EXTREME TIREDNESS IN BARIATRIC SURGERY PATIENTS POSTOPERATIVELY LEADING TO WEIGHT GAIN AND HOSPITAL ADMISSIONS – WATCH OUT!

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[X] I have the following potential conflict(s) of interest to report:

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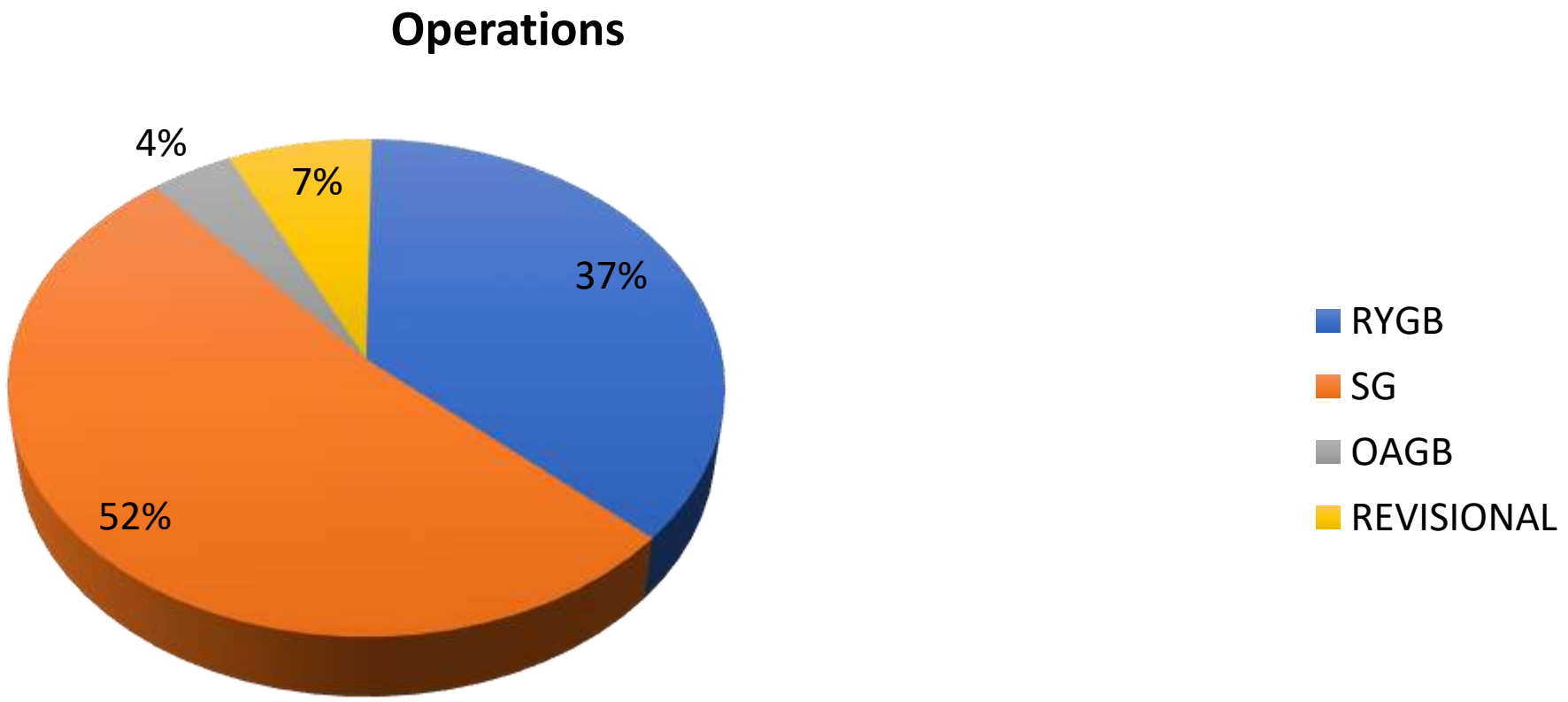

Operations
4%
7%
37%
52%
RYGB
SG
OAGB
REVISIONAL

INTRODUCTION

- Extreme tiredness and weight gain and post-operatively can be demoralising for bariatric surgery patients.
- Common causes include nutritional deficiencies which can improve following correction in primary care.
- Difficult cases of extreme tiredness can indicate unusual pathologies and require urgent specialist referral.

AIM

- To present two cases of extreme tiredness presenting to a specialist Bariatric Chemical Pathologist, referred by colleague Consultant Bariatric surgeon.

METHODS

- Retrospective notes review of two unusual cases

CASE 1 – 33F

- Background: RYGB 11 years ago, iron deficiency, Mirena coil
- Presenting complaint: excessive tiredness and weight gain.
- Weight gain despite small portion sizes, attends gym 3-5 times a week. No vomiting/abdo pain.
- Initial weight: 94 kg BMI 40.7 kg/m2
- Lowest weight: 61.1kg BMI 27.1kg/m2 35% total weight loss
- Current weight: 85kg BMI 37.8kg/m2 9.6% total weight loss

- Medication: Multivitamin 2 per day, zinc 15mg per day, Vitamin D 3 3000 IU, Acidophilus 100mg, Iron 210mg per day

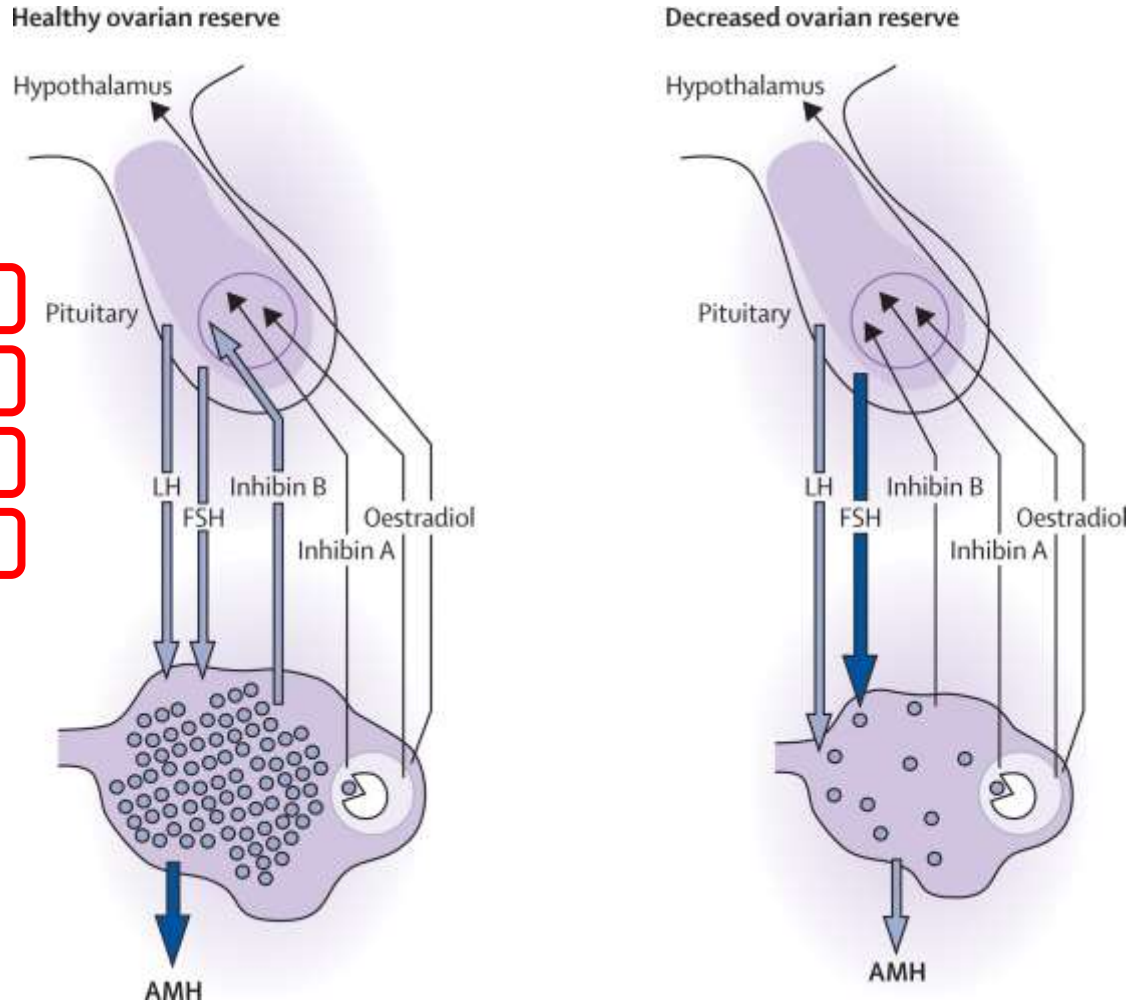
INVESTIGATIONS

• Vitamin D	40nmol/L	↓	
• Parathyroid hormone (PTH)	16.1p mol/L	↑	(1.6 - 7.2)
• B12	363 nanogram/L	normal	(200-1000)
• Folate	7.4 ug/L	normal	(4-18)
• Copper	17.5 umol/L	normal	(12.6 - 24.3)
• Zinc	11.2 umol/L	normal	(11-19)
• Selenium	89.8 ug/L	normal	(65-150)
• Iron	13 umol/L	normal	(12-28)
• Ferritin	7 ug/L	↓	(9-120)
• Hb	133 g/L	normal	(115-165)
• Thyroid stimulating hormone (TSH)	2.44 mu/L	normal	(0.3-5.0)
• Thyroxine T4	10.4 pmol/L	normal	(9-19)
• DEXA Scan	normal		

[300,000 IU IM injection given]

Secondary hyperparathyroidism

- Follicle stimulating hormone (FSH) 88 IU/L ↑
- Leutenising hormone (LH) 28.2 IU/L ↑
- Oestrodiol <37 pmol/L ↓
- Anti-Mullerian Hormone (AMH) 2.1 pmol/L ↓



De Vos, M., Devroey, P., & Fauser, B. C. (2010). Primary ovarian insufficiency. Lancet (London, England), 376(9744), 911–921. https://doi.org/10.1016/S0140-6736(10)60355-8

MANAGEMENT

- Referral to Gynaecology confirmed diagnosis of primary ovarian insufficiency
- Commenced on HRT
- Symptoms slowly improved

MANAGEMENT OF IRON DEFICIENCY

2 years later

• Ferritin	7 ug/L	↓	(9-120)
• Iron	11umol/L	↓	(12-28)

- Treated with Ferrinject 1g over 50 mins in medical day unit

- Admitted to hospital with dizziness and severe headache

• Phosphate	0.3umol/L	↓ very low	(0.8-1.4)

- Sodium Glycerophosphate 21.6% (20mmol vials) 20mmol diluted in 500mL 5% glucose to be given over 12 hours. based on patient weight of 82 kg.

CASE 2 – 59F

- Background: Sleeve gastrectomy 18 years ago followed by 2nd stage duodenal switch
  - Oteoarthritis, osteopenia, asthma, secondary hyperparathyroidism, hypovitaminosis D.
- Presenting complaint: low energy levels and metallic taste in the mouth, slight weight gain
- Initial weight: 190 kg BMI 70.6 kg/m2
- Lowest weight: 85.9kg BMI 31.55 kg/m2 55% total weight loss
- Current weight: 90.3kg BMI 34.0 kg/m2 52% total weight loss (5.1% weight gain)

- Medication: 300,000 IU vitamin D2 injection and Vitamin B12 injection 8 weekly, vitamin D20,000 IU one per day, centrum multivitamin 2 per day, Folic acid 5 mg three per day, Iron tablets 4 per day, vit A 2 per day, Adcal D3

INVESTIGATIONS

Vitamin D	90 nmol/L	normal	
Parathyroid hormone (PTH)	17.2 pmol/L	↑	(1.6 - 7.2)
Calcium (adjusted)	2.16	↓	(2.2-2.6)
B12	510 nanogram/L	normal	(200-1000)
Folate	4 ug/L	normal	(4-18)
Copper	15.5 umol/L	normal	(12.6 - 24.3)
Zinc	7.6umol/L	↓	(11-19)
Selenium	112 ug/L	normal	(65-150)
Iron	4 umol/L	↓	(12-28)
Ferritin	7 ug/L	↓	(9-120)
Hb	101 g/L	↓	(115-165)
Thyroid stimulating hormone (TSH)	1.8 mu/L	normal	(0.3-5.0)
Thyroxine T4	11.4 pmol/L	normal	(9-19)
DEXA Scan	osteoporosis in R femur		

TREATMENT OF IRON DEFICIENCY

• Ferritin	6 ug/L	↓	(9-120)
• Iron	6 umol/L	↑	(12-28)

- Treated with Ferrinject 1g over 50 mins in medical day unit

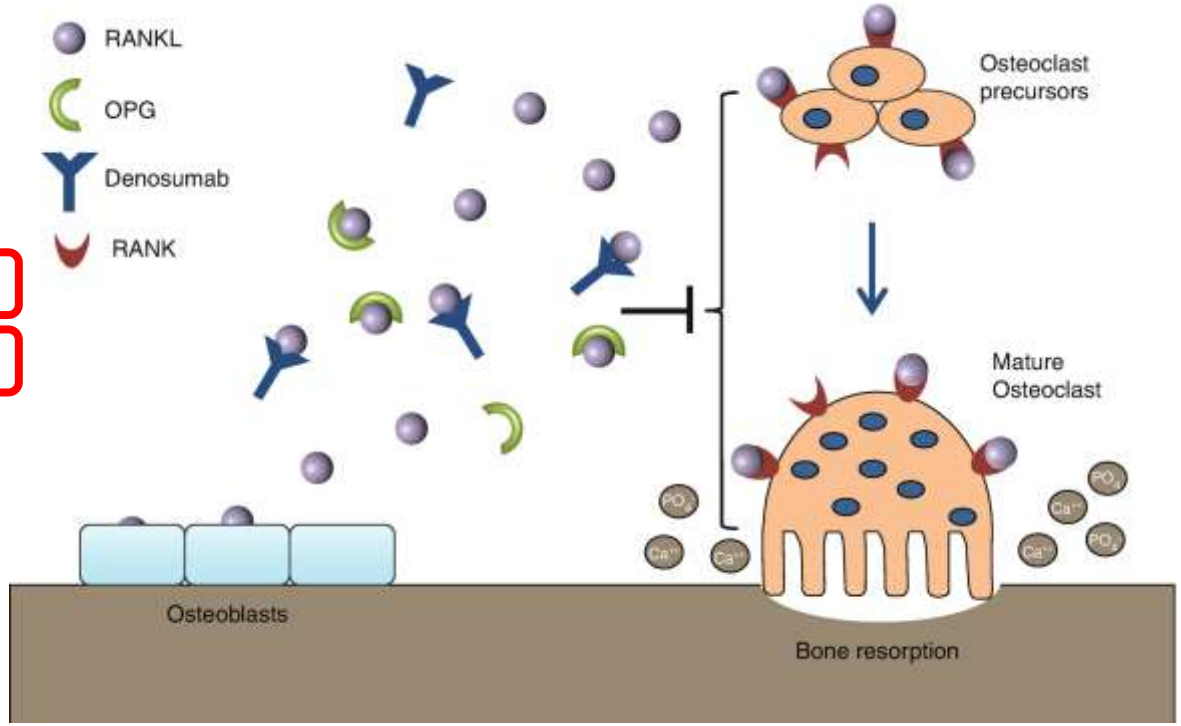
- Not symptomatic

• Phosphate	0.69 umol/L	↓	(0.8-1.4)

MANAGEMENT OF OSTEOPOROSIS

- DESONUMAB INJECTION RESULTED IN:
- Calcium (adjusted) 2.09 ↓ (2.2-2.6)
- Phosphate 0.78 umol/L ↓ (0.8-1.4)
- Required inpatient calcium and phosphate infusion

- Patent's symptoms of tiredness improved with higher energy levels; resulting in greater ability to engage with treatment and weight loss.

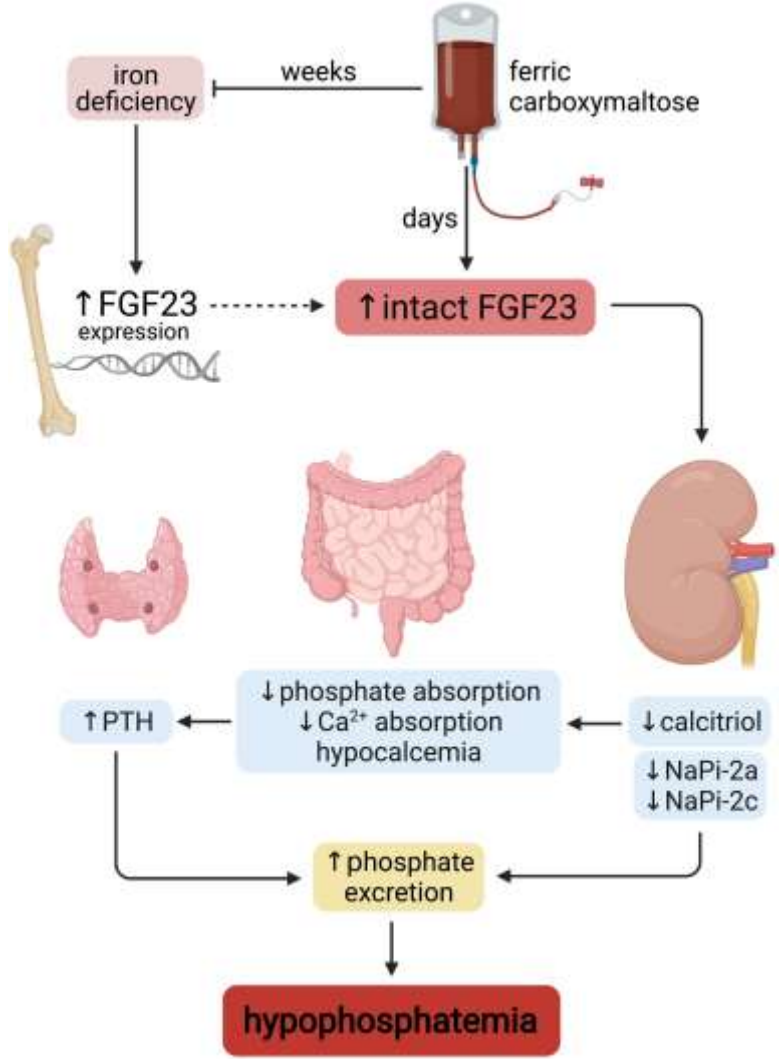


By binding to RANKL, the principal regulator of osteoclastic bone resorption, denosumab reduces osteoclast differentiation, activity, and survival.

Lewiecki, E.M. (2020). Denosumab: Mechanisms and Therapeutic Effects in the Treatment of Osteoporosis. In: Leder, B., Wein, M. (eds) Osteoporosis. Contemporary Endocrinology. Humana, Cham. https://doi.org/10.1007/978-3-319-69287-6_15

RECOGNISING IRON INFUSION -RELATED HYPOPHOSPHATAEMIA

- Symptoms of iron-induced hypophosphatemia may present as weakness,, fatigue, shortness of breath, and respiratory failure, as well as symptomatic musculoskeletal complaints, osteomalacia, evidence of fracture,.
  - However, the majority of cases are asymptomatic
- The diagnosis of hypophosphatemia is complicated since many of these symptoms mimic the symptoms of iron-deficiency anemia.
- Involvement of specialist Chemical Pathologists are indicated in order to consider these rare complications.



Schaefer, B., Tobiasch, M., Wagner, S., Glodny, B., Tilg, H., Wolf, M., & Zoller, H. (2022). Hypophosphatemia after intravenous iron therapy: Comprehensive review of clinical findings and recommendations for management. *Bone*, *154*, 116202.

CONCLUSIONS

- One should have a high index of suspicion for unusual causes of extreme tiredness leading to weight gain and other comorbidities following bariatric surgery; this should be managed by timely referral to a Bariatric specialist unit.
- In the case of iron deficiency anaemia treated with iron infusions, watch out for hypophosphataemia