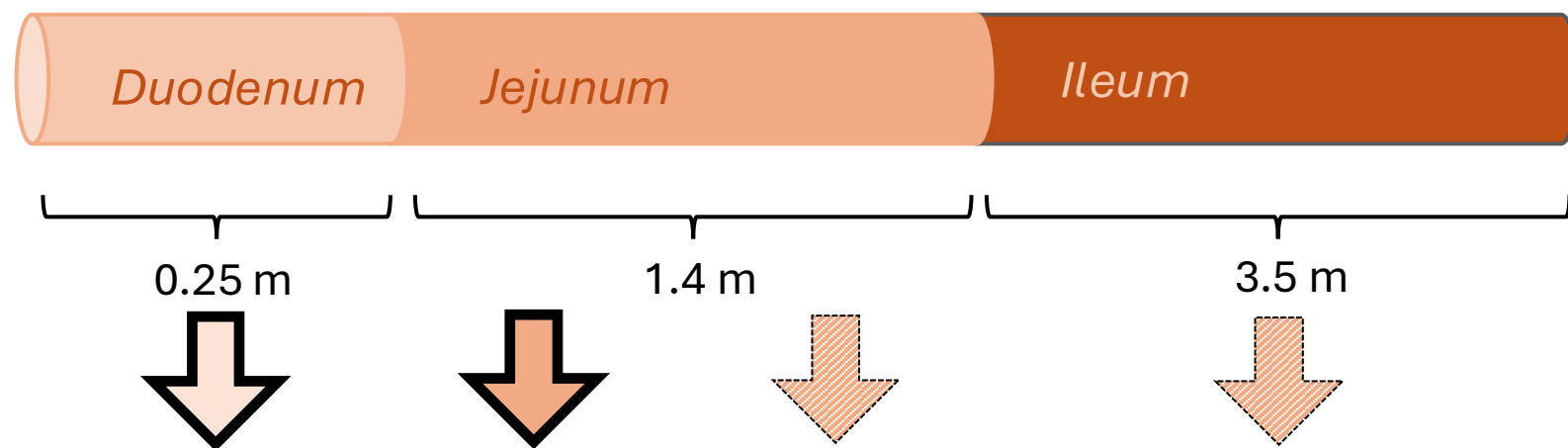


Handläggning av förhöjda PTH-värden

Ville Wallenius

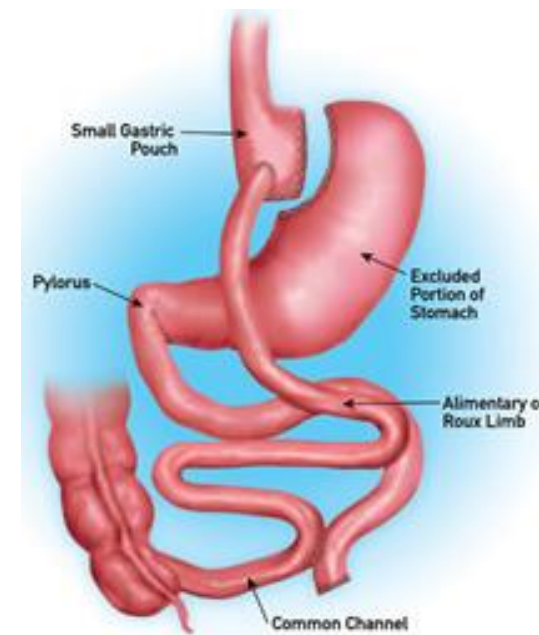
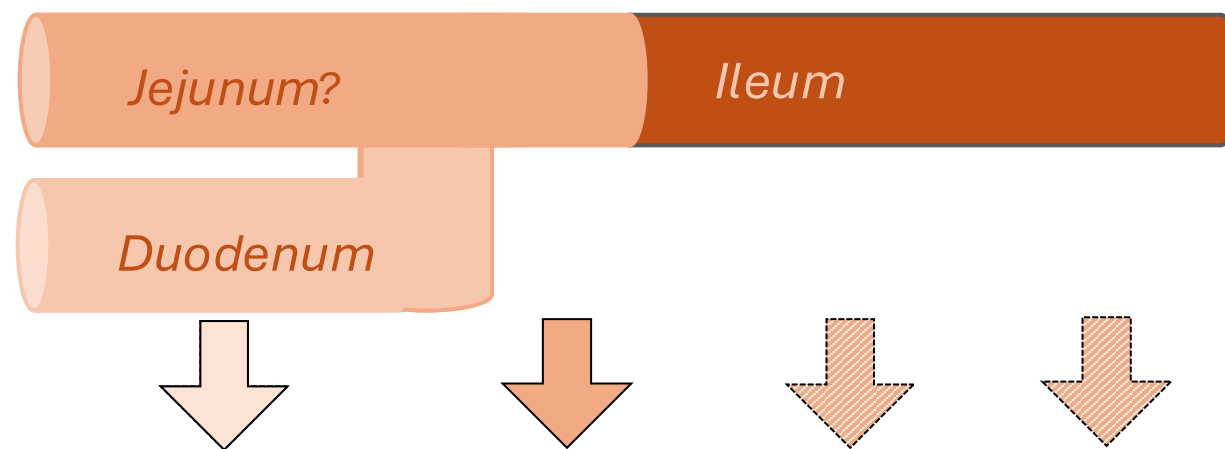
Adj professor, universitetssjukhusöverläkare
Kirurgi, Sahlgrenska Universitetssjukhuset Östra
Göteborg

Kalcium & D-vitamin-upptag i tunntarmen

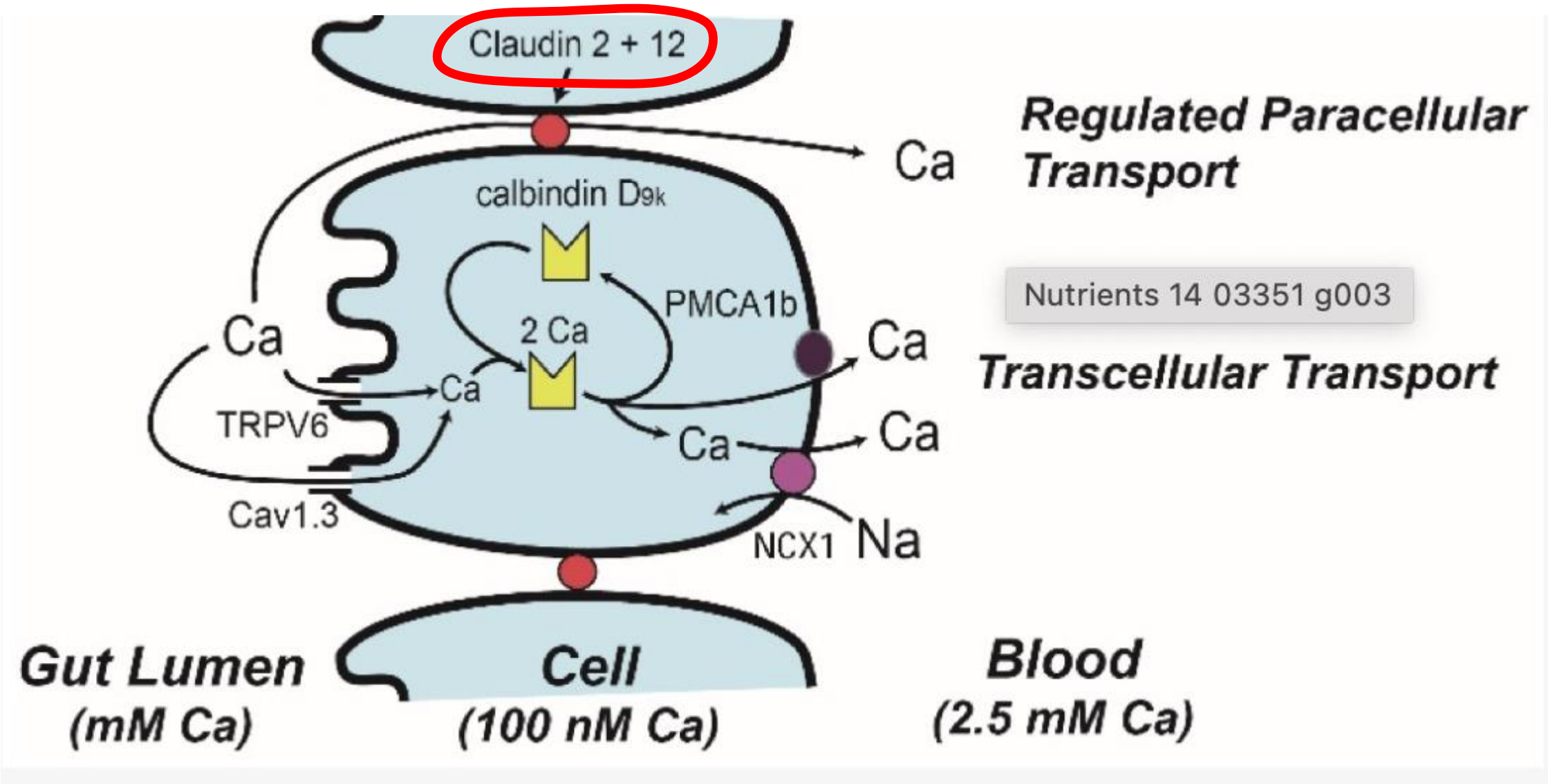


- **Aktiv** D-vitamininducerad kalciumtransport i duodenum och proximala jejunum
- **Duodenum och jejunum** speciellt aktiva i kalciumupptaget
- Aktiv transport står dock normalt för den mindre delen av upptaget (~ 10%)
- **Den passiva transporten i nedre magtarmkanalen står för merparten (~ 90%)**

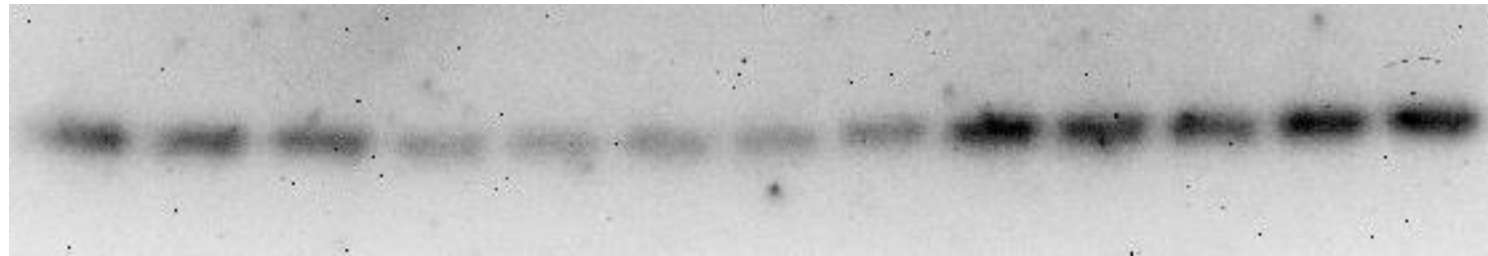
Kalcium & D-vitamin



- Duodenum urkopplad – inget upptag
- Det aktiva D-vitamininducerade kalciumupptaget i jejunum minskar
- Kan ökad *passiv* transport i distala t-tarmen kompensera fullt ut för minskad *aktiv* transport?



Claudin-2 →



Vit-D **low-dose**
+ Vehicle

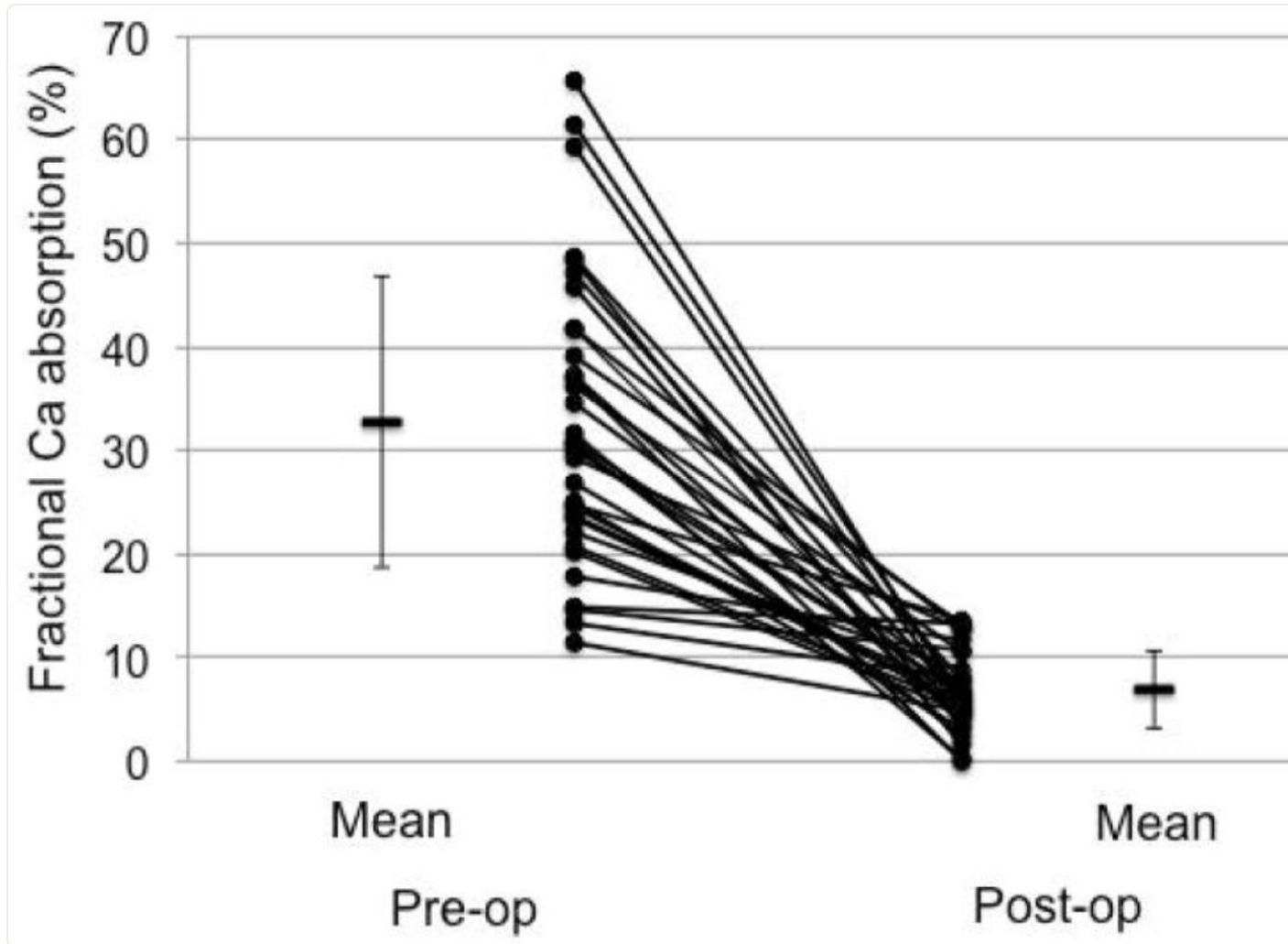
Vit-D **high-dose**
+ Hsp90β-inhibitor

Vitamin-D **high-dose**
+ Vehicle

- Vitamin D-receptors (VDR) aktivitet regleras av Hsp90 β
- Hsp90β nedregleras i Roux-slyngan pga avsaknad av galla och fettsyror
- Claudin 2 regleras av vitamin D!
- **Även den *passiva* transporten är D-vitaminreglerad**

Casselbrant A, *et al.* Bone Rep. 2020

Kalciumupptag efter GBP



- Vitamin D median 41 ng/mL 6 mån post-op
- FCA minskar från 32.7 till 6.9 = **79%**
- Benresorptionsmarkörer Ökade
- FCA korrelerade med CTX

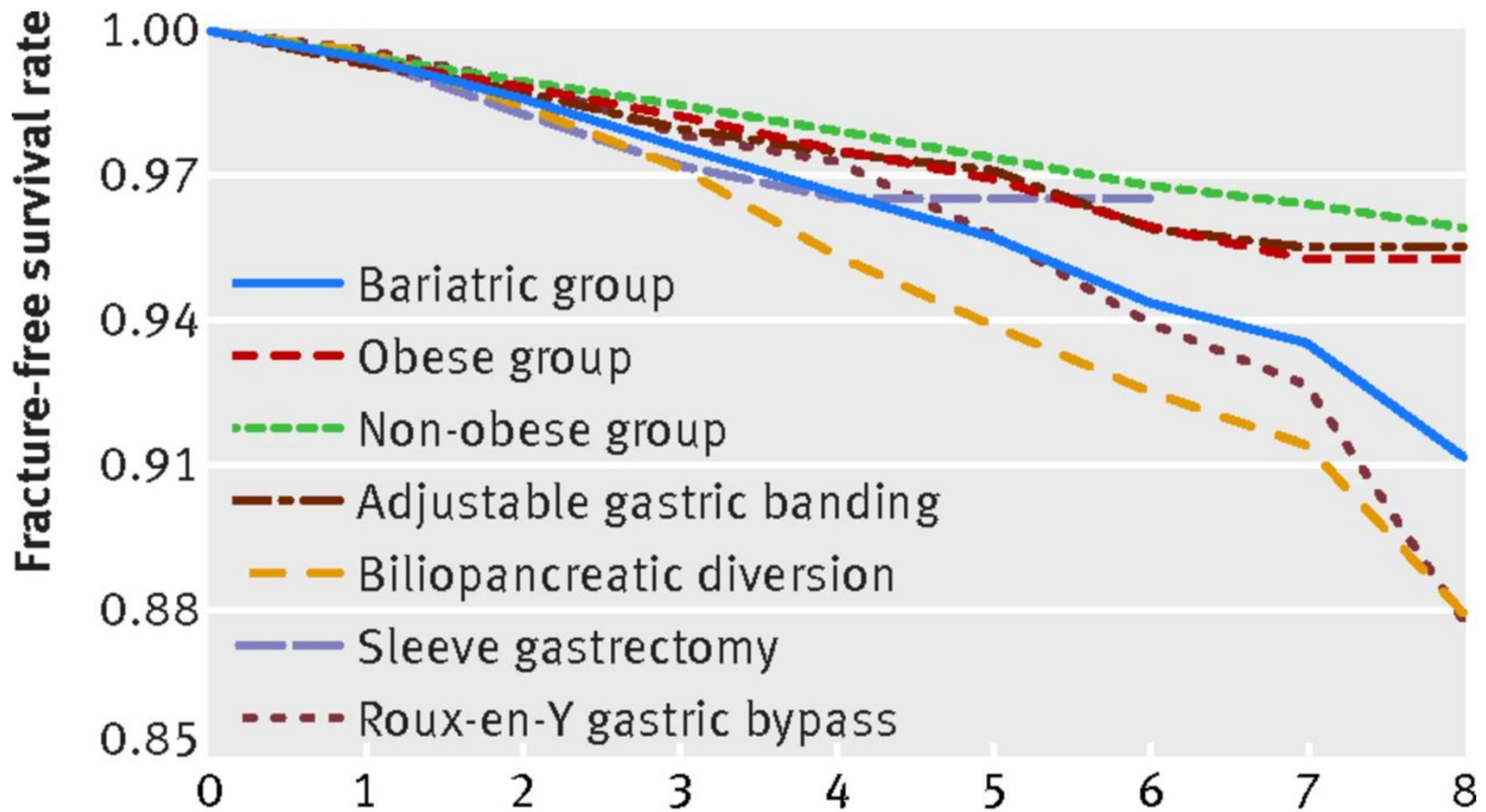


Fig 4 Non-adjusted fracture-free survival rate (all fractures) by group and by type of bariatric procedure (for period between 2006 and 2014). Although fracture-free survival rate appears similar in adjustable gastric banding group to non-obese and obese groups, it is decreasing more rapidly in biliopancreatic diversion and Roux-en-Y gastric bypass groups. Follow-up time for sleeve gastrectomy is too short to draw conclusions

thebmj

Change in fracture risk and fracture pattern after bariatric surgery: nested case-control study

BMJ 2016 ; 354 doi: <https://doi.org/10.1136/bmj.i3794> (Published 27 July 2016)

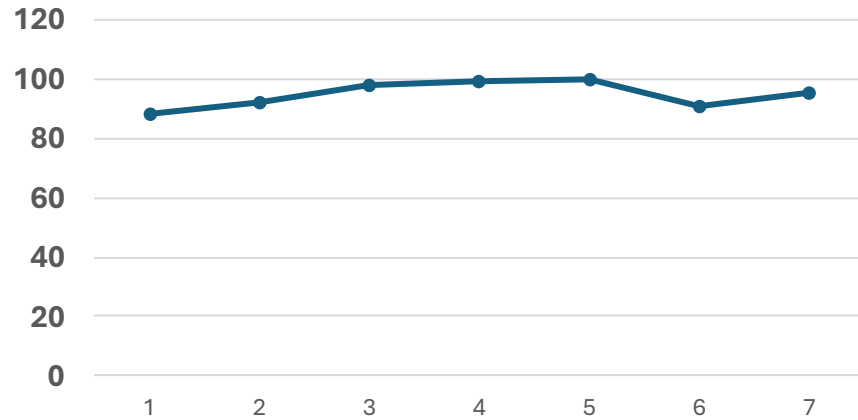
Cite this as: BMJ 2016;354:i3794

Catherine Rousseau, MSc student^{1 2}, Sonia Jean, PhD researcher^{2 3}, Philippe Gamache, statistician³, Stéphanie Lebel, bariatric surgeon⁴, Fabrice Mac-Way, assistant professor^{1 2}, Laurent Biertho, bariatric surgeon⁴, Laëtizia Michou, associate professor^{1 2 5}, Claudia Gagnon, assistant professor^{1 2 5}

Participants 12 676 patients who underwent bariatric surgery, age and sex matched with 38 028 obese and 126 760 non-obese controls.

Patientfall: GBP-opererad patient

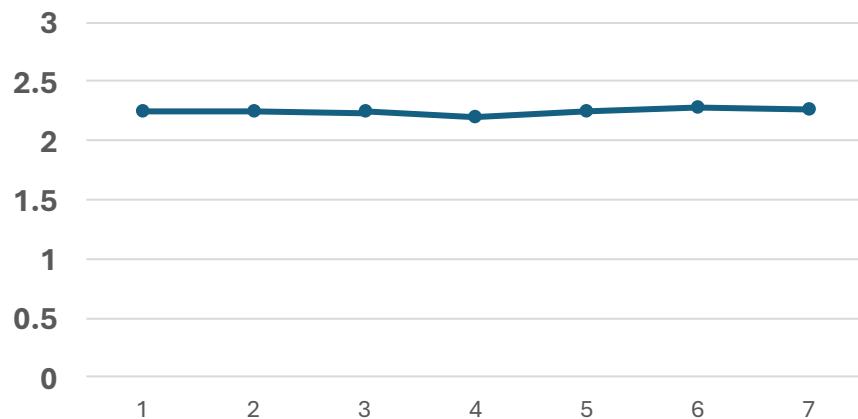
S-25-OH-vitamin D



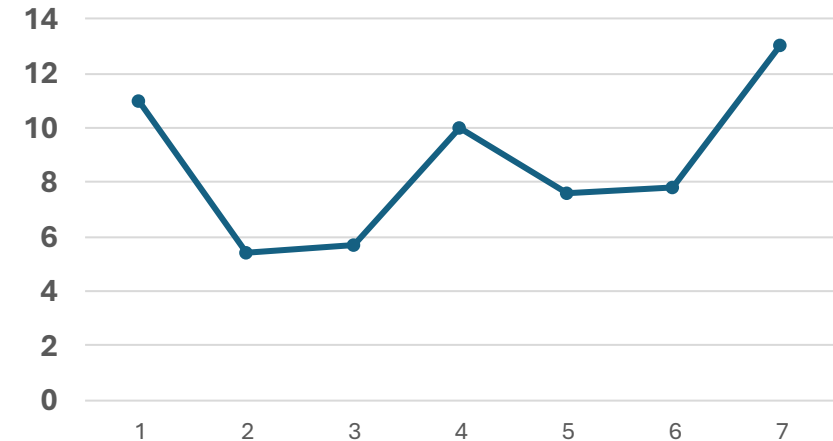
April

Nov

P-calcium (mmol/L)



PTH

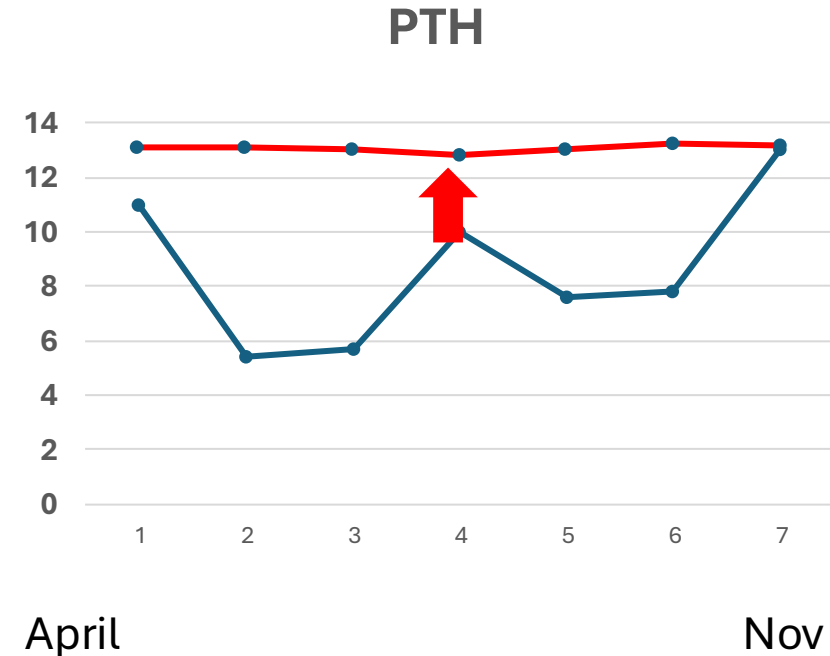
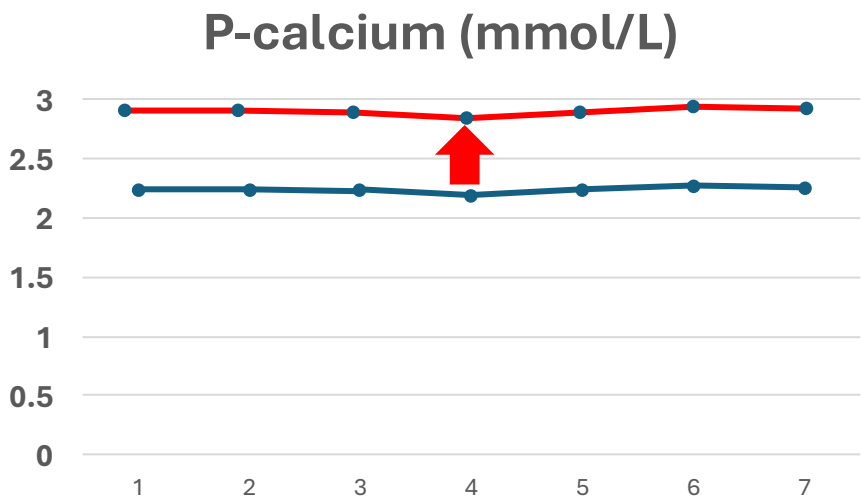
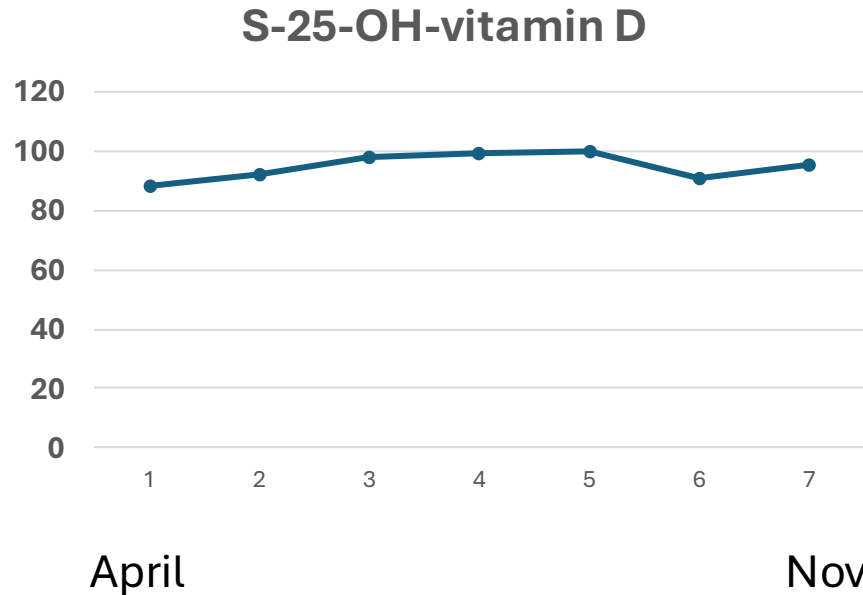


April

Nov

- **Exempel på bild hos en verklig GBP patient över tid**
- **PTH kan ibland variera trots stabila bra värden på vita D och kalcium**

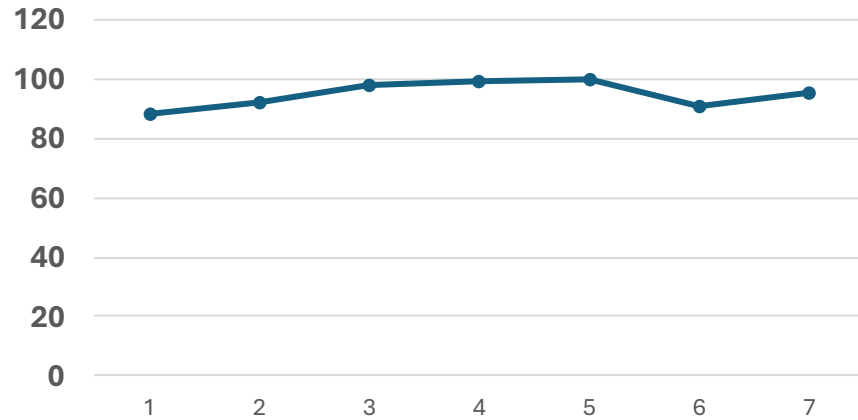
Hur tolka PTH-värden?



- Om samtidigt ↑ kalcium och normalt vitamin D
- Primär hyperpara!
- Remiss till endokrinkirurg

Hur tolka PTH-värden?

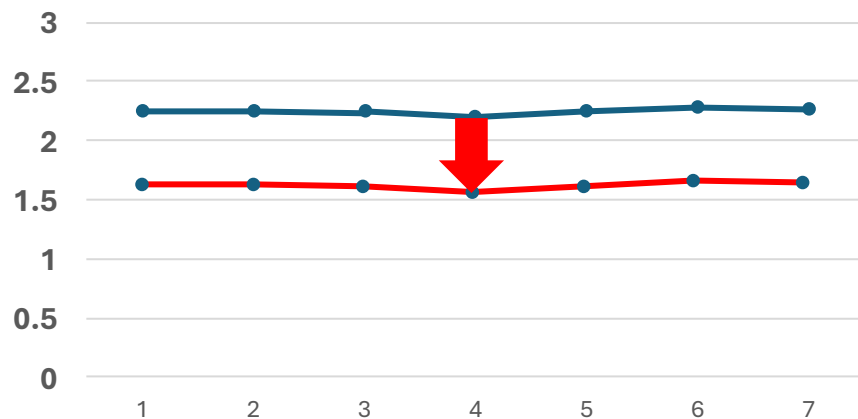
S-25-OH-vitamin D



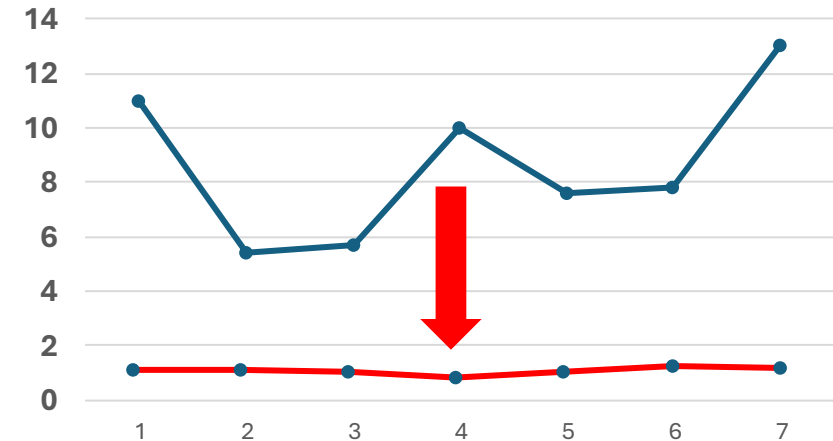
April

Nov

P-calcium (mmol/L)



PTH



April

Nov

- **GBP op pat som op för hypopara med lågt PTH**
- **Kan ibland ge svårbehandlad hypokalcemi**

ORIGINAL ARTICLE

Hypoparathyroidism after total thyroidectomy in patients with previous gastric bypass

Raoul A. Drosler¹ · Johan Ottosson² · Andreas Muth³ · Hella Hultin⁴ · Karin Lindwall-Åhlander⁵ · Anders Bergenfelz⁶ · Martin Almquist^{6,7}

”**Case reports** suggest that patients with previous gastric bypass have an increased risk of severe hypocalcemia after total thyroidectomy”

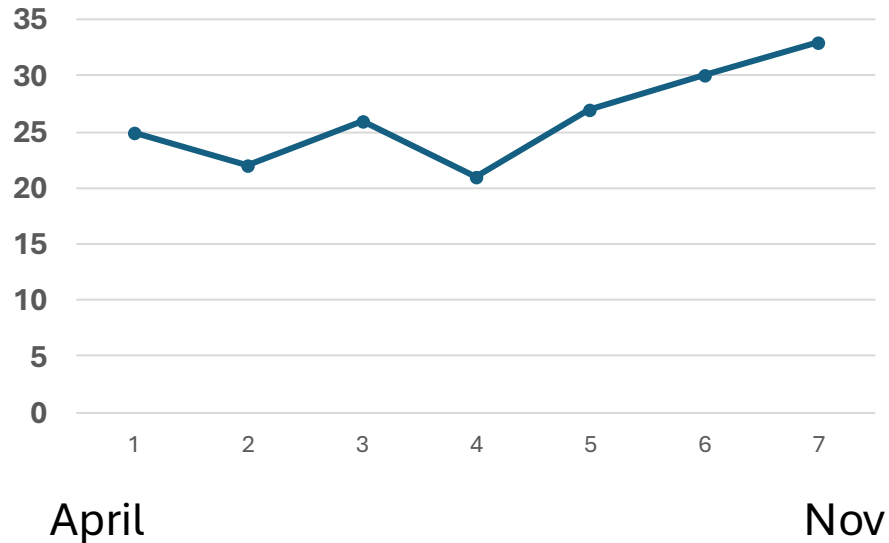
➤ 6115 patients, 25 GBP

Conclusion

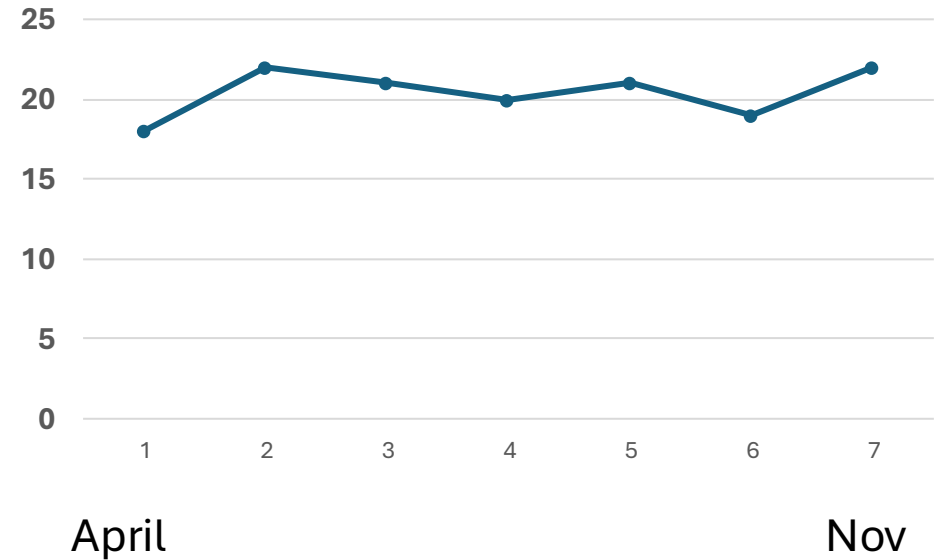
Previous gastric bypass surgery was infrequent in patients undergoing total thyroidectomy and was not associated with an increased risk of postoperative hypocalcemia.

Hur tolka PTH-värden?

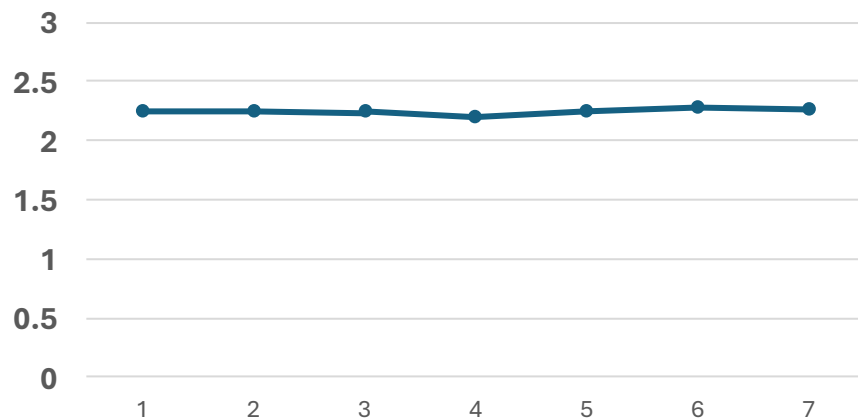
S-25-OH-vitamin D



PTH

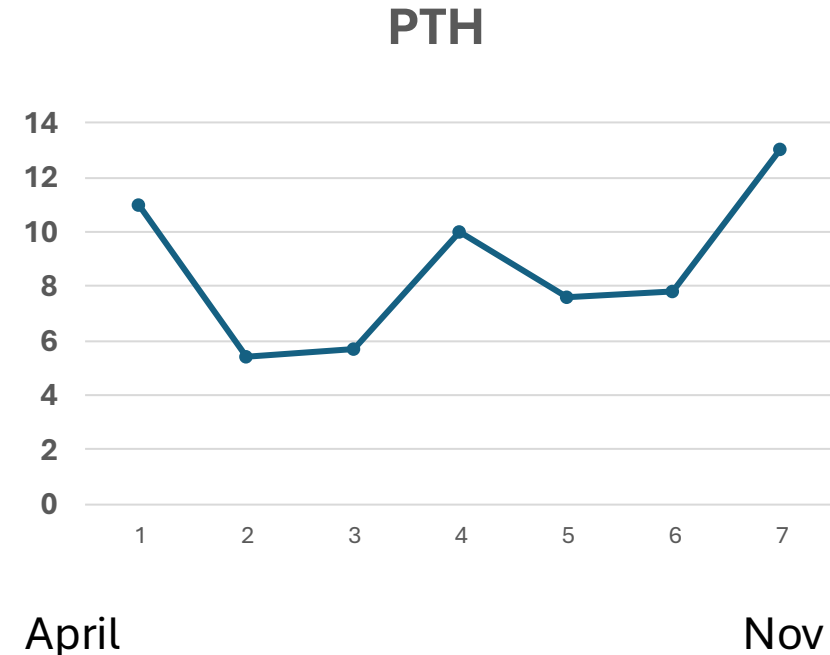
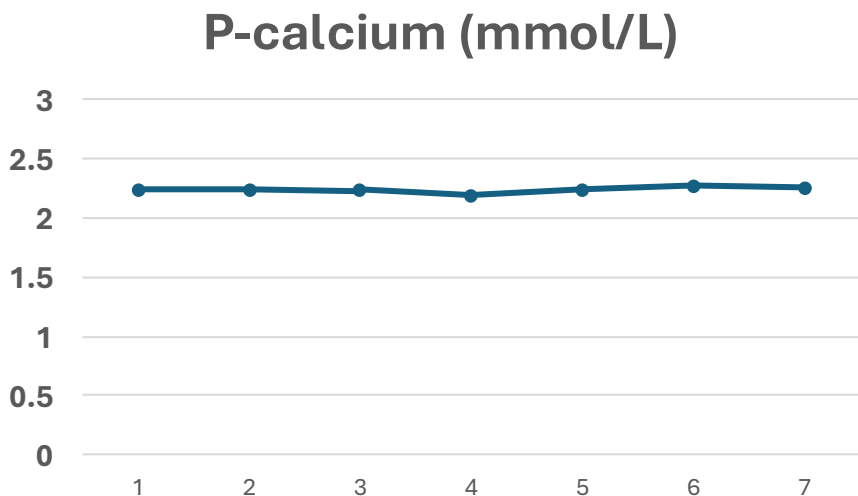
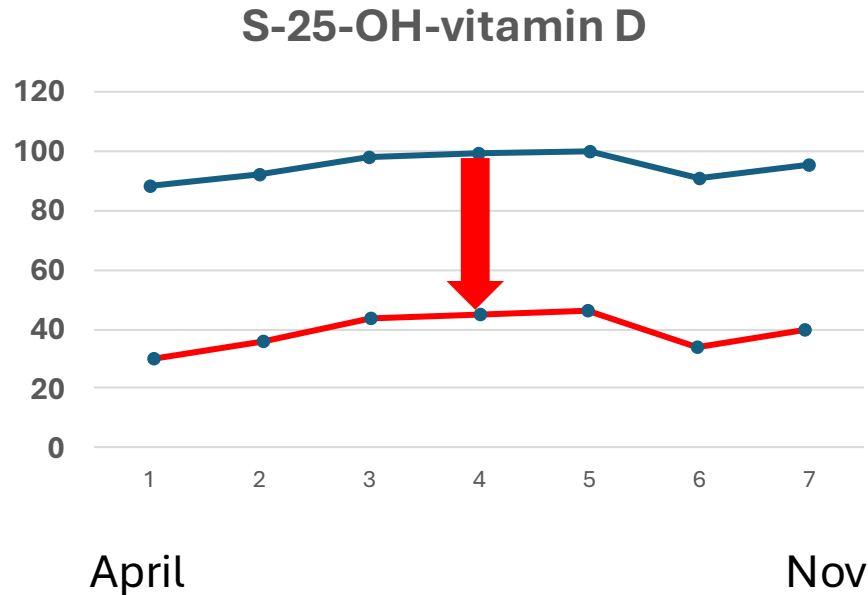


P-calcium (mmol/L)

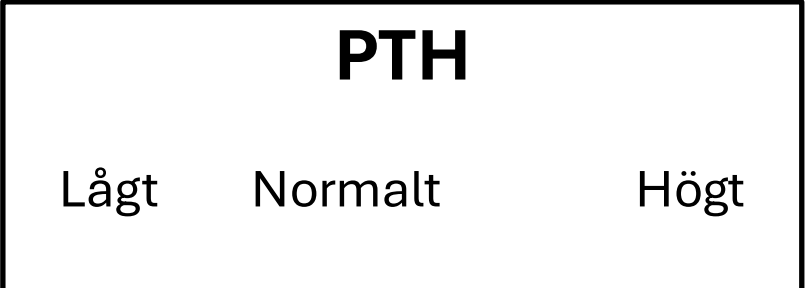
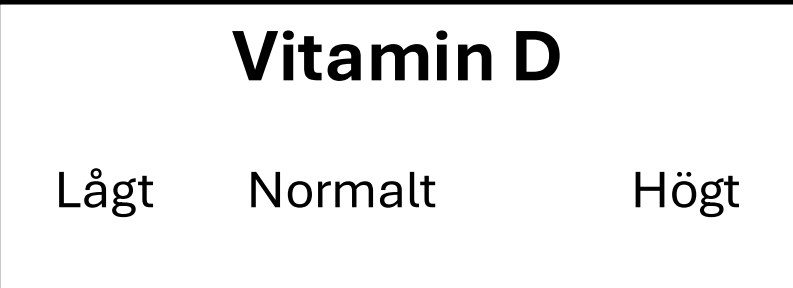
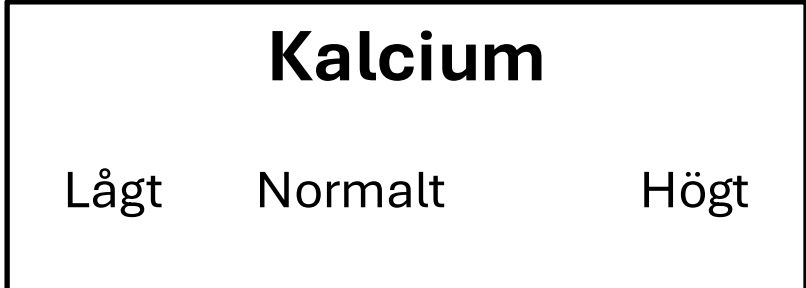


- **Högt PTH men normalt p-kalcium**
- **PTH går inte att få ner trots höga vitamin-D doser**
- **”Normal” bild för duodenal switch-opererad patient**

Hur handlägga förhöjda PTH-värden?



- **GBP pat med högt PTH men normalt P-calcium?**
- **Höj vitamin D-dos! Vitamin D får gärna ligga mellan 75 och 100**
- **Man vill ha PTH ner inom normal-intervallet**



**Vitamin D-brist
-GBP & BPD-DS**

Hypoparathyroidism

**Primär
hyperparathyroidism**

Ny rekommendation kalcium - vitamin D

- Kalcipos D forte 3 tabletter per dag eller motsvarande (kalcium 1500 mg + vit D 2400 IE)
- Om ändå lågt vitamin D – lägg till Detremin eller Divisun tills pat kommer upp i önskvärd nivå (ofta inte möjligt med BPD-DS)
- Kan vitamin D bli för högt?
 - Önskvärt 75-125 nmol/L
 - Övre säker gräns 250 nmol/L
 - Potentiellt toxiskt över 375 nmol/L – ffa genom hyperkalcemi


Kan GBP patienter behandlas med anti-resorptiva preparat?

- Bisfosfonater – i första hand iv om vitamin D normalt
 - Måste monitoreras noga – risk för hypokalcemi
- Denosumab (Prolia) – monoklonal ak mot RANKL – hämmar osteoclaster
 - Saknas än så länge data på GBP-op patienter
 - Risk för hypokalcemi



Case report | [Open access](#) | Published: 02 March 2023

Denosumab-induced hypocalcemia post bariatric surgery—a severe and protracted course: a case report

[Mohd Hazriq Awang](#), [Sharifah Faradila Wan Muhamad Hatta](#) , [Aimi Fadilah Mohamad](#) & [Rohana Abdul Ghani](#)