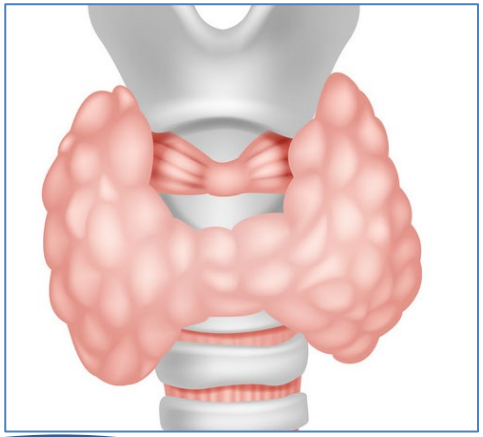
Spring CME Event
May 25, 2022

Nicole Zern MD, FACS
Endocrine Surgery
General & Surgical Specialists

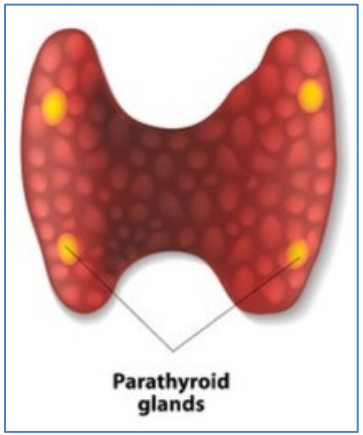
Introduction

- Undergraduate: University of Kansas
- Emory University Medical School
- University of Washington General Surgery Residency
- University of Sydney Endocrine Surgery Fellowship
- Faculty- University of Washington
- Valley Medical Center 2022

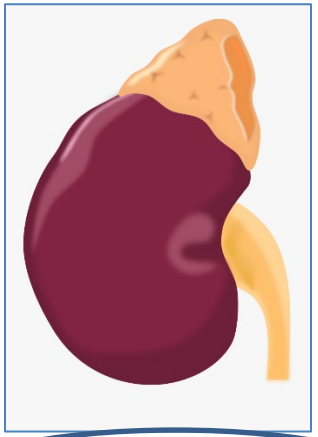
The Role of the Endocrine Surgeon



- Thyroid Nodules
- Multinodular Goiter
- Graves Disease/Toxic MNG/Toxic adenoma
- Thyroid cancer
- Locally metastatic thyroid cancer



- Primary Hyperparathyroidism
- Secondary Hyperparathyroidism
- Tertiary Hyperparathyroidism
- Parathyroid cancer
- MEN1, MEN2



- Adrenal nodules/tumors
- Cushings syndrome
- Pheochromocytoma
- Primary aldosteronism
- Incidentalomas

WE ARE valley

Thyroid Nodules

- Lab evaluation: TSH, Free T4
- Thyroid Ultrasound (CT rarely needed)
  - Features to prompt FNA:
    - Size
    - Hypoechoic
    - Microcalcifications
    - Irregular borders
    - Taller than wide

AMERICAN THYROID ASSOCIATION®

FOUNDED 1923

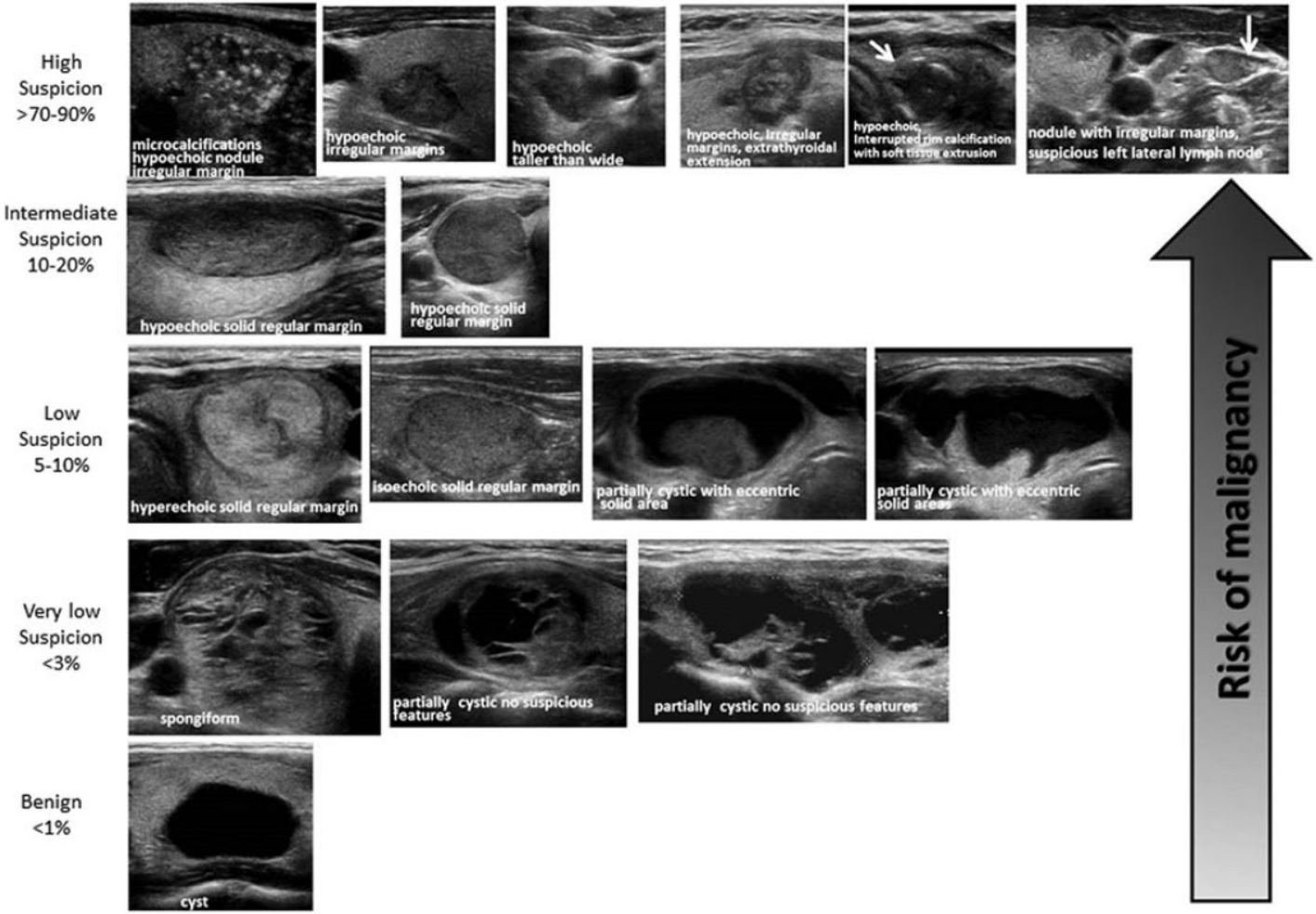
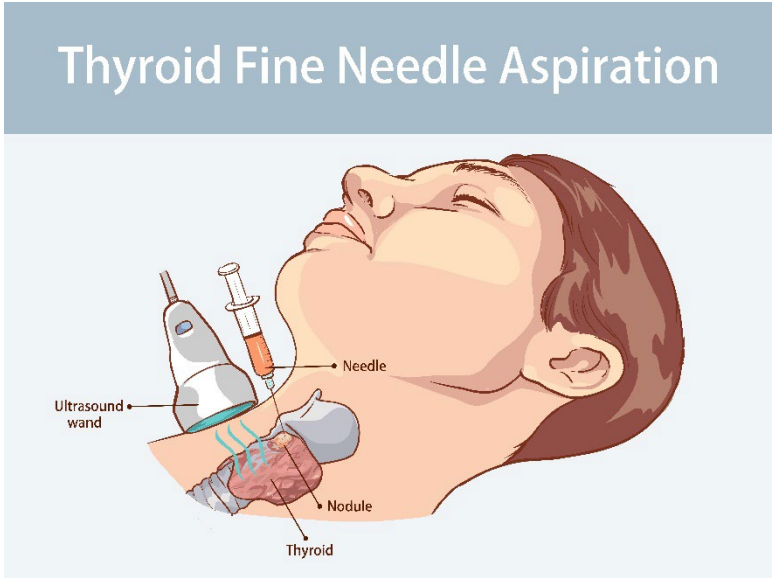


FIG. 2. ATA nodule sonographic patterns and risk of malignancy.

Thyroid FNA



The Endocrine Surgeon…

- Evaluation of thyroid nodules
- Performance of FNA
- Interpretation of results
- Counseling for or against surgery

Thyroid Nodule Cytology

Bethesda Class	Diagnostic Category	Risk of Malignancy
I	Nondiagnostic/Unsatisfactory	1-4%
II	Benign	0-3%
III	Atypia of undetermined significance/ Follicular lesion of undetermined significance (AUS/FLUS)	AUS 5-15% FLUS 15-30%
IV	Suspicious for follicular neoplasm	15-50%
V	Suspicious for malignancy	60-75%
VI	Malignant	97-99%

Observation

???

Surgery

Cibas and Ali 2009 Am J Clin Pathol;132

Molecular Testing

2015 American Thyroid Association Management Guidelines for Adult Patients with Thyroid Nodules and Differentiated Thyroid Cancer

The American Thyroid Association Guidelines Task Force on Thyroid Nodules and Differentiated Thyroid Cancer

Bryan R. Haugen,[1,*] Erik K. Alexander,[2] Keith C. Bible,[3] Gerard M. Doherty,[4] Susan J. Mandel,[5] Yuri E. Nikiforov,[6] Furio Pacini,[7] Gregory W. Randolph,[8] Anna M. Sawka,[9] Martin Schlumberger,[10] Kathryn G. Schuff,[11] Steven I. Sherman,[12] Julie Ann Sosa,[13] David L. Steward,[14] R. Michael Tuttle,[15] and Leonard Wartofsky[16]

Afirma

GENOMIC SEQUENCING CLASSIFIER

ThyroSeq®

Thyroid Genomic Classifier

■ **RECOMMENDATION 15**

(A) For nodules with AUS/FLUS cytology, after consideration of worrisome clinical and sonographic features, investigations such as repeat FNA or molecular testing may be used to supplement malignancy risk assessment in lieu of proceeding directly with a strategy of either surveillance or diagnostic surgery. Informed patient preference and feasibility should be considered in clinical decision-making.

WE ARE valley

Afirma
THYROID FNA ANALYSIS

VV20008

REPORT STATUS: Final
PAGES: 1 of 2
CLIENT ID: 97
AFIRMA REQ: R123

PATIENT REPORT

Sample Patient Report

PATIENT INFORMATION

PATIENT: John Doe | **DOB:** 01 Jan 1973 | **GENDER:** M | **LAB ID:** L123 | **MRN:** M123

COLLECTION DATE	18 Sep 2019	**FACILITY NAME**	University Hospital of Anytown		
RECEIVED DATE	20 Sep 2019	**SUBMITTING PHYSICIAN**	Jane Demo	**PHONE**	(555) 555-5555
REPORT DATE	26 Sep 2019	**TREATING PHYSICIAN/CC**	---	**PHONE**	---

CLINICAL HISTORY: History of Cancer: Family History of Thyroid Cancer: No, History of I(131) radiation or external radiation therapy: No, Suspicious Ultrasound Characteristics: Nodule A: Hypoechoic, Solid: >95% solid

RESULTS

Nodule: A 1.45 cm, Lower Right

CYTOPATHOLOGY

I	II	III	IV	V	VI
Non Diagnostic	Benign	**Atypia of Undetermined Significance**	Suspicious for Follicular Neoplasm	Suspicious for Malignancy	Malignant

Cytopathology Diagnosis: Indeterminate - Atypia of Undetermined Significance

Diagnostic Comments: These features are best categorized as atypia of undetermined signficance.

Microscopic Description: The cytologic and cell block preparations are sparsely cellular and contain only microfollicles and scant colloid.

AFIRMA GENOMIC SEQUENCING CLASSIFIER

Suspicious (Risk of Malignancy ~50%)

MTC: Negative
Parathyroid: Negative

AFIRMA XPRESSION ATLAS

BRAF:p:K601E c.1801A>G

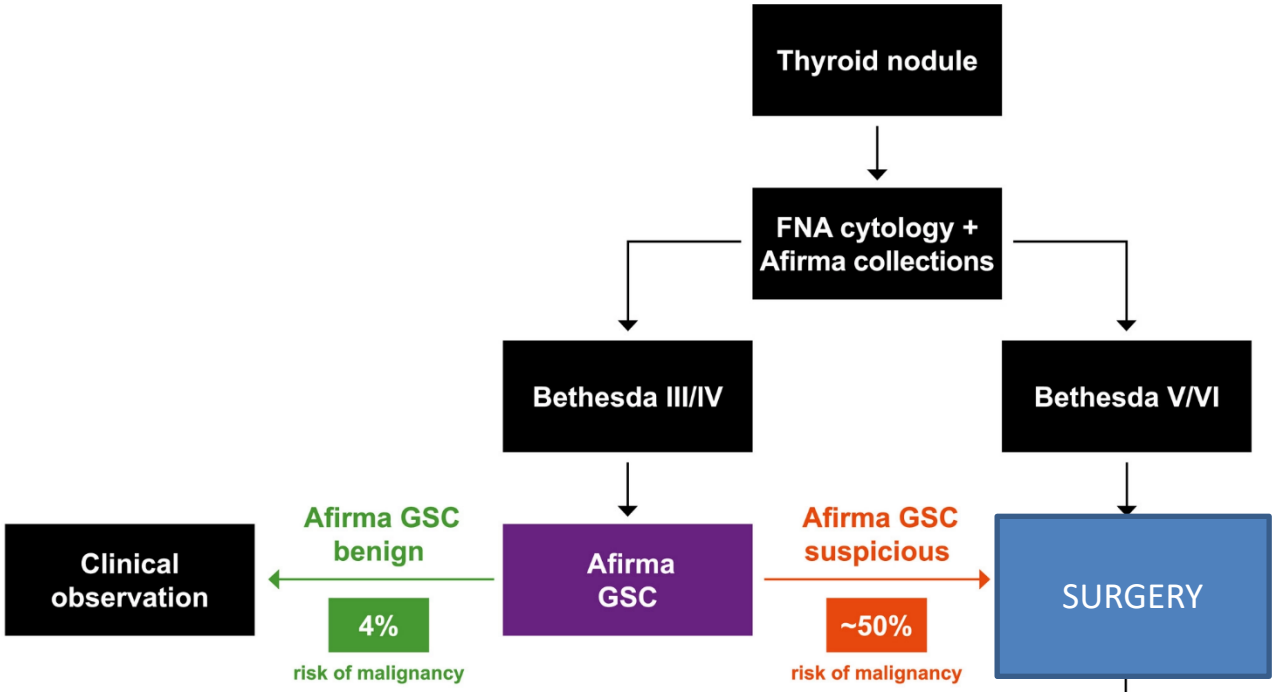
***BRAF*:p:V600E c. 1799T>A:** Negative
***RET/PTC1, RET/PTC3*:** Not Detected

Clinical Relevance	Risk of Malignancy	Associated Neoplasm Type	FDA Approved Therapy[#]
Potential clinical significance in thyroid cancer	~50%[11]	Follicular neoplasms (FA, NIFTP, FVPTC, FTC)	No alteration-specific therapy currently approved

RESULTS INTERPRETATION

The result of this 1.45cm Bethesda III nodule A is Afirma GSC Suspicious and *BRAF*:p:K601E c.1801A>G positive which suggests a risk of cancer of ~50%.[11] This genomic alteration is associated with follicular neoplasms (FA, NIFTP, FVPTC, FTC) and a *RAS*-like profile, which includes rates of lymph node metastases and extrathyroidal extension that are lower than *BRAF* V600E-like neoplasms, but higher than Non-*BRAF*-Non-*RAS*-like neoplasms.[9,10] Clinical correlation and surgical resection should be considered.

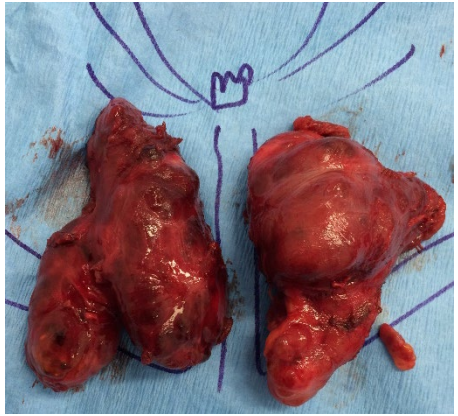
WE ARE valley

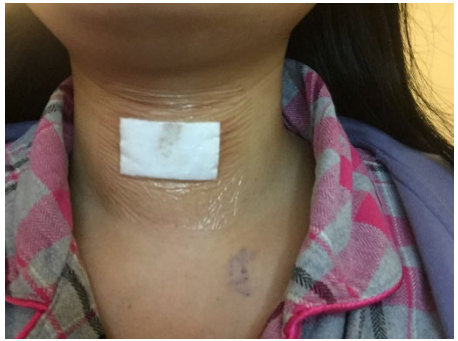

Thyroid nodule
FNA cytology + Afirma collections
Bethesda III/IV
Bethesda V/VI
Afirma GSC benign
Clinical observation
4%
risk of malignancy
Afirma GSC
Afirma GSC suspicious
~50%
risk of malignancy
SURGERY

AMERICAN THYROID ASSOCIATION
FOUNDED 1923

Thyroid Surgery

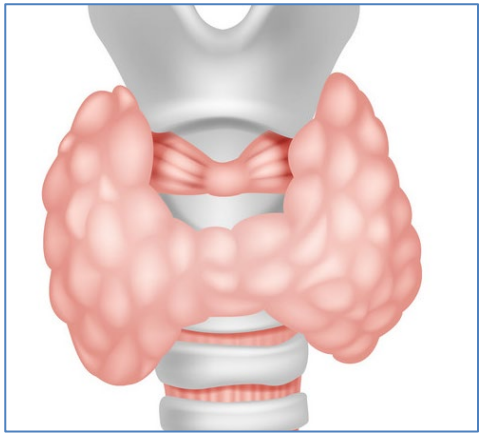
(B) For patients with thyroid cancer >1 cm and <4 cm without extrathyroidal extension, and without clinical evidence of any lymph node metastases (cN0), the initial surgical procedure can be either a bilateral procedure (near-total or total thyroidectomy) or a unilateral procedure (lobectomy). Thyroid lobectomy alone may be sufficient initial treatment for low-risk papillary and follicular carcinomas; however, the treatment team may choose total thyroidectomy to enable RAI therapy or to enhance follow-up based upon disease features and/or patient preferences.



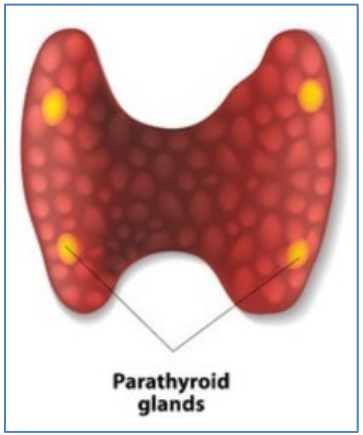


- Hemithyroidectomy (Lobectomy)
- Total Thyroidectomy
- Lateral/Central Neck Dissection

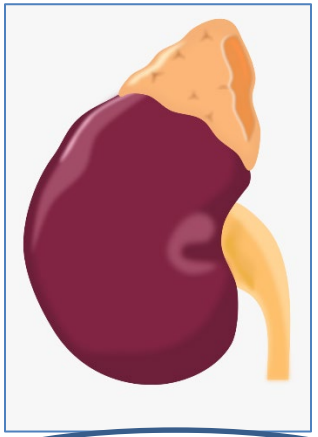
WE ARE valley



- Thyroid Nodules
- Multinodular Goiter
- Graves Disease/Toxic MNG/Toxic adenoma
- Thyroid cancer
- Locally metastatic thyroid cancer

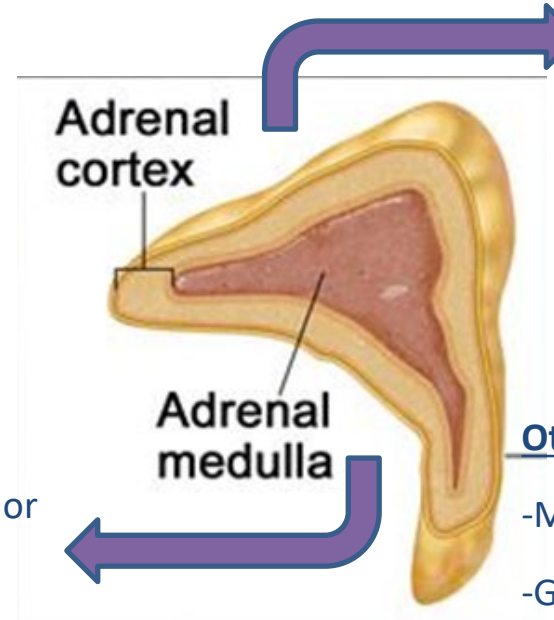


- Primary Hyperparathyroidism
- Secondary Hyperparathyroidism
- Tertiary Hyperparathyroidism
- Parathyroid cancer
- MEN1, MEN2



- Adrenal nodules/tumors
- Cushings syndrome
- Pheochromocytoma
- Primary aldosteronism
- Incidentalomas

Adrenal Gland Tumors



<u>Cortex Tumors:</u> Benign or Malignant

-Non-functional

-Excess Aldosterone= <u>Conn's Syndrome</u>

-Excess Cortisol = <u>Cushings Tumor</u>

<u>Medulla Tumors:</u>

-Excess adrenaline = <u>Pheochromocytoma</u> (benign or malignant)

-Children = Neuroblastoma (malignant)

<u>Other Tumors:</u>

-Myelolipoma

-Ganglioneuroma

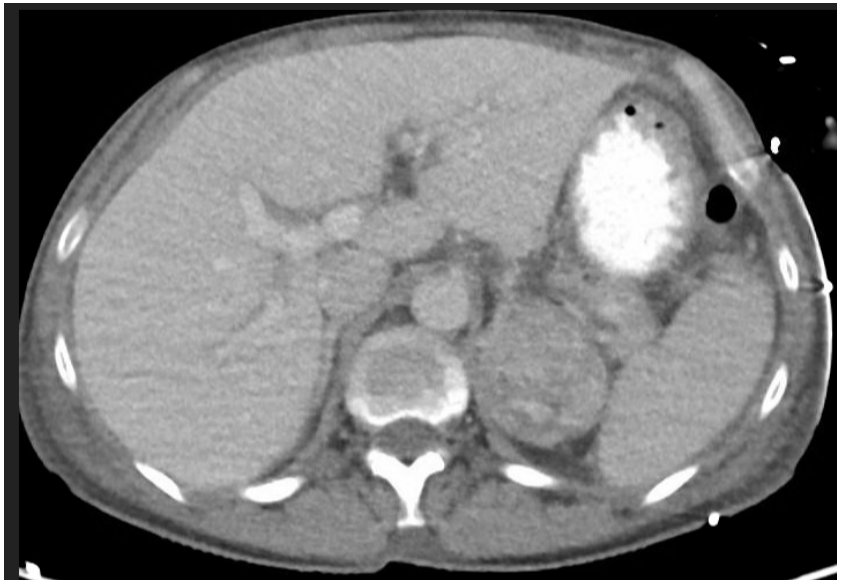
-Cyst

-Metastatic cancer

Adrenal “Incidentaloma”

- ~2% of CT imaging
- ~10% functional

- Risk of cancer:
  - <4 cm = 2%
  - 4-6 cm = 6%
  - >6 cm = 25%



endocrine reviews

Endocr Rev. 2020 Dec; 41(6): 775–820.
Published online 2020 Apr 8. doi: 10.1210/endrev/bnaa008
PMCID: PMC7431180
PMID: 32266384

Adrenal Incidentaloma

Mark Sherlock,[1,2] Andrew Scarsbrook,[3] Afroze Abbas,[4] Sheila Fraser,[5] Padiporn Limumpornpetch,[6] Rosemary Dineen,[1,2] and Paul M Stewart[6]

WE ARE valley

SUMMARY OF TESTS FOR EVALUATION OF INCIDENTAL ADRENAL MASS			
QUESTION	**BEST TEST**	**ALTERNATIVE TEST**	**DIAGNOSIS**
Is it functioning?	Plasma fractionated metanephrines	24-h urine for catecholamines, metanephrines, VMA	Pheochromocytoma
	-mg dexamethasone suppression test	24-h urine for cortisol or Midnight salivary cortisol	Hypercortisolism
	Serum potassium		Hyperaldosteronism
	Plasma renin/plasma aldosterone ratio		

SCORE curriculum. American College of Surgeons.

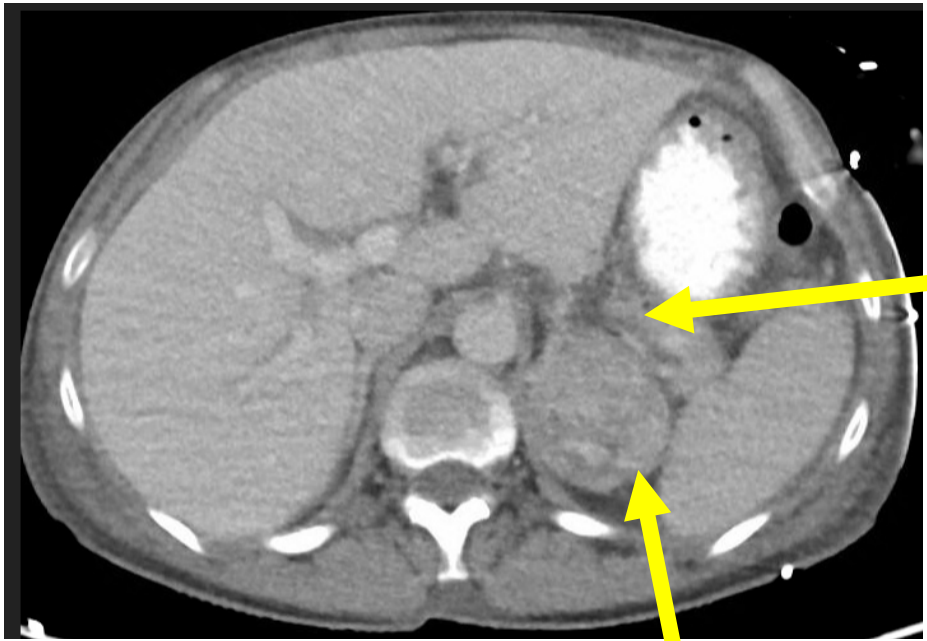
Indications for Adrenal Surgery

- Adrenal tumor
  - Functional
  - Size: >4 cm or significant growth
    - Symptomatic
    - Metastasis

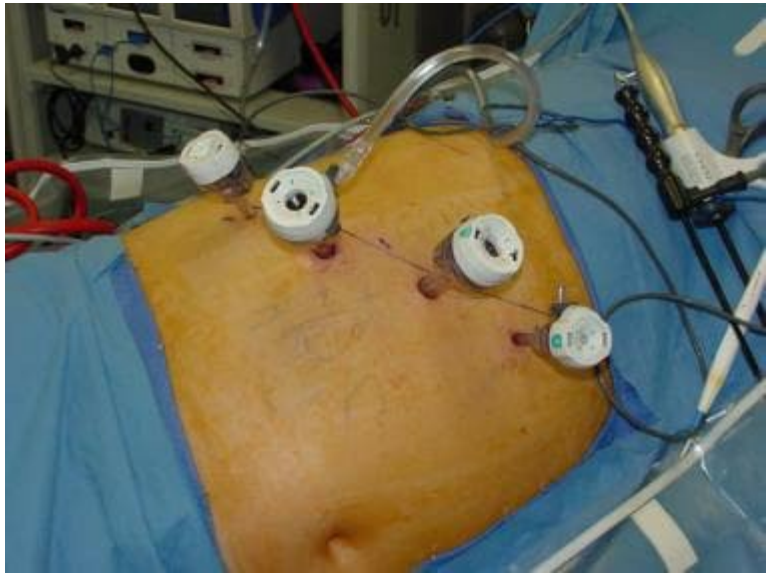
The Endocrine Surgeon…

- Alpha/beta blockade for pheochromocytoma resection
- Coordination of adrenal venous sampling
- Postoperative steroid taper
- Coordination of genetic testing
- Patient Education

Surgical Approach to the Adrenal Gland



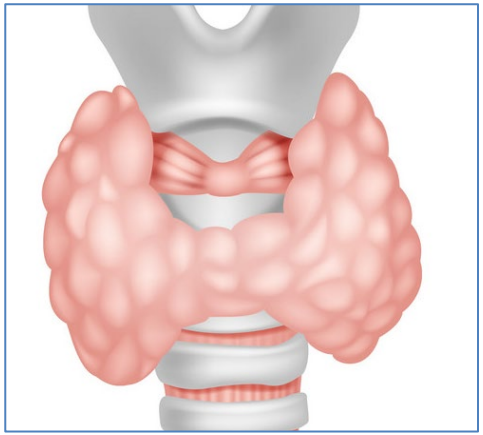
ANTERIOR



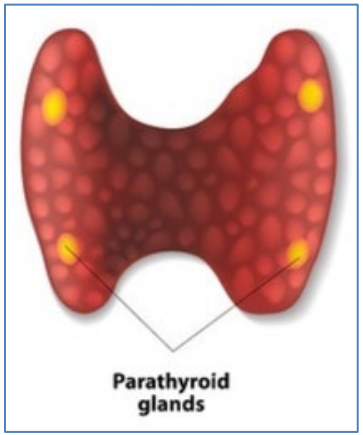
POSTERIOR

Medscape.

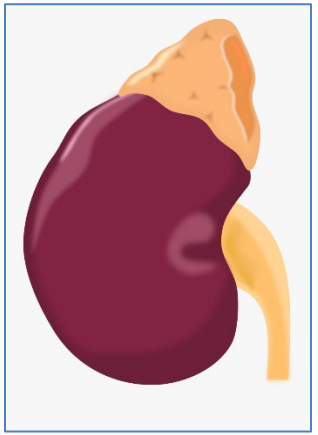
The Role of the Endocrine Surgeon



- Thyroid Nodules
- Multinodular Goiter
- Graves Disease/Toxic MNG/Toxic adenoma
- Thyroid cancer
- Locally metastatic thyroid cancer



- Primary Hyperparathyroidism
- Secondary Hyperparathyroidism
- Tertiary Hyperparathyroidism
- Parathyroid cancer
- MEN1, MEN2



- Adrenal nodules/tumors
- Cushings syndrome
- Pheochromocytoma
- Primary aldosteronism
- Incidentalomas

WE ARE valley

Referrals and Consults

- EPIC-> General Surgery Referral

General and Surgical Specialists
Medical Arts Center Suite 530
Phone: 425-690-3433
Fax: 425-690-9433

Nicole Zern MD, FACS
Nicole_Zern@valleymed.org
Text or Call anytime: 402-429-0989
Voalte, EPIC messaging, Teams

Patients can find me on:
AAES Surgeon Finder
Find an Endocrine Surgeon (endocrinesurgery.org)