STUDENT WORKBOOK IN GASTROENTEROLOGY

Department of Medicine
Faculty of Medicine
Sabaragamuwa University of Sri Lanka

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CLINICAL APPOINTMENT IN GASTROENTEROLOGY

1. Name of the student

……

2. Year passed GCE Advanced level Examination

……..

3. Duration of the appointment

From: ……/……/…… To: ……../……/……..

4. Name of the consultant

……

CONTENTS

PREFACE

Students of the Faculty of Medicine, Sabaragamuwa University of Sri Lanka, study gastroenterology as a separate appointment of one week at Teaching Hospital Ratnapura. During this period, they will be attached to the gastroenterology unit under the consultant gastroenterologist appointed by the Ministry of Health.

This Workbook in Gastroenterology is compiled to help students achieve essential knowledge and skills in gastroenterology expected from an undergraduate when they qualify to work in medical wards as intern house officers. Thus, the workbook will guide the student during their gastroenterology short appointment.

This Workbook is a joint effort between academic staff of the Department of Medicine, SUSL and the current gastroenterologist of the Teaching Hospital Ratnapura. Students are expected to organize their classes and do self-studies in order to complete the tasks set out.

Your honest feedback will be invaluable to improve the Workbook.

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CHAPTER 1

INTRODUCTION

Dear Students,

We have prepared a series of workbooks to guide you during your medical appointments. These include 3rd year workbook, 4th year workbook and workbook for each short appointment and a workbook for the professorial appointment.

The appointments in finer specialties are organized based on the University Grants Commission guidelines and according to the needs of the Ministry of Health.

The short appointment in Gastroenterology will give you the opportunity to study Gastroenterology with exposure to specific case scenarios in more detail. This workbook is prepared to provide guidance to the students during the Gastroenterology appointment to cover the essential areas expected from an undergraduate. You are expected to learn the management plans in further detail. This includes the investigation, treatment of common medical conditions, management of common emergencies, which are essential clinical topics for an intern medical officer. This knowledge, skills and experience you gather during the short appointments will help you to understand patient problems in greater depth.

Your continuous assessments will be based on these workbooks.

Learning Outcomes in Gastroenterology

At the end of the appointment students should be able to

At the completion of the gastroenterology appointment, the student should be able to:

1. Describe the pathogenesis and understand the principals of management of common gastrointestinal and hepato-biliary – pancreatic disorders.

2. To obtain histories, elicit physical signs and interpret physical signs, describe pathophysiology, principles of management and prognosis of patients having the following conditions.

    - Abnormal liver function tests
    - Evaluation of a patient with jaundice
    - Disorders of the esophagus – Gastroesophageal reflux, dysphagia, odynophagia,
    - Dyspepsia and peptic ulcer disease
    - Acute and chronic diarrhea
    - Weight loss due to gastrointestinal pathology
    - Evaluation of chronic abdominal pain
    - Benign and malignant neoplasms of the gastrointestinal tract
    - Upper and Lower gastrointestinal bleeding
    - Common gastroenterological conditions such as Non-Alcoholic Fatty Liver Disease, Cirrhosis, Inflammatory Bowel Diseases, Gall stone disease, Acute and Chronic pancreatitis

3. Arrive at a clinical diagnosis of disorders of the gastroenterological system

4. Describe the indications, limitations and principles of investigations that are relevant.
    a. Diagnostic and therapeutic paracentesis of ascetic fluid.
    b. Upper gastrointestinal endoscopy (UGIE) Colonoscopy
    c. Liver biopsy
    d. Endoscopic Retrograde Cholangio-pancreatography (ERCP)
    e. 24-hour esophageal pH/impedance studies
    f. High resolution esophageal manometry and anorectal manometry
    g. Imaging modalities (barium studies, ultrasound, computerized tomography (CT) scan, magnetic resonance imaging (MRI), radioisotope scan
    h. Tests of exocrine pancreas

5. Gain competence in initial emergency management of the following conditions.
    a. Acute gastrointestinal hemorrhage
    b. Acute abdominal pain
    c. Fulminant colitis
    d. Biliary obstruction, including ascending cholangitis
    e. Acute liver failure
    f. Hepatic encephalopathy and tense ascites

6. Achieve competence in necessary communication skills relevant to gastroenterological diseases and procedures – i.e. explaining the disease condition and prognosis, obtaining consent for examination procedures and investigations, breaking Serious news

7. Write case histories, daily status, referrals, discharge summaries, clinic notes and prescriptions

8. Demonstrate empathy and maintain high ethical standards.

9. Be an effective member of the healthcare team by being familiar with the available facilities and limitations of the health care system of Sri Lanka when providing care for patients with gastroenterological problems.

10. Understand the basis and techniques of screening and surveillance methods practiced in gastroenterology
    a. Methods for colonic cancer screening
    b. Upper GI endoscopy in long term gastro-esophageal reflux disease and in Barrett's esophagus
    c. Upper GI endoscopy in patients with portal hypertension
    d. Screening for Heptocellular Carcinoma in patients with chronic liver diseases

CHAPTER 2

CORE CLINICAL KNOWLEDGE AND SKILLS

At the end of the gastroenterology appointment, you should be competent in the techniques of history taking, physical examination (general examination and examination of abdomen) and clinical reasoning at a level of a student about to enter the Final Year.
In addition to the cases you are allocated during the apppointment, you are adviced to see the following presentations given in the next section on "Topics to cover during Gastroenterology Appointment"

2.1 Clinical Presentations: Gastroenterology appointment

These are some of the key presentations that ought to be 'covered' during the Gastroenterology Appointment.

- Abdominal distension and oedema
- Acute and chronic diarrhea
- Constipation
- Dyspepsia and heartburn
- Difficulty in swallowing (dysphagia)
- Jaundice
- Hematemesis and Malena
- Acute and chronic abdominal pain
- Patient with chronic liver disease
- Evaluation and management of malabsorption and maldigestion
- Gastrointestinal causes of anemia
- Drowsiness and coma in association with a liver disease suggesting of acute liver failure or hepatic encephalopathy

2.3 EMERGENCIES

Following is a list of common gastroenterological emergencies.

1. Upper gastrointestinal bleeding
2. Acute liver failure
3. Fulminant hepatitis
4. Acute pancreatitis
5. Acute abdomen

2.2 Topics in Gastroenterology

These topics are often termed as the theoretical aspects of gastroenterology and require didactic teaching (e.g. lectures) or self-study using standard textbooks.

1. Analysis of common clinical presentations (Poor appetite, nausea and vomiting, heart burn, dysphagia and constipation)
2. Ulcer and non-ulcer dyspepsia
3. Acute and chronic diarrhea
4. Upper GI bleeding and Malena
5. Inflammatory bowel diseases
6. Malabsorption, maldigestion and weight loss
7. GI causes of Anaemia
8. Pancreatitis
9. Liver enzymes and liver function tests
10. Jaundice (Evaluation of jaundiced patient)
11. Acute and chronic hepatitis
12. Alcoholic liver disease
13. Different types of chronic liver diseases, their etiology and management
14. Cirrhosis and complications
15. Non-alcoholic fatty liver disease and metabolic syndrome

CHAPTER 3

HISTORY TAKING

Patients with gastrointestinal pathology can present with a variety of symptoms including abdominal distension and oedema, acute and chronic diarrhea, constipation dyspepsia and heartburn, difficulty in swallowing, jaundice, vomiting, hematemesis, acute and chronic abdominal pain.

HISTORY OF A PATIENT PRESENTING WITH JAUNDICE

Initially use open ended questions to identify and explore the main complaint that made the patient to come to the hospital. In a patient with jaundice, it may be that the patient has noticed yellowish discoloration of eyes, abdominal distension, fever and constitutional symptoms or swelling of legs.

HISTORY OF PRESENTING COMPLAINT

Then ask few questions to understand the story behind the problem in the chronological order. For example, if a patient complains of yellowish discoloration of eyes, ask about the duration and associated other clinical symptoms, and the sequence of events until the patient is admitted to the hospital.

Symptoms are needed to be analyzed to arrive at a diagnosis. For example, if the patient complains of yellowish discoloration of eyes, whether the jaundice is acute onset or gradual onset, color of urine, colour of the stool (normal, dark or pale), presence or absence of pain are details that are necessary to be known. Analysis of abdominal pain includes whether it is colicky or dull aching in character, whether the pain is in the right hypochondrium or in the upper abdomen, whether it is radiated to the right shoulder or whether it ~~is~~ aggravates with fatty food. Other associated symptoms such as feeling of an abdominal mass, abdominal fullness and gastrointestinal bleeding are key symptoms that are needed to be inquired.

Other associated symptoms: swelling of the legs, abdominal distension, feeling an abdominal mass, constitutional symptoms such as fever, loss of appetite, anorexia, nausea and vomiting, and weight loss, and itching of the body.

By this stage you should have an idea as of the cause of the patient's illness. However, you should continue to work through the patient's history to gather more information (e.g. past medical history, social history).

Systemic enquiry

Once the questioning related to the main system involved is over you should ask about the involvement of other organ systems. You may also identify symptoms that the patient has forgotten to mention in the presenting complaint.

- **Systemic**: fevers, weight change, fatigue, swelling of the legs
- **Respiratory**: shortness of breath, cough, chest pain
- **Cardiovascular**: Exertional chest pain or shortness of breath, palpitations
- **Genitourinary**: oliguria, polyuria, anuria,
- **Neurological**: confusion, change of sleep pattern, episodes of drowsiness visual changes, motor or sensory disturbances, headache, tremors or involuntary movements
- **Musculoskeletal**: chest wall pain, trauma
- **Dermatological**: rashes, ulcers, bruising

Past medical history

Question the patient if (s)he has any medical conditions: liver disease and other diseases (e.g. hypertension, diabetes mellitus, ischemic heart disease, stroke), and how well all these diseases, the complications that has occured ad whether they are under control, History of tuberculosis, hemolytic conditions, blood transfusions.

Allergies

Ask if the patient has any allergies and if so, clarify what kind of reaction (e.g. mild rash or anaphylaxis) they had to that substance (e.g. mild rash vs anaphylaxis).

Drug history

Request for information on medications taken currently or past medications used such as anti TB drugs, antibiotics such as co-amoxiclav, in oral contraceptive pills in females, herbal /traditional medicine or food supplements

Family history

Ask the patient if there is any family history of similar symptoms, hepatitis, chronic liver diseases and hemolytic conditions. Consanguinity of parents is important as it can cause rare genetic disorders of the liver and biliary tree, especially in children.

Personal and social history

Explore the patient's social history such as occupation, income, habits to understand their social context. Especially explore carefully risk factors such as smoking and alcohol, possibility of IV drug use, and sexual behavior.

Occupation is important. Exposure to contaminated water carries a risk of acquiring infections such as hepatitis, and leptospirosis. Health care workers are more prone to infections from Hepatitis B or C Virus.

Alcohol

Record the frequency, type and volume of alcohol consumed on a weekly basis. Patients often deny or downplay the amount they drink.

Analysis of symptoms

Presentation	**List three causes**	Describe how to differentiate the causes you have mentioned
Ascites	**1**	
	2	
	3	
Acute diarrhea	**1**	
	2	
	3	
Chronic diarrhea	**1**	
	2	
	3	
Jaundice	**1**	
	2	
	3	
Acute abdominal pain	**1**	
	2	
	3	
Chronic abdominal pain	**1**	
	2	
	3	

CHAPTER 4

EXAMINATION OF THE ABDOMEN

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Important features in the General Examination **commonly** relevant to the examination of the abdomen include:

- General impression – ill looking and emaciation
- Build (obesity, as measured by calculating the body mass index –BMI, and a central obesity i.e. a larger than normal waist circumference, both are risk factors for Non – Alcoholic Steatohepatitis - NASH)
- Temperature (i.e. presence or absence of fever)
- Features of nutrient deficiency (e.g. glossitis and angular-stomatitis)
- Icterus
- Pallor
- Clubbing
- Kayser-Fleischer Ring (KF) rings – seen in patients with Wilson's disease
- Oral pigmentation (may indicate hemochromatosis, but is a difficult sign in pigmented individuals)
- Parotid gland (symmetrically enlarged in chronic alcoholics)
- Lymphadenopathy (neck, axillary, epitrochlear and inguinal)
- Other stigmata of liver failure in chronic liver disease - gynecomastia, spider naevi, palmar erythema, testicular atrophy and loss of axillary and pubic hair
- Features of hepatic encephalopathy such as constructional apraxia and flapping tremors of the hands
- Oedema (facial oedema which is common with nephrotic syndrome or nephritic syndrome, sacral oedema which may persist when there is no oedema elsewhere, and ankle oedema which is seen with renal causes for oedema, liver failure and right heart failure)

Abdominal examination proper

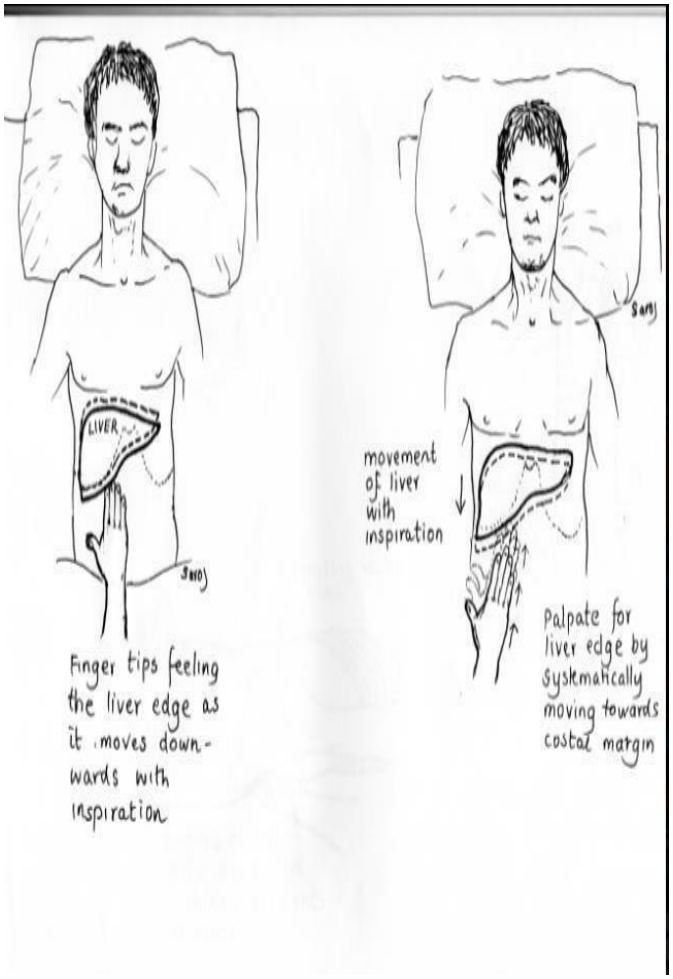
The sequence of features you would examine in the abdomen

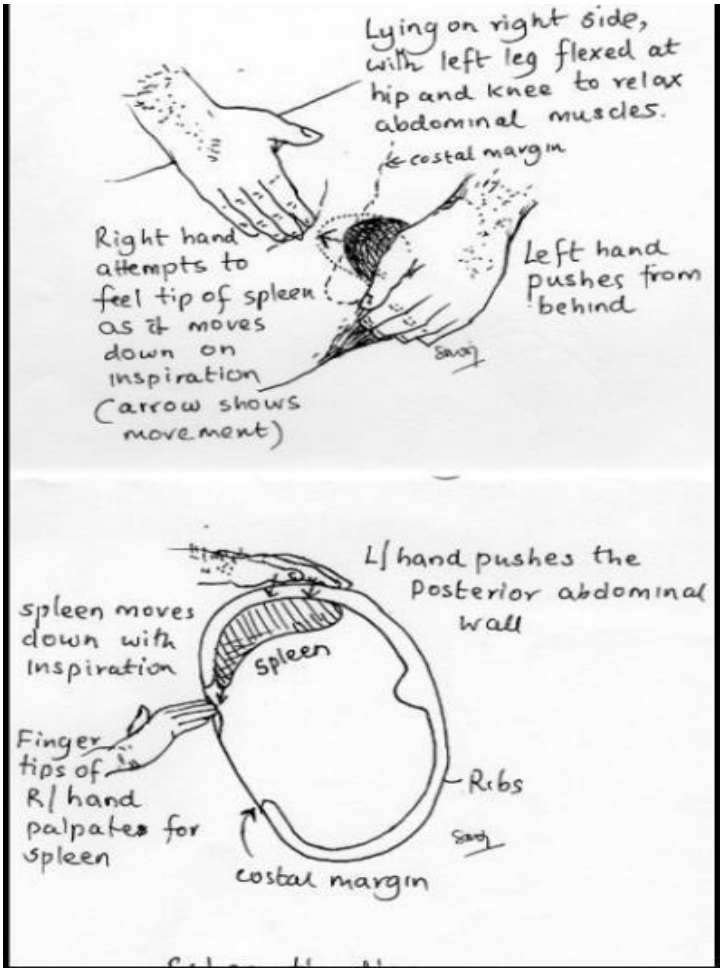
Inspection

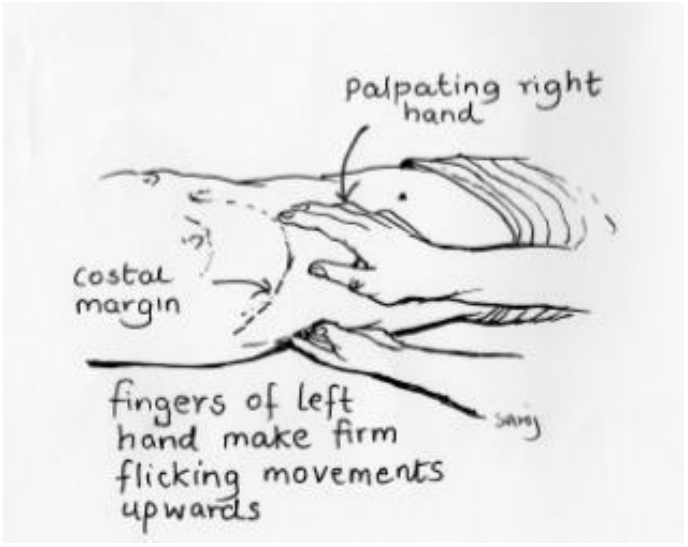
- Inspect the patient from the foot end of the bed and look for abdominal distension (flanks, localized or generalized) and symmetry of movement with respiration
- Look for surgical scars, visible peristalsis, pulsations (a feature of aortic aneurysm, and rarely epigastric pulsations from a pulsatile liver due to right heart failure or tricuspid valve regurgitation)
- Look for distended veins and assess the direction of flow
- Observe the umbilicus and note whether it is inverted, flat oreverted
- Examine the hernial orifices (obtain permission from patient and examiners forthis)

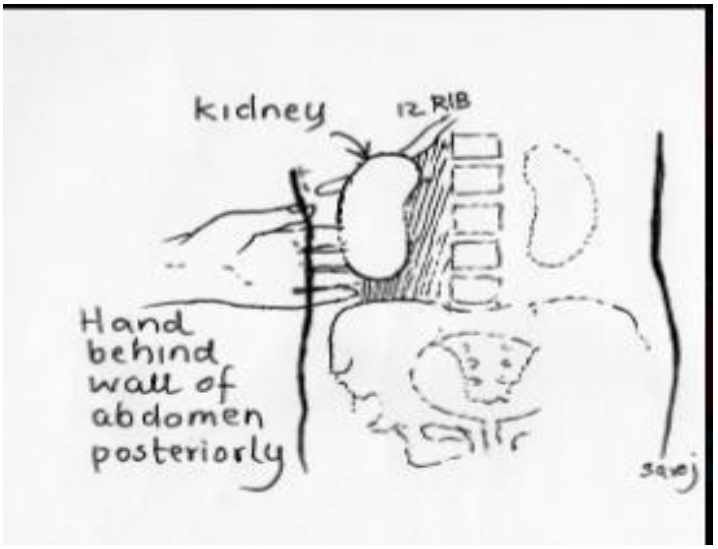
Palpation

- Light palpation to demonstrate superficial tenderness and to locate easily felt masses
  Ask for pain and instruct to relax and take deep breaths, start from one quadrant and systematically move to other quadrants
  Observe for tenderness, rigidity, guarding and masses
- Deep palpation (for organs such as enlarged liver, spleen and kidneys, and to observe for deep tenderness)


LIVER
movement of liver with inspiration
Finger tips feeling the liver edge as it moves downwards with inspiration
Palpate for liver edge by systematically moving towards costal margin


Lying on right side, with left leg flexed at hip and knee to relax abdominal muscles.
costal margin
Right hand attempts to feel tip of spleen as it moves down on inspiration (arrow shows movement)
Left hand pushes from behind
L/ hand pushes the posterior abdominal wall
spleen moves down with inspiration
spleen
Finger tips of R/ hand palpates for spleen
Ribs
costal margin

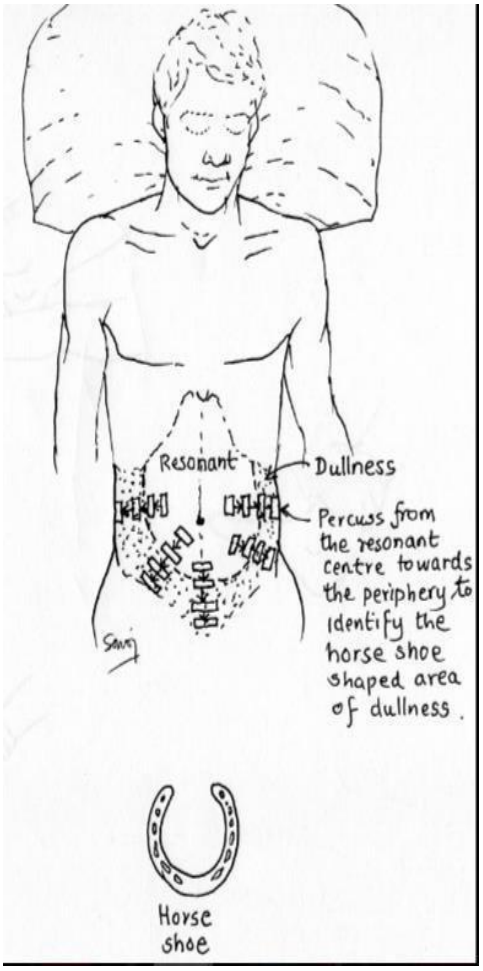

Palpating right hand
costal margin
fingers of left hand make firm flicking movements upwards

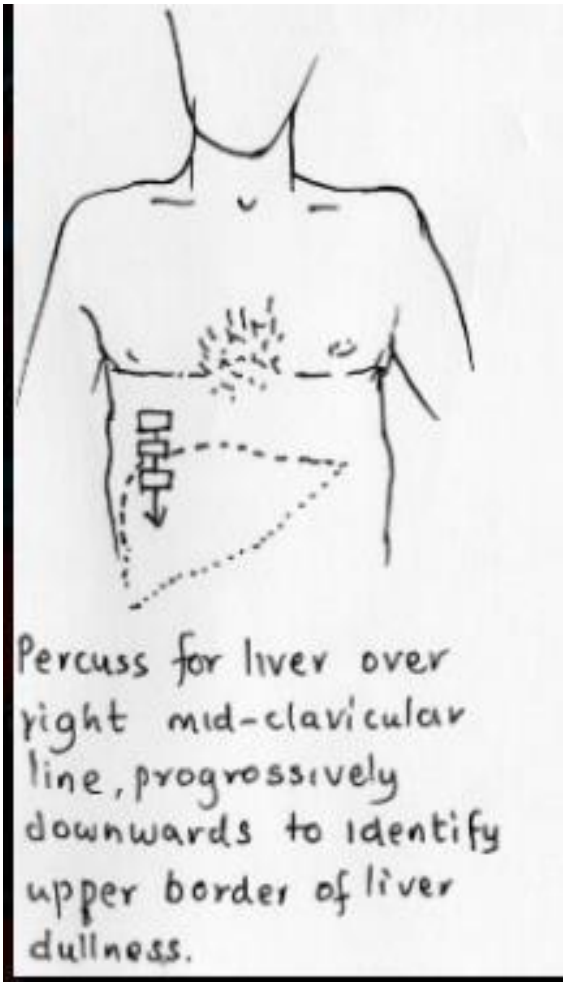

kidney
12 RIB
Hand behind wall of abdomen posteriorly

Percussion

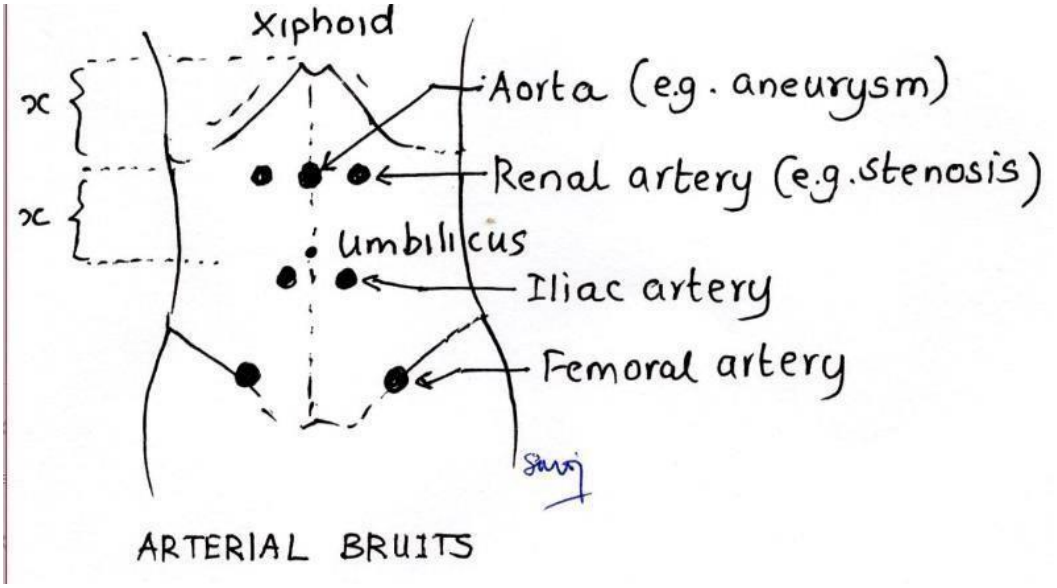
- Percuss over any palpable organs

- Percussion of flanks for horse-shoe shaped dullness, and shifting dullness also for ascites
- (Examine for the fluid thrill in patients with gross ascites)





Auscultation



- Auscultate for bowel sounds and bruits. Bruits are best heard in the mid-line in aortic aneurysm, over the liver due to increased vascularity of liver as in hepatocellular carcinoma, and about an inch lateral to midline between umbilicus and xiphoid in the case of renal bruits.
- Listen for a hepatic (perihepatitis) or splenic rub (splenic infarction)

This is supplemented by examination of hernia orifices, genitalia and rectal examination. During an assessment, please check with the examiner if these are required because the patient has to be exposed and the procedures are embarrassing.

An example of how to present an 'Abdomen Short Case'

History presentation is different from history taking. You may ask various questions and system review when taking history. In contrast, you should state the important positive and negative findings when presenting the history. In the same way examination should also be carried out in details however you may select important positive and negative findings to present.

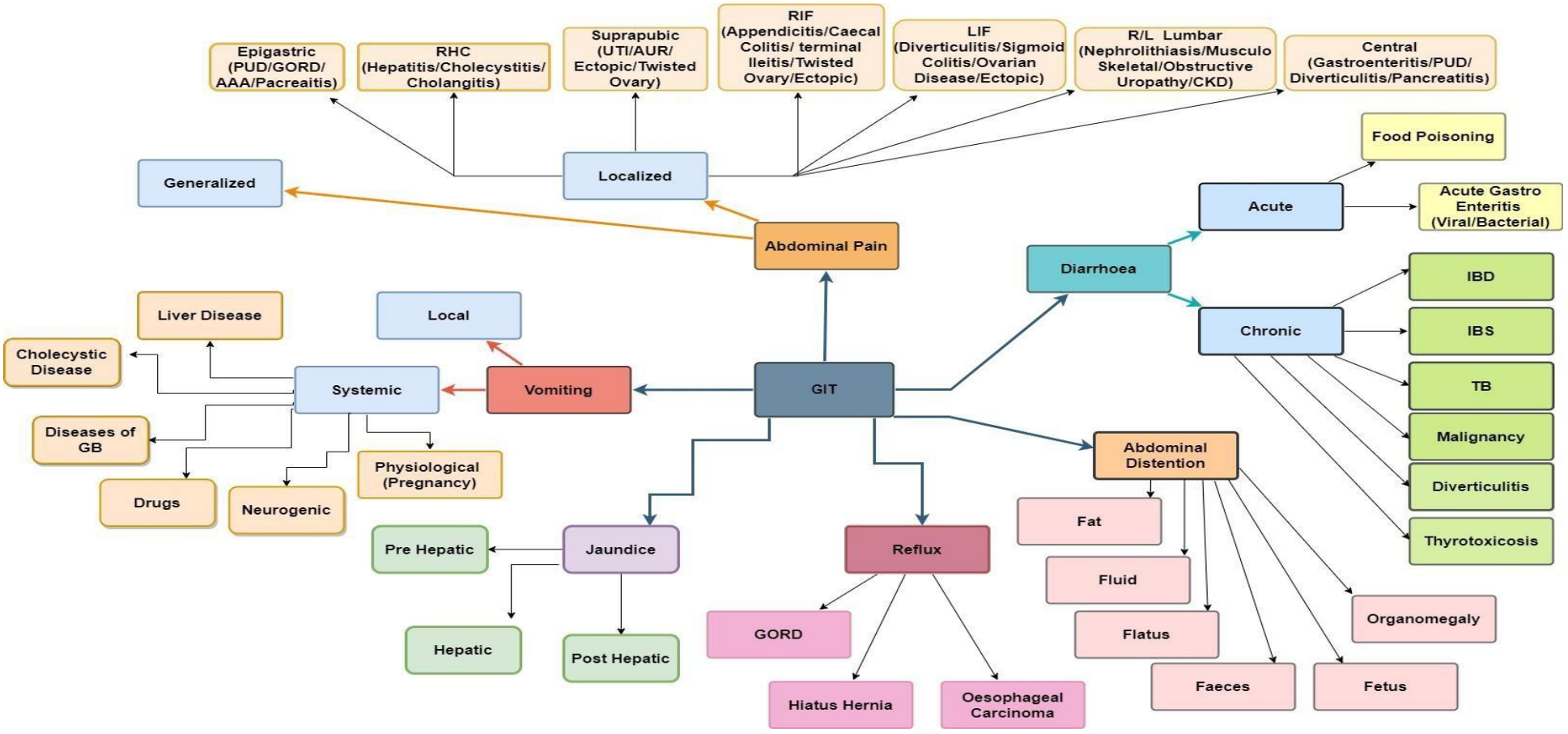
You will be given time to examine the patient and at the end of the allocated time you will be prompted (e.g ringing a bell) to conclude examination and present your findings to the examiner. Always remember before leaving the patient after examining them, cover the clothes that you exposed and thank the patient. Then you turn towards the examiner and make eye contact with them. It is not appropriate to look at the patient again, time to time while you present your findings to the examiner.

You may start presenting your findings in general examination, “My patient is a middle aged, overweight man, who lies comfortably in the bed. He is alert and rational, icteric, not pale and has parotid swelling bilaterally. He has features of chronic liver disease like palmar erythema, multiple spider nevi, loss of body and axillary hair and gynaecomastia. However, there is no clubbing and flapping tremors on outstretched hands.

Once you finish presenting the findings of general examination, move on to the abdomen proper, “on inspection of the abdomen, its distended symmetrically and flanks look full. Abdomen moves with respiration, there are no scars or lumps. The umbilicus is everted with classic appearance of ‘smiling umbilicus’. On palpation abdomen is soft and nontender. The liver is not palpable and upper margin of the liver lies at the level of seventh intercoastal space, compatible with a shrunken liver. The spleen is palpable, it’s moderately enlarged, four finger breaths below left costal margin, with a smooth surface and a regular margin and the palpable notch and is firm in consistency. There are no ballotable masses and inguinal orifices looks normal. The percussion revealed the presence of horseshoe dullness with fluid thrill compatible with moderate ascites. Bowel sounds were heard normal on auscultation”.

At the end of presentation of your findings you may conclude your diagnosis, “In conclusion, this middle-aged man has evidence of shrunken liver, splenomegaly, ascites, ankle oedema and jaundice suggestive of decompensated cirrhosis (or CLCD) without evidence of hepatic encephalopathy”. You may suggest the likely aetiology too, “the presence of bilateral parotid swelling and palmar erythema suggest alcohol as possible aetiology.”
At the end of your presentation, you proceed to the discussion, with the examiner about your patient.

See the mind map below relating the important differential diagnosis for the key symptoms in pulmonology



PUD-Peptic Ulcer Disesase, GORD-Gastro-Oesophageal Reflux Disease, AAA-Abdominal Aortic Aneurysm, UTI-Urinary Tract Infections, AUR-Acute Urinary Retention, CKD-Chronic Kidney Disease, IBD- Inflammatory Bowel Disease, IBS-Irritable Bowel Syndrome, TB-Tuberculosis, GB-Gallbladder

CHAPTER 5

COMMON INVESTIGATIONS

1) Full blood count (FBC) and blood picture
   Mention the characteristic findings you would expect in FBC and BP in following conditions.
   i) Iron deficiency

   ii) B12 deficiency

   iii) Folate deficiency

   iv) Chronic liver cell disease

   v) Acute GI bleeding

2) Liver profile
   a) Explain the pathophysiological basis of measurement of following factors as a part of liver profile.
      i) AST (SGOT)

      ii) ALT (SGPT)

      iii) Alkaline phosphatase

      iv) Gamma GT

      v) Serum proteins

      vi) Bilirubin

b) Mention the pathophysiological basis of high ALP in the following conditions.
   i) Cholangitis

   ii) Hepatocellular carcinoma

   iii) Leptospirosis

   iv) Bone fracture

   v) CKD

   vi) Primary hyperthyroidism

   vii) Pregnancy

c) Answer the following questions on serum proteins.
   i) What are gastrointestinal and non-gastrointestinal causes that could lead to hypoalbuminaemia?

   ii) Write short notes on globulins.

3) Stool full report (SFR)
   Give examples (at least one for each) following abnormal findings on stool analysis.
   i) High levels of fat

   ii) Undigested meat fibers

   iii) Low pH

   iv) High pH

   v) High WBCs

4) Endoscopic investigations
   a) Upper Gastrointestinal Endoscopy (UGIE)
      (1) How do you prepare a patient for UGIE/ OGD

      (2) Outline the way you take consent for OGD from a known patient CLCD presented with upper GI bleeding.

   b) Lower Gastrointestinal endoscopy
      (1) Outline preparation of a patient for colonoscopy

c) Endoscopic retrograde cholangiopancreatography (ERCP)
   (1) How do you monitor and care a patient brought to ward following ERCP

5) Radiological investigations
   a) Find X-rays or pictures of X-rays of the following conditions.
      (1) Chest X-ray with bowel rupture showing gas under the diaphragm
      (2) Supine and erect abdominal X-rays showing intestinal obstruction
      (3) X-ray abdomen with gall stones
      (4) X-ray abdomen with renal stones, stag horn calculus and ureteric calculi
      (5) X-ray abdomen with pancreatic calcifications
      (6) X-ray abdomen with diaphragmatic eventration
   b) Barium studies of GI tract
      (1) Take consent from a patient admitted for a barium study after explaining the indication, preparation, how the procedure is done and possible adverse effects.
      (2) Observe pictures of barium studies of oesophageal carcinoma, Barrett's oesophagus, Crohn's disease,
   c) Ultrasound scan (US/ USS) of the abdomen
      (1) What are the common significant ultrasound findings that may be found in a patient with acute abdomen? State them with examples.

      (2) Observe an intrabdominal procedure (e.g; Paracentesis/ nephrostomy insertion/ liver abscess aspiration etc.) done with ultrasound guidance.

d) CT abdomen
   (1) Write a request contrast enhanced CT (CECT) of abdomen and get the signature from a HO/ SHO/ Registrar and paste below.
e) Magnetic resonant cholangiopancreatography (MRCP)
   (1) Write indications for MRCP

   (2) What are complications that could develop after MRCP

6) Peritoneal fluid aspiration and analysis
   i) How do you prepare a patient for paracentesis?

   ii) What are the common investigations you would request when sending the aspirate for evaluation?

   iii) How do you confirm the presence or absence of portal hypertension with paracentesis?

iv) What are the complications that could occur after therapeutic paracentesis?

CHAPTER 6

EXERCISES

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1) Take a history from a patient admitted with acute upper gastrointestinal bleeding (haematemesis/ melaena) and complete the followings based on your patient.
   a) Write a summary of the presentation of the patient.
   b) Outline the immediate management of the patient at presentation.
   c) How do you assess the severity of UGI bleeding?
   d) Draw a diagram to illustrate the possible sites of bleeding in your patient.
   e) How did you arrive at an aetiological diagnosis in your patient?

2) Complete the following section based on a patient diagnosed to have bleeding from oesophageal varices with cirrhosis.
   a) Explain the pathophysiological basis of development of oesophageal varices in a patient with cirrhosis.
   b) What are the ways that a patient with cirrhosis could develop upper GI bleeding?
   c) What are the specific treatments given for a patient with variceal bleeding and mention the basis for treatment with them?

3) Obtain history from a patient with acute severe hepatitis and answer the questions below.
   a) What is the cause of hepatitis in your patient?
   b) What is hepatitis? How do you diagnose hepatitis?
   c) Outline the principles of management of your patient.
   d) What is the rationale of use of N-acetyl cysteine (NAC) for a patient with severe hepatitis.
   e) Find the liver profile results of the following conditions with hepatitis and appreciate the characteristics of each,
      (1) Viral hepatitis - hepatocellular phase
      (2) Viral hepatitis – cholestatic phase
      (3) Dengue hepatitis
      (4) Ischemic hepatitis
      (5) NASH (Non-alcoholic steatohepatitis)
      (6) DILI (Drug induced liver injury)
      (7) Alcoholic hepatitis
      (8) Autoimmune hepatitis

   f) Draw two timelines to explain how the clinical and laboratory parameters change with the natural history of acute and chronic viral hepatitis.
   g) How do you come to the conclusion of development of acute fulminant hepatitis?

4) Obtain a history from a patient presented with pancreatitis and complete the work below.
   a) What are the signs and symptoms which suggested the diagnosis of pancreatitis in your patient.
   b) What are the investigations carried out in your patient? And mention the reason to do so.
   c) Outline the management of your patient and reason out each step.
   d) What are the possible complications of acute pancreatitis?
   e) What are the common causes of acute pancreatitis?

5) Obtain a history from a patient with chronic diarrhoea and answer the section below.
   a) Describe the diarrhoea, that the patient is having.
   b) How do you locate the area of bowel involved in disease process from the description of diarrhoea?
   c) Give common causes for diarrhoea for each of the mentioned sites.
      (1) Colonic
      (2) Ileal
      (3) Jejunal
      (4) Extraintestinal diarrhoea

6) Complete the following section on acute diarrhoea,
   a) Compare and contrast acute gastroenteritis and food poisoning.
   b) Outline the management of acute gastroenteritis.
   c) What are the factors you consider when deciding on starting antibiotics for acute gastroenteritis?
   d) Explain the rationale of treatment with oral rehydration solution (ORS) in acute diarrhoea.
   e) What are the possible complications of acute diarrhoea?

7) Obtain a history from a patient having Inflammatory Bowel Disease (IBD) either Ulcerative Colitis (UC) or Crohn's Disease (CD) and complete the following.
   a) Write the summary of the patient's presentations including history and important examination findings.
   b) What are the investigations carried out in your patient?
   c) What are the complications that could develop on your patient?
   d) Outline the initial management of your patient.
   e) What are the macroscopic and microscopic differences between UC and CD that help differentiate each other?
   f) Outline how you break the bad news of diagnosis of UC/ CD to your patient.

8) Cholecystitis
   a) Take a history form a patient diagnosed with cholecystitis and write the summary below including examination findings.
   b) Outline the principles of management.

9) Hepatic encephalopathy (HE)
   a) Take a history from a patient diagnosed to have HE
   b) What are the conditions that could precipitate HE?
   c) How do you grade the severity of HE?
   d) Explain the pathogenesis of HE in a patient with cirrhosis
   e) Outline the management of your patient with HE
   f) Write the basis of use of lactulose in the treatment of HE

CHAPTER 7

CASE SCENARIOS

In this section we expect you to write histories (minimum of 4 cases as complete documentations) of patients that you encountered during your gastroenterology appointment.

This book is peer reviewed and recommended as a teaching and learning material for the Department of Medicine, Faculty of Medicine Sabaragamuwa University of Sri Lanka, by the following experts,

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