



## UCLA Medical Group Practice Guideline: Ambulatory Radiology

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**Table A: General Overview of Imaging Modalities**

Modality	Common Clinical Usage	Comment	Cost
Plain Film Radiography & Computed Radiography	Cancer screen, chest symptoms, weight loss; Severe Abdominal Pain (free air) & Obstruction, Calcifications; Trauma; Osteomyelitis; Arthritis; Joint Replacements	Gall stones and Renal Calculi better evaluated by U/S and CT respectively.	+
Fluoroscopy	Gastrointestinal studies (UGI/SBFT, BE, Enteroclysis); Arthrography; Interventional Radiology; Genitourinary exams (RUG, VCUG, Antegrade/retrograde Pyelography)		++
Angiography - Conventional	Peripheral Vascular Disease; AV Shunt Management; Stage Aneurysms and other vascular malformation of CNS; Evaluation of Acute Cerebral Ischemia for Thrombolytic intervention	Multidetector CT Angiography & MR Angiography has largely replaced conventional angiography for diagnostic examinations.	+++
Ultrasound	Abdominal Pain and Pelvic Pain; Visualization of GB stones; Hydronephrosis; Vascular Studies; Testicular Pain and Masses; Breast Imaging; Image guided biopsy.	<b>First choice imaging of RUQ Pain and Female Pelvic Pain</b>	++
Computed Tomography	Oncologic staging and follow up for chest, abdomen and pelvis. Trauma; Stroke evaluation. Bone tumors; Spine evaluation; Pulmonary Artery CTA and other angiographic applications (aortic aneurysm, dissection and rupture, carotid stenosis and dissection, peripheral vascular disease); Image guided biopsy.	<b>Preferred over MRI for Bone and Lung evaluation,</b> e.g. eval following spinal surgery or HRCT lung	+++
Magnetic Resonance Imaging	Hyper-acute stroke evaluation (MRI diffusion weighted images); CNS tumors (1° and 2°); Spinal cord compression; Vascular Studies; Musculoskeletal tumors and infections; Hepatobiliary disease; Breast Disease.	<b>Preferred over CT for soft tissue.</b> e.g. for radiculopathy	++++
Mammography	Screening examinations and Diagnostic Mammography. Comparison exams essential!	For symptomatic patients order a <b>diagnostic</b> study and specify complaint(s).	+

**Additional Information:** NIA Radiology Guidelines used for UCLA Medical Group UM determinations can be reviewed at <http://mcooperations.mednet.ucla.edu> (see section under Medical Management).

**Table B: Common Cross-Sectional Studies that may be Performed Without Contrast Agents**

Study	Common Indications	Imaging Goal
Head CT	Trauma	Visualize edema, hemorrhage, herniation, and fractures. (N.B. i.v. Contrast can mimic subarachnoid hemorrhage. Noncontrast CT should always precede the administration of i.v. contrast).
Head CT	Acute Neurological Deficit and AMS, <b>Severe Headache</b>	Visualize edema, hemorrhage, herniation, masses, hydrocephalus
Brain MRI	Acute Neurological Deficit	Identify Acute/Hyperacute CVA Visualize early and or small lesions (tumor, infection, demyelination) that may be occult at CT
Spine CT	Trauma	Define fractures that may be occult on plain films and or better visualized by CT. Excellent utility of multiplanar reformations with multidetector CT.
Spine MRI	Trauma	Visualize edema and hemorrhage of the spinal cord. Visualize extrinsic cord compression
Spine CT	<b>Radiculopathy, Back Pain</b>	Define bony impingement upon spinal canal and neural foramina. Excellent utility of multiplanar reformations with multidetector CT.
Spine MRI	<b>Radiculopathy, Back Pain</b>	Visualize disk abnormalities that are subtle or occult on CT. Identify cord lesions that would never be seen on CT: mass, edema, syrinx. Excellent view of marrow infiltrative processes.
Spine MRI	<b>Cord compression</b>	Define level of cord compression and causative lesion: metastatic bone lesions, epidural versus intra-axial versus intra-thecal extra-axial masses. Gadolinium can assist identification of small leptomeningeal tumors that seed over the cord and cauda equina, eg. Breast CA
Thorax HRCT	<b>Interstitial lung disease, tumor perilesional staging.</b>	Limited sampling of lung tissue used to characterize lung interstitium and identify patients with signs of active alveolitis.
CT KUB	<b>Renal colic and hematuria.</b>	Characterize size and location of urinary calculi, assess hydronephrosis, hydroureter;
Musculoskeletal CT	Trauma, Infection and Tumors. Joints.	Define fractures, Characterize bone lesions: location, aggressiveness, biopsy and treatment planning
Pelvic MRI	Lesions of the female pelvis	Stage parametrial lesions, assess uterine lesions: adenomyomatosis vs. fibroids, dynamic stress studies for cystocele

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**Table C: Common Cross-Sectional Studies Utilizing Ultrasound**

<b>Study</b>	<b>Common Indications</b>	<b>Imaging Goal</b>
Ultrasound Neonatal cranial and spine	Depressed infant, A & B's, sacral dimple/hairy nevus	IVH, hydrocephalus, spinal dysraphism.
Ultrasound Vascular studies	Extremity swelling, pain, claudication, cold/blue extremity	DVT, Arterial Stenosis, Aneurysms and Pseudoaneurysms. AV fistula, AV malformations
Ultrasound Pediatric body imaging	UTI, palpable mass	Screening for hydronephrosis, masses. Recommend MRI for paraneoplastic syndromes
Ultrasound Pediatric hips	Hip clicks and clunks, breech, family hx.	Screening for hip dysplasia, effusion
Ultrasound Adult Abdomen	<b>RUQ Pain, RLQ Pain, Epigastric Pain, Renal Colic, Distention/Ascites, tumor screening</b>	Excellent visualization of Renal and GB stones. Biliary dilatation, cholecystitis, pancreatitis, hydronephrosis, organomegaly
Ultrasound Female Pelvis	OB Complications, Ectopic pregnancy, vaginal bleeding, <b>pelvic pain</b>	Fetal viability, identification of IUP/Ectopic, free pelvic fluid, masses and cysts, hydrosalpinx, torsion
Ultrasound Scrotum	Pain, Mass, Infertility	Orchitis, torsion, hemorrhage and or masses, hydrocele, varicocele

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**Table D: Appropriate Use of Contrast Agents for Common Studies**

<i>Contrast Agent</i>	<i>In Neuro Imaging</i>	<i>In Chest Imaging</i>	<i>In Abd/Pelvis Imaging</i>	<i>In Musculoskeletal Imaging</i>
<p><b>Intravenous Iodine</b></p> <p>Pre-procedure creatinine is desirable for diabetics and hypertensives and other vasculopath.</p> <p>NPO 2-4 hours (aspiration rare).</p>	<p><b>CT:</b> Screening for masses and infection. (Lesion enhancement is contingent on breakdown of the blood brain barrier. Higher-grade masses enhance more than lower grade lesions).</p> <p><b>CTA:</b> for carotid/vertebral and circle of Willis.</p>	<p><b>CTA and Aortography:</b> Contrast is mandatory for all vascular studies. Contrast assists in the identification of lymph nodes.</p> <p>Identify lung and pleural enhancement related to metastases and infection.</p>	<p><b>CT:</b> Usually desirable. Pre/post contrast studies for liver mets and evaluation on unexplained weight loss</p> <p>Contrast timing is critical in certain instances. Pancreas and liver are optimally studied with a three-phase protocol: noncontrast, pancreatic/arterial phase, portal venous phase.</p>	<p><b>CT:</b> Can help for soft tissue masses to evaluate vessel patency and relationship to major vessels (surgical roadmap), and to provide lesion enhancement, define extent of the lesion.</p>
<p><b>Intravenous Gadolinium</b></p>	<p><b>MRI:</b> 1° 2° Tumor; Infection</p>	<p><b>MRA:</b> Aorta and Pulmonary Arteries</p>	<p><b>MRI:</b> Not usually indicated (but is visible when concentrated in urine). Use for iodine contrast allergy.</p>	<p><b>MRI:</b> Tumors. Viability of tissue in diabetic feet/PVD</p>
<p><b>Intra-articular contrast</b></p>	<p>NA</p>	<p>NA</p>	<p>NA</p>	<p>Iodine conventional arthrography, hip, shoulder and wrist. Gad for hip &amp; shoulder. Characterize derangement of articular cartilage injuries of the joint capsule and ligaments, labral injuries.</p>

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Revised & Approved by UCLAMG May 2006

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