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# MR Body Protocols

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# *Chest*

# Mediastinal Mass W+WO Contrast

**Beware**: chest has protocols from Body, Neuro (thoracic outlet), Cardiac, MSK—*make sure you have the correct protocol*

## Pre Contrast

1. Localizer fb (3 plane)
1. Localizer bh (3 plane)
2. Cor T2 HASTE 7mm
3. Ax T2 HASTE 7mm
4. Ax T2FS HASTE 7mm
5. Ax T2 TrueFISP 7mm
6. T2 Haste DB 7mm
7. Sag T2 HASTE 7mm
8. Sag T2 TrueFISP 7mm
9. Ax T1 Dixon bh 4-5mm (IP/OP/F/W)
10. Ax DWI b50,400,800 7mm (area of interest 1 set or cover entire chest in 2 sets)
11. Ax T1FS VIBE bh 3-5mm
12. Cor T1FS VIBE bh 3-5mm
13. Sag T1FS VIBE bh 3-5mm

## Post Contrast

14. Ax T1FS VIBE bh arterial 25s bh
15. Ax T1FS VIBE venous bh 1min bh
16. Sag T1FS VIBE delayed 3min bh
17. Cor T1FS VIBE delayed 4min bh
18. Ax T1FS VIBE delayed 5min bh

## Notes

- Check for fatsat, wrap around and quality of images specially diffusion

# *Abdomen*

# Liver W+WO Contrast

## Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE
5. AX T1 Dixon bh
6. Ax T1 Dixon bh liver quant (may not be available on all systems)
7. Ax T1FS VIBE bh

## Post Contrast

8. Ax T1FS VIBE 30s
9. Ax T1FS VIBE 70s
10. Ax T2FS HASTE
11. Ax T1FS VIBE 3min
12. Cor T1FS VIBE 4min
13. Ax T1FS VIBE 5min
14. Ax T2 TrueFISP bh
15. Ax DWI b50,400,800
16. Cor T2FS HASTE thick slab bh

# Eovist Liver W+WO Contrast

*FNH/ biliary leak/ Mets*

## Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE
5. T2 SPACE Cor MRCP (thin slab)
6. AX T1 Dixon bh
7. Ax T1 Dixon bh liver quant (may not be available on all systems)
8. Ax T1FS VIBE bh

## Post Contrast

9. Ax T1FS VIBE 30s
10. Ax T1FS VIBE 70s
11. Ax T2FS HASTE
12. Ax T1FS VIBE 3min
13. Cor T1FS VIBE 4min
14. Ax T1FS VIBE 5min
15. Ax T2 TrueFISP bh
16. Ax DWI b50,400,800
17. Cor T2FS HASTE thick slab bh
18. Ax T1FS VIBE 10min
19. Ax T1FS VIBE (flip angle 25)
20. Ax T1FS VIBE 20min (Check with radiologist)
21. Ax T1FS VIBE (flip angle 35)
22. Ax T1FS VIBE 30min (Check with radiologist)
23. Ax T1FS VIBE 40min (Check with radiologist)

## Notes

- After the 20min please check with Radiologist if the exam needs to be extend.
- Check for fatsat, wrap around and quality of images specially Diffusion

# Liver WO Contrast

## Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE Ax
5. Ax T2 HASTE FS Ax
6. Ax T1FS VIBE bh
7. AX T1 Dixon bh
8. Ax T1 Dixon bh liver quant (may not be available on all systems)
9. Ax DWI b50,400,800
10. Ax T2 TrueFISP bh
11. Cor T2FS HASTE thick slab bh

## Optional

12. Ax T1FS VIBE bh

# MRCP WO Contrast

*For stone evaluation or rule out biliary obstruction*

## Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE bh
4. Ax T2 HASTE bh
5. Ax T2FS HASTE bh
6. Ax T2 TrueFISP bh
7. AX T1 Dixon bh
8. Ax T1 Dixon bh liver quant (may not be available on all systems)
9. Thick slab MRCP bh (radial, cor-sag, 4 slices)
10. Ax DWI b50,400,800
13. T2 SPACE Cor MRCP (thin slab)

## Optional

14. Ax T1FS VIBE bh

# Liver Elastography
# (UH MR2 & MR3 - CHS 1 & 2)

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE Ax
5. Ax T2 TrueFISP FS
6. Ax T1 Dixon
7. Ax T1 Dixon (liver quant)

- Histo (save and send histo #1 spec position)

8. Elastography_loc_BH
9. Liver elastography (generate RGB)

Optional

10. Ax DWI b50,400,800 fb

# Liver Fat/Iron

## (UH MR2, 3 & 4 – CHS 1 &2)

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE Ax
5. Ax T2 HASTE FS Ax
6. Ax T2 TrueFISP bh
7. Ax DWI b50,400,800
8. T1 COR FS VIBE bh
9. T1 Ax Vibe e-dixon

- Histo

## Pancreatic/Gall Bladder/MRCP/Common Bile Duct Mass W+WO Contrast

### Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE
5. T2 SPACE Cor MRCP (thin slab)
6. AX T1 Dixon bh
7. Ax T1 Dixon bh liver quant (may not be available on all systems)
8. Ax T1FS VIBE bh

### Post Contrast

9. Ax T1FS VIBE 30s
10. Ax T1FS VIBE 70s
11. Ax T2FS HASTE
12. Ax T1FS VIBE 3min
13. Cor T1FS VIBE 4min
14. Ax T1FS VIBE 5min
15. Ax T2 TrueFISP bh
16. Ax DWI b50,400,800
17. Cor T2FS HASTE thick slab bh

# Adrenal/Renal Mass W+WO Contrast

## Pre Contrast

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE
4. Ax T2 HASTE
5. Ax T1 Dixon bh
6. Ax T1FS VIBE bh
7. Cor T1FS VIBE

## Post Contrast

8. Ax T1FS VIBE 30s
9. Ax T1FS VIBE 70s
10. Ax T2FS HASTE
11. Ax T1FS VIBE 3min
12. Cor T1FS VIBE 4min
13. Ax T1FS VIBE 5min
14. Ax DWI b50,400,800

# *Abdomen-Pelvis*

# Abdomen+Pelvis Stitched W+WO Contrast

## Pre Contrast Abdomen and Pelvis - "Stitched"

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Sag T2 HASTE
4. Cor T2 HASTE
5. Ax T2 HASTE
6. Ax T2FS HASTE
7. Ax T1 Dixon
8. Ax T2 TrueFISP
9. Ax DWI b50,400,800 bh
   - Abdomen and Pelvic separate with good overlap, If the mass is in mid Abdomen then consider doing extra Diffusion
10. Ax T1FS VIBE bh
11. Sag T1FS VIBE bh
12. Cor T1FS VIBE bh

## Post Contrast - Abdomen and Pelvis - "Stitched"

13. Ax T1FS VIBE 30s
14. Ax T1FS VIBE 70s
15. Ax T1FS VIBE 3min
16. Cor T1FS VIBE 4min
17. Ax T1FS VIBE 5min
18. Sag T1FS VIBE

## Post Contrast - Pelvis

19. Ax T1 TSE post (5mm)
20. Ax T2 SPACE iso (3mm) (Call Radiologist to check if we need it, and which location)
21. 3D Thin slice MRCP (Call Radiologist to check if we need it)

# Enterography W+WO Contrast
# (UH MR2, 3 & 4 – CHS 1 &2)

## Prescan

Before arrival

- Patient does not eat or snack 3 hours before arrival
- Patient empties bowel

90 min before scan

- Patient arrives **fasted**, may not eat or snack

1 hour before scan

- Give 3 bottles Breeza, 1 bottle every 15 min (alternative: 2 bottles Breeza + 1 bottle water)
- Contact resident to notify about glucagon/get contact info

30 min before scan

- Remind resident about glucagon

Immediately before scan

- Empty bladder and bowel
- Give water or finish last bottle to distend stomach (up to 200mL)

## Part 1: Pre-glucagon

1. Cor Cine TrueFISP (Dancing bowel)

One station, large FOV, cover colon and small bowel (don't need full liver)

## Part 2: MR Enterography

**Resident injects ½ dose glucagon (#1)** (effect lasts ~20 min)

2. Cor T2FS HASTE (A+P stitched)
3. Cor T2 TrueFISP (A+P stitched)
4. Ax T2FS HASTE (A+P stitched)
5. Ax T2 HASTE (A+P stitched)

**Resident injects ½ dose glucagon (#2)** (effect lasts ~20 min)

6. Ax T1 VIBE Pre (A+P stitched)

**Inject Contrast**

7. Ax T1 VIBE Post Venous (A+P stitched)
8. Ax T1 VIBE Post Delayed (A+P stitched)

9. Cor T1 VIBE 2mm Post (A+P stitched)
10. Sag T1 VIBE 2mm Post (pelvis only)
11. Ax DWI b50,800,c1000 (A+P stitched)
    - Bathroom break if necessary before continuing

## Part 3: Fistula/Abcess (as protocoled)

12. Ax T2 SPACE iso
13. Cor T2FS TSE 3mm
14. Ax T2FS TSE 3mm
15. Backup: Ax STIR 3mm
16. Option: Sag T2FS TSE 3mm

# Urogram W+WO Contrast

## Prescan

- Give saline chase 40 cc

## Pre Contrast (Abdomen and Pelvis)

1. Localizer fb (3 plane)
2. Localizer bh (3 plane)
3. Cor T2 HASTE (stitched A+P)
4. Ax T2 HASTE (stitched A+P)
5. Ax T2FS HASTE (stitched A+P)
6. Sag T2 HASTE (stitched A+P)
7. Ax T1 Dixon bh (abdomen only)
8. Ax DWI b50,400,800 (A and P not stitched)
   - don't stitch but need good overlap
   - if mass is mid abdomen then consider extra third diffusion through mid abdomen
   - If obstructed-hydronephrosis/hydroureter: Call Radiologist to check when in doubt.
9. T2 Urogram Kidneys
   - 3D Thin slice MRCP type fatsat images 2.5mm thick for Kidneys and ureters cover as much as abdo)- get MIPs from post processing. If these don't work then optional 2D thick slabs(6cm). Align the box with long axis of kidneys-ureters
10. T2 Urogram Ureters Bladder
    - 3D Thin slice MRCP type fatsat images 2.5mm thick for pelvic/lower ureters and urinary bladder cover as much as UB)- get MIPs from post processing.
    - If these don't work then optional 2D thick slabs(6cm). Align the box with long axis of ureters and UB
11. Ax T1FS VIBE bh pre (stitched A+P)
12. Cor T1FS VIBE bh pre (stitched A+P)
13. Sag T1FS VIBE bh pre (stitched A+P)

## Post Contrast (Abdomen and Pelvis)

14. Care bolus
15. Ax T1FS VIBE 35s post (stitched A+P)
16. Ax T1FS VIBE 90s post (stitched A+P)
17. Ax T1FS VIBE 3min post (stitched A+P)
18. Cor T1FS VIBE 4min post (stitched A+P)
19. Sag T1FS VIBE 5min post (stitched A+P)
20. Cor T1FS VIBE 7min post (stitched A+P)
21. Cor T1FS VIBE 9min post (stitched A+P)

## Optional

21. Cor T1FS VIBE 12min post (stitched A+P)
22. TrueFISP (stitched A+P) in cases no IV contrast given
23. Ax T1 TSE post (5mm) (P only)
24. Ax T2 SPACE pelvis (3mm) - for lower ureters and urinary bladder problems

# *Pelvis*

# Body Pelvis W+WO Contrast

All sequences are relative to true axis (not relative to uterus)

1. Localizer fb (3 plane)
2. Sag T2 TSE (5mm)
3. Cor T2 HASTE (5mm)
4. Ax T2 HASTE (5mm)
5. Ax T2FS TSE (5mm)
6. Ax T1 Dixon bh (5mm)
7. Ax DWI b50,400,800 bh (5mm)
8. Ax T2 SPACE iso (3mm ST)
9. Ax T1FS VIBE bh (3mm ST)
10. Sag T1FS VIBE bh (3mm ST)
11. Cor T1FS VIBE bh (3mm ST)
12. Cor T2 TrueFISP (cover from top of the kidney to pubic symphysis)

## Contrast

13. Ax T1FS VIBE post (50s)
14. Ax T1FS VIBE post (90s)
15. Sag T1FS VIBE post (2min)
16. Cor T1FS VIBE post (3min)
17. Ax T1 TSE post (4min) (5mm)

## Optional - if there is no contrast

18. Ax T2 TrueFISP bh (5mm)

## Optional - poor HASTE quality

If the Tech recognize that HASTE quality is not diagnostic during the regular hours please contact body staff/fellow. If after hours run:

19. Cor T2 TSE
20. Ax T2 TSE

# Sinogram/Fistulagram W+WO Contrast

- This need to be supervised by facilitator/Second Call
- Call Radiologist to position SPACE and include entire anus and perianal tissues in FOV

## Pre contrast

1. Localizer fb (3 plane)
2. Cor T2FS TSE (5mm)
3. Ax T2FS TSE (5mm)
4. Sag T2FS TSE (5mm)
5. Ax T2 SPACE 2.5mm (Check with Radiologist for placement)
6. Ax T1 Dixon bh (IP/OP/F/W)
7. Ax DWI b50,400,800 bh (Match slice positioning with SPACE)

Include entire anus and perianal tissues in FOV

8. Ax T1FS VIBE bh
9. Sag T1FS VIBE bh
10. Cor T1FS VIBE bh

## Contrast

Include entire anus and perianal tissues in FOV

11. Ax T1FS VIBE post (50s)
12. Ax T1FS VIBE post (90s)
13. Sag T1FS VIBE post (2min)
14. Cor T1FS VIBE post (3min)
15. Ax T1 TSE post (4min)

# Prostate W+WO Contrast

## (UH MR4 3T only)

- Check for rectal prep–did patient take self-retaining enema and did fecal emptying to reduce artifacts before arrival
- Ask for PSA, biopsy results (how many times and positive/negative for cancer)
- If the Tech recognize quality is not diagnostic during the regular hours please contact body staff/fellow. After hours contact facilitator/second call resident.

### Pre contrast

1. Localizer (3 plane)
2. Sag T2
3. Cor T2
4. Ax T2
5. Ax DWI b0,800,1400,1600c
6. Ax T1 VIBE pre flip_ 2_15 deg
7. Ax T2 FS Dixon bh (aortic bifurcation to inguinal area)
8. B1 Map_for_T1 mapping

### Contrast

8. Ax T1 VIBE dynamic 20 phases
9. Ax T1 Dixon bh (IP/OP/F/W; aortic bifurcation to inguinal area)
10. Ax T2 SPACE 3mm

### Optional – rectal gas or fecal matter

If there are artifacts due to rectal gas and fecal matter run extra RESOLVE DWI

11. Ax DWI RESOLVE b0,800,1400,1600c

### Optional – non contrast

12. Ax T2 TrueFISP bh (6mm)

# Penis/Scrotal Cancer W+WO Contrast

*Trauma, cancer, infarcts or infections in penis or scrotal region*

## Patient Prep

- T2 SPACE 3D coverage for area of interest may be needed.
  Call radiologist or upper-level resident
- Tape the penis to Anterior Abdominal wall
- Put towel under scrotum
- Centre at area of interest penis or scrotum

## Pre contrast

1. Localizers (3 planes)
2. T2W Spin echo (3 planes)
3. Axial T1 GRE  Dixon (IP/OP/F/W)
4. Axial TruFISP
5. Axial DWI
6. Axial T2 fat sat
7. Sag T2 fat sat
8. Axial T1 SE

## Contrast

9. Pre and Post T1 vibe all three planes with subtractions
   Dynamic contrast sequence like prostate MRI check with radiologist
10. Axial T1 SE Post

## Optional

11. T2 SPACE 3D (area of interest)
    Call radiologist or upper-level resident

# Brachytherapy with Applicator
# (UH MR2 & 3)

1. Localizer fb (3 plane)
2. T2 Cor HASTE (straight)
3. T2 Sag HASTE (straight)
4. T2 3D space ax iso
5. Resolve_diff_b50,800 Sag

# Brachytherapy without Applicator

Notes

- Use “Body Pelvis” protocol
- Add sagittal diffusion from “Brachytherapy with Applicator”