorptive procedures

- Determine the cause
- May need artificial nutrition e.g. nasojejunal, parenteral
- Revisional surgery
- Pancreatic enzymes
- Food intolerances/adherence – dietetic and psychological input

Malabsorptive procedures -fat-soluble vitamins and trace minerals

Deficiency	BPD/DS 1, 2, 3	SADIs 4, 5, 6	OAGB 7, 8, 9
Vitamin A	22.5%,23.2%,28%	25-53%, 40.8%, 1%	X, 31.2%, 39.7%
Vitamin D	70%, 76.7%, 60%	6-31%, 74 %, 53%	40%, 28.1%, 52.5%
Vitamin E	X, 7%, 10%	0-7%, 8.5 %, 0%	X, X, X
Vitamin K	X, 11.6%, 60%	X, X, 24%	X, X, X
Zinc	34%, 44.2%, 32%	4-50%, 31.8%, 0%	X, X, X
Copper	X	X, 22.7%, 3.4%	X, X, X
Selenium	X, 27.9%, X	28-50%, 26%, X	X, X, X

BPD/DS 1 Topart & al 2014 2 yrs, 2 Nett & al 2016 > 5 yrs, 3 Homan & al 2018 12-90 m
SADIs 4 Shoar et al 2018, 5 Sánchez-Pernaute et al 2022 (results at 5 years), 6 Cottam et al 2020
OAGB 7 Ahuja et al 2018 BPL 250 cm, 8 Komaei et al 2019 BPL 200 cm, 9 Liagre et al 2021 BPL 150 cm

Leeds experience – duodenal switch audit

% patients meeting less than reference range	
Serum vitamin D	64
Serum vitamin A	57
Serum vitamin E	43
Serum vitamin K	85
Serum zinc	71
Serum copper	29
Serum selenium	43

29% - hospital admission for parenteral nutrition on at least 1 occasion and had gone on to have revisional surgery

>20 day-case admissions for parenteral micronutrient replacement

Leeds experience – dietetic management of fat-soluble vitamin replacement

- Dietitian able to request serum fat soluble vitamins A, E and K
- Clinical nutrition team and dietitian agreed protocols for intramuscular replacement of vitamins A and E in outpatients. Approved by Drugs and Therapeutics. Three monthly monitoring.
- Approval by Drugs and Therapeutics of supplement containing high amounts of vitamins A, D, E and K
- Excellent support from clinical nutrition team and obesity physicians (chemical pathologists)

Zinc, copper and selenium deficiencies

- Maintain zinc /copper ratio where possible– zinc induced copper deficiency and vice versa
- Higher doses of zinc, copper or selenium as standalone:
  - Prescribe for fixed time
  - Recheck levels before continuing
  - Confirm in writing to both the patient and general practitioner
- Use clinical judgement and seek help
  - Low zinc and copper
  - Low (and high) selenium levels

Nutritional considerations with Malabsorptive procedures – Prevention!

- Healthcare professionals
  - Do all members of the team, including dietitians, have training in the procedure?
  - Is the patient able to afford and adhere to postoperative diet? (High protein intake required)
  - What are the optimal nutritional supplements to meet increased requirements for fat soluble vitamins and trace minerals?
    - How will these be made available to the patient? Will they be prescribed? Are they affordable?
  - Is the centre able to request all nutritional blood tests, including all fat-soluble vitamins?
  - Who will provide long term follow-up and monitoring? Is this funded?
  - Who will manage the nutritional deficiencies?

My valuable integrated health allies

Clinical Nutrition team

Dietitian

Obesity Physician

Pharmacist

Chemical Pathologist

Liaison psychiatrist

Images from World Obesity Federation and ECPO Image Banks