

# NUCLEAR MEDICINE PROTOCOLS

## HEPATOBILLIARY SCAN WITH OR WITHOUT EJECTION FRACTION

<b>Indications</b>	<ul style="list-style-type: none"><li>• Diagnosis of Cholecystitis; acute (calculous or acalculous), inflammation of the gallbladder, cystic or common bile ducts.</li><li>• Evaluation of RUQ Pain</li><li>• Evaluation of cholelithiasis; obstruction</li><li>• Evaluation of biliary colic</li><li>• Evaluation of extrahepatic biliary tract obstruction</li><li>• Evaluation of post-surgical biliary tract</li><li>• Detection of bile leaks</li><li>• Diagnosis of biliary atresia</li><li>• Evaluation of liver transplants</li><li>• Diagnosis of focal nodular hyperplasia</li><li>• Evaluation of functional hepatobiliary disease; chronic acalculous gallbladder and chronic acalculous biliary disease</li><li>• Evaluation of hepatobiliary function due to abnormal results on related studies</li></ul>
<b>Conflicting Examinations and Medications</b>	<ul style="list-style-type: none"><li>• <b>CONTRAINDICATION FOR MORPHINE: ACUTE PANCREATITIS</b></li><li>• Retained Barium</li><li>• Serum bilirubin level above 20 mg/dl, may cause a nondiagnostic examination owing to poor hepatocellular function</li><li>• Delayed biliary to bowel transit will occur in patients who have received narcotic analgesics.</li><li>• Liver uptake and excretion will be decreased by chronic high dose nicotinic acid therapy and phenobarbital will enhance hepatic excretion.</li></ul>
<b>Exam Time</b>	1 to 4 hours
<b>Patient Preparation</b>	Evaluation of gallbladder NPO for 2 and preferably 4 hours If the patient has fasted for more than 24 hours or is on total parenteral nutrition, the gallbladder may not fill. IN these cases, it may be necessary to pretreat with sinaclide Evaluation of Gallbladder not desired, NO prep needed.
<b>Patient Positioning</b>	Supine - <b>Image Upper abdomen with liver in the upper left quadrant of FOV</b>
<b>Radiopharmaceutical and Dose</b>	Tc-99m mebrofenin (choletec) 4-8 mCi/IV injection/ Flow study may be requested
<b>Acquisition Protocol</b>	<ul style="list-style-type: none"><li>• Acquire serial LAO or ANT 1 minute digital images for 60 minutes for cine display.</li><li>• Selected images can be used to create a standard non cine set of images.</li></ul>

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### Procedure

- If the gallbladder has and/or SB has not been visualized by 60 minutes let patient walk around a few minutes.
- If Gallbladder is visualized but no activity in the small bowel by 1 hour after injection, or GB EF is needed, consider using sincalide (.02 $\mu$ g/kg in 10 ml of normal saline IV over 30 minutes)
- If Gallbladder is not seen after 45 minutes, delayed images should be taken at 15-minute intervals until 2 hours after injection then hourly until 4 hours or *an alternative is to administer morphine.*
- If visualization of the GB is questionable or does not show after 4 hours, obtain right lateral views looking for Bile Leak.

### Morphine Acquisition: (Contraindication Acute Pancreatitis)

If there is bowel and the gallbladder has not been visualized in 60 min. then morphine can be given at the Radiologists' instruction to hasten the visualization of the gallbladder and to distinguish between acute (no visualization) and chronic (eventual visualization) cholecystitis. No visualization of gallbladder 30-150 minutes after morphine injection. (Cholecystitis)

- ANT images with the patient standing may be used to help differentiate the gallbladder and the bile leaks from the duodenum
- Acquire order (case by case from Radiologist, Hospitalist or referring MD) for Morphine.
- If inpatient, floor nurse injects the morphine; if the ER patient, then ER nurse is to inject the morphine; if outpatient then nursing supervisor is to inject the morphine.
- Inject at a rate of .04 mg/kg diluted in 10 ml. saline intravenously over 3 minutes.
- Acquire additional views every 15 minutes through approximately 2 hours from the injection of the radiopharmaceutical.
- OP may not drive for 2-3 hours following the injection of the morphine.

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### **EF Calculation:**

If an ejection fraction of the gallbladder is needed, and either the Imaging Department or Hospital has a standing protocol to use sincalide for this aspect of the study, then the hospital policy for that injection/infusion should be utilized.

If there is not a policy for the use of sincalide, and the hospital has chosen to utilize Ensure Plus, Boost, or another form of a fatty meal to stimulate contraction of the gallbladder for calculation of the GBEF, then the imaging must be carried out for 1 FULL HOUR after the ingestion of the fatty meal. Calculation of GBEF prior to a full hour of imaging following the fatty meal may result in a false calculation and cause the patient to be sent to surgery for cholecystectomy unnecessarily.