# 76 year-old female presents with muscle cramps

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12/6/12

# HPI

- Worked up for outpatient hypercalcemia
- Calcium had been 10.3-11.1, PTH ~120
- No h/o osteoporosis, CKD, kidney stones
- Not taking calcium supplements
- Sestamibi scan: no evidence of parathyroid adenoma
- Diagnosed w/hyperparathyroidism secondary to a parathyroid adenoma

# More history

Past Medical
- HTN
- Dyslipidemia
- Asthma
- Hyperparathyroidism

Family
- Father- TB @ 36
- Mother- CHF

Social
- No tobacco
- No EtOH

Medications
- ASA 81mg daily
- Losartan 50mg daily
- Vitamin D 2000 IU

# Referred for parathyroidectomy

- Immediate pre-op sestamibi scan: re-demonstrated no evidence of parathyroid adenoma.
- Pre-op notes: probable location of the parathyroid adenoma was in the R inferior quadrant.

# Surgery

- Neck exploration of the R inferior region- R inferior parathyroidectomy
- “Attention was directed to the L side where the pre-op studies indicated a probable adenoma. Dissection was carried out on the R inferior thyroid surrounding tissue in addition to the L side.”

# Post-op course

- POD # 0, extubated but suffered acute respiratory failure
- Required tracheostomy placement for B vocal cord paralysis
- G-tube placed
- R inferior parathyroid pathology- abnormal parathyroid tissue consistent w/parathyroid adenoma

# Physical Exam

Vitals: 36.3, 127/71, 70, 16, 98% trach collar
Gen: no apparent distress
HEENT: hearing aids
Neck: tracheostomy
CV: RRR, no murmurs
Pulm: clear bilaterally
GI: g-tube, soft non-tender
MSK: normal ROM joints
Neuro: alert and oriented, normal reflexes
No Chvostek or Trousseau's Sign

# Labs

| | | |
|---|---|---|
| 141 | 98 | 16 |
| 4.1 | 34 | 0.6 |

96

6.4

4.1

1.7

9.9

7.8 275

30

| | |
|---|---|
| 7.0 | 3.7 |
| 0.3 | 57 |
| 31 | 29 |

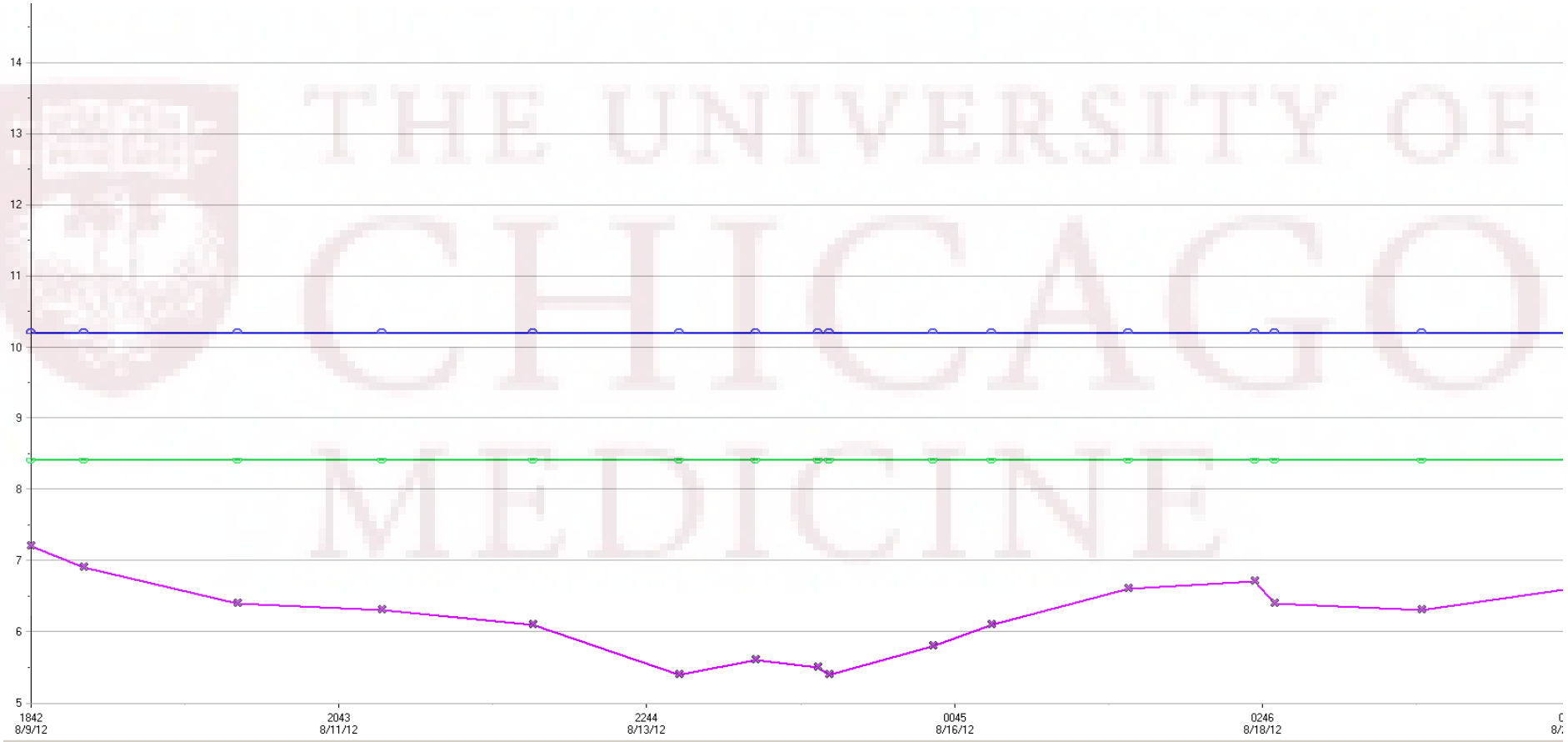
PTH 6 (15-75)

Ionized calcium 3.28 (4.6-5.4)

25-OH vitamin D 40

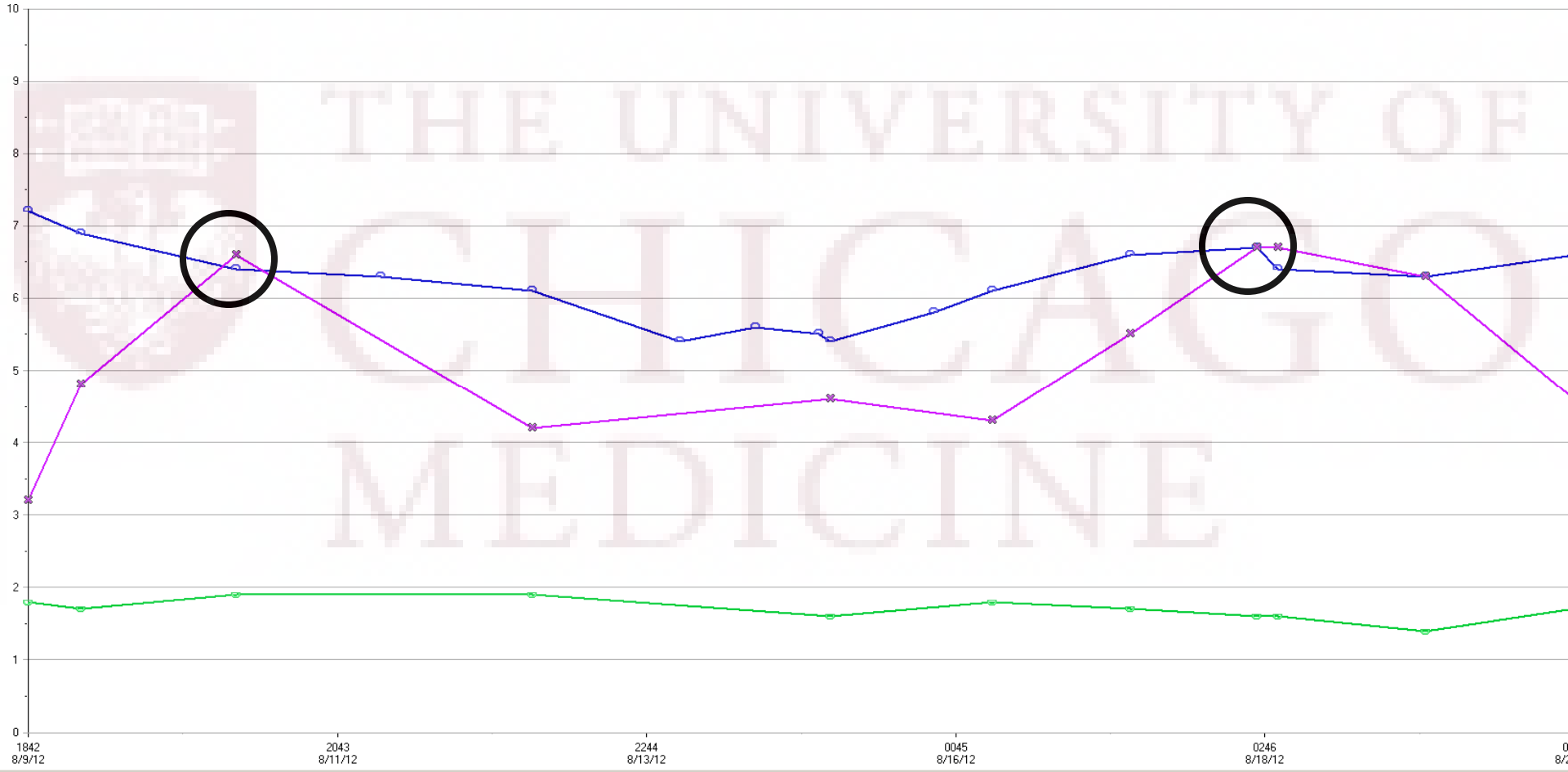
1,25-OH vitamin D 27

# 1st admission: Calcium trend



# Calcium/Phospate/Magnesium

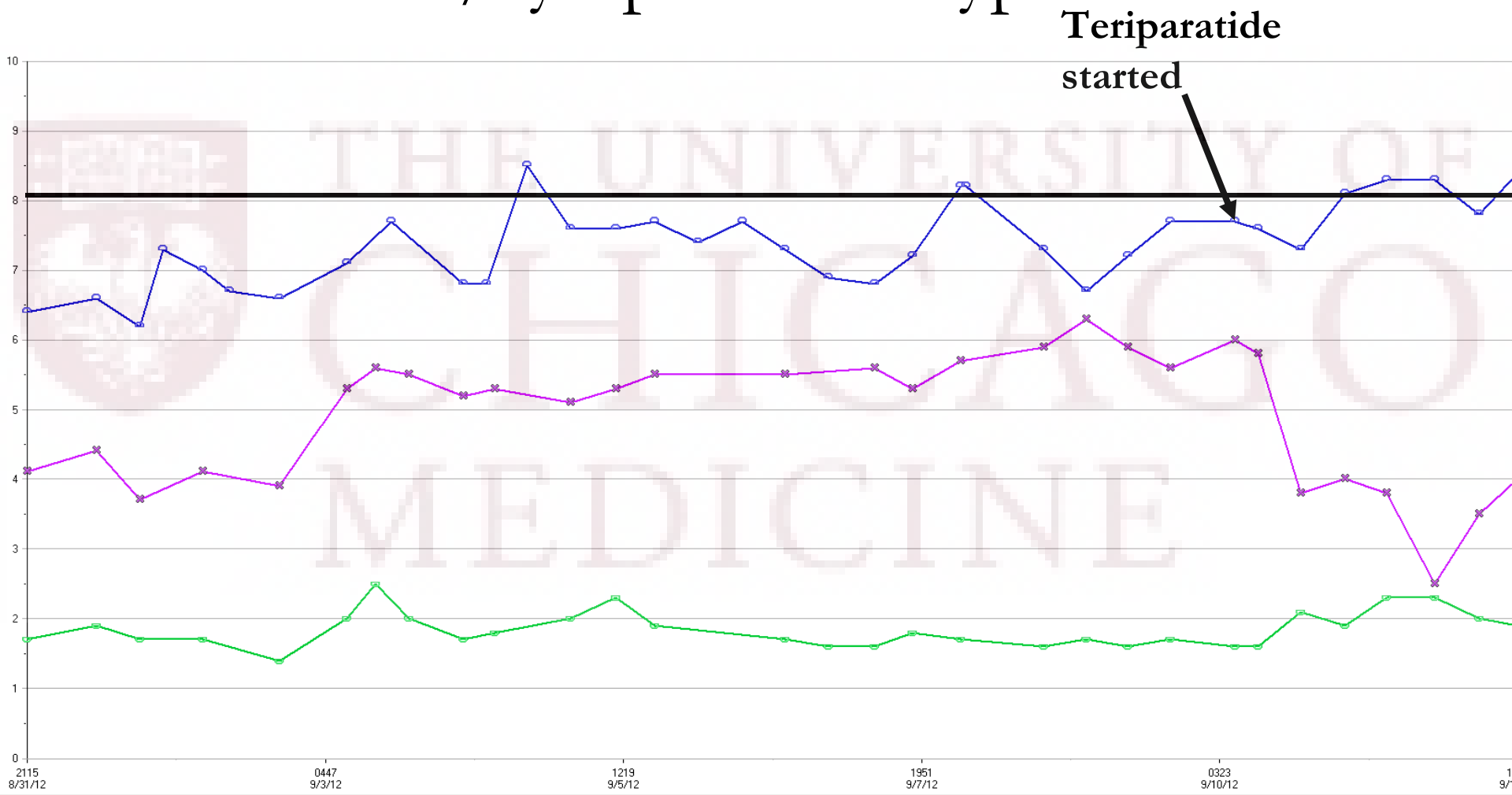
## Electrolyte trend in MICU




From MICU, was only discharged home on Calcium Acetate, no calcitriol

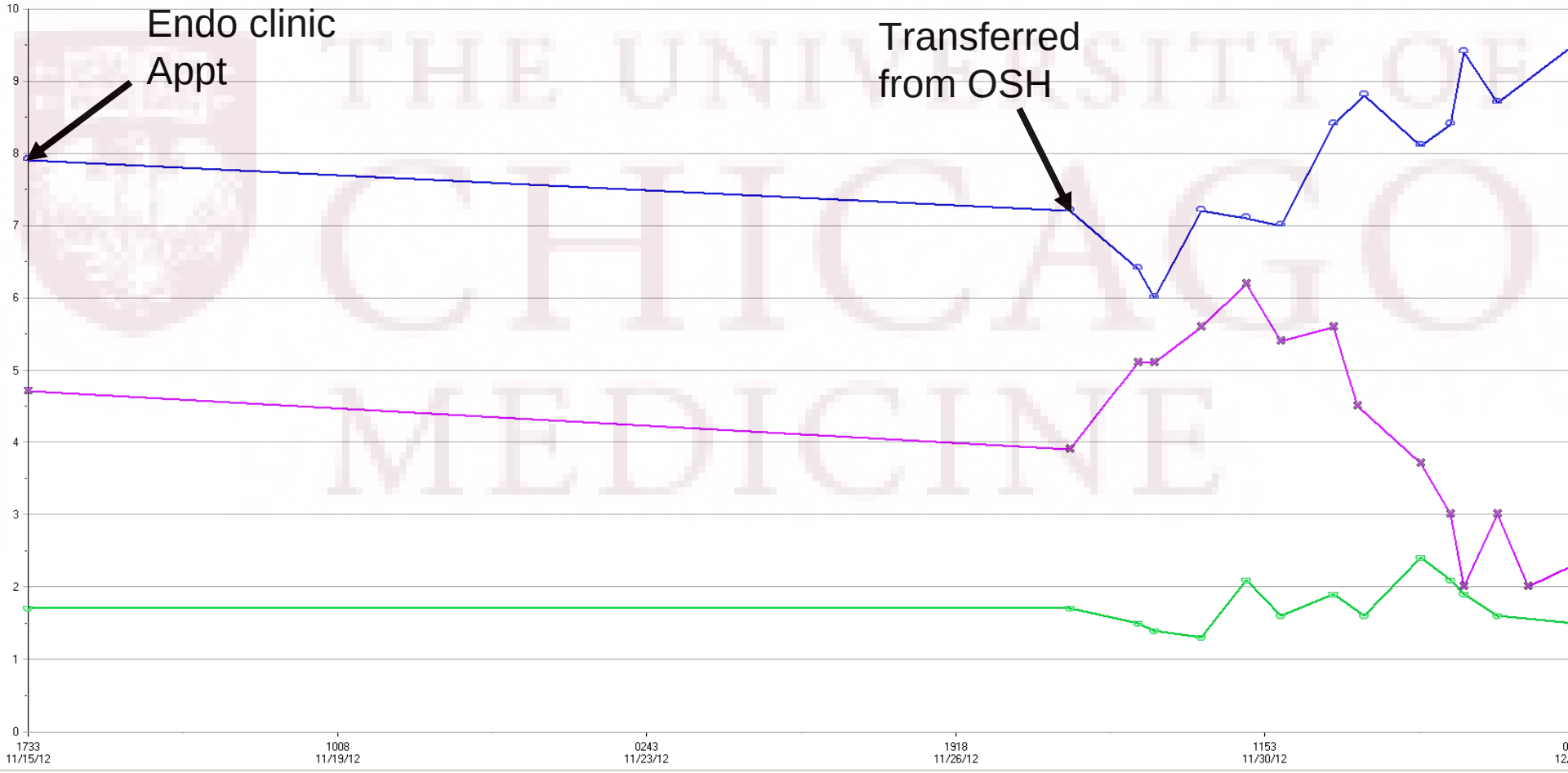
# Calcium/Phospate/Magnesium

## Admitted w/symptomatic hypocalcemia




Required IV calcium gluconate up to 8 gm/day. Discharged to rehab on Teriparatide

# Calcium/Phospate/Magnesium



# Hypocalcemia

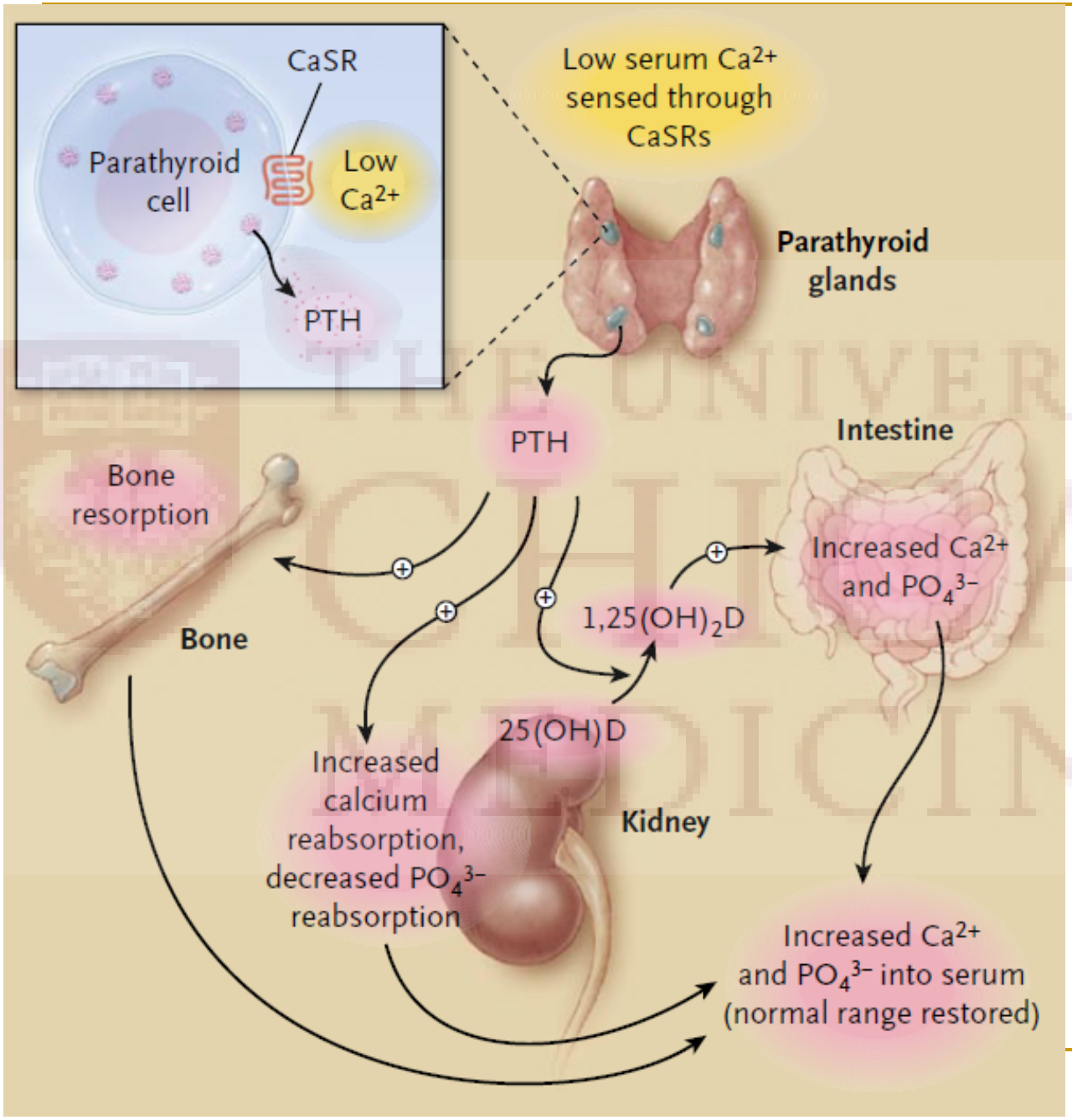
- Gen: altered mental status
- HEENT: premature cataracts
- CV: prolonged QT, CHF
- Pulm: bronchospasm
- Neuro: basal ganglia calcificcations, paresthesias, seizure
- MSK: muscle twitching, cramps

# Post-surgical hypoparathyroidism

- Transient hypoparathyroidism occurs in 10% patients who undergo total thyroidectomy.
- Permanent hypoparathyroidism occurs in <5% of patients who undergo total thyroidectomy.
- Risk of hypoparathyroidism after initial surgery for primary hyperparathyroidism is <1% but increases to up to 30% after successive surgeries.

# Clinical Questions

- Goals of therapy in hypoparathyroidism?
- Using PTH for refractory cases?
- Effect of PTH on bone in hypoparathyroidism?
- Hypoparathyroidism in patients G-tube?




## PTH effect on:

| | Ca | Phos |
|---|---|---|
| **Kidney** | ↑ | ↓ |
| **Bone** | ↑ | ↑ |
| **Gut** | ↑ | ↑ |

Shoback D. NEJM 2008;259(4):391-393.

| Treatment | Preparations available/dosing | Notes |
|---|---|---|
| **Parenteral calcium supplements** | | |
| 10% calcium gluconate | 10-mL ampules (94 mg elemental calcium); 1-2 ampules intravenously diluted in 100-200 mL of 5% dextrose or normal saline, infused over 1-2 hours | Duration of effect, 2-3 hours |
| Calcium gluconate drip | 10-mL ampules (94 mg elemental calcium); 10 ampules diluted in 1 L 5% dextrose solution. Initially infused at 50 mL/h (or 1-3 mg/kg per h) and adjusted to maintain a corrected serum calcium ≥8.0 mg/dL | … |
| **Oral calcium supplements** | | |
| Calcium salts | Starting dose of elemental calcium, 2 g orally 3 times daily | … |
| Calcium carbonate | Calcium content, 400 mg/g; liquid form, 500 mg elemental calcium/5 mL | Gastrointestinal adverse effects, including constipation, are common |
| Calcium citrate | Calcium content 211 mg/g | Used in patients with achlorhydria or gastrointestinal intolerance of calcium carbonate |
| **Vitamin D supplements** | | |
| Calcitriol | 0.25 mcg, 0.5 mcg; liquid, 1 mcg/mL; starting dosage, 0.5 mcg orally 3 times daily | Maximum effect, 10 hours; duration of action, 2-3 days |
| Ergocalciferol | 50 000 IU; liquid, 8000 IU/mL; 25 000-100 000 IU orally weekly | Onset of action, 10-14 days; duration of action, 14-75 days |
| Cholecalciferol | 400, 800, 1000, or 2000 IU; 25 000-100 000 IU orally daily | … |

Khan MI et al. Endo Practice 2011;17(1):18-25.

# Treatment goals

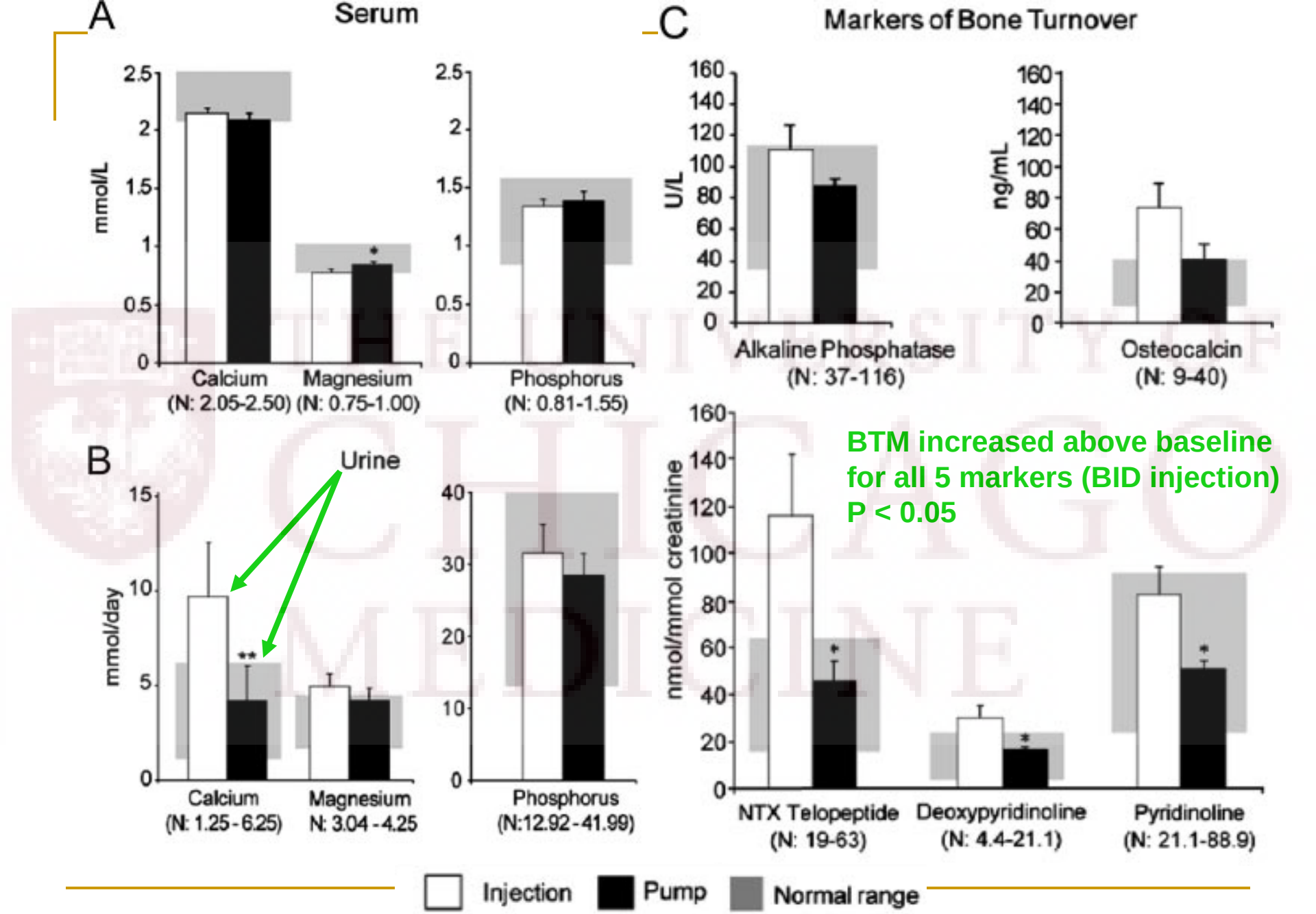
- Serum calcium 8.0-8.5 mg/dL
  - Calcium, calcitriol
- 24h urine calcium < 250-300 mg
  - Thiazides
- Calcium-Phosphate product < 55 mg/dL
  - Low phos diet, Phos binder

# PTH replacement

- PTH 1-34 BID
- PTH 1-84
- Subcutaneous infusion PTH 1-34

# PTH 1-34 BID vs SC infusion

- Winer et al. JCEM 2012.
- Randomized crossover trial lasting 6 months.
- N = 8 patients, ~on calcitriol 0.6 mcg/d, calcium supplementation 3100 mg/d, cholecalciferol 1000 IU/d and magnesium 578 mg/d
- Results: 50% reduction urine calcium, better maintenance of magnesium and normalized bone turnover markers with pump
- Conclusion: pump delivery of PTH 1,34 provides most physiologic replacement therapy



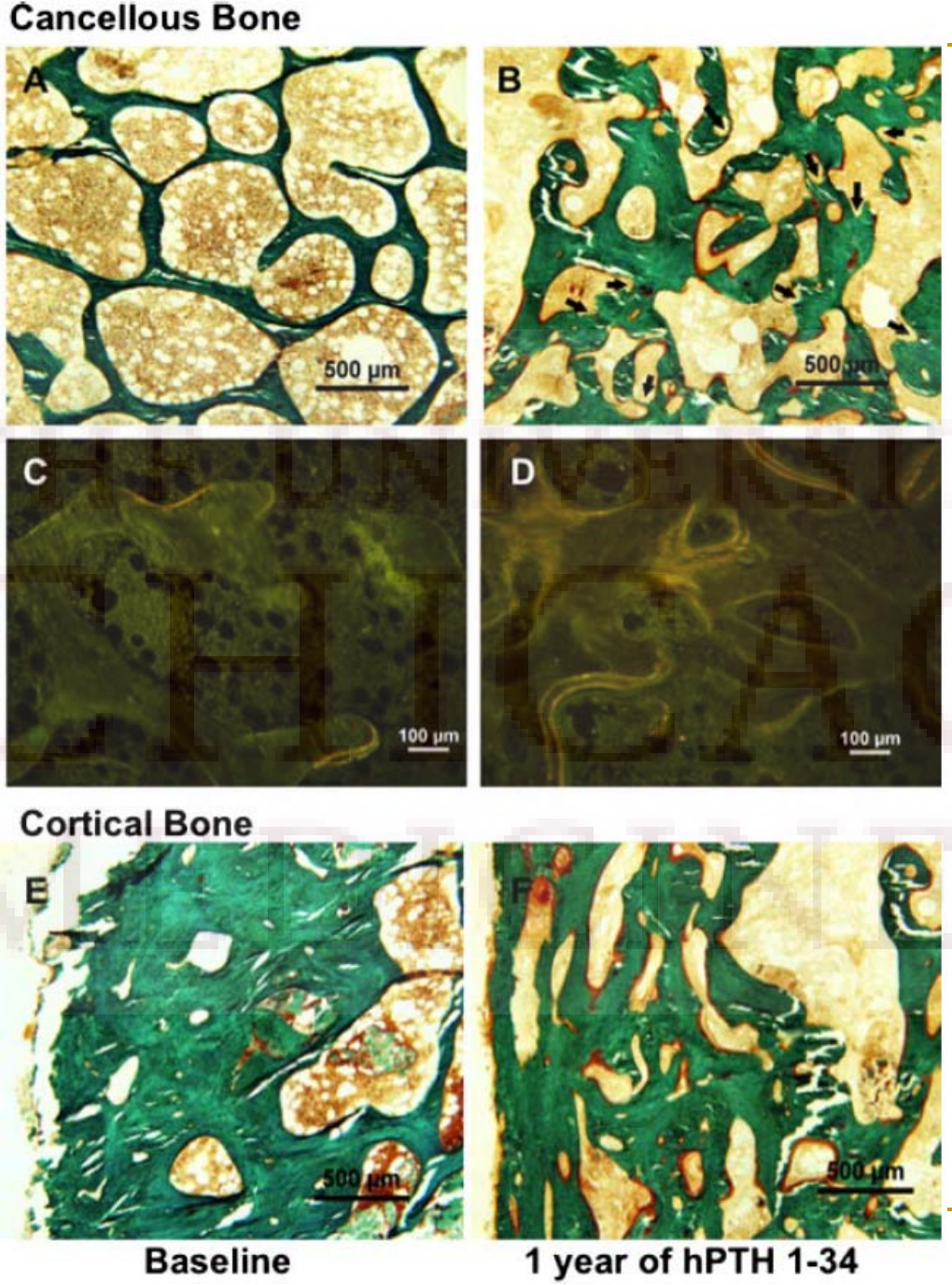

Winer KK. JCEM 2012;97(2).

# Additional points to consider

- Mean TDD PTH 1-34 was 65% less during pump than BID SC delivery (13 vs 37 mcg/d)
- 7 of 8 patients preferred pump to SC due to convenience and less calcium-related symptoms
- Blackbox warning about not using for >2 years due to osteosarcome occurrence in rats

# Chronic PTH on bones

- N = 5 hypoparathyroid subjects
- Human PTH 1-34 BID-TID for 18 mos
- Bone turnover markers, DXA, iliac crest biopsy
- Long-term studies on skeletal changes as well as effects of withdrawal of therapy are needed




Gafni RI et al. JBMR 2012;27(8):1811-1820

# Tube Feeds & Hypoparathyroidism

- No studies on treating hypoparathyroidism in patients with G-tube feeding

# Take Home Points

- Targets of hypoparathyroidism therapy
- PTH replacement through injection or pump is being studied
- Chronic PTH 1-34 Replacement Might induce Bone Structure

# References


- Winer KK et al. Synthetic Human Parathyroid Hormone 1-34 Replacement Therapy: A Randomized Crossover Trial Comparing Pump versus Injections in the Treatment of Chronic Hypoparathyroidism. JCEM 2012;97(2).
- Shoback D. Hypoparathyroidism. NEJM 2008;359(4):391-403.
- Khan MI et al. Medical Management of Postsurgical Hypoparathyroidism. Endo Prac 2011;17:19-25.
- Gafni RI et al. Daily PTH 1-34 Replacement Therapy for Hypoparathyroidism Induces Marked Changes in Bone Turnover and Structure. JBMR 2012;27(8):1811-1820.
- Cusano NE et al. Mini-review: new therapeutic options in hypoparathyroidism. Endo 2012;41:410-414.