

RADIOLOGY PARTNERS BEST PRACTICES

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Incidental Thyroid Nodule (ITN)

PATIENT AGE	NODULE SIZE	FOLLOW-UP GUIDELINES
≤ 18 years	Any	Consider Ultrasound
>18 years and < 35 years	≥ 1 cm	Ultrasound
≥ 35 years	≥ 1.5 cm	Ultrasound
Locally invasive or abnormal LNs	Any	Ultrasound
Heterogeneous, enlarged thyroid	Any	Ultrasound
Increase uptake on PET	Any	Ultrasound and Recommend Biopsy
Significant co-morbidities or limited life expectancy	Any	No follow-up (unless clinically warranted)

Note: If an ITN does not meet the criteria for further evaluation, it may or may not be mentioned in the body of the report at the radiologist's discretion, but should **not** be mentioned in the Impression. If mentioned in the body of the report, the ITN should be identified as “**not clinically significant**” and the statement should be made, “**No follow-up imaging recommended.**”

Note: For multiple thyroid nodules, above recommendations are to be applied to the largest nodule

Note: These recommendations do not apply to pts with increased risk for thyroid CA or with symptomatic thyroid disease

ITN BPRs based on ACR White paper: J Am Coll Radiol. 2015 Feb;12(2): 143-50 (Available on RadWiki)

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Abdominal Aortic Aneurysm (AAA)*

Infrarenal Aortic Diameter (cm)	RECOMMENDED FOLLOW-UP
≤ 2.0 cm	Normal diameter of infrarenal aorta
2.1 cm to 2.5 cm	Not AAA. If reported AND described as dilated, no f/u rec
2.6 cm to 2.9 cm	Every 5 years ¹
3.0 cm to 3.4 cm	Every 3 years
3.5 cm to 3.9 cm	Every 2 years
4.0 cm to 4.4 cm	Every 12 months, Recommend vascular consultation
4.5 cm to 5.4 cm	Every 6 months, Recommend vascular consultation
≥ 5.5 cm	Referral to vascular specialist

*Does not apply to Suprarenal Aorta

¹For aortas of maximum diameter 2.6--2.9 cm meeting the criteria for AAA ($\geq 1.5 \times$ proximal normal segment; no f/u if $< 1.5 \times$ proximal normal segment)

- **How to measure aorta:** Outer wall to outer wall, maximum diameter of aorta, perpendicular to blood flow
- **Definition of AAA:** Focal dilatation of the abdominal aorta that is ≥ 3 cm in maximum diameter or 2.6 – 2.9 cm when $\geq 1.5 \times$ proximal normal segment. **(No follow-up for aortas < 2.6 cm).**

Recommended: The term “ectasia” not be used as it is ambiguous, especially when recommending f/u of a AAA.

Enlarging Fusiform AAA: Recommend vascular consultation if enlarges ≥ 0.5 cm in 6 months or ≥ 1 cm in 1 year.

Saccular AAA of any size: Recommend vascular consultation.

AAA BPRs based on ACR White paper: J Am Coll Radiol 2013;10 (10):789-794. (Available on RadWiki)

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Incidental Pulmonary Nodules on CT (Complete & Incomplete Chest CTs)

Single Solid Nodule

Single Solid Nodule	NODULE SIZE (average diameter, measured in mm increments)			
	Low Risk Nodule	High Risk Nodule (suspicious morphology and/or located in upper lobe)	6-8 mm (100-250 mm ³)	≥ 9 mm (≥ 250 mm ³)
Low Risk Patient (Usually not applicable, see note below)	No routine follow-up	No routine follow-up	CT at 6-12 months, then consider CT at 18-24 months	Complete Chest CT: Consider CT at 3 months, PET/CT, or tissue sampling Incomplete Chest CT: Prompt complete chest CT
Unknown Risk Patient		If patient is low risk, no routine follow-up. If patient is high risk, optional CT at 12 months; if stable at 12 months, no further f/u.	CT at 6-12 months, then CT at 18-24 months (For low risk patient CT 18-24 months is optional)	
High Risk Patient (see note below)		Optional CT at 12 months. If stable at 12 months, no further f/u.	CT at 6-12 months, then CT at 18-24 months	

Multiple Solid Nodule

Multiple Solid Nodules (f/u based on most suspicious nodule)	NODULE SIZE (average diameter, measured in mm increments)			
	Low Risk Nodule	High Risk Nodule (suspicious morphology and/or located in upper lobe)	≥ 6 mm (≥ 100 mm ³)	If a most suspicious nodule is present and ≥ 9 mm (≥ 250 mm ³)
Low Risk Patient (Usually not applicable, see note below)	No routine follow-up	No routine follow-up	CT at 3-6 months, then consider CT at 18-24 months	CT at 3-6 months, then CT at 18-24 months (For low risk patient CT 18-24 months is optional) OR Consider CT at 3 months, PET/CT, or tissue sampling
Unknown Risk Patient		If patient is low risk, no routine follow-up. If patient is high risk, optional CT at 12 months; if stable at 12 months, no further f/u.	CT at 3-6 months, then CT at 18-24 months (For low risk patient CT 18-24 months is optional)	
High Risk Patient (see note below)		Optional CT at 12 months. If stable at 12 months, no further f/u.	CT at 3-6 months, then CT at 18-24 months	

Note: from the reading radiologist's perspective, the patient can only be Unknown Risk or High Risk. Only the referring physician has enough information to determine that a patient is Low Risk.

Note: high risk patients include individuals with a history of smoking, emphysema, pulmonary fibrosis, family history of lung cancer, and/or other known risk factors.

[Reference: Radiology. 2017 Jul; 284\(1\):228-243](#)

Subsolid Nodules

Sub Solid Nodules	NODULE SIZE (average diameter, measured in mm increments)	
	0-5 mm (<100 mm ³)	≥6 mm (≥100 mm ³)
Single Ground Glass Nodule	No routine follow-up. (For 5 mm nodule with suspicious morphology consider f/u CT at 2 and 4 years. Suspicious = bubbly lucencies/cystic areas. If solid component(s) or growth develops, consider resection.)	CT at 6-12 months to confirm persistence, then CT every 2 years until 5 years, if stable. (Recommend first f/u CT at 6 months for ≥ 11 mm nodules and for ≥ 6 mm nodules with bubbly lucencies.) If solid component(s) or growth develops, consider resection.
Single Part Solid Nodule	No routine follow-up. (For 5 mm nodule with suspicious morphology consider f/u CT at 2 and 4 years. Suspicious = bubbly lucencies/cystic areas. If solid component(s) or growth develops, consider resection.) (Part solid nodule < 6 mm cannot be reliably defined as such and should be treated similar to ground glass nodule.)	CT at 3-6 to confirm persistence* If unchanged and solid component remains < 6 mm, annual CT should be performed for 5 years. For persistent suspicious part solid nodules: recommend PET/CT (if solid component ≥ 9 mm), biopsy or resection (suspicious= lobulated or spiculated margins, cystic areas, growing solid component, or solid component ≥ 6 mm) *If largest (not average) diameter ≥ 16 mm, no short term CT. Recommend PET/CT, biopsy, or resection.
Multiple Sub Solid Nodules	CT at 3–6 months. If stable, consider CT at 2 and 4 years.	CT at 3–6 months. Subsequent management based on the most suspicious nodule(s). *If most suspicious nodule present is part solid and ≥ 16 mm, consider PET/CT, biopsy or resection

Reference: Radiology. 2017 Jul; 284(1):228-243; *Chest. 2013 May; 143(5)(Suppl):e93S-e120S

Perifissural Nodules (PFNs)

Type of Nodule	Characteristics	Management Recommendations
Typical PFNs and benign juxtaleural nodules (intrapulmonary lymph nodes)	• Well circumscribed, smooth margins, solid, homogeneous • Commonly triangular or oval/lentiform in shape • In contact with or closely related to a fissure or pleural surface, often showing a septal attachment • Majority < 5 mm, but can measure larger; can increase or decrease in size • Usually located below carina	No routine follow-up

Note: Juxtaleural nodules, if not consistent with IPLN, should be managed as a solid nodule, per Fleischner Guidelines.

Reference: [Radiology](#). 2017 Jul; 284(1):228-243; [Radiology](#). 2012 Nov; 265(2):611-6; [Radiology](#). 2010 Mar; 254:949-56

Nodules Detected on Incomplete Chest CTs (Abdomen, Neck, Heart)

Nodule Size	≥ 9 mm (> 250 mm ³)		All other sizes (solid & subsolid)
Density	Solid	Subsolid	
Recommendation	Prompt complete chest CT	Manage as if detected on complete chest CT, per Fleischner Guidelines	

Reference: [Radiology](#). 2017 Jul; 284(1):228-243

Guidelines for Measuring and Reporting Incidental Pulmonary Nodules on CT

- **Guidelines for solid and sub solid nodules do not apply to the following:** Patients younger than 35 years, immunocompromised patients, and patients with known primary cancer. F/u in patients with significant comorbidities as clinically warranted. For lung cancer screening, adhere to Lung-RADS guidelines.
- Evaluate nodules on all planes (axial, coronal and sagittal)
- Measure nodules < 10 mm on lung windows (sharp filter)
- Measurements should be performed on axial plane unless maximal dimension on coronal or sagittal plane
- Both axes should be measured on same image which shows maximal dimension
- Nodules < 10 mm: Report as average of maximal long-axis and perpendicular maximal short-axis measurements on same image
- Nodules $\geq$ 10 mm (average diameter): Report as both long- and perpendicular short-axis measurements
- Measurements and averages reported as rounded to nearest whole millimeter
- Micronodules < 3 mm should not be measured
- Part solid nodules, overall total nodule size: Report as per above guidelines
- Part solid nodules, solid component: Report only maximum diameter and only if > 3 mm. (This may be on different or same image as overall total nodule maximum dimension.)
- Spiculated nodules: Measure and report nodule core (do not include spiculations)

For lung nodules, include: location, density (solid, ground glass or part solid), size, margins and other relevant characteristics

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GENERAL REPORTING RECOMMENDATIONS: ADRENAL MASS

- Measurements are applied to maximum diameter of adrenal mass. Follow-up measurements should be in the same dimension.
- Guidelines for placement of ROI and measuring HU on CT:
 - Homogeneous adrenal mass: HU measurements should be in the center, the ROI encompassing about 2/3rd of the adrenal mass
 - Avoid calcifications, blood vessels, cystic or necrotic areas, hemorrhagic components and peripheral portions to prevent partial volume artifacts.
 - Heterogeneous adrenal mass: Measure most vascular component
 - Cyst on non contrast CT: Create high contrast window to confirm mass is homogeneous and measure central 2/3
- For bilateral adrenal masses, assess each mass separately.
- Work-up of adrenal mass in patients with serious comorbidities or limited life expectancy may be unnecessary, unless clinically warranted.

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Incidental Benign Adrenal Mass on **CT/MR**

Size	HU and other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	if contrast portal venous phase CT, ≤ 130 HU	probably benign	No follow-up imaging is recommended
Any Size	≤ 10 HU on noncontrast CT	lipid-rich adenoma	No follow-up imaging is recommended
< 4 cm	asymptomatic, macroscopic fat	myelolipoma	No follow-up imaging is recommended
< 4 cm	symptomatic (abdominal or flank pain not of other known etiology), macroscopic fat	myelolipoma	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
≥ 4 cm	macroscopic fat	myelolipoma	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
Any Size	calcification w/o associated mass or soft tissue component	benign	No follow-up imaging is recommended
Any Size	cyst	benign	No follow-up imaging is recommended
Any Size	signal loss compared with the spleen between in- and opposed-phase images on chemical shift MR	lipid-rich adenoma ¹	No follow-up imaging is recommended

1. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI

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Incidental Indeterminate Adrenal Mass on **CT**

Noncontrast CT, No prior imaging, No cancer history

Size	HU and other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	No follow-up imaging is recommended
≥ 1 - 2 cm	> 10 HU, homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	> 10 HU, heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	> 10 HU, homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4 cm	> 10 HU, heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm	> 10 HU	possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

Contrast portal venous phase CT, No prior imaging, No cancer history

Size	HU and other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	No follow up imaging is recommended
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up CT abdomen w/c. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	≤ 130 HU, homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	≤ 130 HU, heterogeneous OR > 130 HU, homogeneous or heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	≤ 130 HU, homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4 cm	≤ 130 HU, heterogeneous OR > 130 HU, homogeneous or heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection.

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Incidental Indeterminate Adrenal Mass on **MR**

W/O or W/C MR, No prior imaging, No cancer history

Size	Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	No follow-up imaging is recommended
≥ 1 - 2 cm	Homogeneous	probable adenoma	1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
≥ 1 - 2 cm	Heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, 1 year follow up adrenal washout CT. If stable ≥ 1 year, no further f/u imaging
> 2 - < 4 cm	Homogeneous	probable adenoma	Adrenal washout CT or chemical shift MRI
> 2 - < 4 cm	Heterogeneous	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT or chemical shift MRI
≥ 4 cm	Any	possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

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Non-Incidental Indeterminate Adrenal Mass on **CT**

W/O or W/C portal venous phase CT, No prior imaging, History of cancer other than RCC or HCC, no other metastatic disease

Size	HU on PV Phase	Type of Cancer, Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	Follow-up for stability in surveillance imaging for primary cancer
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, follow-up for stability in surveillance imaging for primary cancer
≥ 1 - < 4cm	≤ 130 HU	other than RCC or HCC, possible metastasis	Adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis)
≥ 1 - < 4cm	> 130 HU	other than RCC or HCC, possible pheochromocytoma or metastasis	Biochemical lab evaluation for pheochromocytoma. If lab values normal, adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis.)
≥ 4 cm		other than RCC or HCC, possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy.

W/O or W/C portal venous phase CT, No prior imaging, History of RCC or HCC, no other metastatic disease

Size	HU on PV Phase	Cancer Type, Suggested Diagnosis	Recommendation
< 1 cm	≤ 130 HU	probably benign	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC
< 1 cm	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC
≥ 1 - < 4cm	≤ 130 HU	RCC ¹ or HCC ¹ , possible metastasis	Staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 1 - < 4cm	> 130 HU	RCC ¹ or HCC ¹ , possible pheochromocytoma or metastasis	Biochemical evaluation for pheochromocytoma and staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 4 cm		RCC ¹ or HCC ¹ , possible metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Adrenal metastasis from RCC and HCC are commonly hypervascular and can have the same rapid washout characteristics as adenoma on adrenal washout CT. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI. PET-CT is of limited value in RCC and HCC as FDG uptake is variable in both.

RADIOLOGY PARTNERS BEST PRACTICES

Non-Incidental Indeterminate Adrenal Mass on **CT**

Contrast arterial/corticomedullary and portal venous/nephrographic phases of initial staging renal/liver mass protocol CT, History of RCC or HCC, no other metastatic disease:

Size	HU arterial (A) and venous (V) phases & other Characteristics	Suggested Diagnosis	Recommendation
< 1 cm	Any	probably benign	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC ¹
≥ 1 - < 4cm	≤ 100 HU arterial AND either venous = arterial ($\Delta < 5$ HU) or venous > arterial ($\Delta \geq 5$ HU), AND homogeneous	suggestive of adenoma	Follow-up for stability in surveillance imaging (CT/MR) for RCC/HCC ¹
≥ 1 - < 4cm	>100 HU arterial OR arterial > venous($\Delta \geq 5$ HU), OR heterogeneous	suspicious for metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection
≥ 4 cm		suspicious for metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. If > 100 HU arterial or > 130 HU venous, recommend biochemical lab evaluation for pheochromocytoma if not already done.

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Non-Incidental Indeterminate Adrenal Mass on CT

W/O or W/C portal venous phase CT, Prior imaging, No cancer history

Size	HU PV & other Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	≤ 130 HU, stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	> 130 HU, stable ≥ 1 year	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, no further f/u imaging
< 4 cm	≤ 130 HU, new or enlarging ¹	possible malignancy	Consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
< 4 cm	> 130 HU, new or enlarging ¹	possible pheochromocytoma, possible malignancy	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status prior to resection
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

W/O or W/C portal venous phase CT, Prior imaging, History of cancer, no other metastatic disease

Size	HU PV & other Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	≤ 130 HU, stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	> 130 HU, stable ≥ 1 year	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, no further f/u imaging
< 4 cm	≤ 130 HU, new or enlarging ¹	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
< 4 cm	> 130 HU, new or enlarging ¹	possible pheochromocytoma, possible metastasis	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status prior to biopsy
≥ 4 cm		possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

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Non-Incidental Indeterminate Adrenal Mass on **MR**

W/O or W/C MR, No prior imaging, History of cancer, no other metastatic disease

Size	Cancer Type	Suggested	Recommendation
< 1 cm	any	probably benign	Follow-up for stability in surveillance imaging for primary cancer
≥ 1 - < 4 cm	other than RCC or HCC	possible metastasis	Adrenal washout CT, chemical shift MRI or PET/CT (Consider PET/CT when morphological characteristics suggest metastasis)
≥ 1 - < 4 cm	RCC ¹ or HCC ¹	possible metastasis	Staging renal mass/liver mass CT protocol (includes arterial/corticomedullary and portal venous/nephrographic phases)
≥ 4 cm	other than RCC or HCC	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
≥ 4 cm	RCC ¹ or HCC ¹	possible metastasis	Consider biopsy or surgical evaluation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection

1. Adrenal metastasis from RCC and HCC are commonly hypervascular and can have the same rapid washout characteristics as adenoma on adrenal washout CT. Adrenal metastasis from clear cell RCC and HCC may contain intracellular lipid and mimic lipid-rich adenoma on chemical shift MRI. PET-CT is of limited value in RCC and HCC as FDG uptake is variable in both.

RADIOLOGY PARTNERS BEST PRACTICES

Non-Incidental Indeterminate Adrenal Mass on **MR**

W/O or W/C MR, Prior imaging, No cancer history

Size	Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	new or enlarging ¹	possible malignancy	Consider adrenal washout CT, chemical shift MRI or resection. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection
≥ 4 cm		possible malignancy	Surgical consultation. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to resection

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

W/O or W/C MR, Prior imaging, History of cancer, no other metastatic disease

Size	Characteristics	Suggested Diagnosis	Recommendation
< 4 cm	stable ≥ 1 year	probably benign	No further f/u imaging
< 4 cm	new or enlarging ¹	possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy
≥ 4 cm		possible metastasis	Consider PET-CT or biopsy. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy

1. Size change > 0.5 cm per 6 months is considered suspicious for malignancy warranting further evaluation. Eur J Endocrinol. 2017 Dec;177(6):475-483.

RADIOLOGY PARTNERS BEST PRACTICES

Interpretation of Adrenal Washout **CT**

APW & RPW	HU on portal venous phase	Suggested Diagnosis	Recommendation
No enhancement ($\Delta < 10$ HU between W/O and W/C)		benign – cyst or hemorrhage	No follow-up imaging is recommended
APW $\geq 60\%$ and/or RPW $\geq 40\%$	≤ 130 HU	Washout characteristics consistent with adenoma	No follow-up imaging is recommended
APW $\geq 60\%$ and/or RPW $\geq 40\%$	> 130 HU	possible pheochromocytoma	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider f/u CT in one year to assess for growth
APW $< 60\%$ and/or RPW $< 40\%$	≤ 130 HU	possible malignancy	Consider f/u CT Abdomen w/c 6-12 months, PET-CT, biopsy or surgical consultation depending on clinical scenario. Consider biochemical lab evaluation for functional status and pheochromocytoma prior to biopsy or resection
APW $< 60\%$ and/or RPW $< 40\%$	> 130 HU	possible pheochromocytoma, possible malignancy	Biochemical lab evaluation for pheochromocytoma. If lab values normal, consider f/u CT Abdomen w/c 6-12 months, PET-CT, biopsy or surgical consultation depending on clinical scenario. Consider biochemical lab evaluation for functional status prior to biopsy or resection

1. RPW is used when unenhanced CT is not available

RADIOLOGY PARTNERS BEST PRACTICES

Inferior Vena Cava Filter Placement

Components	Description
Use Standardized Template	This is identified on the report template as SIR_IVCFilterInsertion2.0 IVCPLID-v1y19q1 DO NOT DELETE OR MODIFY
Appropriate Indication	Select one of nine acceptable indications
Filter Type	Manufacturer and device name
Follow up plan	Permanent placement or evaluation at 3 months for potential retrieval

Opportunities for improvement:

- **Decision to place filter** - Only place for approved indications
- **Filter selection** - Place permanent filters when appropriate
- **Differences and risk profiles** - Be aware of different Retrievable IVC filters
- **Follow up program** - Prevent legal risk from morbidity and costs associated with complications
- **Removal when appropriate** - Follow up programs, training, and preparation for “advanced” techniques

IVC Filter Placement BP based on ACR white paper: 2016 ACR-SIR-SPR Resolution 18 (Available on RadWiki)

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Inferior Vena Cava Filter Placement

Acceptable Indications:

For patients with VTE/DVT:

1. Contraindication to anticoagulation
2. Inability to achieve/maintain therapeutic AC
3. Failure of anticoagulation
4. Massive PE (within 14 d)
5. Limited Cardiopulmonary Reserve
6. Free Floating Iliac or IVC Thrombus
7. PE or Iliocaval DVT treated with thrombolysis

For patients receiving a prophylactic filter:

8. Absolute contraindication to anticoagulation
9. Inability to ambulate

RADIOLOGY PARTNERS BEST PRACTICES

Coronavirus Disease 2019 (COVID-19)

COVID-19 Pneumonia Imaging Classification	Rationale	CT Findings	Suggested Reporting Language
Atypical appearance	Uncommonly or not reported features of COVID-19 pneumonia	Absence of typical or indeterminate features AND presence of: • Isolated lobar or segmental consolidation without GGO • Discrete small nodules (centrilobular, “tree-in-bud”) • Lung cavitation • Smooth interlobular septal thickening with pleural effusion	“Imaging features are atypical or uncommonly reported for (COVID-19 or viral) pneumonia. Alternative diagnoses should be considered.”
Indeterminate appearance	Nonspecific imaging features of COVID-19 pneumonia	Absence of typical features AND presence of: • Multifocal, diffuse, perihilar, or unilateral GGO with or without consolidation lacking a specific distribution and are non-rounded or non-peripheral. • Few very small GGO with a non-rounded and non-peripheral distribution	“Imaging features can be seen with (COVID-19 or viral) pneumonia, though are nonspecific and can occur with a variety of infectious and noninfectious processes.”
Negative for pneumonia	No features of pneumonia	No CT features to suggest pneumonia	“No CT findings present to indicate pneumonia. Note: CT may be negative in the early stages of (COVID-19 or viral pneumonia).”
Typical appearance	Commonly reported imaging features of greater specificity for COVID-19 pneumonia	• Peripheral, bilateral GGO with or without consolidation or visible intralobular lines (“crazy-paving”) • Multifocal GGO of rounded morphology with or without consolidation or visible intralobular lines (“crazy-paving”) • Reverse halo sign or other findings of organizing pneumonia (seen later in the disease)	“Commonly reported imaging features of (COVID-19 or viral) pneumonia are present. Other processes such as influenza pneumonia and organizing pneumonia, as can be seen with drug toxicity and connective tissue disease, can cause a similar imaging pattern.”

COVID BPRs based on RSNA Expert Consensus Statement on Reporting Chest CT Findings Related to COVID-19. Endorsed by the Society of Thoracic Radiology, the American College of Radiology, and RSNA, 2020

RADIOLOGY PARTNERS BEST PRACTICES

GENERAL REPORTING RECOMMENDATIONS

ADNEXAL CYSTS

- These BPRs apply to non-pregnant postmenarchal patients (≥ 16 years old if menarche status unknown)
- US BPRs apply to asymptomatic patients & to those whose symptoms are not clearly attributable to the cyst
- CT/MR BPRs apply to incidental, asymptomatic adnexal cysts
- US and CT/MR BPRs may be helpful in symptomatic cysts, but management of symptomatic cysts should be determined by the clinical setting.
- US and CT/MR BPRs do not apply to patients with increased risk (genetic, family history, elevated tumor markers or other high risk factors) of ovarian cancer
- Report **LMP** or pre-menarche status in Clinical Indication/History section
- Report any technical limitations of exam resulting in limited or inadequate assessment of adnexal lesion
- Use largest diameter for management
- Report all measurements in **cm**
- **Body of Report:** include all measurements of adnexal lesions
- **Impression:** state only maximum diameter of adnexal lesions
- **Impression:** state f/u recommendations
 - “No follow-up imaging recommended” may be in body of report if cyst not mentioned in the Impression

RADIOLOGY PARTNERS BEST PRACTICES

EXAM TECHNIQUE RECOMMENDATIONS AND QUALITY OF EXAM

ADNEXAL CYSTS

US EXAM RECOMMENDATIONS:

- Technologist to record cine clip of any adnexal lesion that requires follow-up
- Technologist should document any tenderness/discomfort/pain related to the adnexal lesion elicited during the exam

QUALITY OF CT AND MR EXAMS:

- Limited assessment: lack of IV contrast, artifacts, incomplete anatomic coverage, low signal-to-noise ratio
- Fully characterized on MR: If exam has 1) T2-weighted images, 2) pre and post IV contrast T1-weighted images, and 3) complete anatomic coverage in at least two imaging planes

Simple Adnexal Cyst on US BPRs based on SRU Consensus Update: Radiology 2019 Nov;293(2):359-371

Complex Adnexal Cyst on US BPRs based on SRU Consensus Statement: Radiology 2010 Sep;256(3):943-54

Simple-appearing Adx Cyst on CT/MR BPRs based on ACR White paper: J Am Coll Radiol 2020 Feb;17(2):248-254
(These references are available on RadWiki)

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **US**

SIMPLE ADNEXAL CYST

PRE-Menopause; POST-Menarche (≥ 16 years old if status unknown)		
Size	Describe in report as:	Follow-up Guidelines
≤ 3 cm	Report at rad's discretion If reported, describe as "follicle, normal finding"	"No follow-up imaging recommended"
3.1--5 cm	"benign functional cyst"	"No follow-up imaging recommended"
5.1--9.9 cm	"probable benign cyst"	Follow-up US in 3-6 months
≥ 10 cm	"concern for low-grade cystic neoplasm"	Gynecology consult and consider MR w/IV contrast if clinically warranted

POST-Menopause (≥ 1 year from LMP)		
Size	Describe in report as:	Follow-up Guidelines
≤ 1 cm	Report at rad's discretion If reported, describe as "normal finding"	"No follow-up imaging recommended"
1.1--3 cm	"benign simple cyst"	"No follow-up imaging recommended"
3.1--5 cm	"probable benign cyst"	Follow-up US in 3-6 months
5.1--9.9 cm	"concern for low-grade cystic neoplasm"	Either gynecology consult and follow-up US in 3-6 months, or MR w/IV contrast for improved characterization
≥ 10 cm	"concern for low-grade cystic neoplasm"	Gynecology consult and consider MR w/IV contrast if clinically warranted

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on US

Simple Adnexal Cyst, Paraovarian and Paratubal (PRE-Menopause and POST-Menopause)

Size	Cyst Description	Follow Up Guidelines
Any size	paraovarian or paratubal simple adnexal cyst	No follow-up imaging recommended

Likely Simple Adnexal Cyst, not fully characterized (PRE-Menopause and POST-Menopause)

Size	Cyst Description	Follow Up Guidelines
< 10 cm	Adnexal cyst likely simple, but not adequately characterized at US	Consider short-term follow-up US or MR w/IV contrast in less than 3 months
≥ 10 cm	"concern for low-grade cystic neoplasm"	Gynecology consult and consider MR w/IV contrast if clinically warranted

Management of simple adnexal cyst on f/u US (PRE-Menopause > 5 cm; POST-Menopause > 3 cm on initial study)

Change in cyst	Describe in report as:	Follow-Up Guidelines
Decrease > 10-15% average linear dimension	"non-neoplastic cyst"	No follow-up imaging recommended
Stable in size, < 2 years from initial study	"non-neoplastic cyst or benign cystic neoplasm"	Gynecology consult. If not resected, imaging follow-up with US or MR w/IV contrast is advised for 2 years from initial study to confirm stability
Stable in size, ≥ 2 years from initial study	"non-neoplastic cyst or benign cystic neoplasm"	Gynecology consult with follow-up imaging if clinically warranted
Increase > 10% average linear dimension	"probable enlarging low-grade cystic neoplasm"	Gynecology consult with follow-up imaging if clinically warranted
New features in cyst (no longer simple)	"complicated cyst"	Gynecologic oncology consult

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on US

Adnexal Cyst with single thin septation or focal wall calcification

PRE-Menopause; POST-Menarche (≥ 16 years old if status unknown)

Size	Describe in report as:	Follow-Up Guidelines
≤ 3 cm	Report at rad's discretion If reported, describe as "benign cyst"	"No follow-up imaging recommended"
3.1--5 cm	"almost certainly benign cyst"	"No follow-up imaging recommended"
5.1--7 cm	"almost certainly benign cyst"	US follow-up annually
> 7 cm	"mildly complicated cyst"	MR w/IV contrast or surgical evaluation

POST-Menopause (≥ 1 year from LMP)

Size	Describe in report as:	Follow-Up Guidelines
≤ 1 cm	Report at rad's discretion If reported, describe as "benign cyst"	"No follow-up imaging recommended"
1.1--3 cm	"almost certainly benign cyst"	"No follow-up imaging recommended"
3.1--7 cm	"almost certainly benign cyst"	US follow-up annually
> 7 cm	"mildly complicated cyst"	MR w/IV contrast or surgical evaluation

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **US**

INDETERMINATE, Probably Benign -- Septations or non-vascular nodule (ANY AGE)

Any Size	Document in Report	Follow-Up Guidelines
Septations: < 3 mm, Multiple	Yes	Surgical evaluation
Nodule (non-hyperechoic), any size: without blood flow	Yes	MR w/IV contrast or surgical evaluation

INDETERMINATE, Probably Benign – Suggestive of but not classic for hemorrhagic cyst, endometrioma, dermoid

PRE-Menopause		
Size	Document in Report	Follow-Up Guidelines
≤ 7 cm	Yes	US f/u 6–12 weeks If unchanged, continue f/u with US or MR w/IV contrast If f/u studies do not confirm endometrioma or dermoid, consider surgical evaluation
> 7 cm	Yes	MR w/IV contrast or surgical evaluation

POST-Menopause (≥ 1 year from LMP)		
Size	Document in Report	Follow-Up Guidelines
Any	Yes	Surgical evaluation

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **US**

WORRISOME FOR MALIGNANCY (ANY AGE)

Any Size	Document in Report	Follow-Up Guidelines
Septations: ≥ 3 mm, Single/multiple/irregular	Yes	Surgical evaluation
Nodule, any size: with blood flow	Yes	Surgical evaluation

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on US

HEMORRHAGIC CYST

PRE-Menopause		
Size	Document in Report	Follow-Up Guidelines
≤ 3 cm	At the rad's discretion	State: "No follow-up imaging recommended"
> 3 cm to ≤ 5 cm	Yes	State: "No follow-up imaging recommended"
> 5 cm	Yes	US f/u 6—12 weeks If not resolved, US f/u annually

Early POST-Menopause (1-5 years from LMP)		
Size	Document in Report	Follow-Up Guidelines
Any	Yes	US f/u 6—12 weeks If not resolved, US f/u annually

Late POST-Menopause (> 5 years from LMP)		
Size	Document in Report	Follow-Up Guidelines
Any	Yes	Surgical evaluation

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **US**

CORPUS LUTEUM CYST W/O PREGNANCY

Size	Document in Report	Follow-Up Guidelines
≤ 3 cm	At the rad's discretion	State: "No follow-up imaging recommended"
> 3 cm	Yes	US f/u 6—12 weeks If resolved/smaller, no further f/u If stable/larger, continue US f/u or consider MR w/IV contrast

DERMOID (ANY AGE)

Size	Document in Report	Follow-Up Guidelines
≤ 5 cm	Yes	MR w/IV contrast If not surgically resected, US f/u annually
> 5 cm	Yes	Surgical evaluation and if not resected, MR w/IV contrast; then US f/u annually

ENDOMETRIOMA (ANY AGE)

Size	Document in Report	Follow-Up Guidelines
≤ 7 cm	Yes	US f/u 6—12 weeks If not surgically resected, US f/u annually
> 7 cm	Yes	MR w/IV contrast or surgical evaluation If not surgically resected, US f/u annually

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on CT

Simple-Appearing Adnexal Cyst

(Excludes normal/benign: corpus luteum, adnexal calcifications w/o solid mass, stable ≥ 2 years; & previously characterized by US or MR)

PRE-Menopause (< 50 years old if status unknown); **POST**-Menarche (≥ 16 years old if status unknown)

Size	Assessment*	Describe in report as:	Follow-Up Guidelines
≤ 1 cm	limited or adequately characterized	Do not report. If reported, describe as "normal finding"	Do not report. If reported, state "No follow-up imaging recommended"
1.1--5 cm	limited or adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
5.1--9.9 cm	adequately characterized	"simple-appearing cyst"	Follow-up US in 3-6 months
	limited	"simple-appearing cyst, not adequately characterized"	Prompt US
≥ 10 cm	limited or adequately characterized	"concern for low-grade cystic neoplasm"	Gynecology consult and consider MR w/IV contrast if clinically warranted

*"Limited" assessment if: lack of IV contrast, artifacts or incomplete anatomic coverage. "Adequately characterized" if listed limitations absent.

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **CT**

Simple-Appearing Adnexal Cyst

(Excludes normal/benign: corpus luteum, adnexal calcifications w/o solid mass, stable ≥ 2 years; & previously characterized by US or MR)

POST-Menopause (≥ 50 years old if status unknown)

Size	Assessment*	Describe in report as:	Follow-Up Guidelines
≤ 1 cm	limited or adequately characterized	Do not report. If reported, describe as "normal finding"	Do not report. If reported, state "No follow-up imaging recommended"
1.1--3 cm	limited or adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
3.1--9.9 cm	adequately characterized	"simple-appearing cyst"	Follow-up US in 6-12 months
	limited	"simple-appearing cyst, not adequately characterized"	Prompt US
≥ 10 cm	limited or adequately characterized	"concern for low-grade cystic neoplasm"	Gynecology consult and consider MR w/IV contrast if clinically warranted

*"Limited" assessment if: lack of IV contrast, artifacts or incomplete anatomic coverage. "Adequately characterized" if listed limitations absent.

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on MR

Simple-appearing Adnexal Cyst

(Excludes normal/benign: corpus luteum, adnexal calcifications w/o solid mass, stable ≥ 2 years; & previously characterized by US or MR)

PRE-Menopause (< 50 years old if status unknown); **POST-Menarche** (≥ 16 years old if status unknown)

Size	Assessment*	Describe in report as:	Follow-Up Guidelines
≤ 1 cm	limited or adequately characterized	Do not report. If reported, describe as "normal finding"	Do not report. If reported, state "No follow-up imaging recommended"
1.1–5 cm	limited or adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
5.1–7 cm	adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
7.1–9.9 cm	adequately characterized	"simple-appearing cyst"	Follow-up US in 6-12 months
5.1–9.9 cm	not limited, but not adequately characterized	"simple-appearing cyst, not adequately characterized"	Follow-up US in 6-12 months
	limited	"simple-appearing cyst, not adequately characterized"	Prompt US
≥ 10 cm	adequately characterized	"concern for low-grade cystic neoplasm"	Gynecology consult
	not adequately characterized	"simple-appearing cyst, not adequately characterized, concern for low-grade cystic neoplasm"	Gynecology consult and consider repeat MR with IV contrast for improved characterization if clinically warranted

*"Limited" assessment if: low signal-to-noise ratio, lack of IV contrast, artifacts or incomplete anatomic coverage.

"Adequately characterized" if listed limitations absent AND MR exam has 1) T2-weighted images, 2) pre and post IV contrast T1-weighted images, and 3) complete anatomic coverage in at least two imaging planes.

RADIOLOGY PARTNERS BEST PRACTICES

Adnexal Cysts on **MR**

Simple-Appearing Adnexal Cyst

(Excludes normal/benign: corpus luteum, adnexal calcifications w/o solid mass, stable ≥ 2 years; & previously characterized by US or MR)

POST-Menopause (≥ 50 years old if status unknown)

Size	Assessment*	Describe in report as:	Follow-Up Guidelines
≤ 1 cm	limited or adequately characterized	Do not report. If reported, describe as "normal finding"	Do not report. If reported, state "No follow-up imaging recommended"
1.1--3 cm	limited or adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
3.1--5 cm	adequately characterized	"simple-appearing cyst"	"No follow-up imaging recommended"
5.1--9.9 cm	adequately characterized	"simple-appearing cyst"	Follow-up US in 6-12 months
3.1--9.9 cm	not limited, but not adequately characterized	"simple-appearing cyst, not adequately characterized"	Follow-up US in 6-12 months
	limited	"simple-appearing cyst, not adequately characterized"	Prompt US
≥ 10 cm	adequately characterized	"concern for low-grade cystic neoplasm"	Gynecology consult
	not adequately characterized	"simple-appearing cyst, not adequately characterized, concern for low-grade cystic neoplasm"	Gynecology consult and consider repeat MR with IV contrast for improved characterization if clinically warranted

*"Limited" assessment if: low signal-to-noise ratio, lack of IV contrast, artifacts or incomplete anatomic coverage.

"Adequately characterized" if listed limitations absent AND MR exam has 1) T2-weighted images, 2) pre and post IV contrast T1-weighted images, and 3) complete anatomic coverage in at least two imaging planes.