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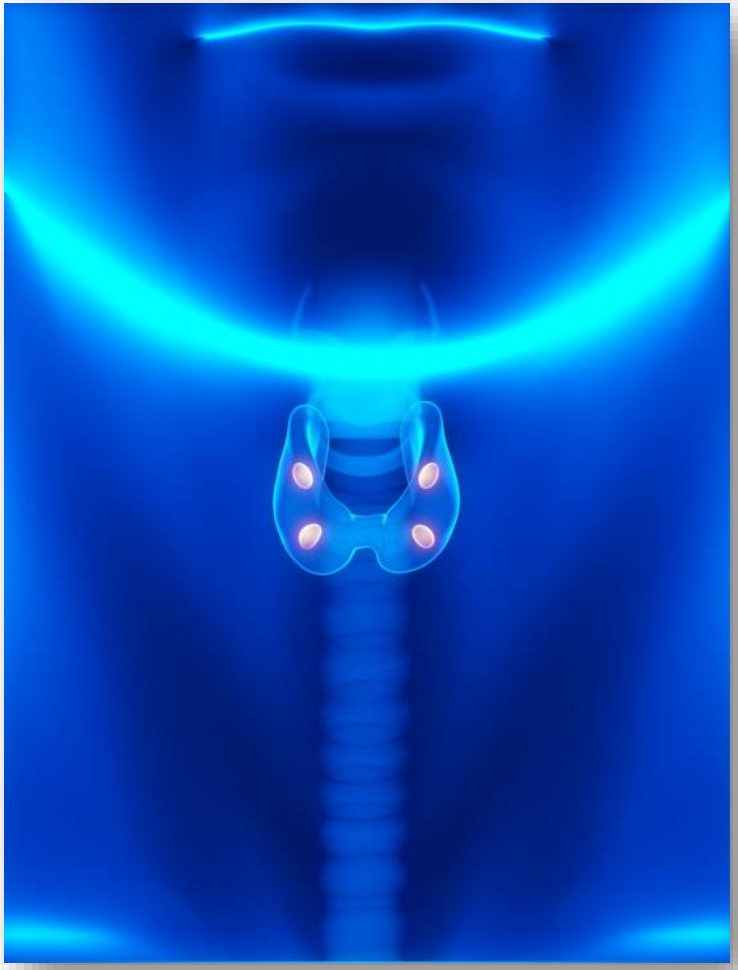
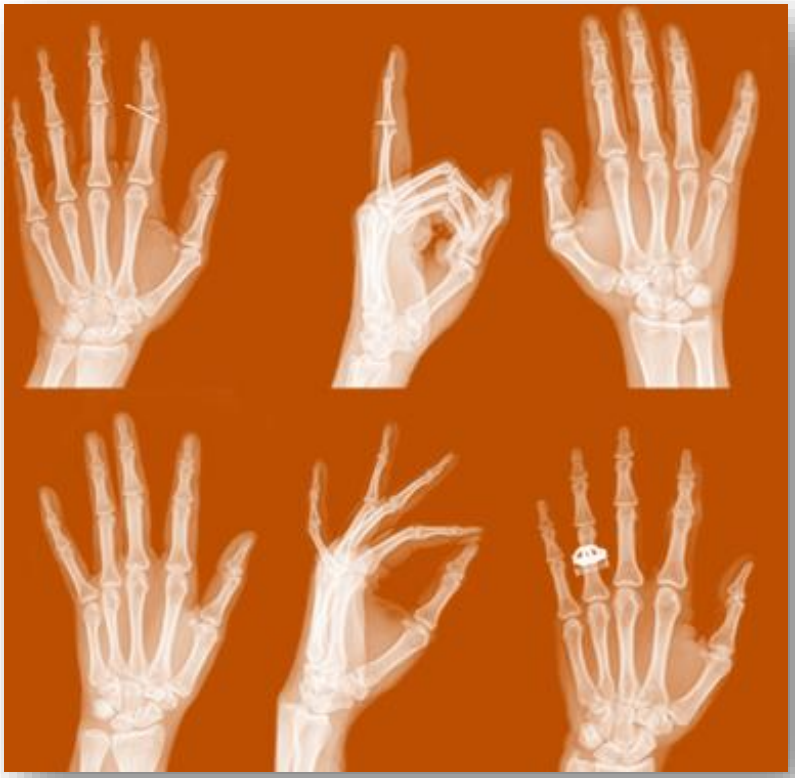
Hyperparathyroidism



Parathyroid hormone (PTH)

The main actions of PTH are:

- Bone resorption
- Tubular calcium reabsorption and phosphate excretion in the kidney
- Formation of calcitriol (1,25 dihydroxy vitamin D) which increases gastrointestinal calcium absorption
  - Calcium and phosphate homeostasis



Hyperparathyroidism types

- **Primary**- Most often caused by parathyroid adenoma, causing elevated parathyroid hormone (PTH) and serum calcium.
- **Secondary**- most often due to Chronic Kidney Disease (CKD), especially with an estimated glomerular filtration rate (eGFR) below 60.
  - Can also be caused by vitamin D deficiency, poor PO calcium intake or gastrointestinal loss (i.e. malabsorption).
- **Tertiary**- due to autonomous production of PTH in setting of longstanding CKD.

Normocalcemic primary hyperparathyroidism

In **normocalcemic primary hyperparathyroidism** (PHPT), levels are elevated but serum calcium is normal.

In order to make this diagnosis, certain conditions must be met:

- In particular, all secondary causes for hyperparathyroidism must be ruled out, and ionized calcium levels should be normal.
- The most common explanation for the finding of an elevated PTH and normal serum calcium remains concomitant hypercalcemic primary hyperparathyroidism and vitamin D deficiency.

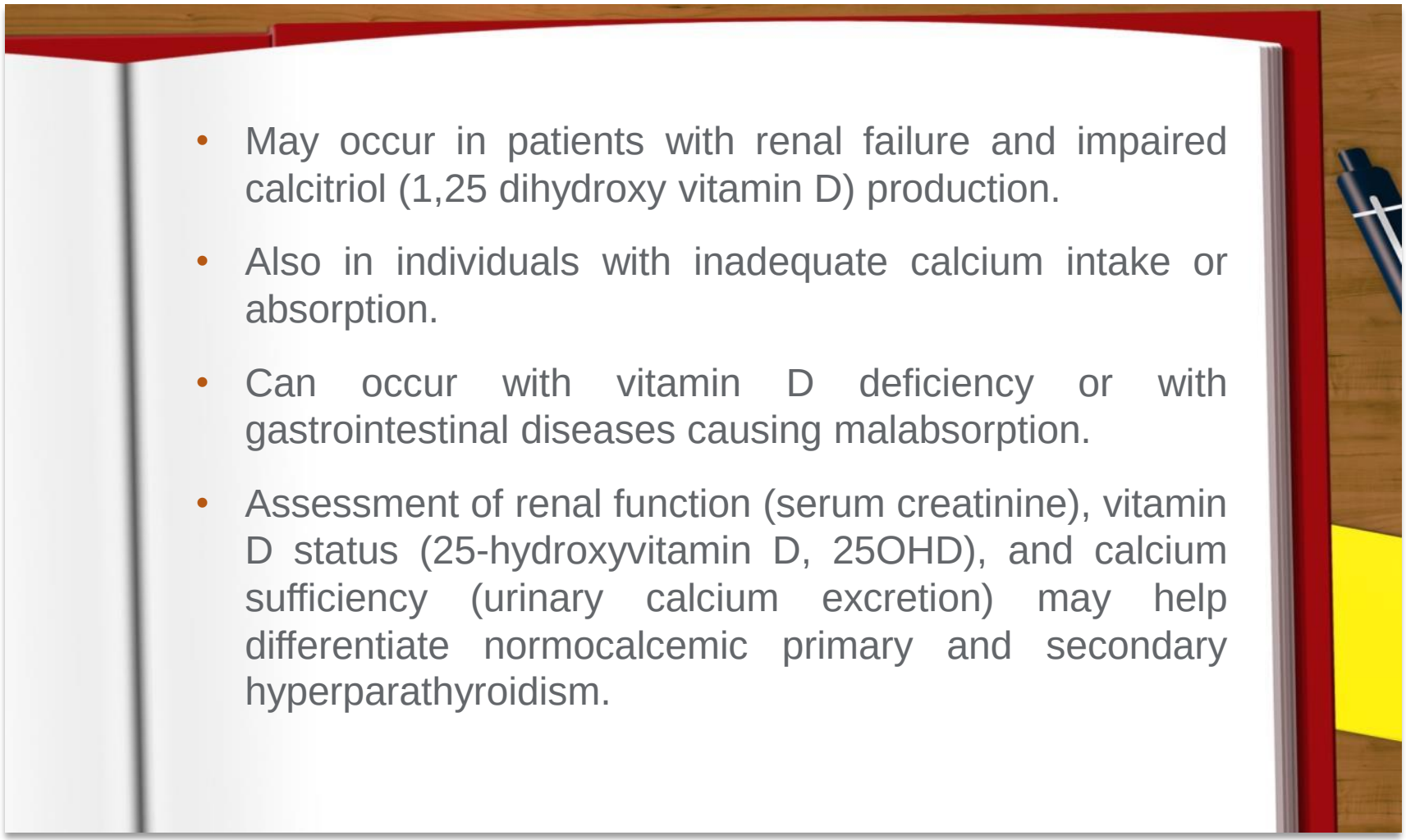
Secondary hyperparathyroidism

Secondary hyperparathyroidism (SHPT) occurs when the parathyroid gland appropriately responds to a reduced level of extracellular calcium.

- PTH concentrations rise, and calcium is mobilized by increasing intestinal absorption (via increase in calcitriol) and by increasing bone resorption.

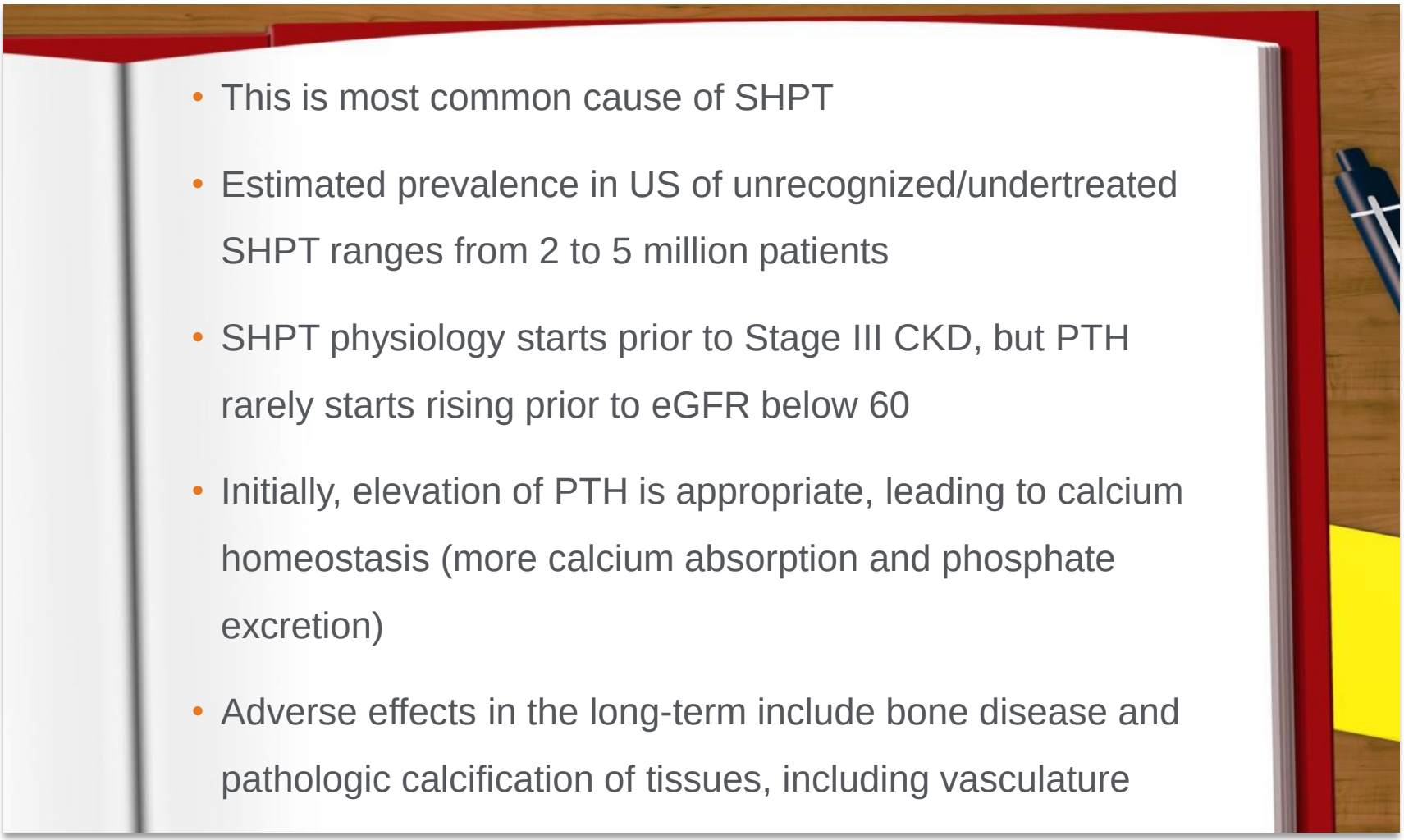
- Thus, it is characterized biochemically by elevated PTH and normal or low serum calcium concentrations.

Secondary hyperparathyroidism



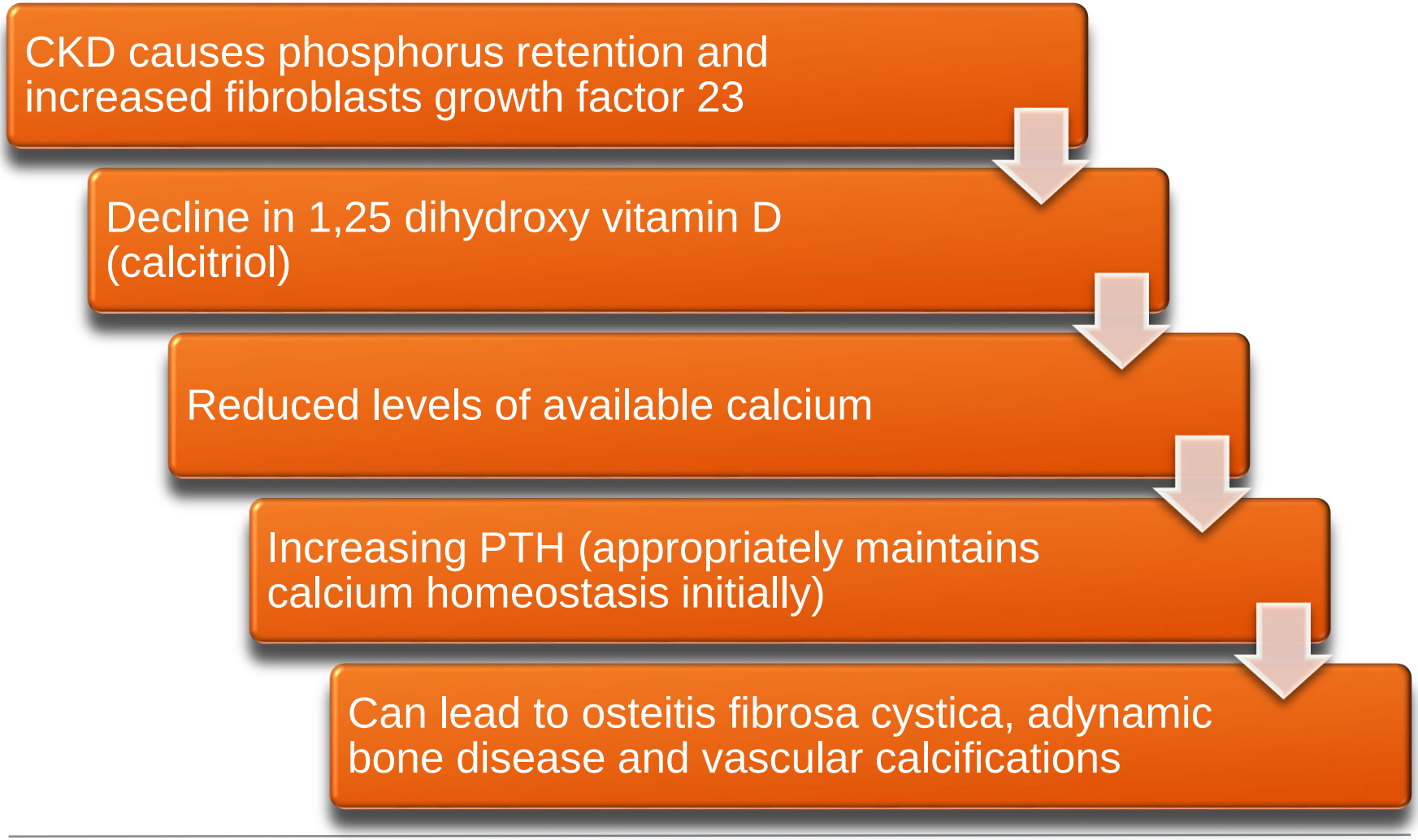
- May occur in patients with renal failure and impaired calcitriol (1,25 dihydroxy vitamin D) production.
- Also in individuals with inadequate calcium intake or absorption.
- Can occur with vitamin D deficiency or with gastrointestinal diseases causing malabsorption.
- Assessment of renal function (serum creatinine), vitamin D status (25-hydroxyvitamin D, 25OHD), and calcium sufficiency (urinary calcium excretion) may help differentiate normocalcemic primary and secondary hyperparathyroidism.

Secondary hyperparathyroidism due to CKD



- This is most common cause of SHPT
- Estimated prevalence in US of unrecognized/undertreated SHPT ranges from 2 to 5 million patients
- SHPT physiology starts prior to Stage III CKD, but PTH rarely starts rising prior to eGFR below 60
- Initially, elevation of PTH is appropriate, leading to calcium homeostasis (more calcium absorption and phosphate excretion)
- Adverse effects in the long-term include bone disease and pathologic calcification of tissues, including vasculature

Pathophysiology of SHPT in CKD



Testing frequency for SHPT

Frequency of checking intact parathyroid hormone (iPTH), calcium (Ca), and phosphorous (Phos)

- **CKD 2- yearly**
- **CKD 3- every 6 months**
- **CKD 4- every 3 months**
- **CKD 5- every 3 month**

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National Kidney Foundation KDOQI guidelines

Management and control of SHPT

Goal iPTH levels after SHPT diagnosis

- **CKD 2: 35-70**
- **CKD 3: 35-70**
- **CKD 4: 70-110**
- **CKD 5: 200-300**

National Kidney Foundation KDOQI guidelines

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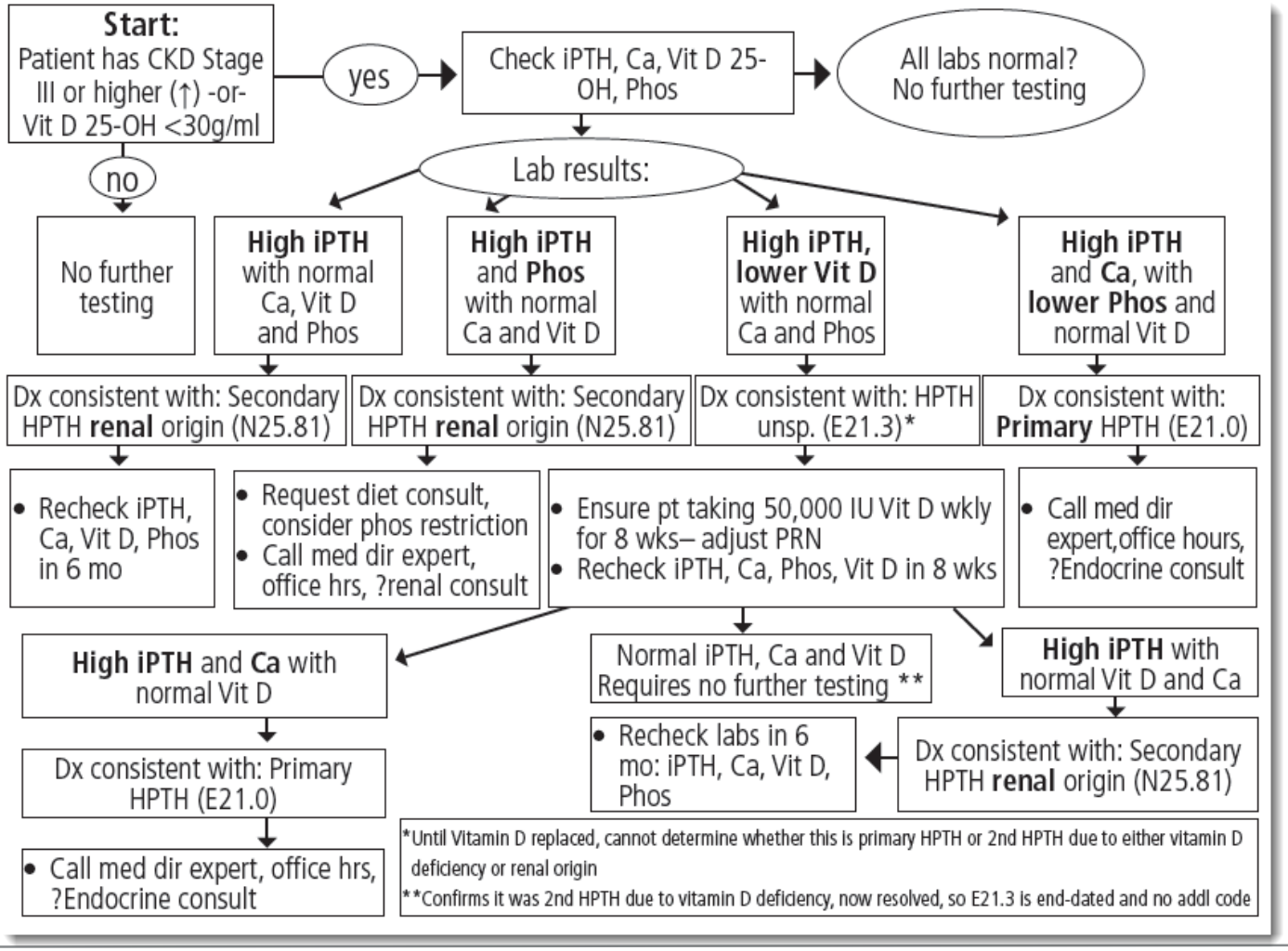
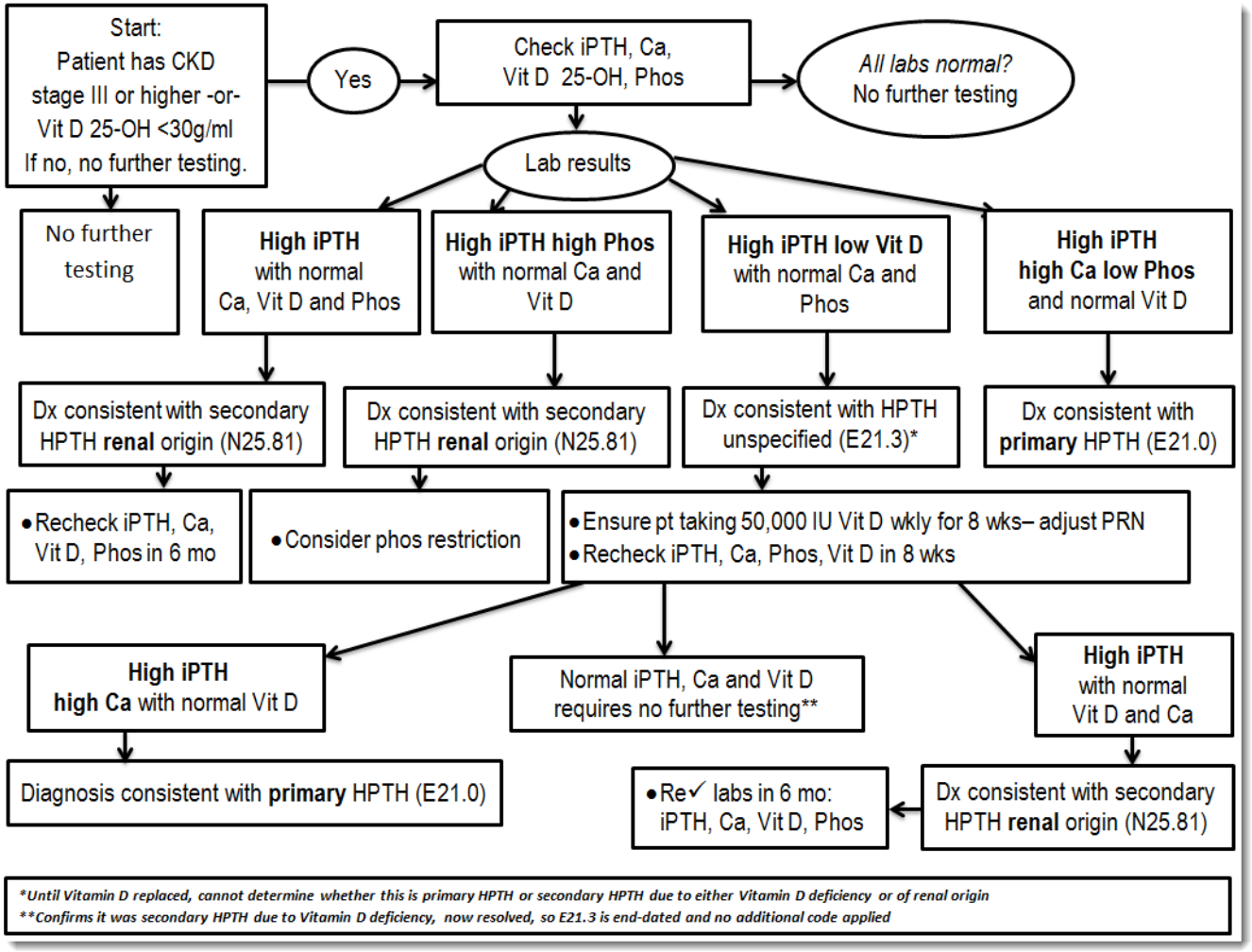
CCM - secondary hyperparathyroidism decision tree



Secondary hyperparathyroidism decision tree



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Key points

- In your patients with CKD, consider screening for secondary hyperparathyroidism (order vitamin D testing as well), especially in stage III or greater CKD patients.

- Treatment usually involves laboratory monitoring and possible dietary changes such as phosphorous restriction
  - Foods with higher phosphorous include most dairy, whole grains, peas, beans, processed meats, nuts, seeds, chocolate

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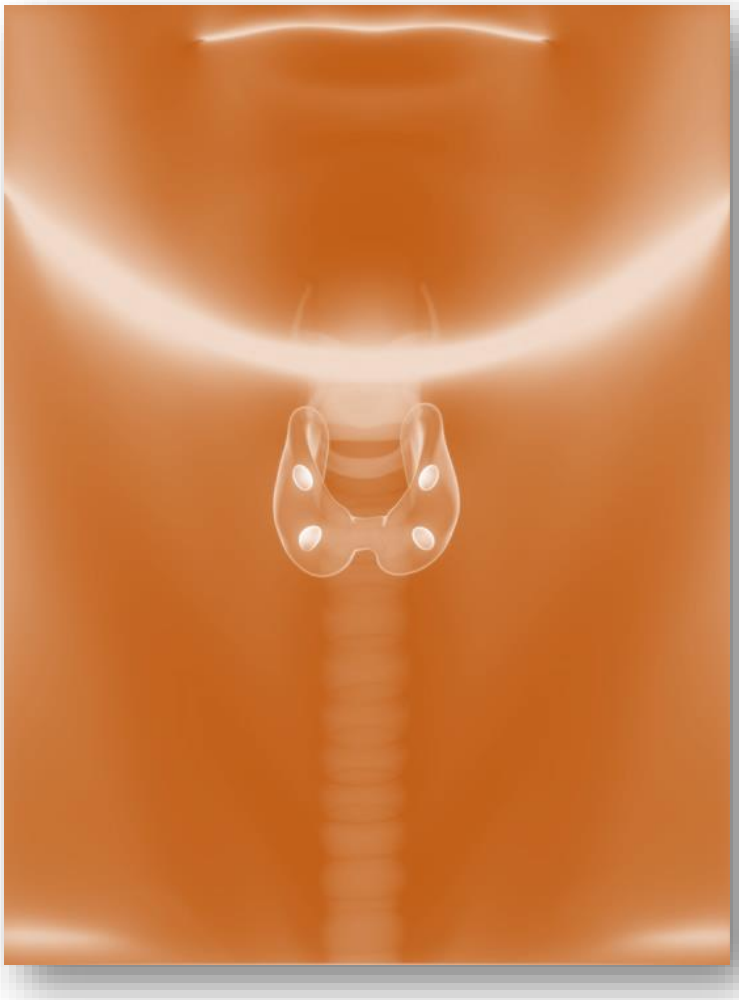

ICD-10 and required specificity

Parathyroidism disease codes

ICD-10-CM	Description
E21.0	Primary hyperparathyroidism
E21.1	Secondary hyperparathyroidism, NEC (excludes of renal origin)
E21.2	Other (tertiary) hyperparathyroidism
E21.3	Hyperparathyroidism NOS
E21.4	Other specified disorders of parathyroid gland
E21.5	Parathyroid disorder, unspecified
N25.81	Secondary hyperparathyroidism of renal origin

Resources

- International Classification of Diseases, Tenth Revision, Clinical Modification (ICD-10-CM). (2017, February 2). Retrieved January 1, 2017, from CDC/National Center for Health Statistics website: https://www.cdc.gov/nchs/icd/icd10cm.htm

- Quarles, L.D., & Berkoben, M. (2017, January 6). Management of secondary hyperparathyroidism and mineral metabolism abnormalities in adult predialysis patients with chronic kidney disease. Retrieved April 12, 2017, from UpToDate website: https://www.uptodate.com/contents/ management-of-secondary-hyperparathyroidism-and-mineral-metabolism-abnormalities-in-adult-predialysis -patients-with-chronic-kidneydisease

- Secondary hyperparathyroidism. (2017, March 17). Retrieved April 12, 2017, from The National Kidney Foundation website: https://www.kidney.org/atoz/content/secondary-hyperparathyroidism