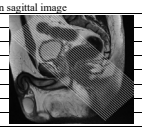
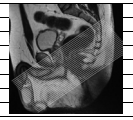
Radiology of Indiana

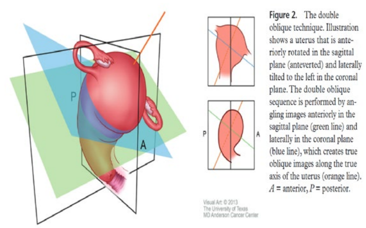
Protocols	Scan #	FOV (CM)	Slice Thickness (mm)	Spacing (mm)	Special Instructions/Comments
Abdomen					Any abdomen study without an organ specific indication. Otherwise, see organ specific protocol.
Ax Fiesta/ True FISP		~30-40	5	1	
Ax 3D Dual Echo		~30-40	5	2.5	
Ax T2 SSFSE/HASTE		~30-40	5	1	
Cor T2 SSFE/HASTE		~30-40	4	1	
Ax T2 FS Propeller/T2 Haste FS		~30-40	5	1	
Ax DWI (50/1000)		~30-40	8	2	Only send B50 and 1000
ADC		~30-40	8	2	
Ax Pre (Lava or sim)		~30-40	5	2.5	If there is a "mask" phase you don't need to complete pre-contrast LAVA. If not, we need a separate pre-contrast LAVA.
Ax Post Dyn (20 sec, 1 min 3 min)		~30-40	5	2.5	
Cor Post 5 min		~30-40	4	2	
Ax Post 10 min		~30-40	5	2.5	
Ax T1 Lava 20 min (Eovist only)		~30-40	5	2.5	FYI: All Vibes/Lavas should be Fat Sat or "water only" images for all MRI body protocols
Adrenal					
Ax Fiesta/ True FISP		~30-40	5	1	
Ax 3D Dual Echo		~30-40	5	2.5	
Coronal 3D Dual Echo		~30-40	5	2.5	
Ax T2 SSFSE/HASTE		~30-41	5	1	
Cor T2 SSFE/HASTE		~30-40	4	1	
Ax T2 FS Propeller/T2 Haste FS		~30-40	5	1	
Ax DWI (50/1000)		~30-40	8	2	Only send B50 and 1000
ADC		~30-40	8	2	
Ax Lava or similar		~30-40	5	2.5	
Liver					
Ax Fiesta/ True FISP		~30-40	5	1	Please refer to Liver & Abdominal MRI Clinical Guidelines for Gadolinium Based Contrast Agents
Ax 3D Dual Echo		~30-40	5	2.5	For dedicated liver indication, axial coverage can be from lung bases to below liver. Does not need to cover below kidneys
Ax T2 SSFSE/HASTE		~30-41	5	1	
Cor T2 SSFE/HASTE		~30-40	4	1	
Ax T2 FS Propeller/T2 Haste FS		~30-40	5	1	
Ax DWI (50/1000)		~30-40	8	2	Only send B50 and 1000
ADC		~30-40	8	2	
Ax Pre (Lava or sim)		~30-40	5	2.5	
Ax Post Dyn (20 sec, 1 min 3 min)		~30-40	5	2.5	
Cor Post 5 min		~30-40	4	2	
Ax Post 10 min		~30-40	5	2.5	
Ax T1 Lava 20 min (Eovist only)		~30-40	5	2.5	
Pancreas with MRCP					
					* Use Gadavist and have Body Radiologist review last set of images to determine if delayed images need to take place, if no bile leak identified.
Ax Fiesta/ True FISP		~30-40	3	1	Pancreatic protocol must include MRCP in order
Ax 3D Dual Echo		~30-40	4	2	F/U IPMN, pancreatic cyst, chronic pancreatitis, pancreatic mass.
Ax T2 SSFSE/HASTE		~30-41	5	1	For dedicated pancreas indication, axial coverage can be from bottom of heart/left hemidiaphragm to below C-loop of
Cor T2 SSFE/HASTE		~30-40	4	1	duodenum. Plan from coronal localizer. Coronal images must cover pancreas from front to back using axial images for
Ax T2 FS Propeller/T2 Haste FS		~30-40	4	1	planning. Do not need to cover skin to skin on coronal. Smallest FOV as possible.
Ax DWI (50/1000)		~30-40	7	1	Only send B50 and 1000
2D MRCP		~30-40	40	0	3 Oblique views. See planning images
Cor 3D MRCP		~30-40	1.4	0.7	Focus on pancreatic duct
3D MIP		~30-40			Single thick slab from 3D images
ADC		~30-40	7	1	
Ax Pre (Lava or sim)		~30-40	3	1	
Ax Post Dynamic (45 sec, 80 sec, 3 min)		~30-40	4	1.5	
Cor Post 5 min		~30-40	4	2	
Ax Post 10 min		~30-40	3	1	
Renal					
Ax Fiesta/ True FISP		~30-40	4	1	For dedicated renal indication (usually renal mass), axials must cover from above adrenal glands to below kidneys. Plan from
Ax 3D Dual Echo		~30-40	6	1.5	localizer. Does not need to cover entire abdomen. Coronal images must cover both kidneys from front to back using axial
Ax T2 SSFSE/HASTE		~30-41	5	1	images for planning. Do not need to cover skin to skin.
Cor T2 SSFE/HASTE		~30-40	4	1	
Ax T2 FS Propeller/T2 Haste FS		~30-40	4	1	
Ax DWI (50/1000)		~30-40	7	1	Only send B50 and 1000
ADC		~30-40	7	1	
Ax Pre (Lava or sim)		~30-40	3	1	
Cor Pre (Lava or sim)		~30-40	3	1	
Ax Post Dyn (20 sec, 60 sec, 90 sec)		~30-40	3	1	
Cor Post 3 min		~30-40	3	1	
Ax Post (acquired after Cor Post 3 min)		~30-40	3	1	
Post process subtraction					Cor post minus pre; Ax post minus pre
Liver with MRCP					* Use Eovist and have Body Radiologist review last set of images to determine if delayed images need to take place, if no bile leak identified.
Ax Fiesta/True FISP		~30-40	5	1	Any MRCP study without a pancreas specific indication (otherwise use Pancreas with MRCP protocol). Must cover entire liver
Ax 3D Dual Echo		~30-40	5	2.5	axial and coronal. Does not need to include entire kidney on axial unless needed to cover liver. Does not need skin to skin coverage
Ax T2 SSFSE/HASTE		~30-40	5	1	on coronal.
Cor T2 SSFE/HASTE		~30-40	4	1	
Ax T2 FS Propeller/T2 Haste FS		~30-40	5	1	
Ax DWI (50/1000)		~30-40	8	2	Only send B50 and 1000
ADC		~30-40	7	1	
2D MRCP		~30-40	40	0	3 Oblique views.
Cor 3D MRCP		~30-40	1.4	0.7	
3D MIP		~30-40			Single thick slab from 3D images
Ax Pre (Lava or sim)		~30-40	5	2.5	
Ax Post Dyn (20 sec, 1 min 3 min)		~30-40	5	2.5	
Cor Post 5 min		~30-40	4	2	
Ax Post 10 min		~30-40	5	2.5	
Ax T1 Lava 20 min (Eovist only)		~30-40	5	2.5	

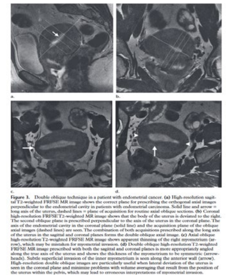
Abbreviated MRCP (w/o)					
Ax T2 SSFSE/HASTE Fat Sat		~30-41	5	1	Any MRCP study without a pancreas specific indication (otherwise use Pancreas with MRCP protocol). Must cover entire liver
Cor T2 SSFE/HASTE		~30-40	4	1	axial and coronal. Does not need to include entire kidney on axial unless needed to cover liver. Does not need skin to skin coverage on coronal.
Ax DWI (50/1000)		~30-40	8	2	Only send B50 and 1000
Ax Fiesta/True FISP		~30-40	5	1	
Axial 3D Dual Echo		~30-40	5	2.5	
2D MRCP (Thick & Thin cuts)		~30-40	40	0	3 Oblique views.
Cor 3D MRCP		~30-40	1.4	0.7	
Ax Lava		~30-40	5	2.5	
Cor Lava		~30-40	5	2.5	
Appendicitis (Order as MR Abd and Pelvis)					
Sag SSFSE		42	4	1	
Cor 2D Fiesta		42	4	1	
Cor SSFSE		42	4	1	
Cor SSFSE FS		42	4	1	
Ax Fiesta		40	5	1	
Ax SSFSE		40	5	1	
Ax SSFSE FS		40	5	1	
Ax T1 Lava		40	6	3	
Ax DWI (800 to 1000)		40	8	2	
Enterography - Order as MR Abdomen and Pelvis					
Cor Fiesta Cine		32	8	0	* Coverage for all sequences to include stomach (as much stomach as possible) to perineum (through anus); axial images may need to be split into 2 stacks for appropriate coverage
(Give .5 mg Glucagon: IV preferred)					* Glucagon contraindications: Allergy to glucagon or history of pheochromocytoma, insulinoma, or glucagonoma.
Cor SSFSE		40	3	1	* Glucagon relative contraindication to diabetes.
Ax SSFSE		40	4	1	* Administration of glucagon via IV injected slowly, is preferred over IM, if possible.
Ax SSFSE FS		40	4	1	* NPO 4 hours prior to exam
Ax T1 Lava		40	5	2.5	* 2 bottles Breeza/Volumen over 1 - 1.5 hour as tolerated by patient prior to imaging, water if can't tolerate Breeza/Volumen (adult and peds)
Cor SSFSE FS		40	3	1	* Please send images to PACS in appropriate orientation
Ax T1 Lava +C (70 sec delay)		40	5	2.5	
Cor T1 Lava +C		40	5	2.5	
Axial DWI (50,1000)		40	8	2	
Perianal Fistula or Perianal Abscess					
Sag T2 FSE		22	4	0.5	* Axial scan range from bladder base to gluteal skin, coronal scan range from pubic symphysis to coccyx
Ax T2 propeller or FRFSE		22	2	0.2	* Oblique axial and coronal **to anal canal** based on sagittal image
Ax T2 FS propeller or FRFSE		22	2	0.2	* Need surgeon note.
Cor T2 propeller or FRFSE		22	4	0.1	* Does pt. have seton drain?
Cor T2 FS propeller or FRFSE		22	4	0.1	
Ax T1 SPGR FS sm FOV		24	4	0.5	
Ax T1 SPGR FS +C		42	5	1	
Cor T1 SPGR FS +C		24	4	0.5	
Ax T1 Sm FOV FS +C		24	4	0.5	
Prostate					
					* **Preferred prep: Microenema** administered by the patient in the department, immediately before the scan.
					* If microenema is not available in the department, full prep may be utilized which requires the patient to plan to purchase and perform the prep at home.
					* Prep: Nothing to eat or drink 12 hours prior, 1 bisacodyl suppository (Dulcolax) 10 hours prior to study, void just before exam
					* Special Instructions: No Caffeine the morning of the exam
Ax Global Lava		40 freq x 32 phase	2.5	0	Iliac Crest through Pubic Symphysis : **Scan in the plane of the magnet and 90 degrees from each other.**
T2 Sag propeller or FRFSE		12cm - 20cm	3	0	Entirety of Prostate gland including seminal vesicles
T2 Cor propeller or FRFSE		12cm - 20cm	3	0	Entirety of Prostate gland including seminal vesicles
T2 Ax propeller or FRFSE		12cm - 20cm	3	0	Entirety of Prostate gland including seminal vesicles: Diffusion/ Ax T2/Dynam are all same plane
Ax Focus Diffusion (50/1000)		24	4	1.5	Entirety of Prostate gland including seminal vesicles: Diffusion/ Ax T2/Dynam are all same plane
`		24	4	1.5	Entirety of Prostate gland including seminal vesicles: Diffusion/ Ax T2/Dynam are all same plane
Ax Perfusion (Dynamic)		(not specified)	3	0	Entirety of Prostate gland including seminal vesicles: Diffusion/ Ax T2/Dynam are all same plane: **Include color mapping through CAD system**
Ax Global Lava + Contrast		40 freq x 32 phase	2.5	0	Iliac Crest through Pubic Symphysis: Diffusion/ Ax T2/Dynam are all same plane
					Each type for Diffusion
					Use B value of 1000 to calculate ADC map
					Send B value of 1400 to PACS for diffusion. Do NOT use this B value to calculate ADC
					If your MRI can extrapolate B values of 1400, use to save time. If not acquire 2 separate diffusion sequences
					Please send "water only" LAVA images
					If your MRI can extrapolate B values of 1400, use to save time. If not acquire 2 separate diffusion sequences
					Only provide 10 sequences
					* If pelvic hardware present, the exam should be completed on 1.5T and not 3T MRI

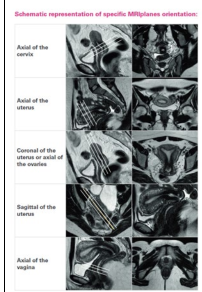


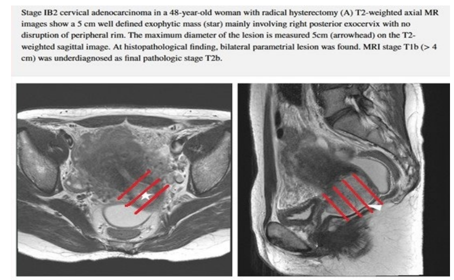


PELVIS FEMALE GYN (see subtype)					
					These exams use the same protocol except that double oblique (angulation) imaging is done perpendicular to the tumor location / or body part if tumor is not seen (see illustrations)
					Tumors tend to be a light grey on T2W sequences. Look at history provided if you can't see the tumor and scan relative to the body part (like vagina, cervix, endometrium)
					if cervix cancer then double oblique images are done with attention to cervix but if endometrial cancer then with attention to the endometrium


P
A
Figure 2. The double oblique technique. Illustration shows a uterus that is anteriorly rotated in the sagittal plane (anteverted) and laterally tilted to the left in the coronal plane. The double oblique sequence is performed by angling images anteriorly in the sagittal plane (green line) and laterally in the coronal plane (blue line), which creates true oblique images along the true axis of the uterus (orange line). A = anterior, P = posterior.
Visual Art: © 2013
The University of Texas
MD Anderson Cancer Center

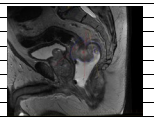


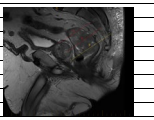



Stage IB2 cervical adenocarcinoma in a 48-year-old woman with radical hysterectomy (A) T2-weighted axial MR images show a 5 cm well defined exophytic mass (star) mainly involving right posterior exocervix with no disruption of peripheral rim. The maximum diameter of the lesion is measured 5cm (arrowhead) on the T2-weighted sagittal image. At histopathological finding, bilateral parametrial lesion was found. MRI stage T1b (> 4 cm) was underdiagnosed as final pathologic stage T2b.

GYNECOLOGIC CANCER	**Scan number**	**Best done without and WITH IV CONTRAST**			
Includes: Endometrial, cervix and vaginal cancer					
Patient Prep:					Fast for at least 4 hours and empty bladder/ rectum about 1 hour before examination (so bladder is part full) .
Patient Prep:					Use 40 mL of warmed Vaginal ultrasound gel or KY jelly
Patient Preg:					Air in rectum may interfere with exam. If full of air have patient empty.
Technical note:					Scan perpendicular to the tumor site (or body part of the study such as cervix, endometrium or vaginal if tumor is not seen) using double oblique imaging
Technical note:					small FOV images (above)- see diagram These oblique images are used for scans 5, 6, 7, 8, 9
Technical note:					The color indicators (yellow and blue scans) which use the same imaging FOV and planes for each color
Technical note:					use ANTERIOR SAT BAND when possible for imaging below if phase is AP; use phase AP in most situations; if artifacts might need to swap phase direction
LOC (3 planes)	1				
Large FOV Cor (to body) **T2** (> 3000/90 to 102 ms)	2	40 (30 to 50) cm	8 (6 to 10) mm	2 mm	Large FOV to include entire pelvis and all of the kidneys matrix =256 x 192 to 256: use fast FSE like RESTORE, FRFSE, DRIVE, DE FSE
					Smaller sized images are fit to patient
Small FOV **Obl SAG T2 no Fat Sat** (>3000/90 to 102 ms)	3	22(18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	from inside of one hip to the other (small FOV): ETL = 17 (13 to 21); NEX = 2 ; Freq A-P to avoid bowel motion ghosting into uterus
					whole pelvis
Small FOV **Obl COR** to tumor site **T2 no Fat Sat** (>3000/90 to 102 ms)	4	22(18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	small dedicated to region of tumor (COR long axis tumor site) - i.e. double oblique (double angulation) set of images
Small FOV **Obl AX** to tumor site **T2 no Fat Sat** (>3000/90 to 102 ms)	**5**	22(18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	small dedicated to region of (AX to long axis of tumor) i.e. double oblique (double angulation) set of images
Small FOV AX to tumor site **DWI** (same as immediately above)	6	22(18 to 28) cm	3 to 4 mm	0.3 mm	b= 50, 1000
Create ADC from data above	6 (create ADC map)				
Small FOV **Obl AX GE T1** to tumor site (like scan 5) (**NO Fat Sat** 3D GRE T1*)	7	22 (18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	Nex =1 at 0 (pre contrast) scan top L5 thru entire pelvis: DCE*= dynamic contrast enhancement
AX (to body) (**NO Fat Sat dual echo** GRE T1)	8	28 cm (20 to 44 cm)	3 (2 to 4) mm		These are very important (both T1 without Fat Sat then with Fat Sat) if looking for endometriosis/ adnexal mass, repeat if degraded by motion or other)
same as scan above 7 GRE T1 **with FAT SAT** AX (to body)	9	28 cm (20 to 44 cm)	3 (2 to 4) mm		
Small FOV Obl SAG (Sag to tumor/ body part) **DCE** (**Fat Sat**, 3D GRE T1*)	10	22 (18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	Nex =1 at 0 **(pre contrast) then 25, 60, 100, 140, 180, 240 seconds** (and make subtraction of each of these from non contrasted exam)
make subtractions (all post & pre contrast scans)	10 (make subtractions)	22 (18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	or alternatively do if available on scanner 3d of 5 sec per phase with 36 phases
OBL AX +C (like scan 5) Fat Sat GRE T1	11	22 (18 to 28) cm	3 to 4 mm	0.3 to 0.4 mm	Nex = 2
optional Large FOV COR delayed post c+ (Fat Sat, 3D GRE T1*)	12	40 (30 to 50) cm	10 mm	1 to 2 mm	From mid kidneys through upper thigh (include all pelvis and lower Abd); perform if time permits for imaging slot
UTERINE FIBROIDS / LEIOMYOMA	**Scan #**	**Done without and WITH IV CONTRAST**			
Patient Prep:					Fast for at least 4 hours and empty bladder/ rectum about 1 hour before examination (so bladder is part full) .
Patient Prep:					NOT needed (vaginal gel or KY jelly)
Patient Preg:					Air in rectum may interfere with exam. If full of air have patient empty.
Technical note:					Imaging FOV should include all of uterus and all fibroids / masses (may need to increase or decrease FOV)
Technical note:					use ANTERIOR SAT BAND when possible for imaging below if phase AP; use phase AP in most situations; if artifacts might need to swap phase direction
LOC: (3 planes)	1		any		
	Smaller or larger FOV images are fit to patient and all pelvic organs				
Small FOV SAG T2 no Fat Sat (>3000/90 to 120 ms)	2	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	from inside of one hip to the other (small FOV): ETL = 17 (13 to 21); NEX = 2 Matrix at least 256 x 256
Small FOV AX (to endometrium) T2 no Fat Sat (>3000/90 to 120 ms)	3	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	small dedicated to region of mass (AX to long axis of cervix) i.e. double oblique set of images
Small FOV AX DWI (same FOV and plane as immediately above for scan 3)	4	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	b= 50, 1000
Create **ADC** from data above	4 (create ADC map)				
AX (to endometrium or uterus, same FOV and plane as scan 3,4) (**NO Fat Sat** 3D GRE T1*)	5	28 cm (20 to 44 cm)	4 to 5 mm		Nex =2 at 0 (pre contrast) The scans 11 and 12 should be the same except for no FS (FAT SAT) and FS
DCE (pre contrast then dynamic post) SAG +C Fat Sat GRE T1	6	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	Nex =1 at 0 **(pre contrast) then 25, 60, 100, 140, 180 seconds** (and make subtraction of each of these from non contrasted exam)
make subtraction	6 (make subtractions)				make subtraction of ALL post contrast scans - pre contrast scan
AX (to endometrium/ uterus) (**with Fat Sat** otherwise same as scan 3,4 and 5, 3D GRE T1*)	7	28 cm (20 to 44 cm)	4 to 5 mm		
FEMALE UTERINE CONGENITAL ABNORMALITIES		**NO IV contrast needed for this type of scan**			
Patient Prep:					Fast for at least 4 hours and empty bladder/ rectum about 1 hour before examination (so bladder is part full) .
Patient Prep:					NOT NEEDED: use no Vaginal ultrasound gel or KY jelly
Patient Preg:					Air in rectum may interfere with exam. If full of air have patient empty.
Technical note:					use ANTERIOR SAT BAND when possible for imaging below if phase AP; use phase AP in most situations; if artifacts might need to swap phase direction
Technical note:					
LOC: (3 planes)	1	40 cm	any		
Large FOV Cor (to body) T2 no Fat Sat (>3000/90 to102 ms)	2	40 to 50 cm	8 (6 to 10) mm	2 mm	Large FOV to include entire pelvis and all of the kidneys matrix =256 x 192 to 256: use fast FSE like RESTORE, FRFSE, DRIVE, DE FSE
					Small FOV images are designed to" fit to patient" and are as small as reasonably possible
Small FOV Obl SAG no Fat Sat T2 (>3000/90 to102 ms)	3	20(18 to 24) cm	4 to 5 mm	0.4 to 0.5 mm	from inside of one hip to the other (small FOV): ETL = 17 (13 to 21); NEX = 2 Matrix at least 256 x 256
Small FOV Obl COR to Endometrium no Fat Sat T2 (>3000/90 to102 ms)	**4**	**20(18 to 24) cm**	**4 to 5 mm**	**0.4 to 0.5 mm**	**small FOV (COR long axis of Endometrium) - i.e. double oblique set of images THIS is the MOST IMPORTANT sequence repeat if blurred**
Small FOV Obl AX to Endometrium no Fat Sat T2 (>3000/90 to102 ms)	5	20(18 to 24) cm	4 to 5 mm	0.4 to 0.5 mm	small FOV (AX to long axis of Endometrium) i.e. double oblique set of images
NO FAT SAT - AX to body (NO Fat Sat **dual echo** GRE T1)	6	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	Nex =2
with FAT SAT AX to body same as scan 7 but with FS (**w Fat Sat**, GRE (dual echo) T1)	7	28 cm (20 to 44 cm)	4 to 5 mm	0.4 to 0.5 mm	Nex =2

ADNEXAL MASS or ENDOMETRIOSIS or R/O OVARIAN TORSION (female gynecologic emergencies)		**Best done without and WITH IV CONTRAST**			
Patient Prep:					Empty bladder 20 min to 1 hour (1 hour best if time permits however for torsion r/o may use shorter (any) times) before examination (so bladder is part full) .
Patient Preg:					Air in rectum may interfere with exam. If full of air have patient empty.
Technical note:					use ANTERIOR SAT BAND when possible for imaging below if phase AP; use phase AP in most situations; if artifacts might need to swap phase direction
Technical note:					Vaginal Gel or KY Jelly is NOT needed for this exam
Technical note:					Use Ax, Cor and Sag imaging to the body (not cervix or endometrium)
Technical note:					* IV contrast recommended, if ordered without contrast , then to all scans above (including scan 9 without contrast, but no dynamic contrast scans)
LOC: (3 planes)	1	40 cm	any		
Cor (to body) T2 (>3000/90 to 102 ms)	2	40 to 50 cm	8 (6 to 10) mm	2 mm	Large FOV to include entire pelvis and all of the kidneys matrix =256 x 192 to 256: use fast FSE like RESTORE, FRFSE, DRIVE, DE FSE
		FOV to view bone to bone in pelvis (view both ovaries and Uterus)			
SAG (to body) Small FOV no Fat Sat T2 (>3000/90 to 102 ms)	3	28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	from inside of one hip to the other (small FOV): ETL = 17 (13 to 21); NEX = 2 Matrix at least 256 x 256
COR (to body) Small FOV no Fat Sat T2 (>3000/90 to 102 ms)	4	28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	
AX (to body) Small FOV no Fat Sat (>3000/90 to 102 ms)	5	28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	
AX DWI (same as immediately above)	6	28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	b= 50, 1000
Create ADC from data above					
AX (to body) **(NO Fat Sat dual echo** GRE T1)	7	28 cm (20 to 44 cm)	3 (2 to 4) mm		These are very important (both T1 without Fat Sat then with Fat Sat) if looking for endometriosis/ adnexal mass, repeat if degraded by motion or other)
same as scan above 7 GRE T1 **with FAT SAT** AX (to body)	8	28 cm (20 to 44 cm)	3 (2 to 4) mm		
SAG (to body) pre then post contrast DCE +C Fat Sat GRE T1	9	28 cm (20 to 44 cm)	3 (2 to 4) mm	make subtractions	Nex =1 at 0 **(pre contrast) then 25, 60, 100, 140, 180 seconds** (and make subtraction of each of these from non contrasted exam)
make subtractions of ALL post contrast - pre contrast	9 (make subtractions)				Sag images are pelvic bone to pelvic bone
same as scan 8 but post contrast AX (to body) +C (Fat Sat, 3D GRE T1)	10	28 cm (20 to 44 cm)	3 (2 to 4) mm		go to bathroom for urethra diverticulum
Bladder Mass					
Patient Prep:					Empty bladder about 2 hours before examination (so bladder is moderately full) .
Patient Preg:					Air in rectum may interfere with exam. If full of air have patient empty.
Technical note:					use ANTERIOR SAT BAND when possible for imaging below; if artifacts might need to swap phase direction
LOC: T2W SSFSE or Haste COR		40 cm	any		
Large FOV Axial (to body) T2 (4000/90 ms)*		34 (30 to 40 cm)	6 mm	1 mm	
Large FOV Cor (to body) T2 (4000/90)*		40 to 50 cm	8 mm	2 mm	*Large FOV to include entire pelvis (bone to bone) and at least most of the kidneys
		FOV to view bone to bone in pelvis (view both ovaries and Uterus)			
SAG T2 (4000/90 ms)		28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	**from inside of one hip to the other (small FOV): ETL = 17 (13 to 21); NEX = 2 Matrix at least 256 x 256
COR T2 (4000/90 ms)		28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	
AX T2 (4000/90 ms)		28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	
AX DWI (same as immediately above)		28 cm (20 to 44 cm)	3 to 4 mm	0.3 to 0.4 mm	Diffusion b= 50, 1000
Create ADC from data above		28 cm (20 to 44 cm)			
AX DCE (NO Fat Sat3D GRE T1*)		28 cm (20 to 44 cm)	3 (2 to 4) mm		Nex =2 at 0 (pre contrast)
AX DCE (Fat Sat, 3D GRE T1*)		28 cm (20 to 44 cm)	3 (2 to 4) mm	make subtractions	Nex =1 at 0 (pre contrast) then 30,60, 90, 120, 150 seconds (and make subtraction of each of these)
SAG +C Fat Sat GRE T1		28 cm (20 to 44 cm)	3 (2 to 4) mm		Nex = 2
COR +C delayed (Fat Sat, 3D GRE T1*)		40 cm (30 to 50 cm)	8 mm	2 mm	From mid kidneys through upper thigh (include all pelvis and lower Abd)
* IV contrast recommended, if ordered without contrast then do scans above without contrast (do Ax no Fat Sat, Ax Fat Sat, Sag T1)					Use Ax, Cor and Sag imaging to the body (not cervix or endometrium)
Penis (Fracture)					
Cor STIR Global		30	5	1	Tape penis to abdomen if needed
Ax T1 Lava Global		30	4	2	
Sag T2 Propeller		24	3	0.4	
Sag T1		24	3	0.4	
Cor T2 Propeller		22	3	0.1	
Cor T1		22	3	0.1	
Ax T2 Propeller		17	3	0.2	
Ax T1		17	3	0.2	
Penis (Peyronie's Disease)					
Cor STIR Global		40	5	1	Tape penis to abdomen if needed
Ax T1 Lava Global		40	4	2	
Sag T2 FS Propeller		24	3	0.4	
Sag T1 FS		24	3	0.4	
Cor T2 Propeller		22	3	0.1	
Cor T2 FS Propeller		22	3	0.1	
Cor T1 FS		22	3	0.1	Rev 7-11-19
Ax T2 Propeller		17	3	0.2	
Ax T2 FS Propeller		17	3	0.2	Include IMA
Ax T1 FS		17	3	0.2	
Ax T1 FS +C		17	3	0.2	
Cor T1 FS +C		22	3	0.1	
Sag T1 FS +C		24	3	0.4	
Rectal Cancer (1.5 T)					
					* **Preferred prep: Microenema** administered by the patient in the department, immediately before the scan.
					* If microenema is not available in the department, full prep may be utilized which requires the patient to plan to purchase and perform the prep at home.
Technical note:					* Prep: Nothing to eat or drink 12 hours prior, 1 bisacodyl suppository (Dulcolax) 10 hours prior to study, void just before exam
					* Special Instructions: No Caffeine the morning of the exam
Ax T2 FRFSE Global		~30	5	0	320x320
Ax Diff Global (50/800)		~30	5	1	
Sag T2 FRFSE		24	4	0	320x224 (Do axials PERPENDICULAR to mass. VERY IMPORTANT** See images)
Cor T2 FRFSE		24	3	0	320x224
Ax OBL T2 FRFSE		24	3	0	320x224 (See Images Below)
Cor OBL T2		24	3	0	The second image shows how sometimes multiple axial planes must be used to get it perpendicular.
					* No laxative is needed for diverted patients
Rectal Cancer (3.0 T)					
					* **Preferred prep: Microenema** administered by the patient in the department, immediately before the scan.
					* If microenema is not available in the department, full prep may be utilized which requires the patient to plan to purchase and perform the prep at home.
					* Prep: Nothing to eat or drink 12 hours prior, 1 bisacodyl suppository (Dulcolax) 10 hours prior to study, void just before exam
					* Special Instructions: No Caffeine the morning of the exam
Ax T2 FRFSE Global		~30	5	0	320x320
Ax Diff Global (50/800)		~30	5	1	
Sag T2 FRFSE		24	4	1	416x384
Cor T2 FRFSE		24	3	1	320x320 (These are overlapped images. 3mm then move 1 mm)
Ax OBL T2 FRFSE		24	3	1	416x384 (Perpendicular to tumor)
Cor OBL T2		24	3	1	The second image shows how sometimes multiple axial planes must be used to get it perpendicular.
					* No laxative is needed for diverted patients





Urethra Diverticuli					
Ax T2 FS Global		28	4	1	Include entire urethra from bladder neck to external meatus.
Axial T2		12-16	3	0.3	No vaginal gel.
Sag T2		12-16	3	0.3	
Cor T2		12-16	3	0.3	
Ax T1 Lava		12-16	3	1	
Ax T1 Lava +C (Dynamic)		12-16	3	1	Nex =1 at 0 (pre contrast) then 25, 60, 100, 140, 180 seconds (and make subtraction of each of these from non contrasted exam)
Ax T1 Lava + C Global		34-40	3	6	
Ax T1 Lava +C (after voiding)		12-16	3	1	Images acquired after voiding through urethra (to answer the question does the abnormality fill with contrast after voiding to confirm a urethra diverticulum)
MRV Pelvis (May-Thurner's Syndrome)		40		na	
CEMRA (Mask + 4 phases 20 sec apart , 3D Lab recons)		40	4	2	
MRA Aorta					
Ax 3D Dual Echo		40	4	2	
Ax T2 FS Propeller		40	6	1	
CEMRA (Mask + Dyn 2cc/sec 32 Locs)		40	3	1.5	
MRA Renal					
Ax 3D Dual Echo		40	4	2	If requested by referring physician to complete with and without, you can complete with following post sequences
Ax T2 FS Propeller		40	6	1	• Axial and coronal VIBE/LAVA fat saturated images at 3-4mm slice thickness
Ax 3D Enhance wo (60 locs/slab)		38	2	1	• Axial and coronal 3D enhance post contrast (same parameters as without 3D enhance) with reformats (MRA spin/tumble)
Mediastinal Mass					
Coronal T2 Haste		20-30	4	1	
Axial T2 Haste		20-30	4	1	Please confirm with radiologist regarding scan range to ensure lesion is imaged appropriately, as this is an uncommon exam. Typically, thoracic inlet through base of heart.
Axial STIR		20-30	4	1	
Axial IN/OUT phase		20-30	3	1	
Axial TRUFISP		20-30	4	1	
Axial DWI (B50, B1000)		20-30	5	1	
Axial T1 VIBE pre		20-30	3	1	
Axial T1 VIBE post (20-30s, 60-70s, 3 min)		20-30	3	1	
Coronal T1 VIBE post (5 min)		20-30	3	1	
Abridged Whole Body MRI					
Neck					3 separate exams will need ordered MRI Neck, MRI Chest, and MRI Abdomen/Pelvis. Whole Body MRI is an unlisted CPT code and cannot be used as it is not billable
Axial T1		18	3	3	Superior FOV must include IACs
Axial T2 fat sat		18	3	3	
Axial DWI		18	3	3	
Axial C+T1 fat sat		18	3	0.3	
Coronal C+T1 fat sat		25	3	0.3	
Chest					
Coronal T2 Haste		20-30	4	1	
Axial STIR		20-30	4	1	
Axial DWI/ADC		20-30	3	1	
Axial T1 VIBE pre/post (60-70s)		20-30	4	1	
Coronal T1 VIBE post (5min)		20-30	5	1	
Abdomen/Pelvis					
Coronal T2 Haste		~30-40	5	1	
Axial T2 fat sat		~30-40	5	2.5	
Axial T1 in/out of phase		~30-40	5	1	
Axial DWI/ADC		~30-40	4	1	
Axial T1 VIBE pre/post (60-70s)		~30-40	5	1	
Coronal T1 VIBE post		~30-40	8	2	
Rib					
Routine Breathing					Mark the site(s) of pain
Axial T1		25-35*	4	1	* FOV to only include rib cage and adjacent chest wall musculature
Axial T2 Fat Sat		25-35*	4	1	
Coronal STIR		25-35*	4	1	
Coronal GRE		25-35*	4	1	
Breath Hold (~20 seconds each)					
COR T1 VIBE (non Fat Sat)		25-35*	4	1	
Sag T1 VIBE (non Fat Sat)		25-35*	4	1	
Ax T2 HASTE (non Fat Sat)		25-35*	4	1	If poor Fat Sat on the HASTE, please use triplane breath-hold STIR
Triplane T2 HASTE Fat Sat		25-35*	4	1	
Soft Tissue "Tumor"					*FOV and Spacing subject to area of concern. Use same FOV and Spacing as the closest joint or body part.
Axial T1		*	*	*	
Axial PD Fat Sat		*	*	*	
Axial GRE		*	*	*	
If contrast ordered: Ax T1 Fat Sat		*	*	*	
Cor T2		*	*	*	
Cor STIR		*	*	*	
Sag T2 Fat Sat		*	*	*	
If contrast ordered					
Triplane T1 Fat Sat Post		*	*	*	
Pectoralis					
Axial T2 Fat Sat		35	4	1	Large field of view oriented to pectoralis major muscle (to include from lateral cortex of humerus thru sternum)
Cor T1		32	4	1	Large field of view oriented to pectoralis major muscle (to include from lateral cortex of humerus thru sternum)
Cor STIR		32	4	1	Large field of view oriented to pectoralis major muscle (to include from lateral cortex of humerus thru sternum)
Sag T1		32	4	1	Large field of view oriented to pectoralis major muscle (to include from lateral cortex of humerus thru sternum)
Axial T2		20	4	1	Small field of view oriented to the humerus (truly axial to humerus, from glenohumeral joint to about mid humerus)
Axial PD Fat Sat		20	4	1	Small field of view oriented to the humerus (truly axial to humerus, from glenohumeral joint to about mid humerus)
Axial GRE		20	4	1	Small field of view oriented to the humerus (truly axial to humerus, from glenohumeral joint to about mid humerus)

Urogram					
Saline Bolus 100 ml					
Cor SSFSE		~30-40	6 mm	7 mm	
Axial SSFSE		~30-40	6 mm	7 mm	
Axial DE		~30-40	5 mm	2.5 mm	
Axial LAVA		~30-40	3 mm	1.5 mm	
Axial T2		~30-40	6 mm	7 mm	
Axial DWI		~30-40	8 mm	10 mm	
Give Lasix 10 mg		~30-40			
2D Cor Oblique (MRCP)		~30-40	60 mm	60 mm	
3D Cor Oblique (MRCP)		~30-40	2 mm	2 mm	
Cor LAVA - Dynamic 5 min. & 10 min.		~30-40	3 mm	1.5 mm	
Axial LAVA 12 minute		~30-40	3 mm	1.5 mm	
Cor Fiesta		~30-40	6 mm	7 mm	
Axial Fiesta		~30-40	6 mm	7 mm	
Cor LAVA - 15 min.		~30-40	6 mm	7mm	
Inguinal Hernia					
COR T1		36	5 mm	1 mm	
COR STIR		36	5 mm	1 mm	
AX T1		36	5 mm	1 mm	
AX STIR		36	5 mm	1 mm	
SAG T2 Fat Sat		36	5 mm	1 mm	
AX SSFSE without Valsalva		36	5 mm	1 mm	
AX SSFSE with Valsalva		36	5 mm	1 mm	
AX SSFSE Fat Sat without Valsalva		36	5 mm	1 mm	
AX SSFSE Fat Sat with Valsalva		36	5 mm	1 mm	
COR SSFSE without Valsalva		36	5 mm	1 mm	
COR SSFSE with Valsalva		36	5 mm	1 mm	
AX T1 Fat Sat Pre		36	5 mm	1 mm	Only if referring physicain ordered with contrast
AX T1 Fat Sat + C		36	5 mm	1 mm	Only if referring physicain ordered with contrast
COR T1 Fat Sat + C		36	5 mm	1 mm	Only if referring physicain ordered with contrast