

## Indications for magnetic resonance cholangiopancreatography (MRCP)

- > Biliary obstruction (choledocholithiasis, benign and malignant strictures)
- > Bile ducts, surgery or postsurgical biliary tract alterations
- > Biliary cystadenoma and cystadenocarcinoma
- > Congenital anomalies
- > Pancreatic pseudocyst
- > Chronic pancreatitis
- > Acute cholecystitis
- > Bile ducts, calculi
- > Pancreatic cancer
- > Pancreas divisum

## *Contraindications*

- > Any electrically, magnetically or mechanically activated implant (e.g. cardiac pacemaker, insulin pump biostimulator, neurostimulator, cochlear implant, and hearing aids)
- > Intracranial aneurysm clips (unless made of titanium)
- > Pregnancy (risk vs benefit ratio to be assessed)
- > Ferromagnetic surgical clips or staples
- > Metallic foreign body in the eye
- > Metal shrapnel or bullet

## *Patient preparation*

- > A satisfactory written consent form must be taken from the patient before entering the scanner room
- > Ask the patient to remove all metal object including keys, coins, wallet, any cards with magnetic strips, jewellery, hearing aid and hairpins
- > Ask the patient to undress and change into a hospital gown
- > **Instruct the patient to hold their breath for the breath hold scans and breathe gently for the gated scans (its advisable to coach the patient two to three times before starting the scan)**
- > Claustrophobic patients may be accompanied into the scanner room e.g. by staff member or relative with proper safety screening
- > **Patients should fast for 4 -6 hours before the exam (nothing to eat or drink)**
- > Offer headphones for communicating with the patient and ear protection
- > Explain the procedure to the patient and answer questions
- > Note down the weight of the patient

## *Positioning*

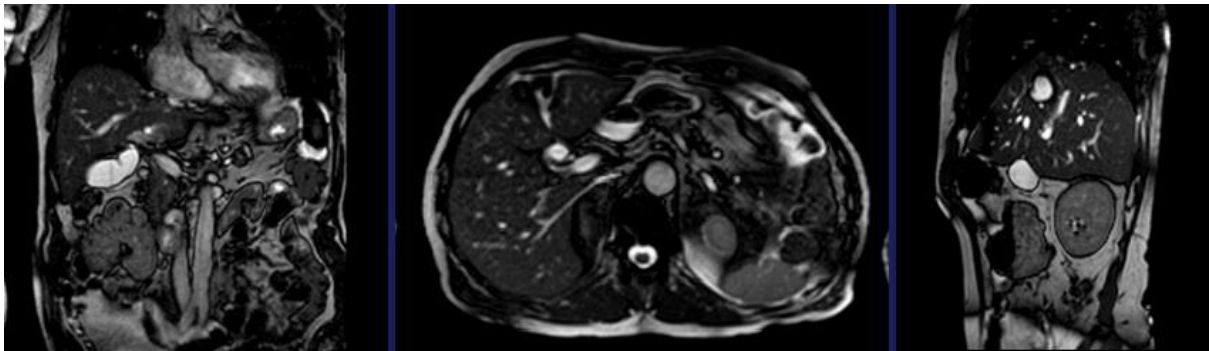
- > Position the patient in supine position with head pointing towards the magnet (head first supine)
- > Position the patient over the spine coil and place the body coil over the upper abdomen (nipple down to iliac crest)
- > Securely tighten the body coil using straps to prevent respiratory artefacts
- > Give a pillow under the head and cushions under the legs for extra comfort
- > Centre the laser beam localiser over xiphoid process of sternum



## Suggested sequence parameters and planning

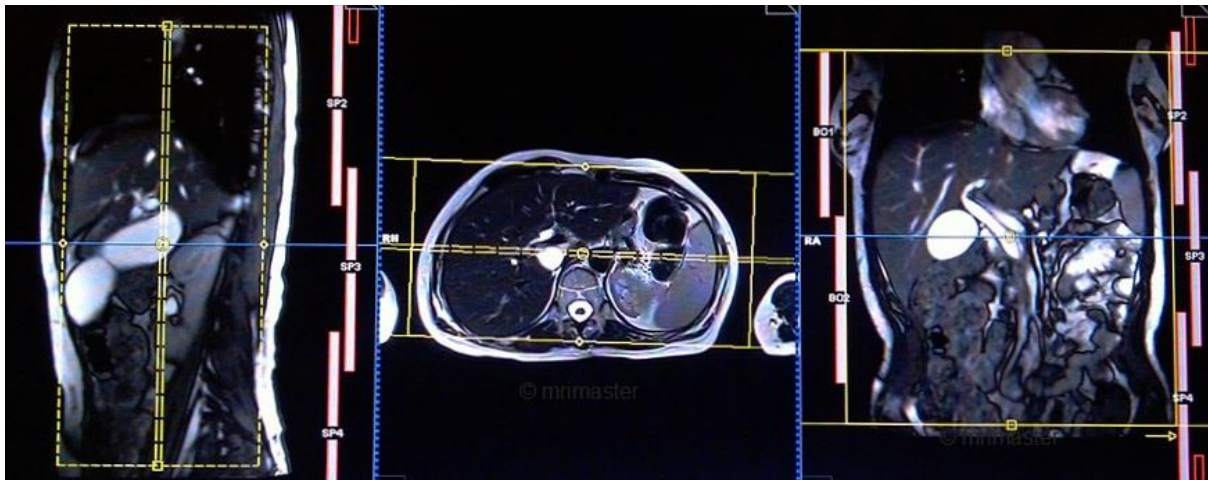
### *localiser*

A three plane TrueFISP localiser must be taken initially to localise and plan the sequences. These are fast single shot localisers with under 25s acquisition time which are excellent for localising abdominal structures.



*T2 TRUEFISP fat sat (or HASTE)4mm breath hold coronal*

Plan the coronal slices on the axial localizer; position the block across the liver as shown. Check in the other two planes. Slices must be sufficient to cover the whole liver from the anterior abdominal wall to the posterior abdominal wall. Phase direction must be right to left to avoid the artifacts from the heart. Phase oversampling must be used to avoid wrap around artefacts. Instruct the patient to hold their breath during image acquisition. (In our department we instruct the patients to breathe in and out twice before the “breathe in and hold” instruction.)

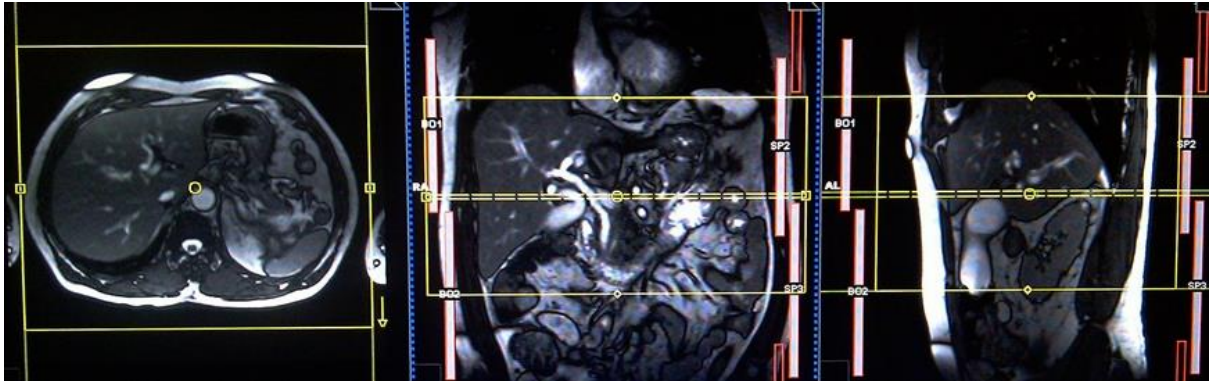


Parameters

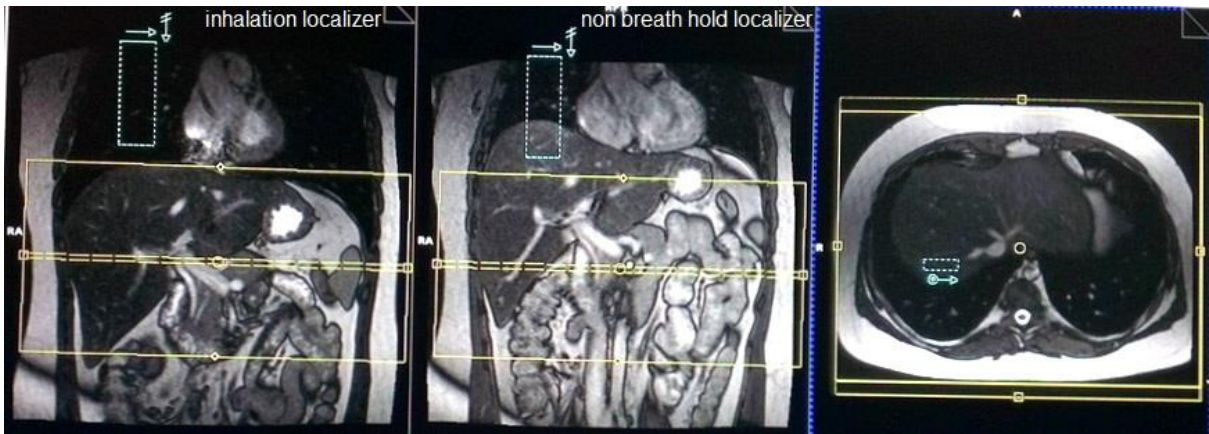
TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	OVERSAMPLE	TRIGGER
4-5	2-3	10	1	3MM	256x256	350	R>L	50%	NO

*T2 TRUFI 4mm breath hold axial*

Plan the axial slices on the coronal TRUFI image; position the block across the liver as shown. Check the position in the other two planes. Slices must cover the whole biliary system from the diaphragm down to the C loop of the duodenum. Instruct the patient to hold their breath during image acquisition.

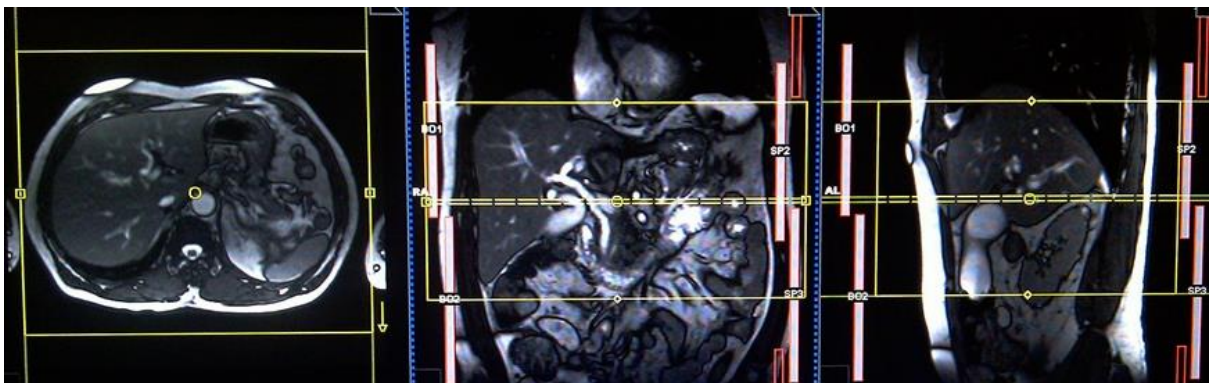


Planning must be done in the breath hold truFi coronal because the diaphragm will push down the liver during inhalation and that will change the position of liver from the initial localizer scans.



*T2 HASTE fat sat 4mm breath hold axial*

Plan the axial slices on the coronal TRUFI image; position the block across the liver as shown. Check the position in the other two planes. Slices must cover the whole biliary system from the diaphragm down to the C loop of the duodenum. Instruct the patient to hold their breath during image acquisition.

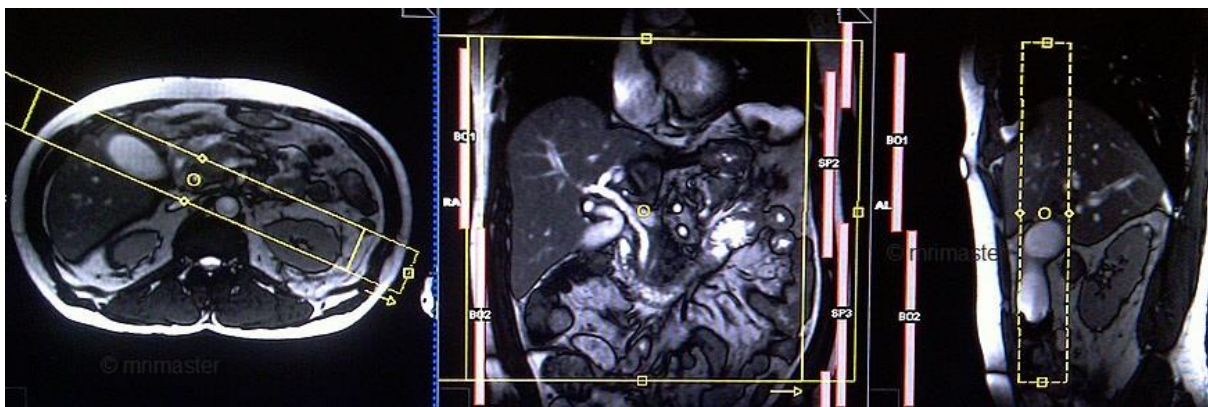


Parameters

TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	OVERSAMPLE	IPAT
1000-1500	100	150	1	4 MM	320X320	400-450	A>P	50%	Off

*T2 HASTE thick 40mm breath hold coronal oblique (single slice)*

Plan the coronal oblique (left anterior oblique) thick slab on the axial TRUFI (or HASTE); position the block across the common bile duct and rotate the block 20-30 clockwise to include common bile duct and gall bladder. Check in the other two planes. Slice thickness must be sufficient to cover the whole common bile duct and gall bladder. Phase oversampling must be used to avoid wrap around artefacts. Instruct the patient to hold their breath during image acquisition.



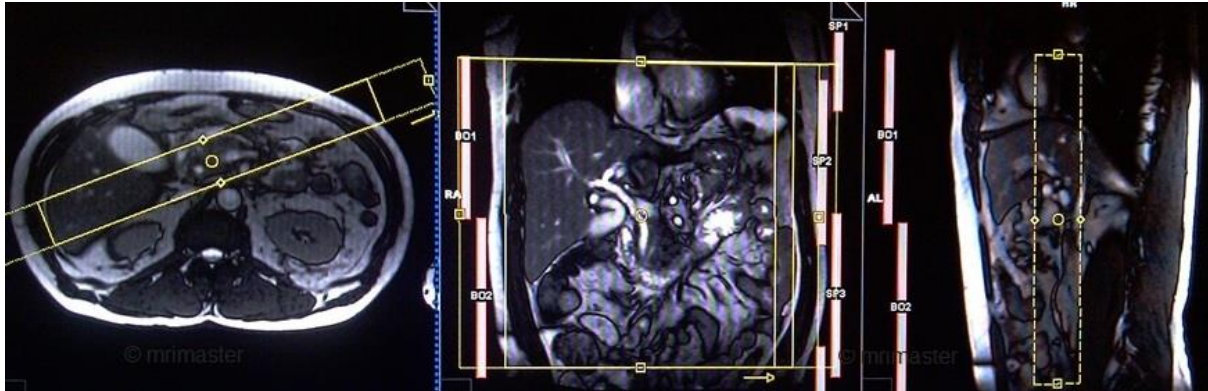
Parameters

TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	OVERSAMPLE	IPAT
1000-1500	100	150	1	40MM	320X320	400-450	R>L	50%	ON

*T2 HASTE thick 40mm breath hold coronal oblique(single slice)*

Plan the coronal oblique (right anterior oblique) thick slab on the axial TRUFI (or HASTE); position the block across the common bile duct and rotate the block 20-30 anticlockwise to

include common bile duct and pancreatic duct (Do not worry about excluding part of gallbladder). Check in the other two planes. Slice thickness must be sufficient to cover the whole common bile duct and pancreatic duct. Phase oversampling must be used to avoid wrap around artifacts. Instruct the patient to hold their breath during image acquisition.

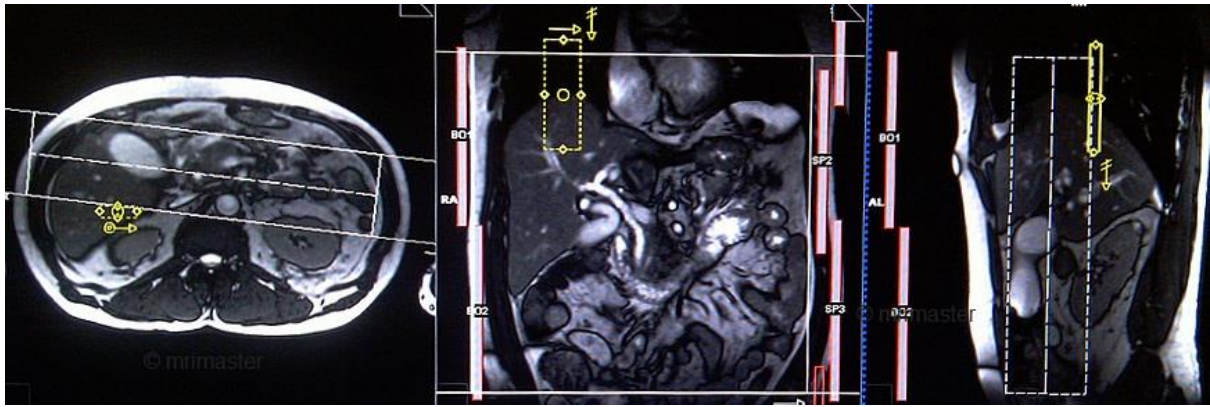


#### Parameters

TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	OVERSAMPLE	IPAT
1000-1500	100	150	1	40MM	320X320	400-450	R>L	50%	ON

#### *T2 tse 3D(or SPACE 3D) coronal gated*

Plan the coronal 3D on the axial TRUFI (or HASTE); position the block across the common bile duct. Check in the other two planes. Slices must be sufficient to cover the whole common bile duct, pancreatic duct and gall bladder. Phase oversampling must be used to avoid wrap around artifacts. For respiratory gated scans it is important to place the respiratory navigator box correctly ie. in the middle of the right dome of diaphragm with half the box over the right lobe of the liver (segment 8) and the other half over the lungs. Planning must be done in a non-breath hold localizer because the diaphragm will push down the liver during inhalation and that will lead to an improper planning of slices and respiratory navigator box. It is important to instruct patient to breathe gently throughout the sequence. The effectiveness of the navigator will be reduced with very shallow or erratic breathing.



### Parameters

TR	TE	FLIP	NEX	SLICE	MATRIX	FOV	PHASE	OVERSAMPLE	IPAT
2000-3000	200	12	1	1MM	320X320	350	R>L	50%	ON