

Section G: Gastrointestinal system

Clinical/Diagnostic Problem	Investigation	Recommendation (Grade)	Dose	Comment
G01. Difficulty in swallowing: high dysphagia (lesion may be high or low)	Ba esophagogram	Indicated [B]	⊕⊕	Ba esophagogram is the best investigative modality for diagnosing motility disorders. It is also useful for demonstrating webs and pouches and may show subtle strictures not seen at endoscopy.
G02. Difficulty in swallowing: low dysphagia (lesion will be low)	Ba esophagogram	Indicated only in specific circumstances [B]	⊕⊕	Endoscopy should be performed initially. Ba esophagogram should only be performed if endoscopy normal used to demonstrate a motility disorder or a subtle stricture.
G03. Heartburn/ chest pain: hiatus hernia or reflux	Ba esophagogram /UGI	Indicated only in specific circumstances [B]	⊕⊕	Reflux is common and can usually be diagnosed clinically. Investigation is only indicated when medical therapy fails. pH monitoring is the gold standard for the diagnosis of reflux, but endoscopy will show early changes of reflux esophagitis and allow biopsy of metaplasia. Ba esophagogram may be ordered by a surgeon to assess esophageal motility prior to anti-reflux surgery.
G04. Esophageal perforation	CXR	Indicated [B]	⊕	A pneumo- mediastinum is present in only 60% of cases, but other suggestive abnormalities may also be seen on a CXR.
	CT	Indicated [A]	⊕⊕⊕ – ⊕⊕⊕⊕	CT is the best imaging modality for diagnosing esophageal perforation and for the detection of mediastinal and pleural complications.
	Contrast swallow	Indicated [B]	⊕⊕	May be used if CT is not immediately available, but if no leak is seen then proceed to immediate CT.
G05. Acute GI bleeding: hematemesis / melena	Ba studies	Not indicated [C]	⊕⊕	Endoscopy is the appropriate diagnostic modality for most cases of upper GI bleeding and can be used to deliver hemostatic therapy.
	Angiography	Specialized investigation [B]	⊕⊕⊕⊕	In cases of uncontrollable bleeding angiography is indicated and transcatheter embolization may be used as the primary treatment.
	Abdominal US	Indicated only in specific circumstances [B]	0	Can be used to diagnose chronic liver disease and varices.
	Abdominal XR	Not indicated [B]	⊕	No diagnostic yield.

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G06. Dyspepsia in the younger patient (e.g. < 45 years)	Ba studies	Indicated only in specific circumstances [B]	⊕⊕	Most patients < 45 years should be treated without investigations, and if symptoms recur or persist, the <i>Helicobacter pylori</i> status should be assessed. Diagnostic investigation is indicated if there are symptoms such as weight loss, anorexia, iron deficiency anemia, severe pain or non-steroid anti-inflammatory drug use, and endoscopy is the investigation of choice. Ba studies can be used to demonstrate amotility disorder or a subtle stricture, if endoscopy normal.
	NM	Indicated only in special circumstances [B]	⊕⊕	Useful in stable patients when surgery and/or angiography are not indicated to determine the origin/intensity of bleeding.
G07. Dyspepsia in the older patient (e.g. > 45 years)	Ba studies	Indicated only in specific circumstances [B]	⊕⊕	Endoscopy should be the initial investigation to facilitate the early detection of cancer. If endoscopy is negative and symptoms persist, then Ba studies should be considered to rule out an unrecognized cancer or a motility disorder.
	NM	Indicated [B]	⊕⊕	Gastric emptying with a solid meal can establish the diagnosis of gastroparesis particularly in patients with diabetes.
G08. Ulcer: follow-up	Ba studies	Not indicated [B]	⊕⊕	If follow-up is required endoscopy is most accurate to confirm complete healing and to obtain biopsies where necessary because residual scarring precludes accurate assessment by Ba studies.
G09. Previous upper GI surgery (recent) to check for anastomotic leaks	Contrast study	Indicated [B]	⊕⊕	Water-soluble contrast should be used as the contrast agent, because Ba will interfere with a CT study and therefore should not be used.
	CT with oral contrast	Indicated only in specific circumstances [B]	⊕⊕ – ⊕⊕⊕⊕	If the contrast study does not demonstrate a leak at the anastomotic site and there is a continuing clinical concern, then immediate CT should be performed as it is more sensitive.
G10. Previous upper GI surgery (not recent): dyspeptic, dysmotility, obstructive symptoms	Contrast/Upper GI studies	Indicated only in specific circumstances [B]	⊕⊕	Contrast studies can be useful to rule out obstructions, but intrinsic abnormalities of the gastric remnant, such as ulceration or recurrent tumour, are best assessed by endoscopy.
	CT with oral contrast	Specialized investigation [B]	⊕⊕ – ⊕⊕⊕⊕	CT accurately delineates the surgical anatomy and may demonstrate disease extrinsic to the lumen.

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G11. Intestinal blood loss: chronic or recurrent	Ba studies	Not indicated initially [B]	⊕⊕	The initial investigation should be endoscopy. Small bowel follow-through does not reliably detect lesions likely to cause chronic bleeding and should not be used.
	CT	Indicated [B]	⊕⊕⊕ – ⊕⊕⊕⊕	CT may be ordered by a specialist to look for lesions such as tumours or bowel angiodysplasia in select cases.
	Ba small bowel enema/enteroclysis	Indicated [B]	⊕⊕	More sensitive than Ba follow-through for small discrete lesions. However, 'capsule' endoscopy is becoming the investigation of choice in chronic bleeding if it is available.
	NM	Indicated [B]	⊕⊕	When all other investigations are negative, labeled red cell and/or Meckel's study may be useful in detecting and localizing the site of chronic and/or recurrent bleeding.
	Angiography	Specialized investigation [B]	⊕⊕⊕⊕	Angiography may be ordered by a specialist to diagnose angiodysplasia.
G12. Acute abdominal pain: perforation / obstruction suspected (For children see L54 – L55) (See also G14, G21)	CT	Indicated [B]	⊕⊕⊕ – ⊕⊕⊕⊕	CT is the most sensitive and specific imaging modality to assess a perforation of a hollow viscus. It also adequately identifies small sealed perforations and establishes the site and cause of obstruction. <i>This recommendation applies only to adults.</i>
	Abdominal XR and CXR erect	Indicated [B]	⊕+⊕	Indicated if CT is not available. If an erect examination cannot be performed a left lateral decubitus abdominal XR should be obtained to show free intraperitoneal gas.
	US	Indicated [C]	0	Can be used following abdominal XR. It is sensitive for free fluid in perforation and is useful in children.
G13. Small bowel obstruction: acute (See also G21)	Abdominal XR	Indicated [B]	⊕	Often the first line investigation to detect the presence of obstruction.
	CT	Indicated [A]	⊕⊕⊕ – ⊕⊕⊕⊕	CT is the best imaging modality for diagnosing acute small bowel obstruction. It indicates the level and may show cause.
	Contrast studies	Indicated only in special circumstances [B]	⊕⊕	May be helpful if CT is unavailable or contraindicated.
G14. Small bowel obstruction: chronic or recurrent (See also G13, G14, G21)	CT	Indicated [A]	⊕⊕⊕ – ⊕⊕⊕⊕	CT will be as diagnostic as a small bowel enema, but may be a better guide to management in complex cases, e.g. in patients with a previous malignancy or following complicated abdominal surgery.
	Ba small bowel enema/enteroclysis	Indicated [B]	⊕⊕	Indicated if CT is unavailable or contraindicated. Will confirm the presence and the level of obstruction in most cases and may suggest a cause.

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G15. Suspected small bowel disease (Crohn's disease)	CT	Indicated [A]	⊕⊕ – ⊕⊕⊕	CT, where available, is indicated as the investigation of choice.
	US	Specialized investigation [B]	0	US can be helpful in assessing the bowel in children and young patients with lean body habitus
	MRI	Specialized investigation [B]	0	May be ordered by a specialist to help in the assessment of disease activity or to assess extramural complications, particularly in young patients to avoid the radiation burden.
	Ba small bowel follow-through	Indicated [B]	⊕⊕	If CT is unavailable or contraindicated this can be used for the diagnosis of small bowel disease, including Crohn's disease.
	Ba small bowel enema	Indicated [B]	⊕⊕	This technique is more effective than a small bowel follow-through in establishing the extent of disease prior to surgery, in diagnosing a fistula, and in determining the cause of obstructive symptoms in patients with known Crohn's disease.
G16. Change of bowel habit to diarrhea and rectal bleeding in the absence of perianal symptoms: suspected colorectal neoplasia	CT Colonography (CTC)	Indicated [A]	⊕⊕	Colonoscopy is the current investigation of choice for concern regarding colorectal neoplasia. CTC is the first radiological investigation of choice when optical colonoscopy is not performed. Standard CT of the abdomen and pelvis can miss colon cancer.
	Ba enema	Indicated only in specific circumstances [A]	⊕⊕⊕	Ba enema may be used if CTC and Colonoscopy facilities are unavailable.
	CT	Specialized investigation [B]	⊕⊕ – ⊕⊕⊕	CT is not as effective as CTC for the diagnosis of colorectal neoplasia, but it may be used to determine the extent of known disease.
G17. Large bowel obstruction: acute	Abdominal XR	Indicated [B]	⊕	May be used as an initial examination to help establish the diagnosis and to indicate the likely level.
	CT	Specialized investigation [B]	⊕⊕ – ⊕⊕⊕	May be ordered by a specialist as an alternative to a contrast enema, particularly in sick and very frail patients.
	Contrast enema	Not indicated initially [B]	⊕⊕⊕	May consider for problem solving if CT is not available or equivocal.
G18. Inflammatory bowel disease of the colon: acute exacerbation	Abdominal XR	Indicated [B]	⊕	This is a useful initial examination and may be sufficient to determine disease severity and extent.

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G18. Inflammatory bowel disease of the colon: acute exacerbation <i>(continued)</i>	CT	Indicated [A]	☺☺ – ☺☺☺	This is the preferred modality to diagnose complications of inflammatory bowel disease of the colon. Endoscopy is the method of choice for diagnosis.
	MRI	Specialized investigation [B]	0	MRI is preferable to CT in young patients. It may also be ordered by a specialist to guide surgical management of patients with anorectal sepsis.
G19. Inflammatory bowel disease of colon: long-term follow-up	Ba enema	Indicated only in specific circumstances [B]	☺☺☺	Colonoscopy is the most reliable method of identifying complications such as dysplasia, stricture, and carcinoma. Ba enema has a limited role after complex surgery and in the evaluation of fistulae.
	CT	Indicated only in specific circumstances [B]	☺☺ – ☺☺☺	CT is a valuable modality to assess complications from colitis.
G20. Acute abdominal pain requiring surgical evaluation (For children see L54) (See also G12 – G15, G30 – G32)	Abdominal XR	Indicated [B]	☺	Useful as an initial investigation if obstruction or perforation is suspected, particularly if CT or US is unavailable.
	CT	Indicated [B]	☺☺ – ☺☺☺	CT is the most comprehensive imaging modality.
	US	Indicated [A]	0	US is the most appropriate imaging modality for the diagnosis of cholelithiasis and acute gynecological emergencies.
G21. Palpable mass (For children see L70)	CT	Indicated [B]	☺☺ – ☺☺☺	CT is the best initial imaging modality.
	US (females and children)	Indicated [B]	0	US is also an appropriate initial imaging modality, particularly in females and children.
G22. Malabsorption	Ba small bowel meal / follow-through	Indicated only in specific circumstances [B]	☺☺	Imaging is not required for the diagnosis of celiac disease but may be ordered by a specialist for the assessment of other possible causes of malabsorption.
	NM	Specialized investigation [B]	☺☺	There are number of NM investigations available which should be ordered in consultation with a nuclear medicine specialist, to establish presence of malabsorption.
	CT Enteroclysis	Indicated only in specific circumstances [B]	☺☺☺	CT enteroclysis may be ordered by a specialist for the assessment of complicated celiac disease.

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G23. Constipation (For children see L69)	Abdominal XR	Indicated only in specific circumstances [B]	⊕	May be useful in geriatric and psychiatric patients to show extent of fecal impaction.
	4.Evacuation proctography	Specialized investigation [B]	⊕⊕	May be ordered by a specialist to assess a disorder of evacuation.
G24. Suspected abdominal abscess or pyrexia of unknown origin	CT	Indicated [B]	⊕⊕⊕ – ⊕⊕⊕⊕	CT is the best imaging modality for overall assessment.
	US	Indicated [C]	0	Us is also an appropriate imaging modality, particularly when there are localizing signs. It is especially good for subphrenic/subhepatic spaces and pelvis.
	NM	Indicated [C]	⊕⊕⊕	NM is useful when there are no localizing features. The appropriate NM examination should be chosen in consultation with a nuclear medicine specialist.
Liver, gallbladder and pancreas				
G25. Solitary hepatic lesion discovered on US, hemangioma, metastases, other	MRI	Specialized investigation [A]	0	MRI is the technique of choice. It is the most sensitive and specific radiological investigation to characterize liver lesions.
	CT	Specialized Investigation [A]	⊕⊕⊕ – ⊕⊕⊕⊕	CT is less sensitive than MR but can be performed if MRI is not available.
	NM	Specialized Investigation [C]	⊕⊕	If problem solving is required in large lesions equivocal on MRI, NM imaging may be considered in consultation with a Nuclear Medicine specialist.
G26. Known cirrhosis, complications	US	Indicated [B]	0	US is very sensitive for ascites. It may show evidence of portal hypertension and is the initial screening test hepatoma.
	MRI	Specialized investigation [B]	0	MR may be ordered by a specialist for the diagnosis of hepatoma and for treatment planning.
	CT	Specialized investigation [B]	⊕⊕⊕ – ⊕⊕⊕⊕	If MRI is unavailable or contraindicated, CT may be used for the diagnosis of hepatoma.
G27. Jaundice (For children see L65)	US	Indicated [B]	0	US is the appropriate imaging modality for differentiating between obstructive and non- obstructive jaundice. If obstructive jaundice is diagnosed, further investigation will depend on the level and suspected cause of the obstruction, and should be planned in consultation with a radiologist. ERCP is the most accurate method for detection of small duct stones and small papillary or peri-ampullary tumours. It allows biopsy of pancreas without risk of tumor seeding.

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G27. Jaundice <i>(continued)</i>	CT	Specialized investigation [B]	⊕⊕ – ⊕⊕⊕⊕	CT may be ordered by a specialist following US, particularly if the level of obstruction is below the hilum. It is particularly useful for detecting and staging peri-ampullary malignancies.
	MRI, including MRCP	Specialized investigation [B]	0	If US shows obstruction at the level of the hilum or above, MRCP (magnetic resonance cholangiopancreatography) is now the investigation of choice if further imaging is indicated.
G28. Biliary disease (e.g. gallstones) (See also G21)	US	Indicated [B]	0	US is the best imaging modality for the demonstration or exclusion of gallstones and acute cholecystitis. It is the appropriate initial investigation for biliary pain but cannot reliably exclude common duct stones. Cholecystography has been replaced by ultrasound in the investigation of biliary disease.
	CT	Specialized investigation [B]	⊕⊕ – ⊕⊕⊕⊕	CT has a limited role in assessing cholelithiasis. CT may be ordered by a specialist for the evaluation of gallbladder wall and gallbladder masses.
	MRCP	Specialized investigation [B]	0	May be ordered by a specialist to assess possible duct calculi not confirmed by US, and in the investigation of post-cholecystectomy pain.
	NM	Indicated [B]	⊕⊕	Biliary scintigraphy shows cystic duct obstruction in acute cholecystitis, chronic cholecystitis, CBD obstruction, gallbladder and sphincter of Oddi dysfunction.
G29. Biliary disease (post-cholecystectomy pain)	US	Indicated [B]	0	First line investigation and most accessible modality to identify retained bile duct stone, although it may not demonstrate the pre-ampullary CBD.
	MRCP	Specialized investigation [A]	0	Most reliable for assessing retained ductal calculi not confirmed by ultrasound. Optimally demonstrates gall bladder fossa collections in the immediate post-operative period as well.
G30. Post-operative biliary leak	US	Indicated [B]	0	US is the best initial investigation of a suspected biliary leak.
	CT	Indicated [B]	⊕⊕ – ⊕⊕⊕⊕	CT can adequately demonstrate perihepatic collections.
	MRI and MRCP	Specialized investigation [B]	⊕⊕	Hepato-specific contrast agents with biliary excretions can be used to show ductal anatomy and leak.
	NM	Specialized investigation [B]	⊕	HIDA scan will show activity at site of leak.

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G31. Pancreatitis: acute (See also G21)	Abdominal XR	Indicated only in specific circumstances [C]	⊕	Abdominal XR is only indicated to exclude other causes of abdominal pain if laboratory test are not available to confirm the diagnosis.
	US	Indicated [B]	0	US is indicated to identify patients with gallstones, indicating a diagnosis of gallstone pancreatitis. It can also be used to monitor pseudocysts.
	CT	Indicated [B]	⊕⊕ - ⊕⊕⊕	CT is indicated in severe cases to assess the extent of necrosis, and to detect and monitor complications such as pseudocysts.
	MRI and MRCP	Specialized investigation [B]	0	MRCP may be ordered by a specialist to detect choledocholithiasis not seen on US.
G32. Pancreatitis: chronic	CT	Indicated [A]	⊕⊕ - ⊕⊕⊕	CT is the best imaging modality, particularly for assessing It pancreatic calcification.
	US	Indicated [B]	0	US is also appropriate, particularly in thin patients.
	ERCP / MRCP	Specialized investigation [B]	⊕⊕/0	ERCP or MRCP may be ordered by a specialist to to show ductal changes.
G33. Pancreatic tumour	US biopsy	Indicated [B]	0	US may be helpful in localizing the primary lesion for biopsy. The decision to biopsy is best undertaken by a multidisciplinary hepato- pancreatico-biliary team.
	CT special-ized technique	Indicated [B]	⊕⊕⊕	CT is the technique of choice for detection and characterization of pancreatic adenocarcinoma, and reliably predicts unresectability.
	MRI and MRCP	Specialized investigation [A]	0	MRI and MRCP are the imaging modalities of choice for the detection and characterization of cystic neoplasms.