

LINKS

[ACUTE CHOLECYSTITIS AND BILIARY OBSTRUCTION STATdx](#)

TECHNIQUE

- Protocol advice
 - Patient preparation
 - None
 - Physician should know
 - Surgical history
 - Location and number of abdominal drains
 - Location of fluid collection(s) on CT or US
 - Severity of liver dysfunction or hyperbilirubinemia
 - Radiopharmaceutical
 - IDA derivatives
 - Tc-99m mebrofenin/disofenin: 3-5 mCi (111-185 MBq) IV
 - Imaging acquisition
 - Patient supine
 - Large FOV camera with low-energy, all-purpose collimator
 - Matrix: 128 x 128
 - Image over abdomen
 - Angiographic phase x 1 min (4 sec/frame)
 - Dynamic acquisition (1 frame/min) for 60 min
 - Static images at 2-4 hrs, 24 hrs for slow leak
 - Image over pelvis on delayed static images
 - SPECT/CT for anatomic correlation if prior enterobiliary anastomosis, complex surgical procedures, or multiple fluid collections
 - Dosimetry
 - Biliary system receives highest radiation dose
 - Additional nuclear medicine imaging options
 - Oblique, lateral: Localize abnormalities in anteroposterior plane
 - Right lateral decubitus: Facilitates tracer pooling away from central bile duct and enteric system
 - SPECT/CT decreases false-positive studies
 - Include drains/bags on delayed images

When acute cholecystitis is suspected and the gallbladder is not seen by 30 to 60 minutes, morphine sulfate, 0.04 mg/kg or a standard 2 mg dose, may be administered intravenously over 2 to 3 minutes. Sincalide is typically infused at 0.02 ug/kg.

For visualization of gut but not gallbladder, at 45 min administer morphine sulfate (MSO₄, 0.04 milligrams/kg IV over 1-3 minutes). Ensure nonvisualization is not due to either a recent meal (< 4h) or prolonged fasting (> 24h) for which cholecystokinin can be administered.

The pharmaceutical used for evaluation of chronic cholecystitis is sincalide, a synthetic C-terminal octapeptide of cholecystokinin. The Society of Nuclear Medicine suggests an infusion of 0.02 µg/kg over 60 minutes as one that can result in the least variability of reference values and may be considered the method of choice. The reference gallbladder ejection fraction (GBEF) with this methodology should be ≥ 38%.

Biliary leak

- [BILIARY LEAK STATdx](#)
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- Etiology: cholecystectomy or liver tx
- No tracer seen in the SB. can also be seen in CBD obstruction with the hx and tracer seen in the right paracolic gutter.

KEY FACTS

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Terminology

- **Biliary leak**: Focal collection or free flow of bile into abdomen, usually postsurgical complication

Imaging

- Tc-99m IDA hepatobiliary scintigraphy: Radiotracer outside normal biliary system or small bowel
 - Abnormal activity usually starts in gallbladder fossa, porta hepatis, near cystic stump as biloma
 - Reappearing liver sign: As radiotracer decreases in liver parenchyma over time, focal leak projecting over liver increases over time
 - Radiotracer can track inferior to right hepatic lobe → right paracolic gutter/Morison pouch, over liver dome, or freely into peritoneum
 - Near biliary enteric anastomosis after liver transplant
 - Bile may flow through surgical drainage tubes
 - Bile may spread to retroperitoneum
 - Bile may spread to dependent portions of pelvis
- Fluid collections on US, CT are nonspecific
 - Cannot differentiate bile leak from seroma/abscess
- Static images at 2-4 hrs, 24 hrs (slow leak)
 - Include drains/bags to detect slow leak
 - Include pelvis
- Oblique, lateral
 - Localize abnormalities in anteroposterior plane
- Right lateral decubitus
 - Facilitates tracer pooling away from central bile duct and enteric system

Diagnostic Checklist

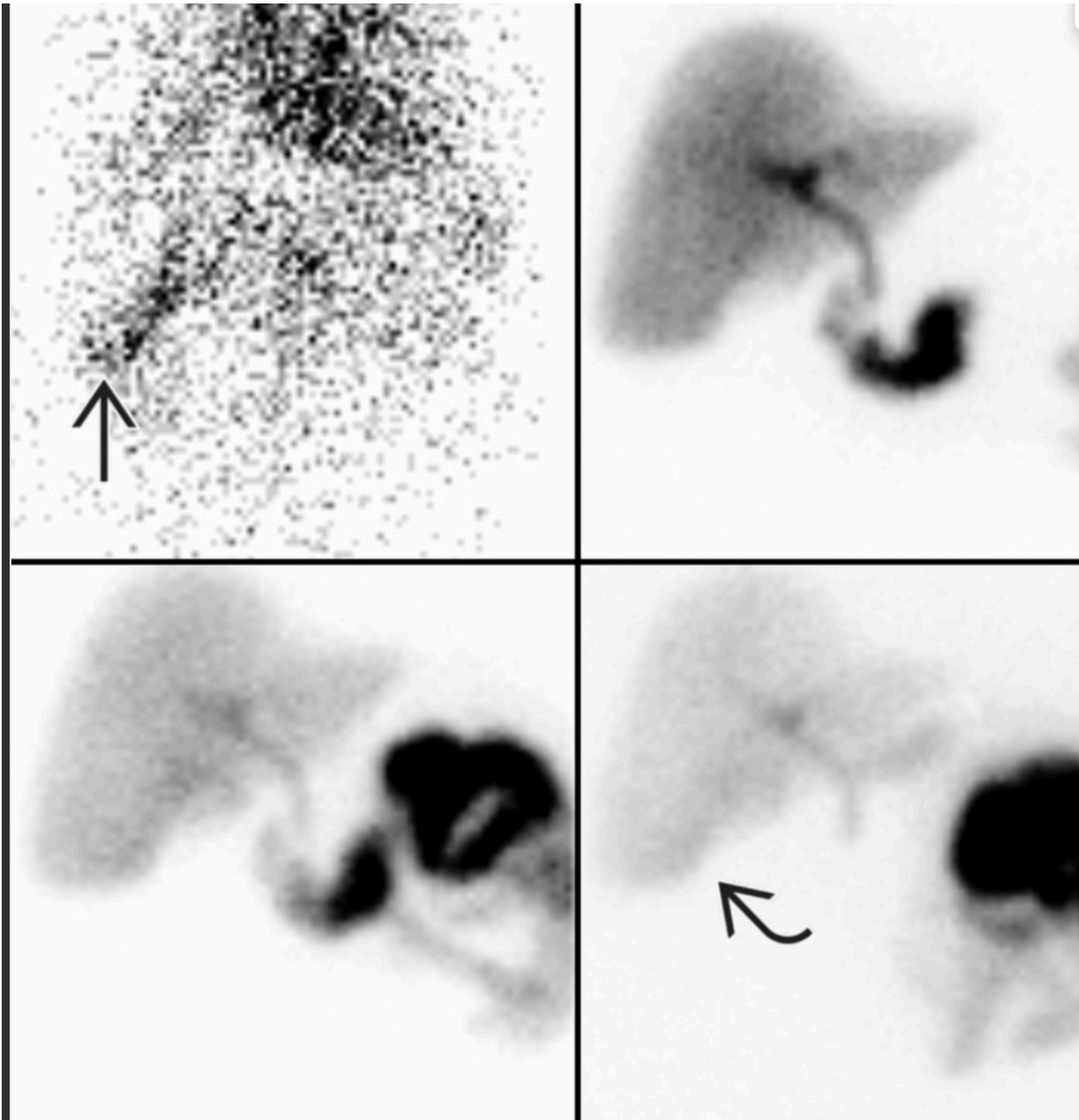
- SPECT/CT for anatomic correlation
 - Prior enterobiliary anastomosis
 - Complex surgical procedures
 - Multiple fluid collections
- If no leak, note that enterogastric reflux of bile can also cause abdominal pain post cholecystectomy

GERD:

- Intense uptake in the stomach. All hepatic uptake is cleared.

Rim sign = gangrenous acute cholecystitis

- Hyperemic hepatic parenchymal changes adjacent to the GB fossa leads to increased flow and diminished clearance of tracer to this region.
- During HIDA, a rim of activity will localize to the hepatic parenchyma adjacent to the GBF in addition to absent visualization of the GB.
- Usually associated w more complicated forms of acute cholecystitis including perforated or gangrenous cholecystitis.
- Surgical intervention is warranted.



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Hepatobiliary scintigraphy shows GB fossa blush ➡ on angiographic phase and a rim sign ↪. The GB was not visualized in this patient with acute acalculous cholecystitis.

- Acute cholecystitis on hepatobiliary scintigraphy
 - Absence of GB filling during imaging protocol: No GB visualization at 4 hours or no GB visualization after morphine augmentation
 - Sensitivity 90-97%; specificity 71-90%
 - Rim sign
 - Hepatic retention of tracer due to adjacent inflammation around GB fossa with no GB filling
 - Seen within 1st hour of imaging
 - Although radiotracer clears from liver, rim sign persists on delayed images
 - Almost 50% of cases with rim sign have complicated cholecystitis
 - GB ulceration/necrosis
 - Fibrinous exudate/empyema
 - Gangrene
 - Perforation
 - Can also see hyperemic blush in GB fossa on angiographic phase images due to inflammation (abscess or gangrene in 36% of patients with hyperemia)
 - Bile leak
 - Indicative of GB perforation ± fistulization