MRI & CT Current recommendations for common patient presentations

This information is provided as a guide. Please contact our Radiologists for further discussion.

	MRI Preferred	CT Preferred
Brain	• **Suspected tumour:** MRI is much preferred for tumour evaluation. • **Demyelination:** MRI is the modality of choice for demonstrating plaques of demyelination. These are often occult on CT, even in advanced cases. • **Internal auditory meatus / cerebello-pontine angle:** If pathology is suspected e.g. sensori-neural hearing loss, balance disorders, then MRI is far more sensitive for small lesions. • **Congenital anomalies:** MRI much better demonstrates brain and ventricular anatomy, and is the method of choice for demonstrating anomalies. • **White matter disease e.g. suspected encephalopathy, demyelination, encephalitis, leukodystrophy:** MRI much better demonstrates white matter pathology. • **Hydrocephalus:** MRI is much more likely to identify the underlying cause and has the advantage of no radiation, which is important when multiple follow-up studies may be required. • **Pituitary fossa and supra-sellar disease:** MRI far better demonstrates pituitary region lesions and can assess for local complications e.g. chiasmal compression or cavernous sinus extension. • **TIA:** Evaluate urgently by MRI and Doppler Carotid Ultrasound not CT. • **Stroke (subacute/outpatient):** Evaluate by MRI for evidence of recent and old infarction/haemorrhage and vascular status. CT is used in the acute hospital setting to exclude haemorrhage and for perfusion analysis guiding thrombolysis. • **Epilepsy:** Evaluate by MRI not CT. • **Dementia:** Evaluate by MRI not CT.	• **Acute cranial trauma:** CT remains the preferred modality for acute head injuries. CT is fast and accurate for fractures and trauma complications. • **Temporal bone pathology:** CT better demonstrates fine bony detail. Therefore, subtle erosions of bone in inflammatory disease, ossicular pathology and some congenital anomalies are better demonstrated.
Chest	• **Mediastinal disease:** MRI is generally reserved for evaluation of difficult mediastinal masses not resolved by CT. • **Cardiac:** Assessment of congenital heart disease, cardiac function and cardiomyopathy	• CT is preferred over MRI for routine thoracic imaging. • **Lung pathology such as tumours, fibrosis, and inflammatory disease** best demonstrated on CT. • **Mediastinal disease such as mediastinal masses or lymphadenopathy:** Initially assessed by CT. • **Pleural disease:** Initially assessed by CT. • **Cardiac:** Coronary artery calcium score and coronary artery disease status.
Abdomen	• **Bile duct stones and pathology:** Ultrasound remains the primary method of assessment. For complicated cases, MRCP is preferred over CT cholangiography and does not require contrast or involve ionising radiation. • **Problem solving:** e.g. liver, renal and pancreatic lesions not clarified by ultrasound or CT.	• **Acute abdomen / abdominal pain:** CT is preferred for adults as it demonstrates common causes of acute abdominal pain, e.g. inflammatory or infective disease, bowel pathology, free gas, abscess formation. For paediatric patients, MRI may be preferred. • **Urinary tract:** Renal stones are better demonstrated. • **Oncology imaging:** CT is preferred for routine oncology staging as it is fast and accurate.

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Pelvis	• **Rectal carcinoma staging:** Assessment of local bowel wall extension and mesorectal extension, MRI is the modality of choice. • **Gynaecologic conditions:** Initially assessed by Ultrasound. MRI reserved for problem solving if not resolved by Ultrasound. • **Prostate:** MRI has an increasing role in prostate cancer evaluation. • **Pelvis:** MRI staging of gynaecological malignancies. • **Problem solving:** Pelvic lesions not resolved by CT or Ultrasound.	
Spine	• **Disc disease / nerve root compression:** MRI better demonstrates the relationship of disc and bone disease to the adjacent thecal sac, spinal cord and nerve roots. MRI also has the advantage of no radiation, whereas dose for CT of the spine is relatively high. • **Spinal cord disease e.g. demyelination, transverse myelitis, tumour, syringomyelia:** The cord is well demonstrated on MRI, but not by CT. • **Spinal cord compression:** MRI allows visualisation of the cord as well as adjacent bony and epidural tumour / infection. • **Infection e.g. discitis, epidural abscess, osteomyelitis:** These are all better demonstrated on MRI. • **Trauma:** MRI may be obtained where further evaluation of cord/ligaments/discs/potential fractures is required.	• **Acute trauma:** If an X-ray raises the possibility of an acute spine fracture then CT is the preferred method of initial further evaluation. CT better demonstrates fracture lines and extent, and has the advantage of allowing a very rapid diagnosis.
Joints and Musculoskeletal	• **Avascular necrosis e.g. juvenile (Perthe's disease) or adult avascular necrosis of the hip or other bones:** MRI allows early diagnosis of ischaemia before bony collapse or remodelling has occurred. • **Chondral disease / osteoarthritis:** MRI can demonstrate chondral disease in much better detail, showing both early and late chondromalacia and frank chondral loss. The cartilage is not well visualised on CT. • **Internal joint derangement e.g. ligament or tendon tears, meniscal or labral tears:** These are well visualised on MRI. Particularly useful for the knee and shoulder, but also extensively used for the hip, elbow, wrist, ankle, hand and foot. • **Suspected fractures not visualised on X-ray:** MRI allows visualisation of marrow oedema and bone bruising, allowing diagnosis of subtle undisplaced acute fractures, e.g. scaphoid, hip and elbow. • **Soft tissue mass/lesion:** Ultrasound is generally the primary method of assessment. MRI is used for detailed evaluation if Ultrasound is non-diagnostic.	• **Complex fractures:** CT is ideal for demonstrating the position and alignment of complex fractures, and determining intra-articular extension, e.g. shoulder fractures, elbow fractures, acetabular fractures etc. This is particularly useful for pre surgical assessment and planning.

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