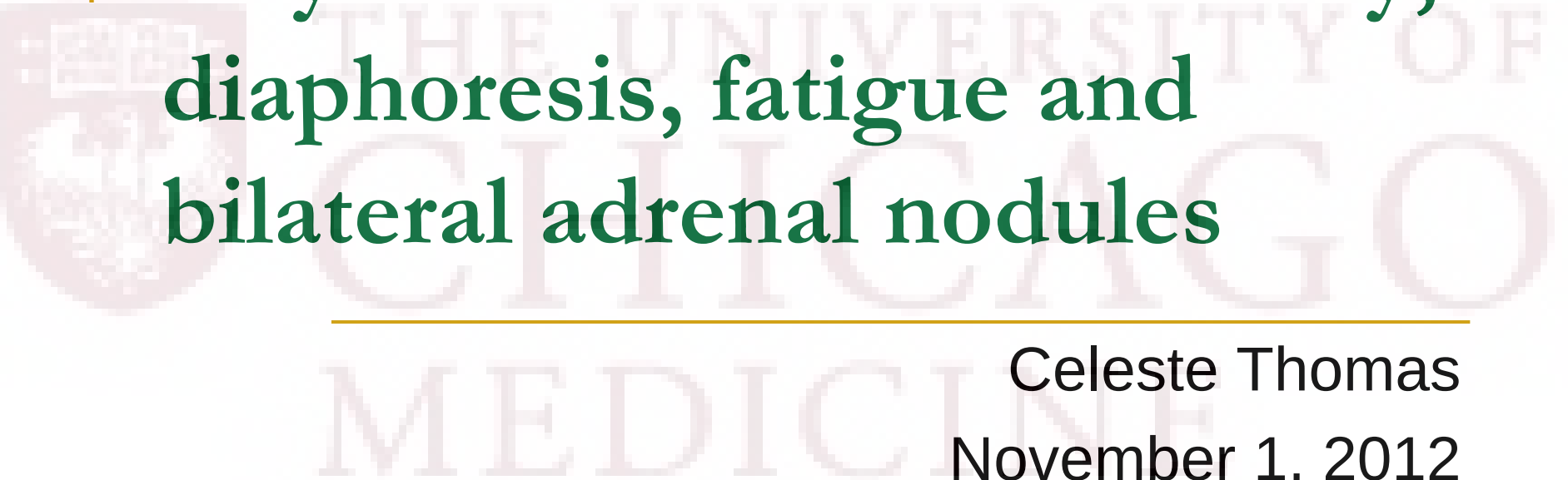


A large, faint, light-colored watermark of the University of Chicago Medicine logo is visible in the background, spanning across the middle of the slide.

57-year-old man with anxiety, diaphoresis, fatigue and bilateral adrenal nodules

Celeste Thomas
November 1, 2012

History of Present Illness

- 8 months prior to presentation developed intermittent right flank pain
- 4 months prior to presentation pain worsened and was associated with voiding symptoms so he sought medical attention
- Lower urinary tract symptoms resolved with tamsulosin but pain persisted
- CT scan identified bilateral adrenal nodules, 5.2 cm on the right, 4.2 cm on the left
- His local endocrinologist performed some studies:
 - Plasma metanephrines 0.26 (normal <0.5)
 - Plasma normetanephrines 0.78 (normal <0.9)
 - 24h urine studies with metanephrine of 195 (normal 44-261), normetanephrines 689 (normal 44-261)
 - Low-dose dexamethasone suppression test with AM cortisol of 4.7
- He and his wife were referred to urology here who discussed options and referred to Dr. Weiss

Outside Images of Adrenal Nodules



History of Present Illness

- Symptoms included profuse sweating, anxiety attacks, extreme fatigue, headaches
- He would like to proceed to surgery

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Bilateral Nodules

■ Questions to consider

- ❑ Are the nodules hormonally active?
- ❑ Do they have radiologic characteristics suggestive of malignant lesions
- ❑ Does the patient have a history of malignancy

■ Which endocrine disease processes are we concerned about?

- ❑ Hyperaldosteronism
- ❑ Hypercortisolism
- ❑ Pheochromocytoma

■ What's most likely?*

- ❑ approximately 80% of those incidentally found are nonfunctioning adenomas,
- ❑ 5% of patients had subclinical Cushing syndrome (SCS)
- ❑ 5% had a pheochromocytoma
- ❑ 1% had an aldosteronoma
- ❑ <5% had an adrenocortical carcinoma (ACC)
- ❑ 2.5% had a metastatic lesion
- ❑ The remaining incidentalomas were ganglioneuromas, myelolipomas, or benign cysts

Hormonal findings in adrenal incidentalomas*

<u>Endocrine state</u>	<u>Prevalence</u>
Nonhypersecreting adenoma	65–90%
Hypercortisolism	5–14%
Hyperaldosteronism	1–3.3%
Hyperandrogenism	0–11%
Hyperestrogenism	Rare
Congenital adrenal hyperplasia	Rare
Pheochromocytoma	1.5–25%

*NIH State-of-the-Science Conference on Management of the Clinically Inapparent Adrenal Mass (“Incidentaloma”)

Past Medical and Surgical History

- **Hypertension**
 - **Diabetes Mellitus**
 - **Hyperlipidemia**
 - **Carotid Artery Stenosis s/p Endarterectomy**
 - **Benign Prostatic Hypertrophy with LUTS**
 - **Bladder Tumor s/p TURBT**
 - **Anal Sphincterotomy**
-

Allergies and Medications

■ Allergies

- Bee Venom causes shortness of breath

■ Medications

- Metformin 1000 mg PO BID
- Sitagliptin 100 mg PO daily
- Lantus 42 units daily
- Clopidogrel 75 mg PO daily
- Aspirin 325 mg PO daily
- Rosuvastatin 20 mg PO QHS
- Lisinopril 40 mg PO daily
- Metoprolol succinate 50 mg PO daily
- Gabapentin 1200 mg PO QHS
- Tamsulosin 0.4 mg PO daily

Family History and Social History

■ Family History

- ❑ Mother: Type 2 DM, Stroke, Dementia
- ❑ Father: Type 2 DM, CAD
- ❑ 2 Brothers: Type 2 DM

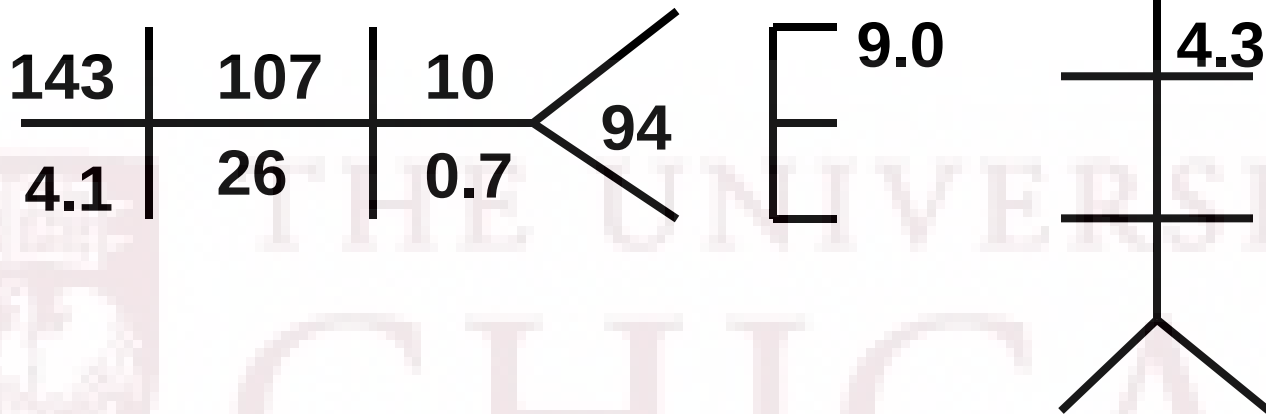
■ Social History

- ❑ Lives with his wife
- ❑ Superintendent of a school district
- ❑ Current every day smoker, 1ppd x 40 years
- ❑ No alcohol or illicit drug use

Physical Exam

- BP: **163/93** Pulse: 80 Height: 188 cm (6' 2") Weight: 118.253 kg (260 lb 11.2 oz)
- Constitutional: He is oriented to person, place, and time. He appears well-developed and well-nourished. **He is not Cushingoid appearing.**
- Head: Normocephalic and atraumatic.
Right Ear: External ear normal.
Left Ear: External ear normal.
- Nose: Nose normal.
- Mouth/Throat: Oropharynx is clear and moist.
- Eyes: Conjunctivae and EOM are normal. Pupils are equal, round, and reactive to light.
- Neck: Normal range of motion. Neck supple. No tracheal deviation present. No thyromegaly present.
- Cardiovascular: Normal rate, regular rhythm, normal heart sounds and intact distal pulses.
- No murmur heard.
- Pulmonary/Chest: Effort normal and breath sounds normal. **Marked bilateral gynecomastia.**
- Abdominal: Soft. Bowel sounds are normal. He exhibits no distension and no mass. There is no tenderness. There is no rebound and no guarding. **No violaceous striae**
- Genitourinary: Penis normal. Right testis shows no mass, no swelling and no tenderness. Right testis is descended. Left testis shows no mass, no swelling and no tenderness. Left testis is descended.
Musculoskeletal: Normal range of motion. He exhibits no edema and no tenderness.
Neurological: He is alert and oriented to person, place, and time. He has normal reflexes. No cranial nerve deficit.
- Skin: Skin is warm and dry. No rash noted. No erythema. **No ecchymosis**
Psychiatric: He has a normal mood and affect. His behavior is normal. Thought content normal.

Laboratory Studies



Total Testosterone = 171 ng/dL (180-800)

Te Binding Globulin = 30 nmol/L (10-80)

Free Testosterone (calc) = 54 pg/dL

FSH = 42.4 mIU/mL

LH = 13.4 mIU/mL

Estradiol = 17 pg/mL

Laboratory Studies

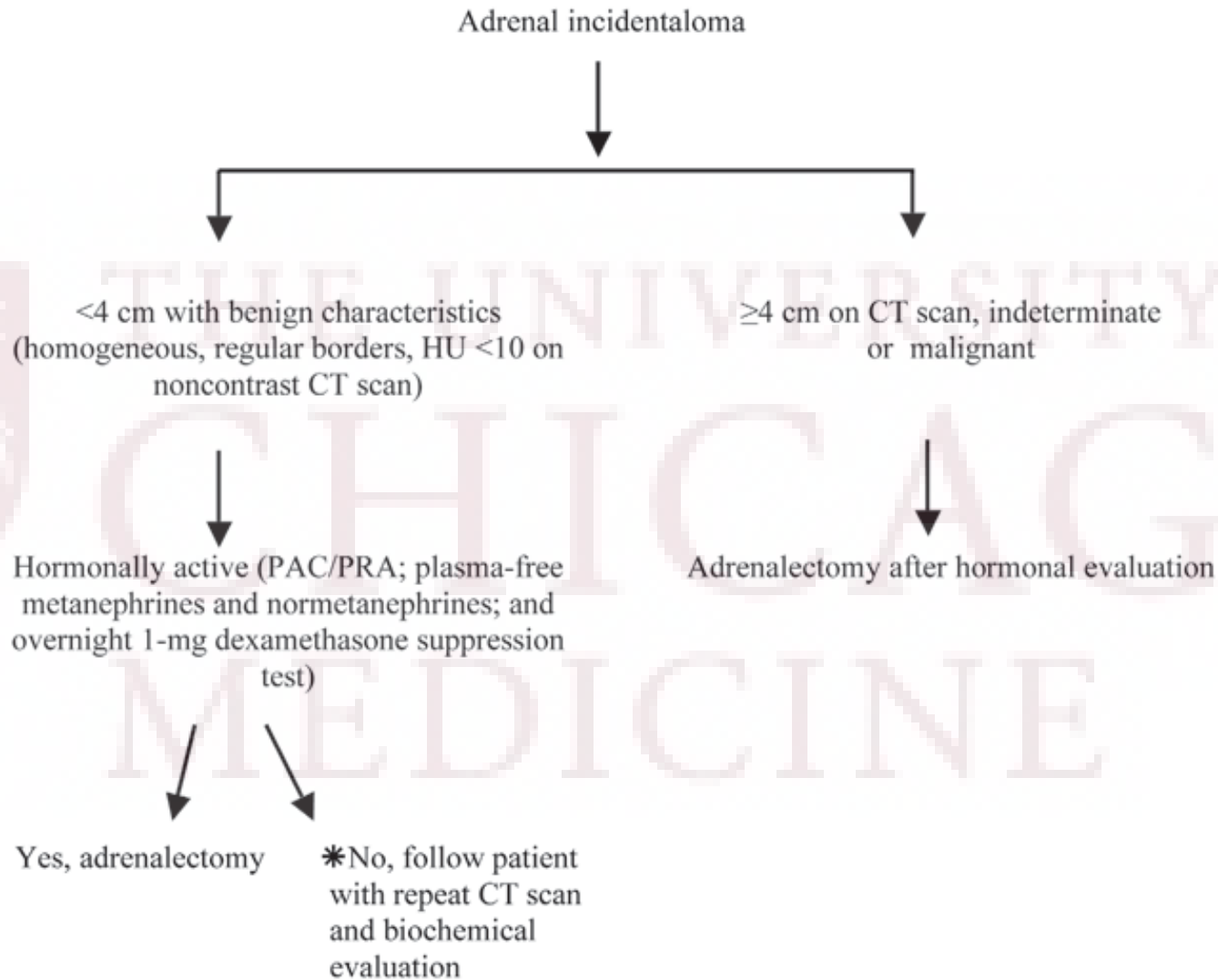
- **Plasma Normetanephrine:**
 - 0.61 nmol/L ref range: <0.90
- **Plasma Metanephrine:**
 - 0.21 nmol/L (ref range: <0.50)
- **ACTH = <5 pg/mL**
- **Midnight salivary cortisol:**
 - 182 ng/dl (ref range <100)
- **Aldosterone <4.0 ng/dL**
- **Renin <0.6 ng/mL/h**

ACTH-Independent Cushing's Syndrome

- Several investigators have shown that elevated nighttime cortisol levels appear to be the earliest and most sensitive markers for Cushing syndrome with sensitivity and specificity approaching 90% to 95%*

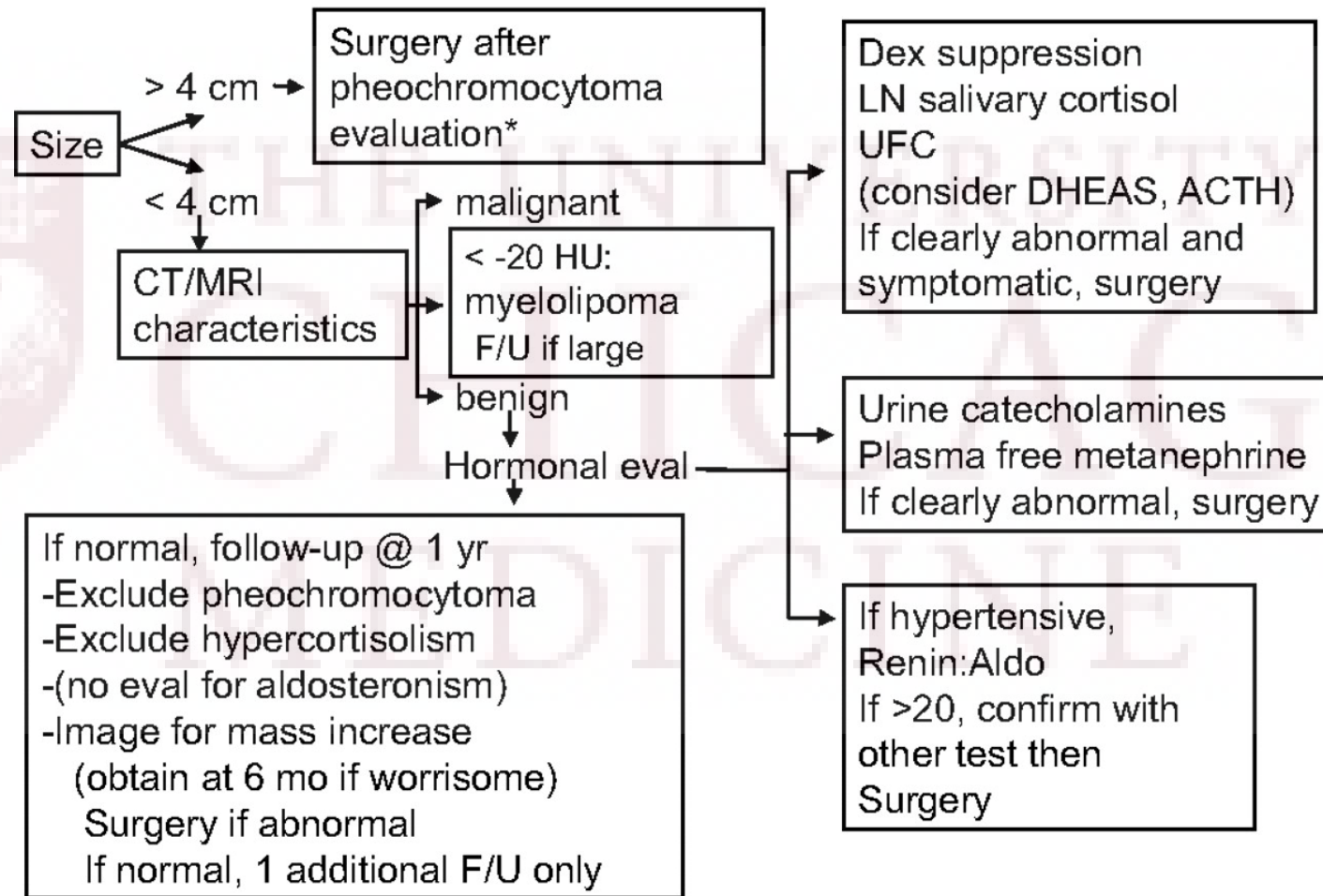
*Findling JW, Raff H. Cushing's syndrome: important issues in diagnosis and management. *J Clin Endocrinol Metab.* 2006;91:3746-3753.

AACE/AAES Guidelines



Suggested evaluation of an incidentally found adrenal mass.

Evaluation of an adrenal incidentaloma



NIH State of the Science Conference

- Hormone-secreting or large (>6 cm) masses should be surgically removed.
- Silent masses smaller than 3 cm should be imaged further. No further followup is needed if the mass is lipid-rich based on unenhanced and enhanced CT or chemical shift MR imaging. No further followup is needed if a concordant image with CT is obtained with NP-59 nuclear scan. If the mass is lipid-poor, it could still be an adenoma; in this case, followup CT scans should be performed to evaluate for change in size at 6, 12, and 18 months. A malignant tumor is likely to grow, whereas a benign tumor will remain stable.
- Masses between 3 and 6 cm should be evaluated by radiographic and scintigraphic techniques to ascertain whether they are potentially benign or malignant. If the imaging features are consistent with a benign adenoma, the patient should be observed if 50 years of age or older. Surgical resection should be considered if the patient is younger than 50 years.

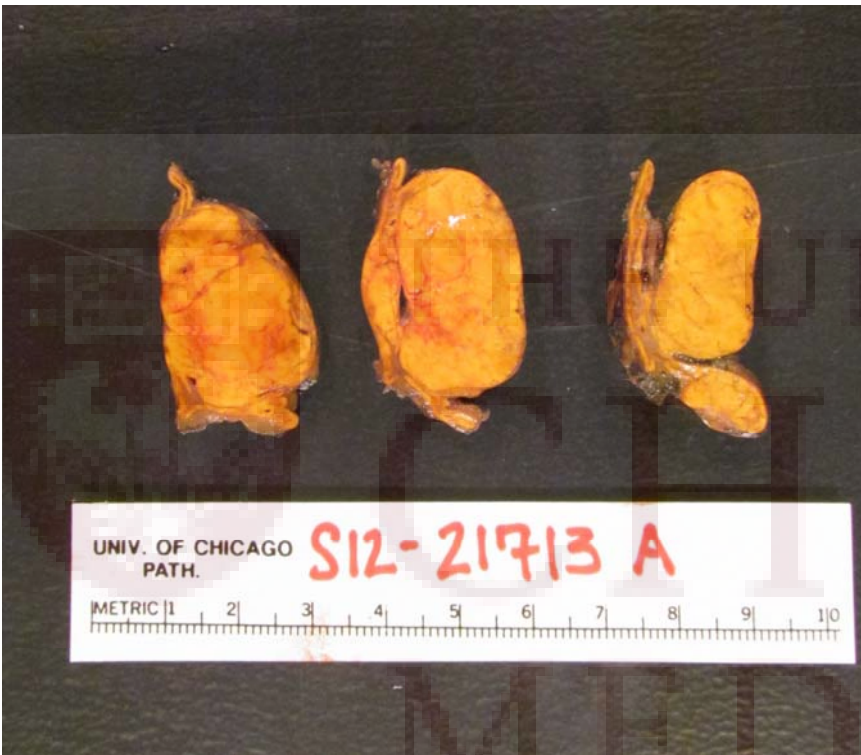
Similar Case

- 69 year-old woman who had a 10-15 year history of controlled hypertension, back pain associated with osteoporosis, easy bruising, and truncal obesity. Her medications included conjugated estrogens.
- Physical examination revealed classical features of CS. She had a raised blue lesion on her buccal mucosa. Plasma cortisol concentrations were elevated at 36 (a.m.) and 38 (p.m.) microg/dL.
- Urinary free cortisol was normal at baseline (65 microg/24 hours) but failed to suppress adequately in response to the low-dose dexamethasone suppression test (75 microg/24 hours).
- The plasma ACTH concentration was undetectable. Plasma cortisol concentrations failed to suppress (37 microg/dL) with an 8 mg overnight dexamethasone test.
- A CT scan of the abdomen revealed bilateral adrenal masses.
- Adrenal venous sampling showed cortisol secretion from both adrenals.
- The patient underwent bilateral adrenalectomy with pathology confirming bilateral adenomas

Back to Our Patient

- Laparoscopic bilateral adrenalectomy
 - Felt remarkably well after surgery
 - Initially required little insulin but insulin requirements have increased postoperatively
 - Post op stress dose steroids were titrated down discharged on 40 and 20 with plan for 20/10, now on 25 and 15
 - Fludrocortisone 0.1 mg PO daily → 0.05
-

Pathology Gross Photographs



3.1 x 2.0 x 2.4 cm golden-yellow to orange nodule (right adrenal nodule)



moderately firm, 5.6 x 3.4 x 2.3 cm yellow-to-orange nodularity (left adrenal nodule)

References

