Abnormal Liver Function Tests

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Patterns of abnormal LFT's and common causes

Cholestatic Picture:
- Raised ALP, bilirubin & GGT
- Due to biliary obstruction where there is the interruption to bile flow
- Common Causes: Gall stones, MAFLD/fatty liver, bile duct disorders, tumours heptatoxic medications.

Hepatocellular Picture:
- Raised AST & ALT
- Suggestive of hepatocellular injury
- Mild: 2-5 x ULN; Moderate: 5-15 x ULN; Severe: >15 X ULN
- Common Causes:
  - Mild elevation: suggestive of chronic alcohol consumption, MAFLD / fatty liver, hepatoxic medications (e.g.statins)
  - Moderate elevation to severe elevation suggestive of acute or chronic viral hepatitis, alcohol-related hepatitis, autoimmune hepatitis, drug induced liver injury, ischaemic hepatitis
  - When accompanied by jaundice, prolonged INR or encephalopathy – liver failure is developing.

Transaminase levels do not directly correlate to the degree of liver damage or reflect the degree of underlying fibrosis. Patients with cirrhosis may have mildly deranged or even normal LFT's.

Investigation of Abnormal LFT's

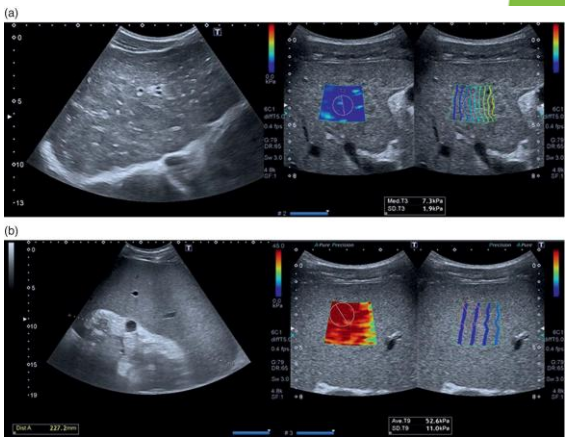
Severely deranged, clinically unwell patients, signs of acute liver failure, jaundice or suspicion of sepsis – send to hospital urgently for investigation and management.

Mild to moderately deranged LFT's and the patient is well and asymptomatic or mild to moderately symptomatic:

- Determine is the issue is persistent of transient
  - Review past LFT results.
  - If a new abnormality – repeat the LFT's 2-3 times over the next 3-6 months to determine is the issue is stable or getting worse.
  - If the abnormality is transient and resolves fully – there no need for any further investigation.
  - If the abnormality persists or is getting worse, complete a full liver screen to identify the cause.

Liver Screen - Identifying the cause

- FBE (low platelets seen in portal hypertension)
- EUC (low albumin can indicate impaired synthetic function of the liver)
- Hba1c (associated with MAFLD)
- Lipid profile (associated with MAFLD)
- INR and PT (abnormal can indicated impaired synthetic function of the liver)
- Hep A, B & Hep C
- Iron Studies (screening for HHC) , HFE gene test(ferritin/TSAT high)& Ceruloplasmin/copper (Screening for Wilsons Disease)
- A1AT, TSH
- ANA, AMA, anti-SMA, anti-LKM, ANCA(screening for autoimmune causes),pANCA, anti actin Ab, anti SLA/LP Ab, anti Liver Cytosol Ab
- Coeliac serology
- CMV, HSV, EBV & HIV
- Abdominal Ultrasound (size and appearance of the liver, signs of cirrhosis, evidence of fatty liver, tumours or gall bladder pathology)
- Elastography for patient with an elevated FIB-4 or APRI



Liver elastography

FIB 4 / APRI / Elastrography / ELF

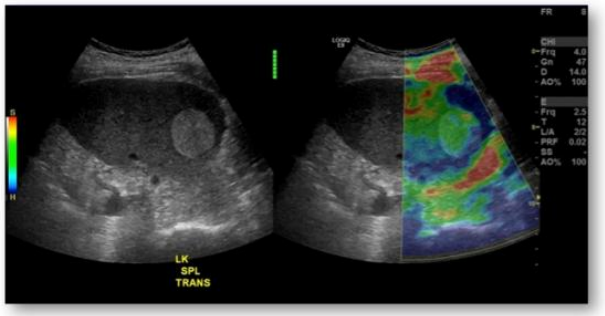
- FIB-4 and APRI (AST to platelet ratio index) –
  - Non invasive screening tools that can be used to identify patients at higher risk of fibrosis and should undergo further testing with Fibroscan or ELF.
  - Calculators are available online

- FIB- 4 <1.45 has 90% Negative Predictor Value for advanced fibrosis
- Fib – 4 >3.25 has 97% specificity and 65% Positive Predictor Value for advanced fibrosis

- The challenge is how to manage the patients in the grey zone between 1.3 – 2.7.

- Elastography and ELF can be useful as a second line test in to identify help identify the patients at risk of fibrosis and would benefit from referral to gastroenterologist.

- Elastography –
  - Shear wave Elastography – available from standard radiology provider
  - Transient Elastography (Fibroscan) – available at major hospitals
  - Both are useful to estimate likelihood of fibrosis



- ELF score serum test (Enhanced Liver Fibrosis Score)
  - Available at pathology providers
  - Combination of markers known to be associated with the development of fibrosis
  - Number of studies have shown it to have comparable accuracy with Fibroscan

Managing abnormal LFT's – In the community.

Direct to an emergency department for:

- Acute liver failure
- Severe hepatic encephalopathy
- Aspartate transaminase (AST) greater than 2,000 units per litre.

Criteria for referral to public hospital specialist clinic services

- Abnormal liver function tests with:
  - platelet count less than 120 x 10^9 per litre
  - splenomegaly
  - ascites
  - hepatic encephalopathy
  - genetic haemochromatosis (C282Y homozygotes and C282Y/H63D compound heterozygotes only)
- Abnormal liver function test with aspartate transaminase (AST) or alanine aminotransferase (ALT) greater than or equal to 5 times the upper level of the normal range
- Two abnormal liver function test results performed at least 3 months apart with aspartate transaminase (AST) or alanine aminotransferase (ALT) 2-5 times the upper level of the normal range.

- Many patients with abnormal liver function tests can be safely managed in the community and do not require specialist intervention.
- Once it is established a patient has persistently elevated LFT's complete a full liver screen to try to identify the underlying cause.
- Patients where their abnormal LFT's are under 2-5 times ULN, monitoring in the community is appropriate, depending on underlying aetiology.

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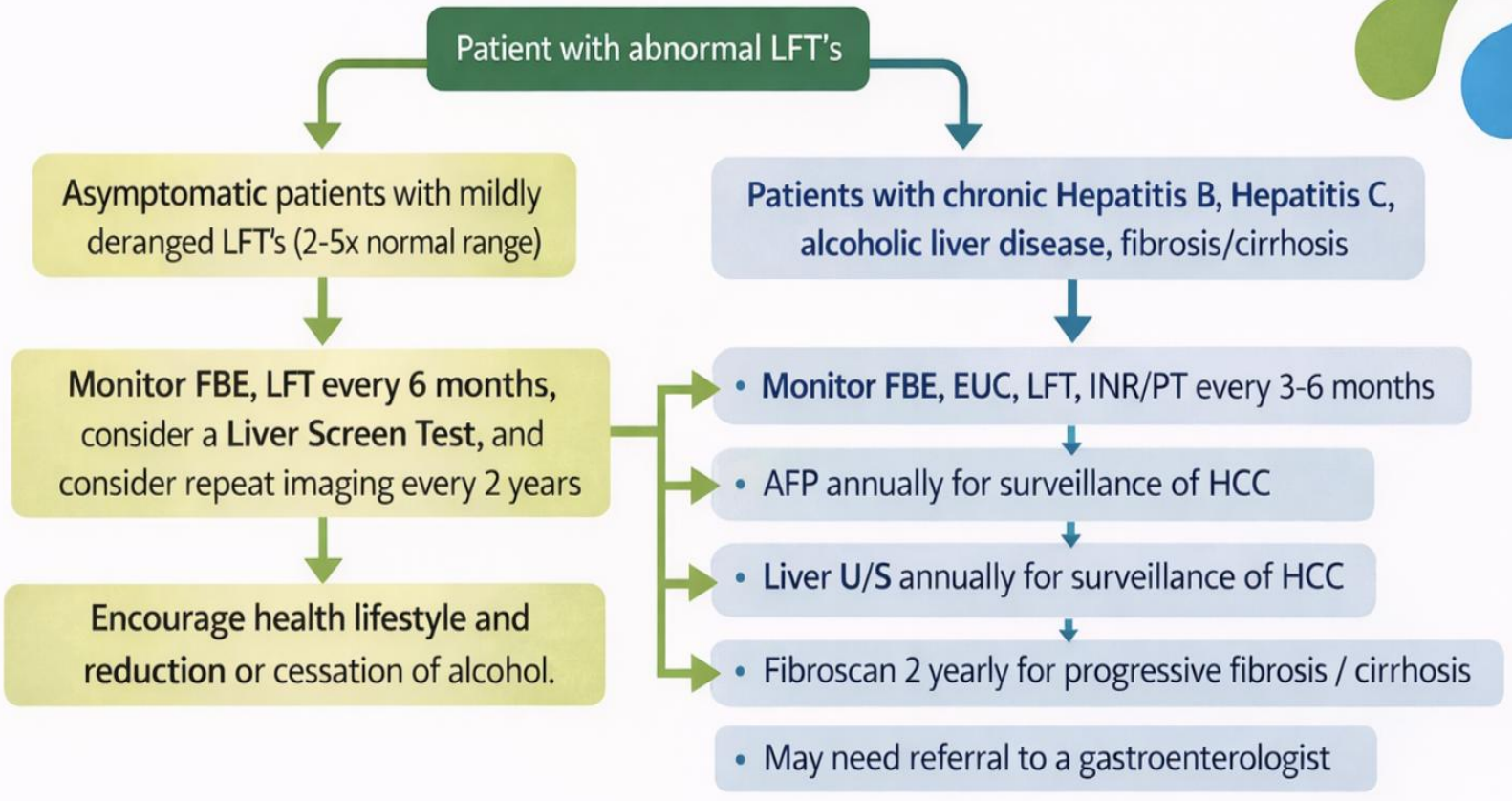
Managing Abnormal LFT's –
In the Community



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Managing abnormal LFT's – In the community - MAFLD

- Abnormal liver function tests + Fatty liver identified on U/S
- Complete Fib-4 score

Patients with low Fib-4 score (<1.3) or Low elastography or direct liver fibrosis serum test

- Monitor FBE, EUC, LFT, Lipids, Hba1C , weight, BMI/or waist circumference index at least annually
- Actively manage metabolic risk factors – weight management, dietician and exercise physiologist referral, cessation of ETHO, manage diabetes and lipids.
- FIB-4 index at least every 3 years.

Patients with a high score Fib-4 score (>2.7)

- Complete direct liver fibrosis serum test or elastography
- For patients with low elastography or direct liver fibrosis test result – monitor as above
- For patients with high risk of fibrosis on elastography refer for consideration of biopsy

Patients with a intermediate Fib-4 score (1.3 - 2.7)

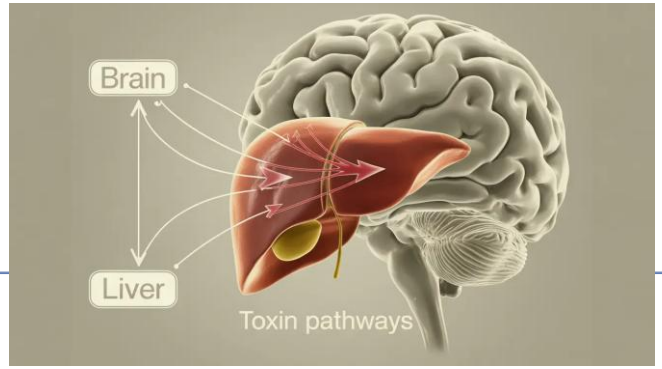
- Should undergo second line testing for liver fibrosis with elastography

Abnormal LFT's – When specialist management is required?

- **Refer to ED** – Patient has deranged LFT's and the patient is clinically unwell:
  - septic, febrile, jaundiced, acute liver failure, severe hepatic encephalopathy, significant pain, severe ascites restricting movement and breathing.

- **Urgent referral to specialist outpatients** – Patient has significantly deranged LFT's but clinically well or mild to moderate symptoms only.
  - Platelet count less than $120x10^9$ per litre, splenomegaly, ascites, mild hepatic encephalopathy.

- Septic
- Febrile
- Jaundiced
- Acute Liver Injury
- Hepatic Encephalopathy
- Significant pain
- Ascites
- Restricting movement + breathing



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Abnormal LFT's – When specialist management is required?

- **Routine referral to specialist outpatients**

  - Patient has abnormal LFT's greater than or equal to 5 times the upper level of normal range, or
  - two abnormal liver function test results performed 3 months apart with an AST or ALT 2-5 times the upper level of the normal range, and
  - has mild symptoms or is asymptomatic.

  - Confirmed HHC
  - Confirmed evidence of cirrhosis on imaging
  - APRI (AST to platelet ratio greater than 2.0)
  - Confirmed Hep B and Hep C for consideration of treatment
  - Positive coealiac serology
  - Unclear cause of the deranged liver function tests
  - High risk of fibrosis of elastrography or liver fibrosis serum testing

Isolated elevated LFT's – When should a GP be worried?

Isolated elevated GGT

- Rarely associated with significant liver disease
- Most commonly due to excess alcohol intake or medications

Isolated elevated ALP

- Associated with liver or bone disorders
- Consider further investigation if ALP is 1.5 times the upper limit of normal
- ALP(isoenzymes)
- If bone disorder suspected – Calcium, Phosphate, Vit D, PTH and bone scan to look for bone lesions such as Paget's Disease.

Isolated elevated Bilirubin

- Moderate levels – consider checking conjugated and unconjugated levels / ratio – if unconjugated likely Gilberts syndrome – provide reassurance
- Persistently elevated – Consider haemolytic anaemias and check for haemolysis: conjugated-unconjugated bilirubin ratio, FBE, peripheral smear, retic count, haptoglobins, LD.

References

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Gastroenterology Society of Australia

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Australian Family Physician, Liver Function Tests, Vol 40, No 3, March 2011

Victorian Statewide Referral Criteria
https://www.health.vic.gov.au/statewide-referral-criteria/

Https:// www.snp.com.au/media/Multisite4524liver_fibrosis_biomarkers_elf_score_.pdf

Recommendations for the assessment of metabolic-associated fatty liver disease (MAFLD) in primary care: a consensus statement. Gastroenterology Society of Australia 2024

Referring to GV Health Outpatients

Dr Nicole Lowe
Rural Hospital Medical Liaison Officer

What to include on the referral?

- **From April 1st 2026 – GV Health will be moving solely to BPAC for all Consulting Clinics referrals. The templates in BPAC will guide you on the required information. We will cease accepting referrals via fax / email / in person.**

- Providing an appropriately detailed referral and all the investigations that you have done, allows the referral to be triaged more accurately and ensures patients with urgent conditions will be seen in a timely manner.

- At a minimum – the condition and the information provide must meet the Statewide referral criteria

- As a Guide include:
  - What are the symptoms
  - How long has it been an issue
  - What investigations have you completed
  - What management have you already tried
  - What are you worried about
  - Copies of all investigations you have done

It is likely that in the coming months referrals that do not meet the statewide referral criteria may be returned back to you for further action.

You may also receive letters outlining recommendations for management and monitoring whilst the patient is on the waiting list to be seen.

Referring to GVH Outpatients

- Referrals are triaged by the consultant

- Once on the waiting list – referrals are not clinically reviewed, therefore it is up to the GP to continue to review and manage the patients condition until the patient is seen.

- If the patients condition deteriorates, send a new referral clearly indicating what has changed and that it is the second referral.

- Consider referring the patient elsewhere – either privately or to a service in Melbourne.

- If the patient has been referred elsewhere or no longer needs to be seen, ask the patient to contact outpatients to be removed from the waiting list.

- If there has been greater than 6 month since when the initial referral was sent and the patient has an appointment to be seen in clinic, consider organizing repeat bloods and investigations prior to the clinic review if appropriate, to ensure the most effective use of the time spent with the consultant.

Monitoring your patient whist they are on the waiting list.

- There is currently an extended delay in patients accessing gastroenterology appointments.

- It is important that the GP continues to monitor the patients clinical status until the patient is seen. Consider the following as a guide:
  - Clinically review the patient every 3 months to check if their condition has changed and ask the patient to see you for review if they deteriorate.
  - Consider repeating bloods every 3 months.
  - Consider repeating imaging every 6-12 months to assess for changes.
  - If the patients condition deteriorates send an updated referral with the new concerns and copies of new investigations – referencing the initial referral so it is obvious this is a second referral for the same condition.
  - Consider if the patient may need to be referred to an alternative service if more urgent review is required.
  - If the patient no longer requires assessment please ask the patient to let us know so we can remove them from the waiting list.

Chronic abdominal pain, diarrhoea & constipation

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Chronic abdominal pain

- Chronic abdominal pain is pain that has been present intermittently or continuously for 3 months
- Need to differentiate if functional or organic
- Organic – usually has a clear anatomical, physiological or metabolic cause.
- Functional – usually has no clear cause despite extensive evaluation and investigation.
- Most common causes of functional abdominal pain is functional dyspepsia or irritable bowel syndrome.
- Worldwide the prevalence of functional gut disorders in adults is over 40%.

 Be alert for acute on chronic abdominal pain – any change in pattern, description or new symptoms from the patients usual presentation warrants further investigation.

Chronic abdominal pain – where to start

Consider patient factors:

- Age
- Family history
- Cultural background
- General health and mental health

A good history including associated symptoms is key:

- Postprandial pain
- Pain relieved by eating, opening bowels
- Pain associated with menstrual cycle
- Nausea / vomiting
- Changes in appetite
- Diarrhoea
- Constipation
- Change in bowel habit
- Weight loss or weight gain
- PR bleeding

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Chronic abdominal pain – where to start

A thorough examination:

- Abdominal examination
- PR examination (if constipation, **diarrhoea**, change in bowel habit or PR bleeding)
- Urinalysis

- Abdominal examination
- PR examination (if constipation, **diarrhoea**, change in bowel habit or PR bleeding)
- Urinalysis
- Urine HCG (patients with uterus of reproductive age)

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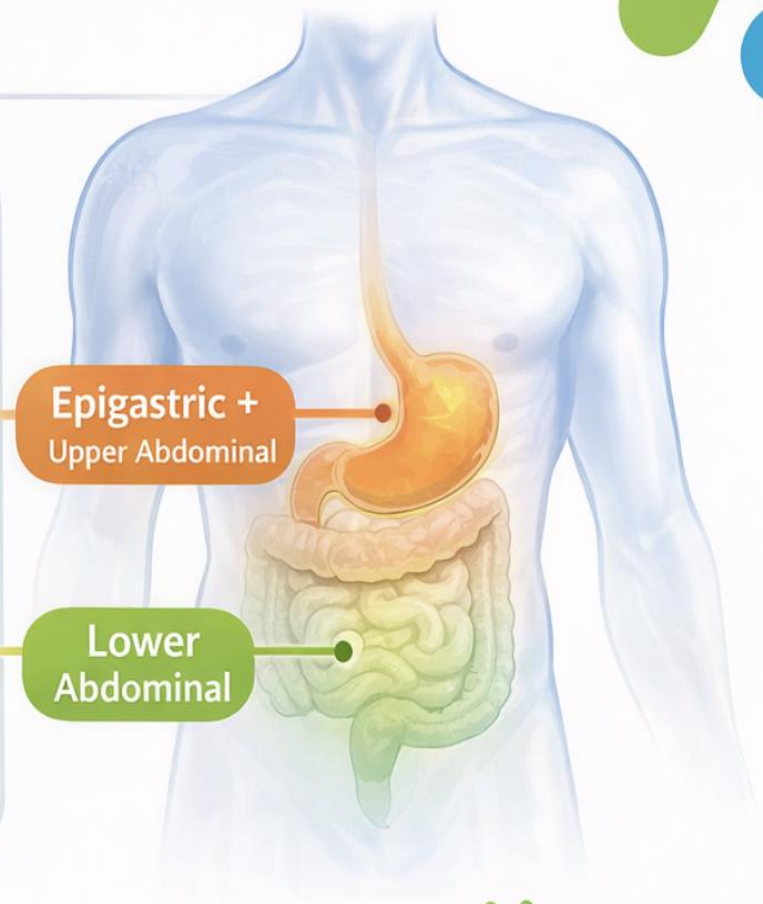
Chronic abdominal pain – possible differentials

Location of pain can guide differentials:

Location:

- General location of organs.
- Referred pain from pelvis, chest or MSK.
- Epigastric + upper abdominal – oesophageal, stomach, duodenal gallbladder, pancreas.
- Lower abdominal – large bowel and pelvic organs.



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Chronic abdominal pain – possible differentials

Pathophysiology can guide differentials:

- Mechanical obstruction
- Rupture of hollow viscera
- Chronic inflammation
- Ischemia
- Drugs / medication
- Centrally mediated conditions
- Metabolic conditions
- Neurogastroenterology

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Causes of chronic abdominal pain

Common	Uncommon
GORD, peptic ulcer disease	Inflammatory Bowel Disease: Crohns and ulcerative colitis
Constipation	Subacute intestinal obstruction
Functional dyspepsia	Coeliac disease
Chronic cholecystitis, chronic cholelithiasis	Chronic pancreatitis
Irritable bowel syndrome	Cancer: oesophageal, gastric, colorectal, pancreatic, hepatocellular, cholangiocarcinoma, ovarian
Gastroparesis	Chronic mesenteric ischemia
Lactase deficiency	Ovarian pathology
Endometriosis	
Referred pain	
Infectious gastroenteritis	

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Chronic abdominal pain – What investigations to do for most patients

Key general principles:

- Targeted investigation to identify or rule out an organic cause.

- Guided by age and associated symptoms.
- Basic investigations to consider for most patients:
  - FBE
  - ESR
  - EUC
  - Glucose
  - LFT
  - Iron studies
  - MSU

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Chronic abdominal pain – What investigations to do for some patients

Other investigations to consider on a case by case basis:

- Amylase and lipase (if upper abdominal pain)
- Stool PCR / MCS / FOBT (If bowel symptoms)
- Faecal calprotectin – to help discriminate between IBD and IBS
  Note: Medicare rebate in patients under 50 years if meets criteria
- Coeliac serology – to help discriminate between coeliac and IBS
  Note: gene testing is not useful – this should be serology
- H. pylori testing – patients with early satiety, epigastric pain or high risk population
- PSA / urine cytology – if urinary abnormality suspected
- Vaginal swabs / CST – gyane cause suspected

Chronic abdominal pain – What imaging to do for some patients

Consider what investigations the patient has had in the past, which investigations should be repeated and which investigations can be reviewed.

- Imaging will be guided by age and associated symptoms.

- Ultrasound is low risk and provides useful information particularly for upper abdominal pain and lower abdominal / pelvic pain.

- Simple AXR can be useful where chronic constipation or overflow is suspected.

Chronic abdominal pain – When to consider a CT Abdo / Pelvis Scan or MRI

- CT scanning should be used in caution in those **under 50 years of age** due to the exposed dose of radiation.

- Consider **CT Abdo / Pelvis** in most patients **over 50 years of age** for investigation of chronic abdominal pain particularly if there are associated symptom such as weight loss, nausea, vomiting, change in bowel habit.

- Consider **CT Abdo / Pelvic** in patients **under 50 years of age** where there is a significant concern of a serious underlying pathology based on history and investigation and the expected review time with a specialist exceeds 3 months.

- MRI if recommended by radiologist when CT scan or U/S is abnormal and other imaging unable to further quantify abnormality.

Treating Functional Chronic Abdominal Pain (IBS Type symptoms)

Diet Consideration

Refer patients to a dietician for consideration of a trial of the LOWFODMAPS diet and other dietary advice.

Constipation Pattern

For patients with predominant constipation pattern of IBS – trial an osmotic laxative such as osmolax.

Diarrhoea Pattern

For patients with a predominant diarrhoea pattern IBS – trial Loperamide or a bile acid sequestrant such as cholestyramine.

Persistent Symptoms

For patients with persistent symptoms despite sub-type directed medical therapy and dietary modification - can trial a TCA such as amitriptyline or nortriptyline. Onset is usually 4-6 weeks.

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Treating Functional Chronic Abdominal Pain (Functional dyspepsia symptoms)

Trial PPI

Trial once daily PPI for 4-8 weeks, high dose if no more effective than low dose.

Continue Treatment

If symptoms improve with PPI, continue treatment for 6 months and then taper and discontinue.

Low Dose TCA Trial

For PPI non-responders, consider low dose TCA (amitriptyline 10mg or nortriptyline 10mg at night) increasing to 20-30mg per nuit over 2-3 weeks, max 50mg per nuit. Continue for 6 months then taper slowly.

Dietary Referral

Dietary modification efficacy in functional dyspepsia is unclear. If initial treatments fail, referral to a dietician for individualized approach may be beneficial.

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Constipation

- Patients with new symptoms of constipation of less than 6 weeks in duration, with no other associated symptoms and a negative FOBT can be safely treated with a 4 week trial of of osmotic laxatives such as osmolax.

- It is important to review the patient after the trial period (4 weeks) and if symptoms have resolved completely, no further investigation is needed. If the patients symptoms have not resolved, or return shortly after, they should be referred for a colonoscopy.

- Adult patients with new onset constipation and additional associated symptoms such as abdominal pain, weight loss, PR bleeding or anaemia should be referred for a colonoscopy as the combination of symptoms increases the likelihood of an organic cause.

- Patients >60 years of age with new onset constipation present for more than 6 weeks should be referred for colonoscopy.

Diarrhoea

- Patients with new symptoms of diarrhoea of less than 6 weeks in duration, with no other associated symptoms such PR blood, mucous, pain, weight loss and a negative FOBT / Stool PCR, that are otherwise well can be safely watched.

- It is important to review the patient at 6 weeks and check if symptoms have resolved completely, if symptoms have resolved, no further investigation is needed.

- If the patients symptoms persist, in patients under 50 consider faecal calprotectin (medicare rebatable) and then refer for a colonoscopy.

- For patients over 50 refer for a colonoscopy.

- Whilst waiting for colonoscopy a trial of loperamide to assist with symptom management is appropriate.

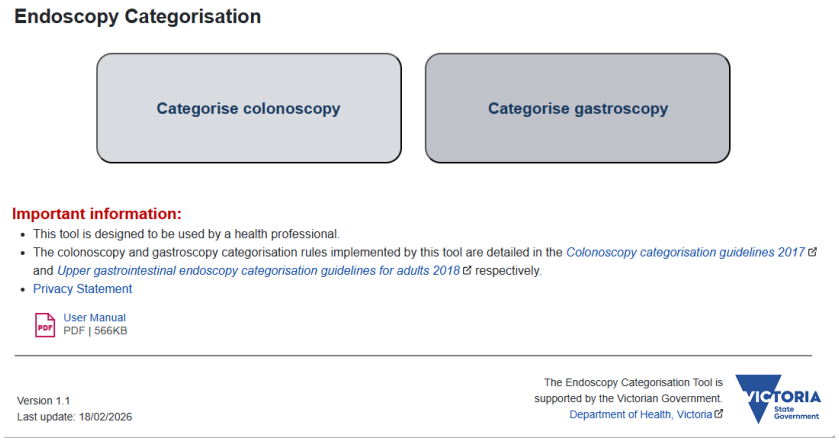
- For those with faecal incontinence, whilst waiting for a colonscopy consider a trial of a stool bulking agent such as Metamucil.

Chronic abdominal pain, diarrhea or constipation – When to consider scopes.

Department of Health - Endoscopy Categorisation Tool

Endoscopy Categorisation

This tool provides an evidenced based recommendation of if a colonoscopy or gastroscopy is recommended based on a patients symptom and the timeframe it which should be completed.



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Scopes at GVH

- There are currently limited direct access scopes – this may change in the future.

- The delay usually is related to the outpatient appointment, rather than performing the actual procedure.

- The more information that you are able to provide in the referral – the easier it is to triage – if you have information to suspect the patient has cancer – include this clearly in the referral to ensure that it is triaged quickly.

- If you are concerned the patient has serious underlying pathology and requires urgent review please contact the SCS Clinic ANUM to discuss.

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Uptodate, treatment of irritable bowel syndrome in adults.

QUESTIONS?