ACR Appropriateness Criteria® Penetrating Neck Injury

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Abstract

In patients with penetrating neck injuries with clinical soft injury signs, and patients with hard signs of injury who do not require immediate surgery, CT angiography of the neck is the preferred imaging procedure to evaluate extent of injury. Other modalities, such as radiography and fluoroscopy, catheter-based angiography, ultrasound, and MR angiography have their place in the evaluation of the patient, depending on the specific clinical situation and question at hand. The ACR Appropriateness Criteria are evidence-based guidelines for specific clinical conditions that are reviewed annually by a multidisciplinary expert panel. The guideline development and revision include an extensive analysis of current medical literature from peer-reviewed journals and the application of well-established methodologies (RAND/UCLA Appropriateness Method and Grading of Recommendations Assessment, Development, and Evaluation or GRADE) to rate the appropriateness of imaging and treatment procedures for specific clinical scenarios. In those instances where evidence is lacking or equivocal, expert opinion may supplement the available evidence to recommend imaging or treatment.

Key Words: Appropriateness Criteria, Appropriate Use Criteria, AUC, Aerodigestive injury, CTA, Penetrating neck injury, Vascular injury

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The American College of Radiology seeks and encourages collaboration with other organizations on the development of the ACR Appropriateness Criteria through society representation on expert panels. Participation by representatives from collaborating societies on the expert panel does not necessarily imply individual or society endorsement of the final document. Reprint requests to: publications@acr.org.

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Disclaimer: The ACR Committee on Appropriateness Criteria and its expert panels have developed criteria for determining appropriate imaging examinations for diagnosis and treatment of specified medical condition(s). These criteria are intended to guide radiologists, radiation oncologists, and referring physicians in making decisions regarding radiologic imaging and treatment. Generally, the complexity and severity of a patient's clinical condition should dictate the selection of appropriate imaging procedures or treatments. Only those examinations generally used for evaluation of the patient's condition are ranked. Other imaging studies necessary to evaluate other co-existent diseases or other medical consequences of this condition are not considered in this document. The availability of equipment or personnel may influence the selection of appropriate imaging procedures or treatments. Imaging techniques classified as investigational by the FDA have not been considered in developing these criteria; however, study of new equipment and applications should be encouraged. The ultimate decision regarding the appropriateness of any specific radiologic examination or treatment must be made by the referring physician and radiologist in light of all the circumstances presented in an individual examination.

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Variant 1. Penetrating neck injury. Clinical soft injury signs.

Radiologic Procedure	Rating	Comments	RRL
CTA neck with IV contrast	9	This procedure is the imaging study of choice. See references [2,5,6,8,11-17].	☢☢☢
X-ray neck	7	Use this procedure to screen and prior to MRI/MRA in gunshot wounds and in some stab wounds if there is any question as to the integrity of the weapon.	☢☢
US neck	5	See references [4,13-15,22,23].	○
MRA neck without and with IV contrast	5	See references [4,10,13,15,21,26].	○
Arteriography neck	5	This procedure is usually used as a follow up test/treatment to a CTA or MRA. See references [2,6,11,20,21].	☢☢☢
X-ray biphasic esophagram	5	See references [2,6,8,11,27].	☢☢☢
MRA neck without IV contrast	4	This procedure may be considered in patients with renal insufficiency.	○

Note: Rating scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. CTA = CT angiography; IV = intravenous; MRA = MR angiography; RRL = relative radiation level; US = ultrasound.

Variant 2. Penetrating neck injury. Normal or equivocal CTA. Concern for vascular injury.

Radiologic Procedure	Rating	Comments	RRL
Arteriography neck	8	See references [2,6,8,20,21].	☢☢☢
MRA neck without and with IV contrast	5	See references [4,10,13,15,23].	○
MRA neck without IV contrast	4		○
US neck	4	See references [4,13-15,22,23].	○

Note: Rating scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. CTA = CT angiography; IV = intravenous; MRA = MR angiography; RRL = relative radiation level; US = ultrasound.

Variant 3. Penetrating neck injury. Normal or equivocal CTA. Concern for aerodigestive injury.

Radiologic Procedure	Rating	Comments	RRL
X-ray barium swallow single contrast	8	See references [2,6,8,11,27].	☢☢☢
MRI neck without and with IV contrast	5	See references [4,10,13,15,23,26].	○
MRI neck without IV contrast	5	○	

Note: Rating scale: 1,2,3 = usually not appropriate; 4,5,6 = may be appropriate; 7,8,9 = usually appropriate. CTA = CT angiography; IV = intravenous; MRA = MR angiography; RRL = relative radiation level.

Table 1. Relative radiation level designations

RRL	Adult Effective Dose Estimate Range (mSv)	Pediatric Effective Dose Estimate Range (mSv)
○	0	0
☢	<0.1	<0.03
☢☢	0.1-1	0.03-0.3
☢☢☢	1-10	0.3-3
☢☢☢☢	10-30	3-10
☢☢☢☢☢	30-100	10-30

Note: Relative radiation level (RRL) assignments for some of the examinations cannot be made, because the actual patient doses in these procedures vary as a function of a number of factors (eg, region of the body exposed to ionizing radiation, the imaging guidance that is used). The RRLs for these examinations are designated as "varies."