Pulsatile Abdominal Mass, Suspected Abdominal Aortic Aneurysm
EVIDENCE TABLE

Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Strength of Evidence
1. Bickerstaff LK, Hollier LH, Van Peenen HJ, Melton LJ, 3rd, Pairolero PC, Cherry KJ. Abdominal aortic aneurysms: the changing natural history. *J Vasc Surg* 1984; 1(1):6-12.	13	296	Review records of patients with abdominal aortic aneurysms (AAA).	Incidence of aneurysms ≥7 cm has increased.	2
2. Ernst CB. Abdominal aortic aneurysm. *N Engl J Med* 1993; 328(16):1167-1172	12	N/A	Review knowledge and management of infrarenal AAA.	Data shows early identification and reconstruction for aneurysms ≤5 cm will save and improve lives.	4
3. Guirguis EM, Barber GG. The natural history of abdominal aortic aneurysms. *Am J Surg* 1991; 162(5):481-483	13	300	Prospective study to examine rate of expansion of AAA and risk of rupture in relation to their size.	• Aneurysms expand at a median rate of 0.3 cm per year. • The risk of rupture of aneurysms >5.0 cm is lower than the risk of rupture of <5.0 cm in diameter.	2
4. Neville A, Herts BR. CT characteristics of primary retroperitoneal neoplasms. *Crit Rev Comput Tomogr* 2004; 45(4):247-270.	12	N/A	Review CT characteristics of primary retroperitoneal neoplasms.	Certain CT characteristics can help suggest tumor type. CT is useful for diagnosis and assessment of the size and extent of retroperitoneal tumors, and assessment of the involvement of organs and vasculature.	4
5. Johnston KW, Rutherford RB, Tilson MD, Shah DM, Hollier L, Stanley JC. Suggested standards for reporting on arterial aneurysms. Subcommittee on Reporting Standards for Arterial Aneurysms, Ad Hoc Committee on Reporting Standards, Society for Vascular Surgery and North American Chapter, International Society for Cardiovascular Surgery. *J Vasc Surg* 1991; 13(3):452-458.	15	N/A	Guideline.	N/A	N/A
6. Schermerhorn ML, Cronenwett JL. Abdominal aortic and iliac aneurysms. In: Rutherford CV, ed. *Journal of Vascular Surgery*. 6th ed. Philadelphia, PA: Elselvier; 2005.	15	N/A	Book chapter.	N/A	N/A

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7. Lederle FA. A summary of the contributions of the VA cooperative studies on abdominal aortic aneurysms. *Ann N Y Acad Sci* 2006; 1085:29-38.	15 (different trials)	N/A	Summary of different studies on AAA by the Department of Veterans Affairs Cooperative Studies Program. • 1st study–Provided information on the prevalence and associations of AAA, and a randomized trial. • 2nd study–Prospective observational study to determine the incidence of rupture in patients with large AAA for whom elective repair was not planned due to medical contraindications or patient refusal. • 3rd study–Open Versus Endovascular Repair (OVER) Trial. Multicenter randomized trial comparing long-term survival following two methods of elective AAA repair.	• 1ST study–Randomized trial found that survival is not improved by repair of small AAA. • 2nd study–AAA in this population had a high risk of rupture, about 10% per year for AAA >5.5 cm, and 25% within 6 months for AAA >8.0 cm.	1
8. Fleming C, Whitlock EP, Beil TL, Lederle FA. Screening for abdominal aortic aneurysm: a best-evidence systematic review for the U.S. Preventive Services Task Force. *Ann Intern Med* 2005; 142(3):203-211.	11	N/A	Conducted a meta-analysis to examine the benefits and harms of AAA screening.	For men 65-75 years of age, invitation to attend AAA screening reduces AAA-related mortality.	1
9. Diehm N, Herrmann P, Dinkel HP. Multidetector CT angiography versus digital subtraction angiography for aortoiliac length measurements prior to endovascular AAA repair. *J Endovasc Ther* 2004; 11(5):527-534.	9	21 patients 2 observers 42 events	Comparative study to assess variation between digital subtraction angiography (DSA) and multidetector CTA in measuring vessel length prior to endovascular aortic aneurysm repair (EVAR).	CTA has better intraobserver and interobserver correlations in measuring vessel length than DSA.	2
10. Wyers MC, Fillinger MF, Schermerhorn ML, et al. Endovascular repair of abdominal aortic aneurysm without preoperative arteriography. *J Vasc Surg* 2003; 38(4):730-738.	13	196	To develop 3D reconstruction and computer-aided measurement, planning, and simulation software (3D CAMPS) based on CT or MRI to eliminate the need for preoperative arteriography.	EVAR can be performed with 3D CAMPS as the sole imaging method.	2
11. Singh K, Bonaa KH, Solberg S, Sorlie DG, Bjork L. Intra- and interobserver variability in ultrasound measurements of abdominal aortic diameter. The Tromso Study. *Eur J Vasc Endovasc Surg* 1998; 15(6):497-504.	13	1ST US: 6,892 patients 2nd US: 112 patients 4 observers (3 sonographers and one radiologist)	To assess the variability of US measurements at different levels of the abdominal aorta.	US measurements can be obtained with a high degree of accuracy.	1

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12. Cohan RH, Siegel CL, Korobkin M, et al. Abdominal aortic aneurysms: CT evaluation of renal artery involvement. *Radiology* 1995; 194(3):751-756.	9	30	Compare CT scans and medical records to determine whether CT assessment of the proximal extent of ruptured aneurysms can help determine whether to clamp the pararenal aneurysm neck.	Authors correctly predicted at CT that AAAs originated caudal to the main renal artery origins for 49/50 vessels in 25 patients. CT can help predict whether an initial aortic clamp can be placed caudal to the main renal artery orifices.	2
13. Broeders IA, Blankensteijn JD. Preoperative imaging of the aortoiliac anatomy in endovascular aneurysm surgery. *Semin Vasc Surg* 1999; 12(4):306-314.	9	N/A	To investigate whether CTA with specialized data processing can be the main technique for sizing of endografts for endovascular aneurysm repair (EAR). Compared CTA, conventional CT scanning, and arteriography.	CTA with special processing should be the first choice.	3
14. Fukuhara R, Ishiguchi T, Ikeda M, et al. Evaluation of abdominal aortic aneurysm for endovascular stent-grafting with volume-rendered CT images of vessel lumen and thrombus. *Radiat Med* 2004; 22(5):332-341.	9	11 patients 5 observers 55 events	Comparative study to evaluate AAA for endovascular stent-grafting with volume-rendered CT images of vessel lumen and thrombus.	Interobserver variation and aneurysm measurements were less with volume rendered display than axial/MPR in half the patients. Volume rendered display was better than axial/MPR in the detection of renal artery and internal iliac artery involvement by aneurysms.	2
15. Singh K, Jacobsen BK, Solberg S, et al. Intra- and interobserver variability in the measurements of abdominal aortic and common iliac artery diameter with computed tomography. The Tromso study. *Eur J Vasc Endovasc Surg* 2003; 25(5):399-407.	13	59 patients 3 observers 177 events	To assess intraobserver and interobserver variability in the measurement of aortic and common iliac artery diameter with CT.	Interobserver was higher than intraobserver. Both intraobserver and interobserver variability increased with increasing vessel diameter and were largest in patients with AAA.	2
16. Filis KA, Arko FR, Rubin GD, Zarins CK. Three-dimensional CT evaluation for endovascular abdominal aortic aneurysm repair. Quantitative assessment of the infrarenal aortic neck. *Acta Chir Belg* 2003; 103(1):81-86.	13	N/A	Assess the use of 3D CTA to determine aneurysm morphology and select patients for endovascular repair.	No results stated.	4
17. Hayter RG, Rhea JT, Small A, Tafazoli FS, Novelline RA. Suspected aortic dissection and other aortic disorders: multi-detector row CT in 373 cases in the emergency setting. *Radiology* 2006; 238(3):841-852.	10	365 patients 373 clinical evaluations	Retrospective review of authors' experience with MD CT for detection of aortic dissection in the emergency setting.	• 112 findings were interpreted as positive for acute aortic disorder, an alternative finding, or both at CT. • No interpretations were false-positive, one was false-negative, 67 were true-positive, and 304 were true-negative. • Sensitivity 99% (67 of 68), specificity 100% (304 of 304), PPV 100% (67 of 67) NPV 99.7% (304 of 305), and accuracy and 99.5% (371 of 373). • Positivity rate in 373 cases examined at MDCT was 18.0%.	1

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Reference	Study Type	Patients/ Events	Study Objective (Purpose of Study)	Study Results	Strength of Evidence
18. Catalano C, Fraioli F, Laghi A, et al. Infrarenal aortic and lower-extremity arterial disease: diagnostic performance of multi-detector row CT angiography. *Radiology* 2004; 231(2):555-563.	10	50 patients 23 aortic lower extremity segments 3 observers	To compare MD CTA with DSA in evaluation of the infrarenal aorta and lower-extremity arterial system. DSA is gold standard.	• For DSA, 349 diseased segments were found among the 1,137 segments evaluated. Sensitivity, specificity, and accuracy, based on a consensus reading of MDCTA, were 96%, 93%, and 94%, respectively. • A statistically significant difference (P<.05) between DSA and MD CTA was present only in arteries graded 1 or 2. • Interobserver agreement was almost perfect among the three readers for treatment recommendations based on findings at CT angiography and DSA. • Concludes that CTA is consistent and accurate.	2
19. Bhalla S, Menias CO, Heiken JP. CT of acute abdominal aortic disorders. *Radiol Clin North Am* 2003; 41(6):1153-1169.	12	N/A	Review CT of acute abdominal aortic disorders.	• CT is the preferred modality. • MRI plays an important role in the imaging of aortic dissection and penetrating aortic ulcer, particularly when the patient is unable to receive intravenous contrast material. • Conventional angiography is used as a secondary diagnostic tool to clarify equivocal findings on cross-sectional imaging. • US is helpful when CT is not readily available and the patient cannot have MRI.	4
20. Rakita D, Newatia A, Hines JJ, Siegel DN, Friedman B. Spectrum of CT findings in rupture and impending rupture of abdominal aortic aneurysms. *Radiographics* 2007; 27(2):497-507.	12	N/A	Review CT findings of ruptured AAA.	CT findings are often straightforward.	4
21. Willmann JK, Lachat ML, von Smekal A, Turina MI, Pfammatter T. Spiral-CT angiography to assess feasibility of endovascular aneurysm repair in patients with ruptured aortoiliac aneurysm. *VASA* 2001; 30(4):271-276.	10	24 patients with suspected rupture 18 patients with ruptured abdominal aortic aneurysms	To evaluate spiral CTA as a technique for assessing feasibility of EAR in patients with ruptured aortoiliac aneurysm.	Spiral CT is a reliable technique, but recommended for patients with stable hemodynamics.	2

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22. Atar E, Belenky A, Hadad M, Ranany E, Baytner S, Bachar GN. MR angiography for abdominal and thoracic aortic aneurysms: assessment before endovascular repair in patients with impaired renal function. *AJR* 2006; 186(2):386-393.	9	19	To establish the possibility of MRA as the main technique before endovascular repair and compare preprocedure measurements by MRA and DSA in patients with impaired renal function.	MRA is effective and reliable for use as the sole imaging method.	3
23. Michaely HJ, Herrmann KA, Kramer H, et al. High-resolution renal MRA: comparison of image quality and vessel depiction with different parallel imaging acceleration factors. *J Magn Reson Imaging* 2006; 24(1):95-100.	10	26	Prospective study to examine the image quality and vessel depiction of renal MRA with different parallel imaging acceleration factors.	iPAT 3 enables a better depiction of the distal parts of the renal artery.	2
24. Wilson GJ, Hoogeveen RM, Willinek WA, Muthupillai R, Maki JH. Parallel imaging in MR angiography. *Top Magn Reson Imaging* 2004; 15(3):169-185.	12	N/A	Review current parallel imaging techniques and their application to MRA.	Increased scan efficiency provided by parallel imaging has been successfully applied to CE-MRA.	4
25. Collidge TA, Thomson PC, Mark PB, et al. Gadolinium-enhanced MR imaging and nephrogenic systemic fibrosis: retrospective study of a renal replacement therapy cohort. *Radiology* 2007; 245(1):168-175.	13	1,826	Retrospectively compare association between gadolinium-based contrast agent administration and development of nephrogenic systemic fibrosis (NSF).	Positive association between gadolinium-based contrast agent administration and development of NSF.	1
26. Hoornweg LL, Wisselink W, Vahl A, Balm R. The Amsterdam Acute Aneurysm Trial: suitability and application rate for endovascular repair of ruptured abdominal aortic aneurysms. *Eur J Vasc Endovasc Surg* 2007; 33(6):679-683	8	256	Prospective study to evaluate anatomical suitability and application rate for endovascular repair of patients with a ruptured AAA.	Suitability for endovascular repair confirmed on CTA is 45.8%. Low application rate.	1
27. American College of Radiology. *Manual on Contrast Media*. Available at: http://www.acr.org/SecondaryMainMenuCategories/quality_safety/contrast_manual.aspx.	15	N/A	Guidance document on contrast media to assist radiologists in recognizing and managing risks associated with the use of contrast media.	N/A	3

Evidence Table Key

Study Type Key

Numbers 1-7 are for studies of therapies while numbers 8-15 are used to describe studies of diagnostics.

1. Randomized Controlled Trial — Treatment
2. Controlled Trial
3. Observation Study
    a. Cohort
    b. Cross-sectional
    c. Case-control
4. Clinical Series
5. Case reviews
6. Anecdotes
7. Reviews
8. Randomized Controlled Trial — Diagnostic
9. Comparative Assessment
10. Clinical Assessment
11. Quantitative Review
12. Qualitative Review
13. Descriptive Study
14. Case Report
15. Other (Described in text)

Strength of Evidence Key

- Category 1 - The conclusions of the study are valid and strongly supported by study design, analysis and results.
- Category 2 - The conclusions of the study are likely valid, but study design does not permit certainty.
- Category 3 - The conclusions of the study may be valid but the evidence supporting the conclusions is inconclusive or equivocal.
- Category 4 - The conclusions of the study may not be valid because the evidence may not be reliable given the study design or analysis.