بسم الله الرحمن الرحيم

نحوه برخورد با هیپرکلسمی در بیمار آقای ۷۸ ساله مراجعه کننده با ضعف و بی حالی با رویکرد پزشکی خانواده

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دانشیار و متخصص داخلی

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دستیار تخصصی پزشکی خانواده

آقای ۷۸ ساله با ضعف و بی‌حالی و عدم توانایی راه رفتن از یک ماه قبل و بی‌اختیاری ادراری از ۲ هفته قبل مراجعه کرده است.

وی مدتی است دچار بی‌اشتهایی و یبوست شده که از یک هفته قبل تشدید شده است.

۸ سال قبل سابقه جراحی کمر و تنگی کانال نخاعی دارد.
۴ سال قبل سابقه جراحی پروستات دارد.
وی سابقه سرفه‌های مکرر، سینوزیت و رینیت مزمن دارد.
دیابت، فشارخون بالا یا بیماری مزمن دیگری ندارد.

داروی خاصی مصرف نمیکند.

برادر بیمار سرطان معده داشته که در سن ۶۰ سالگی فوت کرده است.

سابقه مصرف سیگار به میزان 10 P/yearدارد.

BP=135/80

PR=89/min RR=16/min O2sat: 92% T:38 C

در معاینه فیزیکی بیمار هوشیار است.
III است و به آهستگی به سوالات پاسخ می‌دهد.
در سمع ریه راست کاهش صدا دارد.
صدای قلب نرمال است.
شکم نرم و بدون تندرنس است.
سایر معاینات نرمال است.

در آزمایشات :

Hb:10.1 Hct:31.9 MCV:79.8 MCH:25.3 RDW:16.7

ESR:121 CRP=55

Cr:0.92 Urea:33

Ca:13.9 P:3.7 Na:136 K:4.3 Mg=2 Alb:4.2

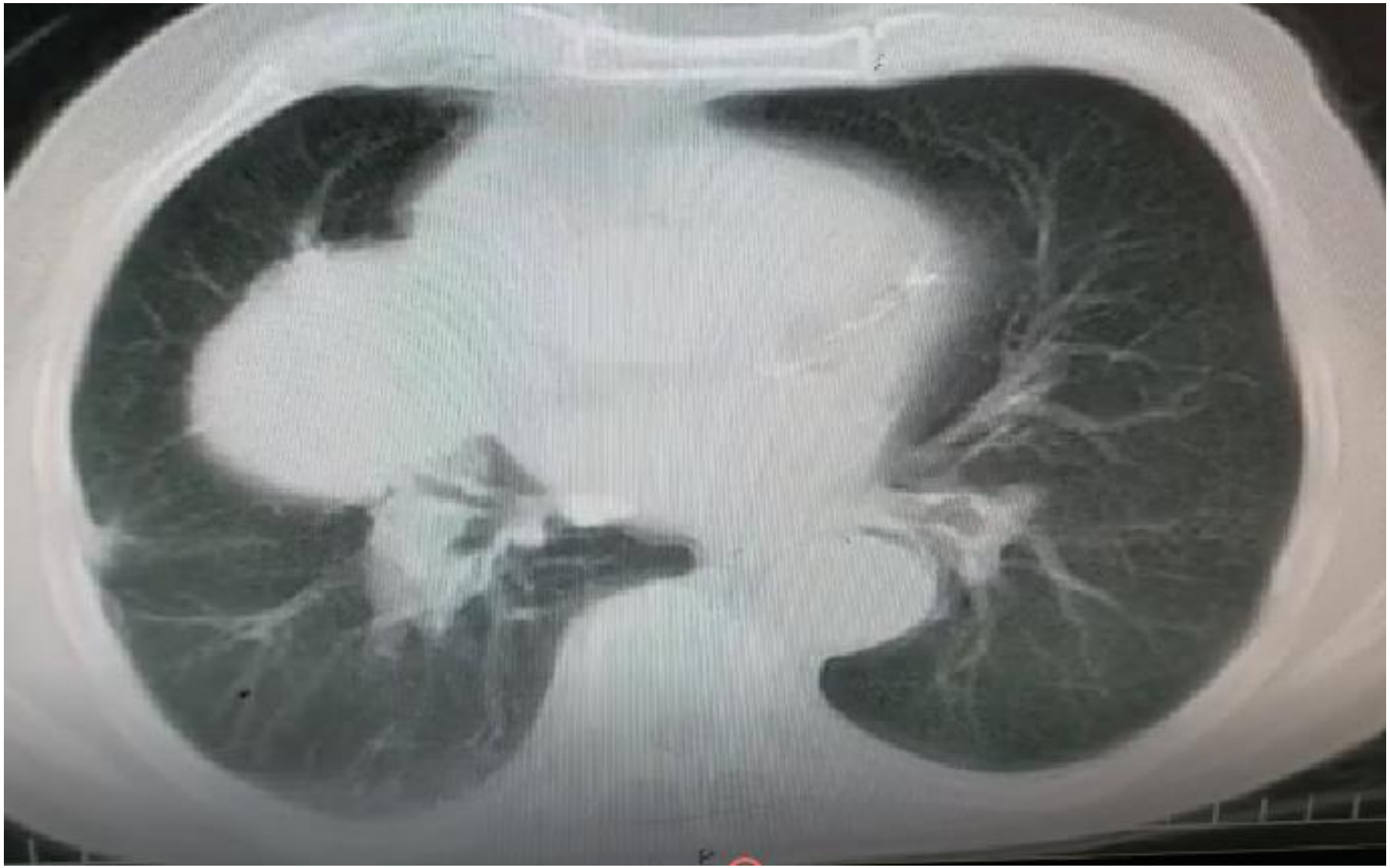
AST: 60 ALT: 70 ALP: 481 Amylase:33

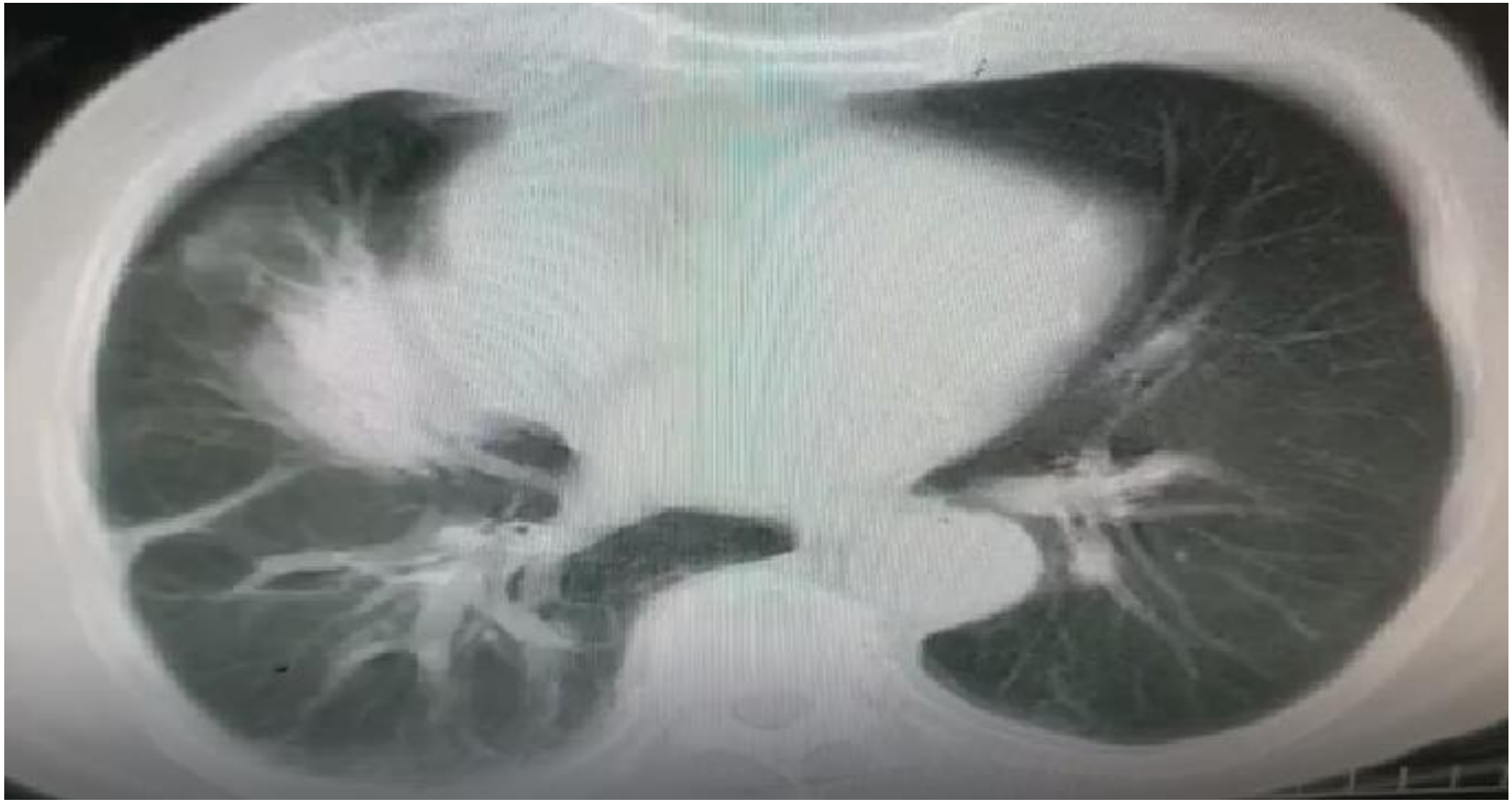
D-Dimer: +2

WBC: 9100 N:70 L:26

در آزمایشات سیر کلسیم بیمار:

12.9 (mg/dl) ← 13.9 ← 14.2 ← 14 ← 13.5





Spiral CT scan of Chest (without IV Contrast) :-

Multislice axial images without IV contrast administration reveal:

*Lungs: A large lobulated mass measuring 82*63mm is visible in anterior segment of right upper lobe with associated surrounding GGO which is more compatible with neoplastic mass , so for further evaluation CT with IV contrast is highly suggested*

Pleural reflections: No pleural thickening or effusion

Mediastinum: unremarkable

Heart: unremarkable

Chest wall: unremarkable

Brain CT scan Without Contrast:

Multislice axial images without IV contrast administration reveal:

Cerebral hemispheres:

- *Normal size, anatomy and density for age.*
- *No hydrocephalus, mass, midline shift, hemorrhage, abnormal calcification or extra-axial fluid collection.*

Cerebellum and posterior fossa structures: grossly unremarkable

Calvarium and scalp: unremarkable

Clinical manifestations of hypercalcemia

Patients with mild hypercalcemia (calcium above the upper limit of normal but <12 mg/dL) may be asymptomatic, or they may report nonspecific symptoms, such as constipation, fatigue, and depression.

A moderately elevated serum calcium of 12 to 14 mg/dL may be well tolerated chronically, while an acute rise to these concentrations may cause marked symptoms, including polyuria, polydipsia, dehydration, anorexia, nausea, muscle weakness, and changes in sensorium.

In patients with severe hypercalcemia (calcium >14 mg/dL), there is often progression of these symptoms .

Clinical manifestations of hypercalcemia

Renal
Polyuria
Polydipsia
Nephrolithiasis
Nephrocalcinosis
Distal renal tubular acidosis
Nephrogenic diabetes insipidus
Acute and chronic renal insufficiency

Gastrointestinal
Anorexia, nausea, vomiting
Bowel hypomotility and constipation
Pancreatitis
Peptic ulcer disease
Musculoskeletal
Muscle weakness
Bone pain
Osteopenia/osteoporosis
Neurologic
Decreased concentration
Confusion
Fatigue
Stupor, coma

Clinical manifestations of hypercalcemia

Neurologic
Decreased concentration
Confusion
Fatigue
Stupor, coma
Cardiovascular
Shortening of the QT interval
Bradycardia
Hypertension

PHYSICAL FINDINGS

There are usually no specific physical findings of hypercalcemia other than those that might be related to an underlying disease, such as malignancy, and nonspecific findings related to dehydration.

Band keratopathy, a resection of subepithelial calcium phosphate deposits in the cornea, is a very rare finding . It is usually detected by slit-lamp examination.

Among all causes of hypercalcemia, primary hyperparathyroidism and malignancy are the most common, accounting for greater than 90 percent of cases.

Non-parathyroid mediated
Hypercalcemia of malignancy
PTHrP
Increased calcitriol (activation of extrarenal 1-alpha-hydroxylase)
Osteolytic bone metastases and local cytokines
Vitamin D intoxication
Chronic granulomatous disorders
Increased calcitriol (activation of extrarenal 1-alpha-hydroxylase)

Parathyroid mediated
Primary hyperparathyroidism (sporadic)
Inherited variants
Multiple endocrine neoplasia (MEN) syndromes
Familial isolated hyperparathyroidism
Hyperparathyroidism-jaw tumor syndrome
Familial hypocalciuric hypercalcemia
Tertiary hyperparathyroidism (renal failure)

Medications
Thiazide diuretics
Lithium
Teriparatide
Abaloparatide
Excessive vitamin A
Theophylline toxicity

Miscellaneous
Hyperthyroidism
Acromegaly
Pheochromocytoma
Adrenal insufficiency
Immobilization
Parenteral nutrition
Milk-alkali syndrome

Hypercalcemia in primary hyperparathyroidism is due to parathyroid hormone (PTH)-mediated activation of osteoclasts, leading to increased bone resorption.

In addition, intestinal calcium absorption is elevated.

Primary hyperparathyroidism is most often due to a parathyroid adenoma.

Patients typically have relatively minor elevations in serum calcium concentrations (less than 11 mg/dL or 2.75 mmol/L), and some patients have mostly high-normal values with intermittent hypercalcemia. Occasionally, however, patients have more severe hypercalcemia with levels over 12 mg/dL.

When one suspects primary hyperparathyroidism (eg, patient with calcium nephrolithiasis), and the serum calcium is high-normal, it may be necessary to obtain a series of serum calcium measurements to detect hypercalcemia.

Hypercalcemia occurs in patients with many malignancies, both solid tumors and leukemias.

In general, serum calcium levels are higher in patients with malignancy than in those with primary hyperparathyroidism, although this is not always the case.

Values above 13 mg/dL (3.25 mmol/L) are less commonly seen in primary hyperparathyroidism and, in the absence of another apparent cause, are more likely due to malignancy.

The first step in the evaluation of a patient with hypercalcemia is to verify with repeat measurement (total calcium corrected for albumin) that there is a true increase in the serum calcium concentration. If available, previous values for serum calcium should also be reviewed.

Total calcium concentration in clinical practice assumes the serum calcium to fall by 0.8 mg/dL for every 1 g/dL (10 g/L) fall in the serum albumin concentration.

Although the signs and symptoms of hypercalcemia are similar regardless of the etiology, there are several features of the clinical evaluation that may help to differentiate the etiology of hypercalcemia.

Clinical findings that favor the diagnosis of primary hyperparathyroidism include an asymptomatic patient with chronic hypercalcemia, a postmenopausal woman, a normal physical examination, no other obvious cause of hypercalcemia (such as sarcoidosis), a family history of hyperparathyroidism, and evidence of multiple endocrine neoplasia.

Patients with hypercalcemia of malignancy often have higher concentrations of, and more rapid increases in, serum calcium and consequently are more symptomatic. In addition, patients with this disorder typically have advanced disease and a poor prognosis.

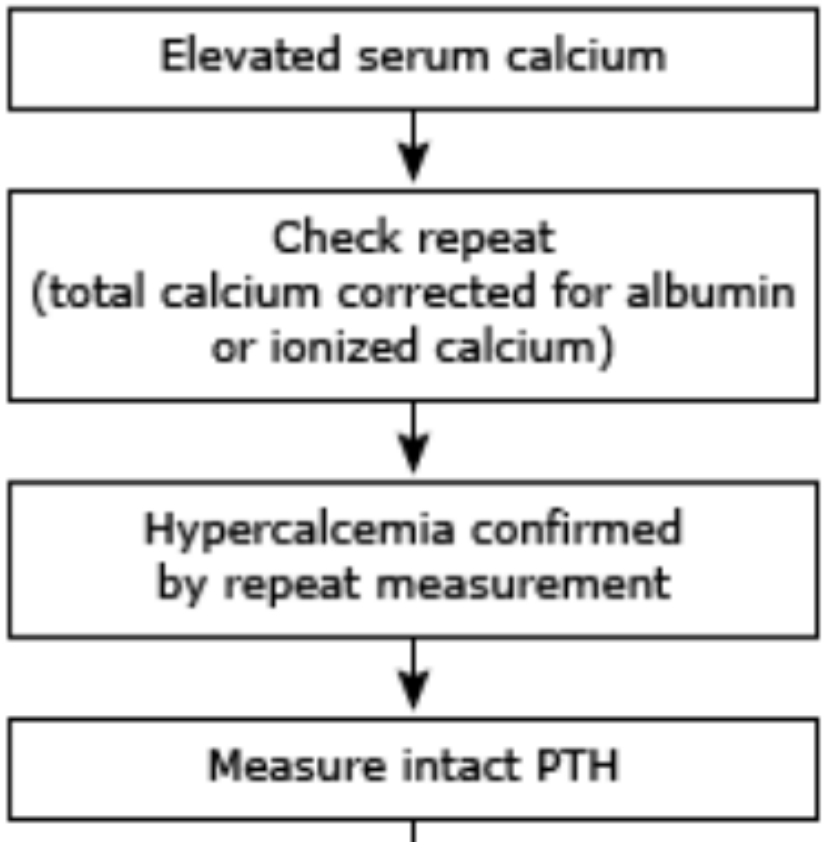
A review of diet and medications (prescription and nonprescription drugs, herbal preparations, calcium and vitamin supplements) is important to assess for the milk-alkali syndrome and drug-induced hypercalcemia If possible, any medication that may be causing hypercalcemia should be discontinued.

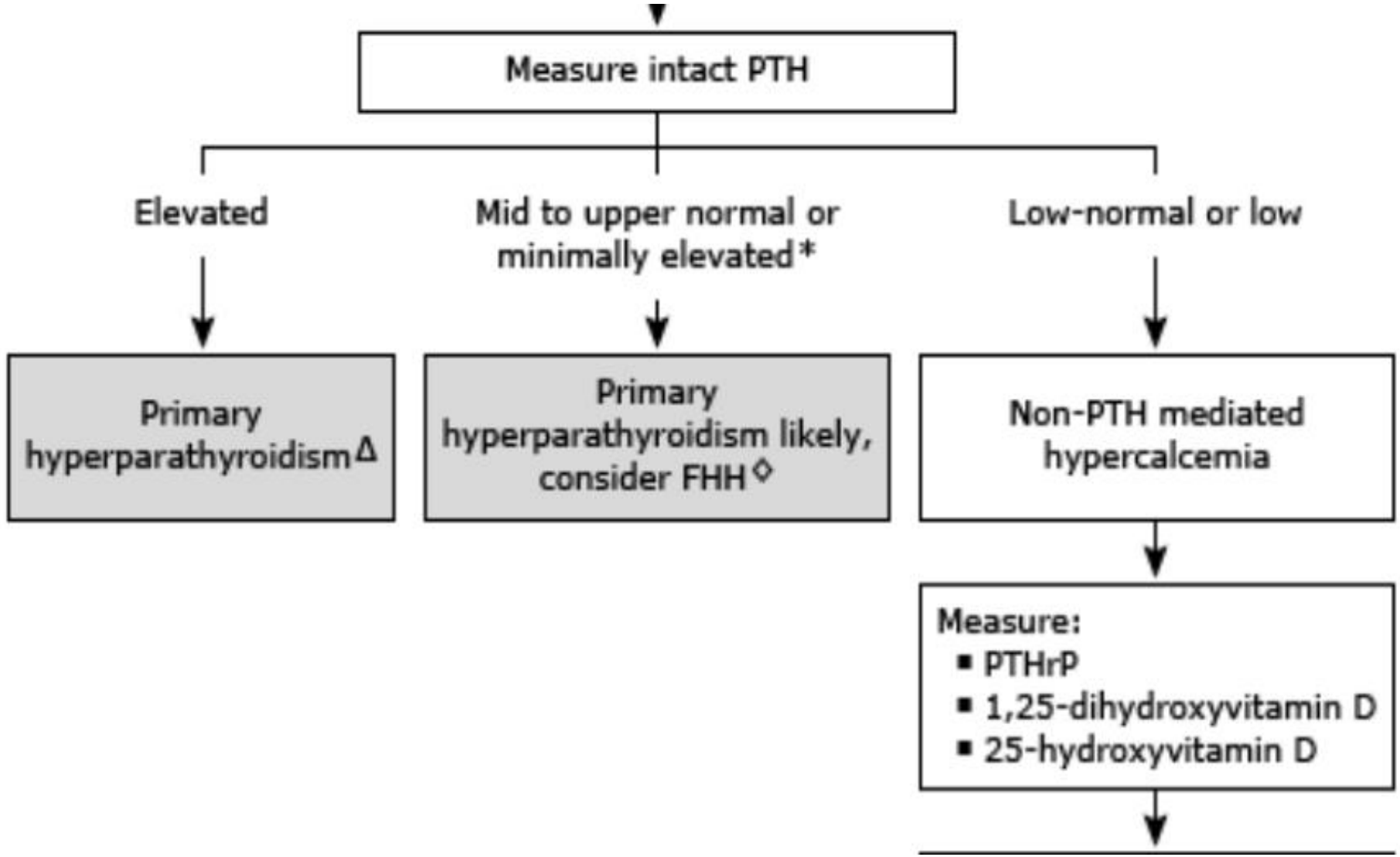
Laboratory evaluation

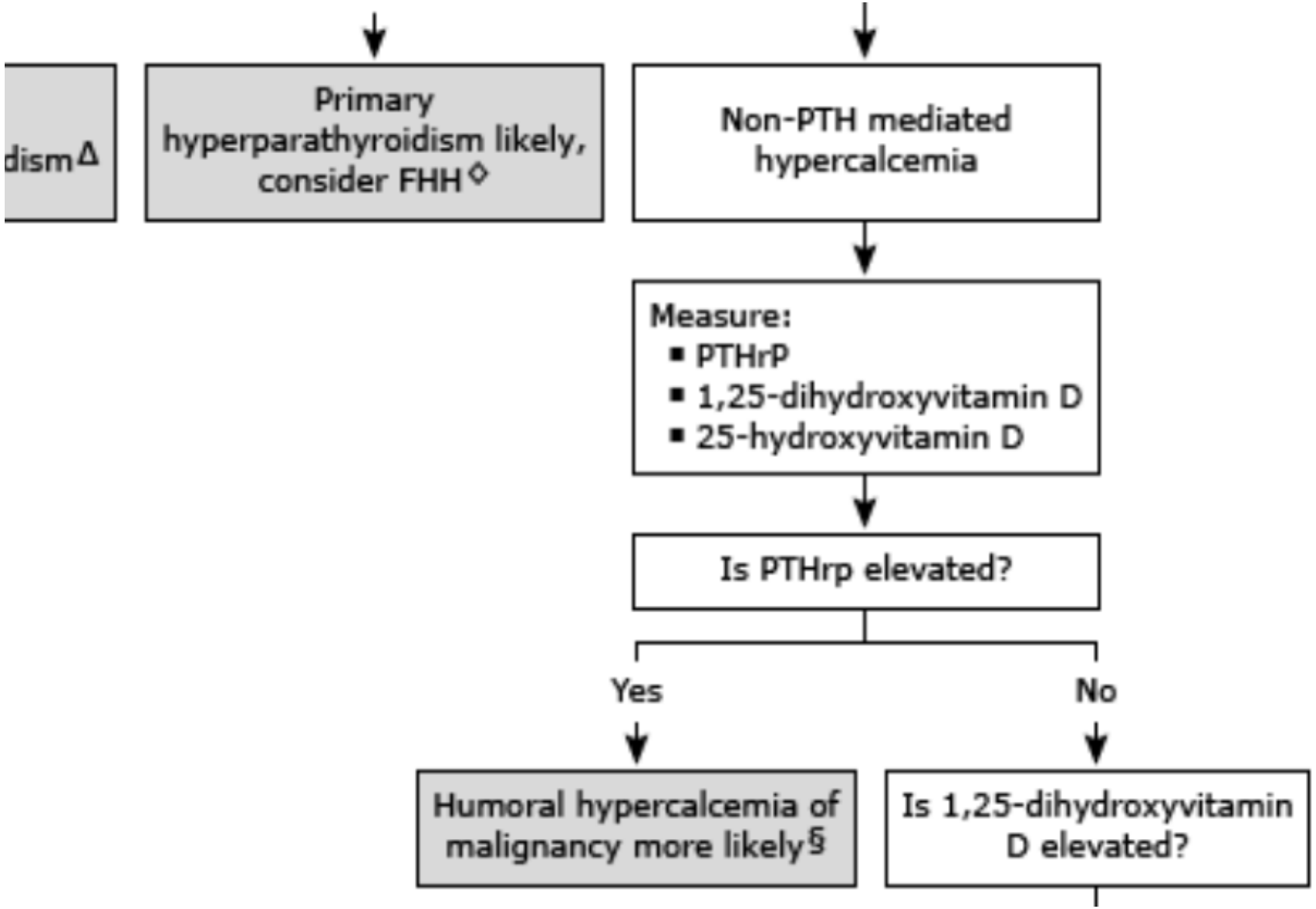
The initial goal of the laboratory evaluation is to differentiate parathyroid hormone (PTH)-mediated hypercalcemia (primary and tertiary hyperparathyroidism, and familial hyperparathyroid syndromes) from non-PTH mediated hypercalcemia (primarily malignancy, vitamin D intoxication, granulomatous disease.

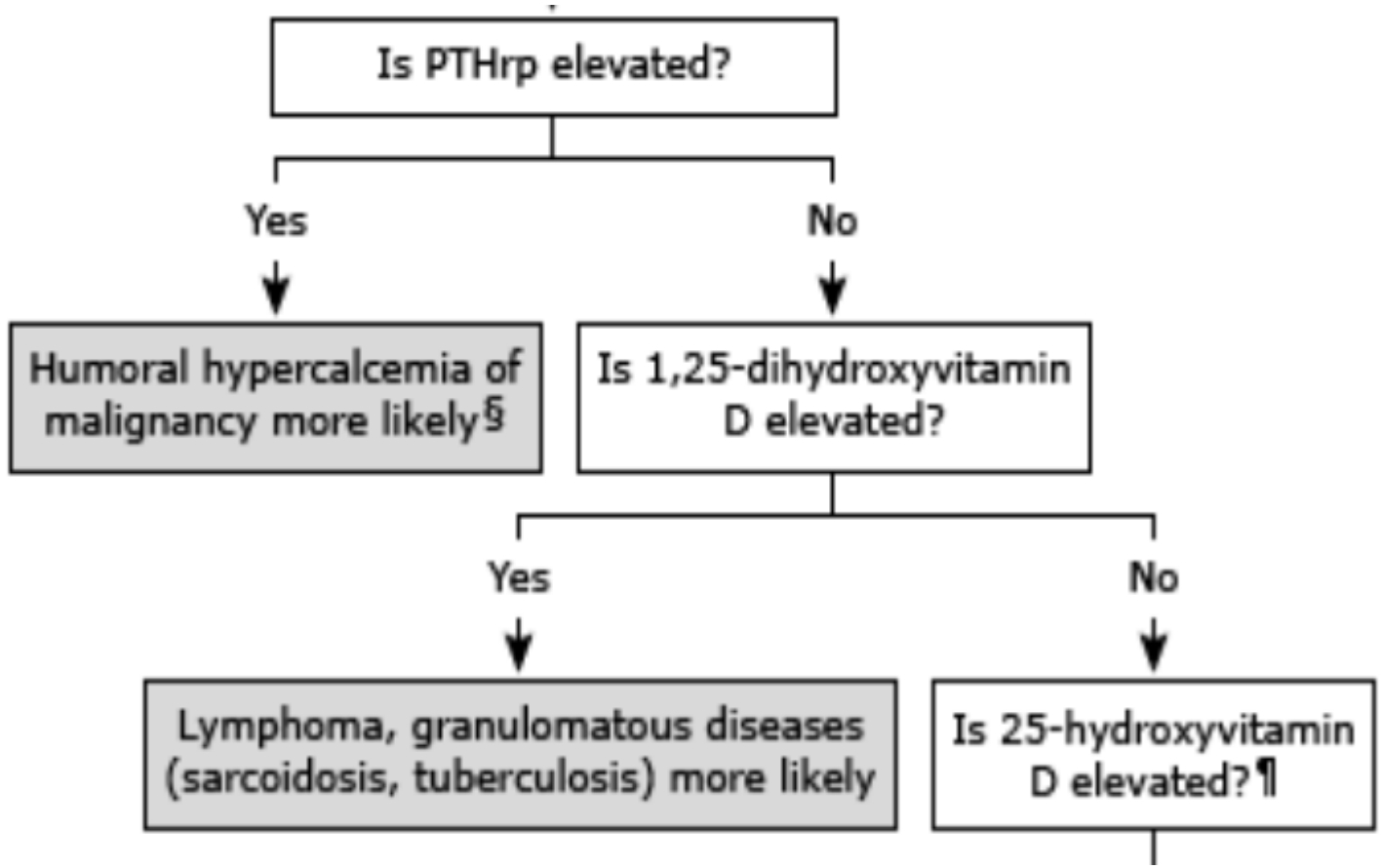
Thus, once hypercalcemia is confirmed, the next step is measurement of serum PTH. There appears to be a higher incidence of primary hyperparathyroidism in patients with malignancy than in the general population. Thus, despite the increased cost, it is reasonable to order an intact PTH assay as part of the routine evaluation for hypercalcemia, even in a patient with known malignant disease.

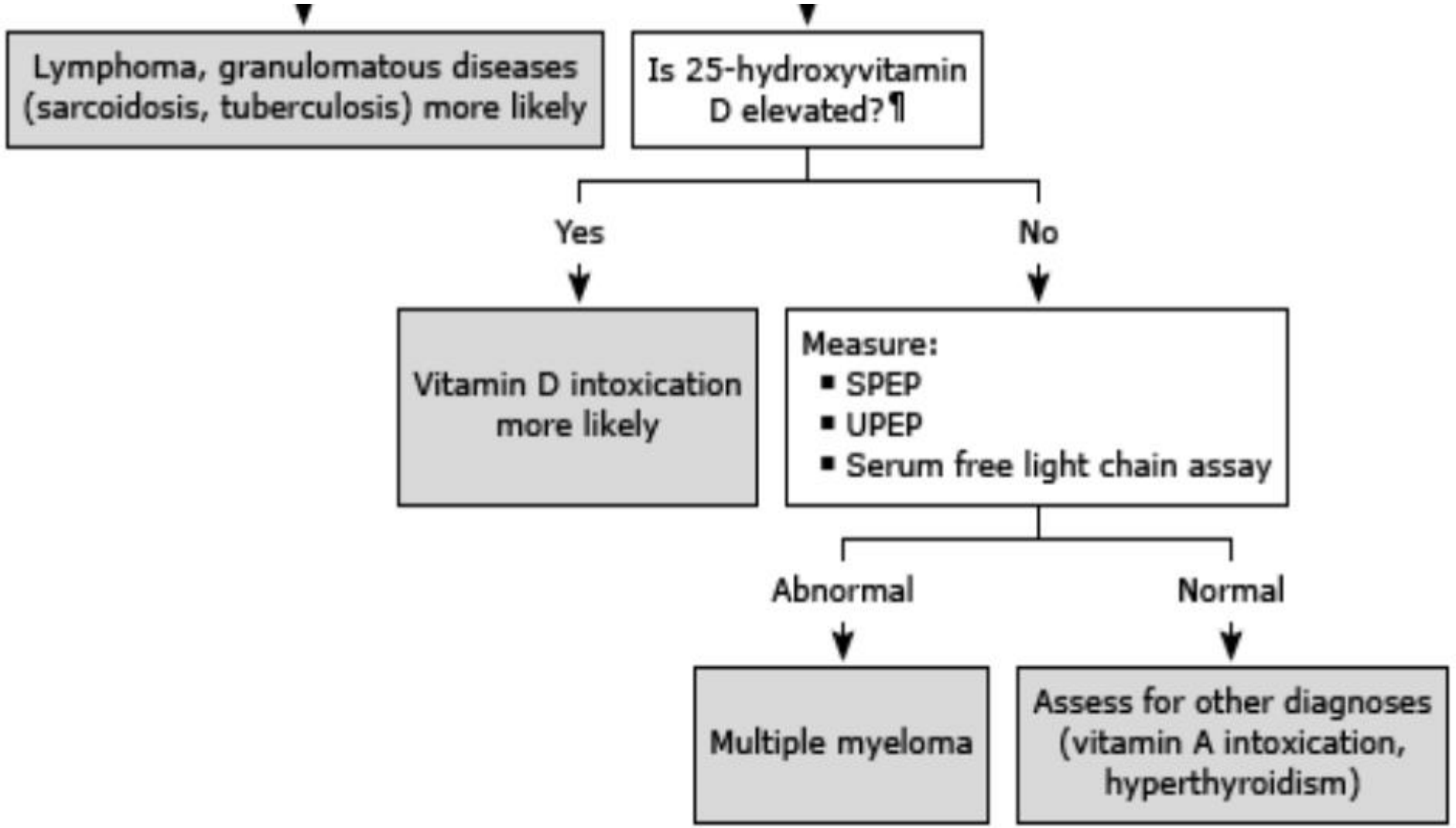
Diagnostic approach to hypercalcemia




Measure intact PTH
Elevated
Mid to upper normal or minimally elevated*
Low-normal or low
Primary hyperparathyroidism Δ
Primary hyperparathyroidism likely, consider FHH ◇
Non-PTH mediated hypercalcemia
Measure:
PTHrP
1,25-dihydroxyvitamin D
25-hydroxyvitamin D


dism Δ
Primary hyperparathyroidism likely, consider FHH ◇
Non-PTH mediated hypercalcemia
Measure:
PTHrP
1,25-dihydroxyvitamin D
25-hydroxyvitamin D
Is PTHrp elevated?
Yes
No
Humoral hypercalcemia of malignancy more likely §
Is 1,25-dihydroxyvitamin D elevated?


Is PTHrp elevated?
Yes
No
Humoral hypercalcemia of malignancy more likely§
Is 1,25-dihydroxyvitamin D elevated?
Yes
No
Lymphoma, granulomatous diseases (sarcoidosis, tuberculosis) more likely
Is 25-hydroxyvitamin D elevated?¶


Lymphoma, granulomatous diseases (sarcoidosis, tuberculosis) more likely
Is 25-hydroxyvitamin D elevated?¶
Yes
No
Vitamin D intoxication more likely
Measure:
SPEP
UPEP
Serum free light chain assay
Abnormal
Normal
Multiple myeloma
Assess for other diagnoses (vitamin A intoxication, hyperthyroidism)

سطوح پیشگیری کانسر ریه

Primordial Prevention

Primary Prevention

Secondary Prevention

Tertiary Prevention

Quaternary Prevention

Primordial Prevention

۱- خارج کردن کارخانجات صنعتی از شهرها برای کاهش آلودگی هوا

۲- عدم فروش دخانیات به افراد زیر ۱۸ سال

۳- ایجاد تدابیر لازم برای کاهش تماس کارگران با مواد سمی (آزبست و ..)

۴- تولید سیگارتهای فیلتردار و مجاز از لحاظ Tarو تنباکو توسط کارخانجات تنباکو

Primary Prevention

۱- توصیه به ترک سیگار در افراد سیگاری

۲- توصیه به مصرف ماسک در محل کار در کارگران در مواجهه با گرد و غبار و مواد کارسینوژن

۳- توصیه به مصرف میوه‌جات و سبزیجات و داشتن فعالیت فیزیکی مناسب

۴- دوری از مواجهه با دود سیگار افراد سیگاری (Second hand) و تغییر محل زندگی از مناطق با الودگی شهری به مناطق خوش آب و هوا

۵- توصیه به استفاده از هود و تهویه مناسب در منازل بهنگام پخت و پز و آلاینده‌های هیدروکربنی

۶- درمان به‌موقع بیماری‌های التهابی ریه (سل، پنومونی و برونشیت و آمفیزم(COPD))

Secondary Prevention

۱- انجام HRCT ریه در سیگاری‌های بالای ۵۰ سال که بیش از ۱۰ سال مصرف سیگار داشته اند.

۲- غربالگری مصرف سیگار در هر ویزیت با روش 5A

Tertiary Prevention

۱- درمان به موقع بیماران مبتلا به کانسر ریه

۲- انجام تمرینات بازتوانی ریه در بیماران مبتلا به کانسر ریه

Quaternary Prevention

۱- عدم درمان اضافه و انجام اقدامات تشخیصی اضافه در بیماری های ریوی