NATIONAL MEDICAL COMMISSION
Postgraduate Medical Education Board

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GUIDELINES FOR COMPETENCY BASED POSTGRADUATE TRAINING PROGRAMME FOR M.Ch. IN SURGICAL GASTROENTEROLOGY

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1. PREAMBLE

The aims and objectives of M.Ch. training should be to train surgeons with adequate knowledge, skills, aptitude and attitudes in the specialty of Surgical Gastroenterology. They should be able to function as an independent clinician/consultant and a teacher with research skills.

2. SUBJECT SPECIFIC OBJECTIVES

During the course, the student should acquire the following knowledge/skills/expertise:

A. THEORETICAL KNOWLEDGE:
Should be able to describe & discuss and synthesize knowledge regarding Luminal and Hepato Pancreatico Biliary (HPB) diseases (benign and malignant), and their diagnosis and management.

B. CLINICAL/PRACTICAL SKILLS:
Should be able to diagnose, investigate, manage and follow-up patients with Luminal and HPB diseases (benign and malignant) using modern therapeutic methods.

C. TEACHING SKILLS:
Should be able to teach relevant aspects of Luminal & HPB diseases (benign and malignant) to resident doctors, junior colleagues, nursing and para-medical staff.

D. RESEARCH METHODOLOGY:
Should be able to identify and investigate a research problem in Luminal & HPB diseases (benign and malignant) using appropriate methodology.

E. GROUP APPROACH:
Should participate in multi-disciplinary meetings with radiologists, pathologists, medical gastroenterologists, oncologists and experts from allied clinical disciplines.

F. ATTITUDES INCLUDING COMMUNICATION SKILLS
Should be able to communicate effectively with patients, colleagues and the community about Luminal & HPB diseases (benign and malignant) as well as counsel patients and relatives about various decisions during management.

3. LEARNING OBJECTIVES

At the end of the M.Ch. (Surgical Gastroenterology) training, the candidate should:

a. Be able to diagnose, investigate, manage and follow up patients with Luminal & HPB diseases (benign and malignant) using relevant current therapeutic methods with confidence.

b. Be able to interpret data from relevant clinical/laboratory investigations.
c. Be able to describe & discuss the indications/contra-indications of common Luminal & HPB surgical procedures for benign and malignant diseases and have the skills to perform these operations (including minimal access).
d. Be able to discuss the current literature on relevant aspects of the investigative, clinical and operative management of Luminal & HPB diseases (benign and malignant).
e. Be aware of all sub-specialties of Luminal & HPB surgery including transplantation.
f. Be acquainted with allied and general clinical disciplines.
g. Be capable of imparting basic Luminal & HPB surgical training.
h. Be able to identify, plan, conduct and communicate research in Luminal & HPB diseases.
i. Be able to discuss and defend the ethical issues involved in the relationship between patients and peers in clinical practice and research.

4. COMPETENCIES

SUBJECT SPECIFIC COMPETENCIES

4.1.1 *Competencies to be acquired in the cognitive domain (knowledge)*

a. Establish rapport, obtain a complete and relevant history; and perform a thorough physical examination adapted to the patient's clinical situation to arrive at a tentative diagnosis and list of probable differential diagnosis.

Implied sub-competencies:

- Obtains appropriate data from patient or caregiver
- Establishes rapport
- Performs appropriate physical examination
- Demonstrates specific physical examination skills
- Integrates all the above
- Lists diagnostic possibilities, identifying the most likely
- Justifies the principal diagnosis
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b. Plan and order relevant sequential investigations and Interpret their results to confirm a working diagnosis and initiate a plan of management. Communicate the same to the patient and relatives.

Implied sub-competencies:

- Recognizes significant urgent or abnormal results
- Distinguishes between normal variation and abnormal results
- Formulates an appropriate preliminary opinion based on the results
- Communicates significant results to other team members

- Communicates results in a clear and comprehensible manner to patients and care givers.
- Proposes evidence informed, holistic initial management plans that t includes pharmacologic and non-pharmacologic components, taking in to account patient's context, patient's consent and values
- Prioritizes the various component of the management plans
- Reviews the plan with other members of the team

c. Present oral and written reports that document a clinical encounter.

Implied sub-competencies:

- Documents approved management plans in the form (written / electronic), prescriptions and consultations / referrals
- Uses the electronic record when available to keep the team informed of progress
- Follows principles of error reduction including discussions of indications / contraindications of treatment plans, possible adverse effects proper dosage and drug interactions
- Writes consults / referrals, orders or prescriptions which are complete, incorporate patient safety principles and that fan be understood by all members of the team including the patient
- Presents a concise and relevant summary of a patient encounter to members of health care team

d. Communicates effectively with patients and relatives

Specifies patient context in report

- Demonstrates a shared understanding among the patient, the health care team members and consultants through oral and written reports
- Documents findings in a clear, focused and accurate manner
- Realize and execute a Proper handing over procedure to the next care giver so that patient care is continuous and uninterrupted
- Obtain a proper informed consent for the planned line of management after explaining alternatives to the patients
- Be prepared to alter the plan of management based on response from the patient
- Prepare patients for surgical and other procedures as well as manage their peri /post-operative and rehabilitative periods. Communicate a proper follow up plan
- Recognize a patient requiring urgent or emergent care, provide initial management and seek help as required

Implied sub-competencies:

- Utilizes early warning scores or rapid response team / medical emergency team criteria to recognize patients at risk of deterioration and mobilizes appropriate resources urgently
- Performs basic life support including CPR in cardiac arrest
- Asks for help when uncertain or requiring assistance

- Involves team members required for immediate response, continued decision making and necessary follow up
- Initiates and participates in a code response
- Rapidly assesses and initiates management steps
- Documents patient's assessment and necessary interventions in record
- Updates family members to explain patent's status and escalation of care plans
- Clarifies patient's goals of care upon recognition of deterioration
- Recognize a situation where a patient needs referral for appropriate management
- Participate in health quality improvement initiatives including auditing one's own practice

Implied sub-competencies:
- Participates in morbidity and mortality rounds
- Enters information in an error-based system
- Engages in daily safety habits like universal precautions, hand washing, time outs etc.
- Recognizes one's own errors to the supervisor/team, reflects on one's contribution and develops his/her own plan or quality improvement plan
- Identifies a risky situation for the safety of a patient
- Participates in a quality improvement exercise/project

e. Collaborate as a member of an inter-professional team. Is actively involved in care coordination

Implied sub-competencies:
- Recognizes the value and contributions of all team members
- Actively strives to integrate in to the team
- Recognizes the value and contributions of all team members
- Seeks input and help from all team members as needed
- Adapts communication strategies to the recipient in content, style and venue contributing to good interactions with team members
- Listens actively and elicits ideas and feedback from all team members
- Anticipates and responds to emotions in typical situations
- Rarely shows lapses in professional conduct except in unanticipated situations that evoke strong emotions and has insight to use experience to learn to anticipate and manage future triggers
- Works toward achieving team goals, although this may be more difficult when personal goals compete with team goals
- Usually involves patients / caregivers and other members of the team in goal setting care plan development
- Shares his knowledge of community resources with patients, family and other members of team
- Is actively involved in care coordination

f. Displays honesty, compassion, respect and empathy for patients and relatives.

g. Recognizes medico-legal issues, patient confidentiality and other regulations pertaining to medical practice.
h. Evaluate published evidence and appropriately apply it to one's clinical practice
i. Plan a study, collect data, record & analyze data and discuss one's findings in comparison to available evidence. Make a verbal and written communication.
j. Teach relevant aspects of GI surgery to resident doctors, junior colleagues, nursing, and para-medical staff.
k. Effectively communicate with patients, colleagues and community about GI Surgery disorders as well as counsel patients and relatives about various decisions during management.
l. Understand factors for hospital infection and take appropriate universal precautions to prevent hospital infection.
m. Performs general procedures of a physician.

Implied sub-competencies:

- Demonstrates the necessary skills to perform the procedure and has good understanding of the indications, contraindications, the risks and the benefits of the procedure
- Anticipates and recognizes the complications associated with the procedure and seeks help appropriately
- Explains the procedure to the patient/caregiver in a language that is familiar to them and such that they understand the risks associated with the procedure
- Answers all the questions of patient/caregivers clearly
- Documents the procedure with all relevant details

4.1.2 Competencies to be acquired in the Upper GI tract diseases, both benign and malignant

a) Provide initial management for critically ill UGI surgical patients
b) Provide initial management for Upper GI trauma patients
c) Assess and perform risk optimization for pre-operative patients in preparation for upper GI surgery
d) Manage uncomplicated post-operative UGI surgical patients
e) Manage post-operative UGI patients with complications
f) Supervise junior learners in the clinical setting

4.1.3 Competencies to be acquired in the Lower G I tract diseases, both benign and malignant

Provide initial management for critically ill LGI surgical patients
a) Provide initial management for Lower GI trauma patients
b) Assess and perform risk optimization for pre-operative patients in preparation for Lower GI surgery
c) Manage uncomplicated post-operative LGI surgical patients

d) Manage post-operative LGI patients with complications
e) Supervise junior learners in the clinical setting

4.1. 4. The Liver

A. Anatomy, Embryology, Physiology, Investigations

Upon completion of this, the trainee should be able to describe & discuss:

1. Intrahepatic and extrahepatic anatomy of the liver and the relationship with the adjacent structures
2. The embryology of the liver and biliary tract and the potential anomalies
3. The physiology of the liver
4. Clinical hematologic and biochemical tests relevant to the liver and their indications and interpretation.
    - Tests of hepatocellular injury
    - Tests of liver function
5. Hepatic imaging techniques and their indications and interpretation
6. Implications of investigations and surgical procedures on the liver

B. Congenital and Acquired Non-neoplastic Liver Disease

Upon completion of this, the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of the congenital and acquired non-neoplastic diseases of the liver.
2. The investigative procedures available to efficiently diagnose the disease/disorder.
3. The treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures.
4. The pre-, intra- and post-operative management, including the management of complications of therapy.

C. Neoplastic Liver Disease

Upon completion of this, the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the liver.
2. The investigative procedures available to efficiently diagnose the disease/disorder.
3. The staging of malignancies of the liver including histologic assessment.
4. The treatment options available for the neoplasm and the results, including the risks and benefits of the operative and non-operative procedures.
5. The pre-, intra- and post-operative management, including the management of complications of therapy.
6. The role of neo-adjuvant and adjuvant therapy of malignant liver neoplasms.

D. Liver Surgery for both benign and malignant diseases

Upon completion of this, the trainee should be able to describe & discuss:

1. The types of and techniques for liver resections
2. Preoperative patient assessment and the cumulative risks of the proposed procedure
3. Preoperative management
4. Intra-operative management during a liver resection
5. Post-operative management including complications.

4.1. 5 The Biliary Tract including Gallbladder

A. Anatomy, Embryology, Physiology, Investigations

Upon completion of this, the trainee should be able to describe & discuss:

1. The anatomy of the biliary tract including the intra- and extra-hepatic ducts, the gallbladder and cystic duct, the ampulla of Vater, and their relationships with the adjacent structures
2. The embryology of the liver and biliary tract and the potential anomalies
3. The physiology of bile metabolism and biliary tract epithelium
4. Clinical biochemical tests relevant to the biliary tract and their interpretation
5. Biliary imaging techniques and their indications and interpretation
6. Implications of investigations on surgical procedures on the bile duct

B. Congenital and Non-neoplastic Biliary Disease

Upon completion of this, the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of congenital and acquired non-neoplastic diseases of the biliary tract including the gallbladder
2. The investigative procedures available to efficiently diagnose the disease/disorder
3. The treatment options available for the condition, and the outcomes, including the risks and benefits of the operative and non-operative treatments
4. The pre-, intra- and post-operative management, including the management of complications of therapy

C. Neoplastic Biliary Disease

Upon completion of this, the trainee should be able to describe & discuss:

1. The presentation and natural history of benign and malignant neoplasms of the bile duct and gallbladder
2. The investigative procedures available to efficiently diagnosis the neoplasm.
3. The staging of adenocarcinoma of the bile duct and gallbladder including histologic assessment
4. The treatment options available for the neoplasm, and the indications and outcomes, including the risks and benefits of the operative and non-operative treatments
5. The pre-, intra- and post-operative management, including the management of complications of surgery.

6. The role of neo-adjuvant and adjuvant chemotherapy and radiation in malignant biliary neoplasms

4.1.6 The Pancreas & Duodenum

A. Anatomy, Embryology, Physiology, Investigations

Upon completion of this, the trainee should be able to describe & discuss:

1. Anatomy of the pancreas and its relationship with portal structures, retroperitoneal structures and the adjacent organs
2. Anatomy of the pancreatic duct and its relationship with the bile duct, sphincter of Oddi and the ampulla of Vater
3. Anatomy of duodenum and its relationship with portal structures, retroperitoneal structures and the adjacent organs
4. The embryology of the pancreas, pancreatic duct and duodenum and potential anomalies
5. The physiology of pancreatic endocrine and exocrine functions and duodenal physiology
6. Clinical biochemical tests of pancreatic function and injury and their interpretation
7. Pancreatic and duodenal imaging techniques and their indications and interpretation
8. Implications of investigations on surgical procedures on the pancreas and duodenum

B. Congenital and Acquired Non-neoplastic Pancreatic Disease

Upon completion of this, the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of congenital and acquired non-neoplastic diseases of the pancreas
2. The investigative procedures available to efficiently diagnose the disease/disorder
3. The treatment options available for the condition, and results, including the risks and benefits of the operative and non-operative procedures
4. The pre-, intra- and post-operative management, including the management of complications of therapy

C. Neoplastic Diseases of the Pancreas

Upon completion of this, the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of benign, primary and secondary malignant neoplasms of the pancreas
2. The investigative procedures available to efficiently diagnose the disease/disorder
3. The staging of malignancies of the pancreas including histologic assessment
4. The treatment options available for the neoplasm, and the outcomes, including the risks and benefits of the operative and non-operative procedures

5. The pre-, intra- and post-operative management, including the management of complications of therapy

D. Diseases of the Duodenum

Upon completion of this unit the trainee should be able to describe & discuss:

1. The pathophysiology, presentation and natural history of the diseases of the pancreas
2. The investigative procedures available to efficiently diagnose the disease/disorder
3. The treatment options available for the condition, and the results, including the risks and benefits of the operative and non-operative procedures
4. The pre-, intra- and postoperative management, including the management of complications of therapy

4.1. 7 Imaging

Upon completion of this, the trainee should:

1. Be able to describe & discuss the physics and technology of Ultrasound and Doppler, CT scan, MRI scan, PET scan and the other nuclear medicine imaging procedures including biliary excretion scan (HIDA), RBC scan, octreotide scan, and liver/spleen scan
2. Be able to describe & discuss the relative advantages, disadvantages and indications of each
3. Read and interpret the detailed information provided by imaging of the liver, biliary tract, pancreas and duodenum
4. Perform and interpret intra-operative ultrasound

4.1.8 Oncology

Upon completion of this, the trainee should:

1. Be able to describe & discuss the basic pathophysiology of neoplasia and the currently understood mechanisms of carcinogenesis
2. Be able to describe & discuss the mechanisms of action of the classes of chemotherapeutic agents currently available for HBP malignancies
3. Be able to describe & discuss the physics, mechanism of action and technology of radiation therapy
4. Apply this knowledge to the multidisciplinary management of HBP malignancies

4.1.9 Trauma

Upon completion of this unit the trainee should be able to describe & discuss:

1. The pathophysiology of blunt and penetrating trauma to the liver, biliary tract and portal structures, pancreas, duodenum and adjacent structures
2. The methods of assessment and diagnosis
3. The principles and techniques available to manage traumatic injuries

4. The management of complications of trauma to the liver, biliary tract, pancreas and duodenum

4.1.10 Transplantation

Upon completion of this, the trainee should be able to describe & discuss:

1. Organ procurement and preservation
2. Indications for liver transplantation
3. Outcomes including complications of transplantation
4. Immuno-suppression and its toxicities

4.2 AFFECTIVE DOMAIN (ATTITUDES AND VALUES DOMAIN)

The trainee in M.Ch. in Surgical Gastroenterology course is expected to acquire following attitudes and values.

1. Should follow ethical standards in managing patients
2. Should be able to identify, discuss and communicate ethical issues involved in a surgeon–patient relationship
3. Should be able to undertake self-appraisal and rectify any shortcomings.

4.3 Psychomotor Domain (Skills domain)

The trainee in M.Ch. in Surgical Gastroenterology course is expected to acquire the following procedural and non-procedural skills in GI and HPB diseases and perform these independently:

1. Clinical examination
2. Minor surgery
3. Major surgery
4. Endoscopic procedures
5. Physiological studies
6. Radiological procedures

Psychomotor domain (skills domain) will overlap with the cognitive and affective domains, as the performance of any skill will require all three domains

4.3.1 Upper GI

a) Assessment of patients with gastro-esophageal reflux disease (GERD) and Barrett's disease and to carry out non-operative and perioperative management for GERD and Barrett's disease.
b) Assessment of patients with para-esophageal hernia and congenital diaphragmatic hernias - investigations and management.
c) Assessment of patients with acute corrosive ingestion and chronic corrosive strictures and carry out non-operative, endoscopic and perioperative management.
d) Assessment of patients with motility disorders of pharynx and esophagus and to carry out non-operative and perioperative management of motility disorders.
e) Assessment of patients with esophageal cancer and to carry out non-operative and perioperative management of esophageal cancer.

f) Assessment of patients with peptic ulcer disease and to carry out the non-operative, endoscopic and perioperative management of peptic ulcer disease.
g) Assessment of patients with GE junction tumors and to carry out non-operative and perioperative management of GE junction tumors.
h) Assessment of patients with gastric cancer and to carry out the non-operative and perioperative management of gastric cancer.
i) Assessment of patients with gastrointestinal stromal tumors (GIST) of the stomach, esophagus and duodenum and carry out non-operative and perioperative management.
j) Assessment of patients with benign tumors of the esophagus, stomach and duodenum and to carry out the non-operative and perioperative management of benign tumors of the esophagus, stomach and duodenum.
k) Assessment of patients with premalignant conditions of the esophagus, stomach and duodenum and to carry out the non-operative and perioperative management of premalignant conditions of the esophagus, stomach and duodenum.
l) Assessment of patients with morbid obesity and to carry out the non-operative and perioperative management of morbid obesity.
m) Insertion of laparoscopic ports or making abdominal wall incisions appropriate for the intended procedure.
n) Laparoscopic intracorporal and extracorporeal suturing.
o) Principles and interpretation of endoscopic ultrasound (EUS) for upper GI indications.
p) Endoscopic dilatation, foreign body removal, clipping, glue techniques.
q) Perform safely/satisfactorily fundoplication/myotomy.
r) To perform safely/satisfactorily esophageal resections.
s) To perform safely/satisfactorily peptic ulcer surgery by open/laparoscopic techniques.
t) To perform safely/satisfactorily foreign body removal, endoscopic dilatation, banding of esophageal varices.
u) To perform safely/satisfactorily gastric resections.
v) To perform safely/satisfactorily gastric volvulus surgery by open/laparoscopic techniques.
w) To perform safely/satisfactorily laparoscopic sleeve gastrectomy, Roux-en-Y bypass for obesity.

4.3.2. Colorectal

a) Assessment of patients with anorectal pain, discharge and bleeding—Clinical evaluation (Knowledge of causes, history eliciting, per rectal examination with concern for the patient, make a diagnosis).
b) Assessment of patients with rectal prolapse: Knowledge about pathophysiology, various treatment procedures, history and examination, should be able to differentiate from other conditions, relevant investigations and interpretation, algorithmic approach in management, choosing the treatment option with justification relevant to the patient.
c) Assessment of patients with pelvic floor and sphincter disorders: Knowledge of definition, diagnostic criteria, history and examination of patient, rational ordering of

investigations and interpretation of investigations, choosing the appropriate treatment, discussion with patient.

d) Assessment of patients with colonic diverticulosis: (anatomical abnormality, pathophysiology, presentation, treatment options, algorithmic approach to treatment).
e) Assessment of patients with rectal injury including foreign body: Evaluation of extent of injury, investigation and interpretation of the results, decision for surgery and nature of surgery.
f) Assessment of patients with colonic polyp: Knowledge of various types of polyps and syndromes. Algorithmic approach to management of polyps.
g) Evaluate a patient with large bowel obstruction with clinical examination, enlist possible causes, demonstrate rational use of investigations and their interpretation and plan management strategies.
h) Evaluate a patient with lower GI bleed, localize the site of bleeding and have an algorithmic approach in a case of lower GI bleeding.
i) Evaluate a patient with inflammatory bowel disease (IBD), plan management and counsel the patient regarding management and associated complications.
j) Evaluate a patient of carcinoma rectum and anal canal, have a sound knowledge of multimodal treatment protocols and management of metastatic rectal carcinoma.
k) Management of a stoma and its complications, know the indications and methods of creating/reversing different types of stomas.
l) Ability to do colonic and rectal mobilization including understanding the vascular basis of it.
m) Colorectal anastomotic techniques including use of staplers.
n) Creation of different pouches and their complications.
o) Trans-anal procedures- indications & methodology.
p) Evaluation and management of acute & chronic mesenteric ischemia.
q) Small bowel obstructions: evaluation & management due to inflammatory diseases & tumours.
r) Ability to assess and manage enterocutaneous fistulae.
s) Assessment of patients with short bowel syndrome and manage them.

4.3.3. Liver

A. Clinical Skills: General

1. Identify, recognize, and describe anatomic structures in and around the liver
    a) By reading and interpreting images of the liver
    b) Intraoperatively
2. Perform and interpret intraoperative ultrasound of the liver and porta hepatis.
3. Perform liver biopsy: percutaneous, laparoscopic or open.
4. Identify anatomic anomalies and explain their embryologic origin.
5. Be able to describe & discuss the indications for and be able to interpret the haematologic and biochemical tests and explain the underlying physiology
6. Interpret dynamic tests of liver function.
7. Apply relative advantages and disadvantages to the application of different modalities of hepatic imaging.
8. Determine the appropriate abdominal wall incisions for open procedures on the liver.

9. Determine the appropriate port site placements and patient positions for laparoscopic procedures on the liver, and the relative indications for each and the need for a hand-port.
10. Evaluate liver function and portal hypertension (including Child's score and its variations).
11. Assess the overall risk and the hepatic risk of surgery by recognizing the implications of abnormalities of haematologic and biochemical investigations on both hepatic and non-hepatic procedures.
12. Develop a detailed operative strategy for liver resections based on preoperative assessment and imaging.
13. Diagnose and treat patients with cystic diseases of the liver.
14. Diagnose and manage patients with liver abscess (es).
15. Perform laparoscopic and open drainage of liver cyst or abscess (deroofing, resection).
16. Diagnose and classify acute and chronic liver failure.
17. Diagnose, investigate and manage patients with portal hypertension.
18. Perform portosystemic shunts: portocaval, mesocaval, splenorenal and their variants.
19. Perform devascularisation procedures and their variants.

B. Clinical Skills: Neoplasms

1. Evaluate patients with benign neoplasms of the liver, including interpretation of imaging and indications for biopsy
2. Manage patients with benign hepatic neoplasms
3. Evaluate patients with hepatocellular carcinoma (HCC), including screening for potential HCC and staging
4. Evaluate patients with primary and secondary adenocarcinoma and other metastatic lesions of the liver including staging
5. Manage patents with primary and secondary hepatic malignancies
6. Participate in multidisciplinary tumour review board meetings
7. Perform liver resections
8. Provide pre- and postoperative therapy following liver resection including the diagnosis and management of complications
9. Recommend appropriate therapy for unresectable hepatic malignancies
10. Recommend appropriate adjuvant radiation and/or chemotherapy following resection for hepatic malignancies
11. Interact with medical and radiation oncologists

4.3.4. Biliary Surgery
A. Clinical Skills: General

1. Identify and describe biliary tract structures (normal and abnormal)
    a. By reading and interpreting images of the biliary tract
    b. Intraoperatively
2. Perform and interpret intraoperative ultrasound of the biliary tract
3. Identify anatomic anomalies and explain their embryologic origin

4. Be able to describe & discuss the indications for and be able to interpret the biochemical tests and explain the underlying physiology
5. Apply the knowledge of the relative advantages and disadvantages of the different modalities of biliary tract imaging to determine the optimal investigation
6. Determine the abdominal wall incisions that are appropriate for open procedures on the biliary tract and the relative indications for each
7. Determine the appropriate port site placements and patient positions that are useful for laparoscopic procedures on the biliary tract and the relative indications for each
8. Develop a detailed operative strategy for biliary surgery based on preoperative assessment and imaging

B. Clinical Skills: Non-Neoplastic

1. Investigate the jaundiced patient by determining the most efficient modalities, and interpret the results of biochemical investigations and imaging
2. Apply the knowledge of the relative advantages and disadvantages of non-operative biliary manipulation (PTBD and endoscopic stenting) to treat biliary tract obstruction.
3. Manage the patient with complex gallstone disease
4. Manage biliary injuries resulting from cholecystectomy and other trauma
5. Perform resection and reconstruction for choledochal cysts, intrahepatic stones and benign strictures
6. Evaluate and manage the patient with complications of primary sclerosing cholangitis

C. Clinical Skills: Neoplastic

1. Investigate and manage patients with gall bladder polyps and benign neoplasms of the ampulla of Vater
   a. Perform extended cholecystectomy for potential oncologic indication
   b. Perform transduodenal resection of the ampulla of Vater with reconstruction of the biliary and pancreatic ducts
2. Investigate and manage patients with hilar cholangiocarcinoma
   a. Perform extended resection of the biliary bifurcation with the caudate and ipsilateral lobes of the liver, portal lymphadenectomy, and biliary reconstruction
3. Investigate and manage patients with distal bile duct tumours
   a. Perform pancreatoduodenectomy
4. Participate in multidisciplinary tumour review board meetings
5. Provide postoperative management including the diagnosis and treatment of complications of biliary resection and/or bypass
6. Recommend appropriate adjuvant radiation and/or chemotherapy following resection and interact with medical and radiation oncologists
7. Recommend appropriate palliative therapy for unresectable carcinoma of the gall bladder or bile duct

4.3.5. Pancreas and Duodenum

A. Clinical Skills: **General**

1. Identify, recognize, and describe anatomic structures in and around the pancreas and duodenum
   a. By reading and interpreting images of the duodenum, pancreas and its duct
   b. Intraoperatively
2. Perform and interpret intraoperative ultrasound of the pancreas and surrounding structures
3. Identify anatomic anomalies and explain their embryologic origin
4. Be able to describe & discuss the indications for and interpret biochemical tests and explain the underlying physiology including the tests of pancreatic function
5. Apply the relative advantages and disadvantages of different modalities of pancreatic imaging to efficiently investigate diseases and disorders of the pancreas and duodenum
6. Determine the appropriate abdominal wall incision for open procedures on the pancreas and/or duodenum
7. Determine the appropriate port site placements and patient positions for laparoscopic procedures on the pancreas and/or duodenum and the relative indications for each and the need for a hand-port
8. Develop a detailed operative strategy for pancreatic and duodenal surgery based on preoperative assessment and imaging

B. Clinical Skills: Non Neoplastic

1. Manage patients with acute pancreatitis, including complications
   a. Determine the need for surgical intervention
   b. Perform open and/or laparoscopic procedures for acute pancreatitis
2. Investigate and manage patients with chronic pancreatitis
   a. Determine the need for operative intervention
   b. Perform: pseudocyst-enterostomy, lateral pancreaticojejunosomy with/without limited resection of the head of the pancreas (Frey procedure), pancreatic resection

C. Clinical Skills: Neoplastic

1. Investigate and manage patients with benign cysts and neoplasms of the pancreas
   a. Determine need for biopsy/aspiration and resection
   b. Perform resections including enucleation of neuroendocrine tumours and spleen preserving distal pancreatectomy
2. Investigate and manage patients with adenocarcinoma of the pancreas
   a. Stage the tumour pre- and intraoperatively and determine resectability
   b. Perform pancreatoduodenectomy with or without portal vein resection and reconstruction
   c. Perform distal pancreatectomy and regional lymphadenectomy
   d. Perform palliative procedures for unresectable tumours
3. Participate in multidisciplinary tumour review board meetings
4. Provide postoperative management including the diagnosis and treatment of complications of pancreatic resection and/or bypass
5. Recommend appropriate therapy for unresectable pancreatic carcinoma

6. Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with medical and radiation oncologists

D. Clinical Skills: Duodenum

1. Investigate and manage patients with benign lesions of the duodenum
2. Determine need for operative intervention
3. Perform acid-reduction procedures, limited resection and duodenal bypass procedures
4. Investigate and manage patients with malignant neoplasms of the duodenum
    a. Stage the tumour pre- and intraoperatively and determine resectability
    b. Perform appropriate resection (including pancreatoduodenectomy with or without portal vein resection and reconstruction when necessary) with regional lymphadenectomy
    c. Perform palliative procedures for unresectable tumours
    d. Participate in multidisciplinary tumour review board meetings
    e. Recommend appropriate therapy for unresectable duodenal malignancies
    f. Recommend appropriate neo- and adjuvant radiation and/or chemotherapy and interact with medical and radiation oncologists
5. Provide postoperative management including the diagnosis and treatment of complications of duodenal resection and/or bypass

4.3.6. Imaging
Clinical Skills

1. Apply understanding of the relative merits of each imaging modality to efficiently investigate (including stage) lesions of the liver, biliary tract and pancreas
2. Interpret images to correctly identify normal structures, anomalies and pathologic abnormalities
3. Correlate and integrate the findings of the various imaging studies during the investigation of a patient
4. Perform and interpret intraoperative ultrasound
5. Interact with diagnostic radiologists with expertise in HPB diseases and body imaging

4.3.7. Oncology
Clinical Skills

1. Apply knowledge of tumour biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual HBP malignancies
2. Participate regularly in multidisciplinary tumour board meetings
3. Interact with interventional radiologists, medical oncologists, radiation oncologists, oncology nurses and allied health professionals, palliative care physicians and nurses

4.3.8. Trauma
Clinical Skills

1. Consult and manage patients with blunt and penetrating trauma to the upper abdomen
2. Evaluate injuries to the liver, biliary tract, pancreas and duodenum

3. Evaluate post-cholecystectomy injuries to the bile duct and determine a management strategy
4. Perform emergency and elective operative procedures to resolve and/or repair injuries to the liver, bile duct, portal structures, pancreas and duodenum
5. Manage complications of operative interventions

4.3.9. Transplantation
Clinical Skills

1. Apply knowledge of liver transplantation to recommend a liver transplant to the appropriate patient at the appropriate time.
2. Recognize the oncologic impact of immunosuppression on recurrence of hepatocellular carcinoma following liver transplantation and the increased risk of de-novo malignancies

5. SYLLABUS

5.1 BASIC SCIENCES AND PRINCIPLES OF SURGICAL GASTROENTEROLOGY and GI ONCOLOGY

- Anatomy: Gross and histological anatomy of the abdomen and its contents including the entire GI tract, Liver (including segmental anatomy), Biliary tract, Pancreas, spleen, portal and Hepatic venous system.

- Physiology: Normal function of the GI tract and related organs including endocrine functions of gut and pancreas. Physiological basis of various tests to study these functions

- Pharmacology of drugs used in GI surgical disorders e.g. to control acid secretion, in the management of ulcerative colitis and immunosuppressive drugs.

- Fluid-electrolyte and acid base disturbance: general aspects, imbalance in GI surgical patient's physiological responses to volume and osmolality abnormalities, interpretation of blood gas analysis, maintenance and replacement therapy.

- Nutritional considerations in GI surgical patients: nutrient stores and body compositions, nutrient requirements, malnutrition, evaluation of nutritional status, nutritional therapy, enteral and parenteral therapy and complications of these.

- Wound healing: Principles, phases, types of healing, factors influencing wound healing, wound dehiscence and management.

- Principles and disorders of hemostasis.
- Immunology in GI surgery. Especially in relation to organ transplantation and GI Oncology

5.2 Oesophagus

- Anatomical detail, physiology of swallowing, oesophageal manometry, pH monitoring, endoscopic ultrasound and other diagnostic techniques, brush cytology, vital staining, contrast imaging and CT scan,

- Congenital lesions (trachea-oesophageal fistula), Zenker's diverticulum, epiphrenic diverticulum, oesophageal trauma, spontaneous or iatrogenic perforations, esophageal motility disorders

- Corrosive burns: detection, evaluation and management,

- Gastroesophageal reflux disease, achalasia cardia. Barrett's oesophagus, oesophageal cancer: adeno & squamous, various oesophageal operations: diverticulectomy, excision of leiomyoma, oesophagostomy, myotomy, fundoplication, oesophageal resection (lvor-Lewis, McKeown, Trans-hiatal)

- Cervical exploration, oesophagogastrostomy, gastric pull-up, gastric and colonic bypass, complications of oesophagectomy, management of chylothorax.

5.3 Stomach and Duodenum

- Anatomical details, physiology of gastric secretions, gastroduodenal motility, diaphragmatic hernia (congenital and acquired), volvulus, pyloric stenosis in children and adults, foreign bodies (bezoars), stomach trauma,

- H. pylori in gastric diseases, peptic ulcer, Zollinger-Ellison syndrome, non-ulcer dyspepsia

- Gastric tumours: benign and malignant, gastric surgery: vagotomy, pyloric drainage, gastrojejunostomy

- Bariatric procedures, Creation of gastric tube, Roux-en-Y oesophagojejunal anastomosis, post-gastrectomy syndromes and complications

5.4 The Liver

A. Anatomy, Embryology, Physiology, Investigations

1. Embryology of the liver and relationship to other foregut structures
2. Extrahepatic anatomy of the liver
    - Lobes, sectors, segments
    - Nomenclature systems
    - Ligaments, fissures and incisures
    - Anomalies
3. Anatomy of the porta hepatis
    - Portal vein, hepatic artery
    - Bile duct, gall bladder
    - Variants of normal and anomalies

- Lymphatic drainage and lymph nodal anatomy
- Nerves

4. Anatomy of the retrohepatic space
    - IVC and its branches
    - Adrenal, kidney, diaphragm
5. Intrahepatic anatomy
    - Hepatic veins and variants of normal
    - Portal triad structures and segmental anatomy
    - Histology of the normal liver
6. Physiology of the liver
    - Bilirubin metabolism
    - Coagulation
    - Other clinically relevant metabolic pathways
7. Haematologic, biochemical, and histologic investigations (assessment) of the liver
    - Transaminases and markers of cholestasis
    - Measures of liver function
        (a) Static: including INR (PT), Factors V and VII, bilirubin, albumin
        (b) Dynamic: including clearance tests, e.g. ICG, galactose, aminopyrine, lidocaine (MEGX)
        (c) Indicators of portal hypertension including hepatic venous pressure gradient
    - Indications for liver biopsy
8. Imaging of the liver
    - Ultrasound and Doppler, Computerized Tomography (CT) Scans, Magnetic Resonance Imaging (MRI) Scans
    - Nuclear tests: Proton Emission Tomographic (PET) Scans, Liver/Spleen scans, Biliary excretion (e.g. HIDA) scans, RBC scans
9. Application of investigations to hepatic surgery

B. Congenital and Acquired Non-neoplastic Liver Disease

1. Paediatric liver diseases, Biliary atresia and Alagille's syndrome
    (a) Presentation, evaluation and natural history
    (b) Treatment options and indications for intervention
2. Liver cysts and abscesses
    a. Solitary liver cysts
        - Presentation, evaluation and natural history
        - Distinguish from cystic neoplasm
        - Treatment options and indications for intervention
    b. Polycystic liver disease
        - Associated abnormalities
        - Presentation, evaluation and natural history
        - Treatment options and indications for intervention
    c. Pyogenic and fungal liver abscess
        - Potential bacterial and fungal pathogens and sources
            - Presentation, evaluation

- Treatment and indications for surgical drainage of liver abscess including amoebic abscess

d.Tuberculous abscess

- Presentation, evaluation and natural history
- Treatment options and indications for intervention

e. Echinococcal liver cyst

- Life cycle, epidemiology, target organs
- Presentation, evaluation and natural history
- Treatment options and indications for intervention

3. Liver failure
    - Hepatitis and acute liver failure
    - Causes of acute liver failure
    - Investigation and prognosis
    - Classification systems including MELD and King's College criteria
    - Treatment strategies
    - Role of liver support systems
    - Role of liver transplantation
    -
4. Cirrhosis and portal hypertension

(a) Causes of cirrhosis, diagnosis and natural history, staging and treatment options (including indications for liver transplantation) for each

i. Viral hepatitis B, C, D
ii. Alcoholic liver disease
iii. Non-alcoholic fatty liver disease and steatohepatitis
iv. Autoimmune liver disease
v. Primary biliary cirrhosis
vi. Primary sclerosing cholangitis
vii. Haemochromatosis, Wilson's disease, alpha-1 antitrypsin deficiency
viii. Budd–Chiari syndrome

(b) Portal hypertension

i. Pathophysiology
ii. Interpretation of haematologic and biochemical tests and imaging
iii. Non-operative treatment options and strategies
iv. Portosystemic decompression
    1. Indications and sequelae
    2. Risks and benefits of TIPS
    3. Surgical shunts, types
    4. Devascularisation procedures
v. Indications for liver transplantation

C. Neoplastic Liver Disease

a. Benign neoplasms of the liver

- Presentation, investigation, diagnosis, and natural history of haemangioma, hamartoma, adenoma, focal nodular hyperplasia

- Histology and indications for biopsy
- Treatment options and indication for ablation or resection

b. Primary malignancies of the liver

1. Hepatocellular carcinoma (HCC)
   - Aetiology, presentation, investigation, diagnosis, and natural history of HCC
   - Role of screening and staging systems for HCC
   - Treatment options and the risk–benefit ratio for each: resection, transplantation, ablation, chemotherapy with or without embolization, radiation
2. Cholangiocarcinoma (intrahepatic or peripheral)
   - Diagnosis, investigation and staging
   - Treatment options including palliative procedures
3. Epithelioid haemangioendothelioma, lymphoma, sarcoma and other neoplasms
   - Diagnosis, investigation and staging
   - Treatment options

c. Secondary malignancies of the liver

❖ Colorectal primary
- Pathogenesis, staging of colorectal cancer
- Investigation and staging
- Treatment options
  - ➢ Indications, and risk–benefit ratio of ablation / resection
  - ➢ Neo-adjuvant, downstaging, and adjuvant chemotherapy

❖ Neuroendocrine and other primary
- Investigation and staging
- Treatment options
  - ➢ Indications, and risk–benefit ratio of ablation / resection
  - ➢ Neoadjuvant and adjuvant therapy

D. Liver Surgery

Types of liver resection
- Nomenclature of liver resections (Brisbane system)
- Laparoscopic, laparoscopic-assisted, open laparotomy
- Non-anatomic, segmental, lobectomy, extended lobectomy
- Vascular control: none, Pringle manoeuvre, total vascular isolation
- Vascular resection and reconstruction
- Staged resections
- Combination with ablation

Preoperative assessment and the cumulative risks to the proposed procedure
- Patient comorbid conditions (cardiopulmonary and other)
- Hepatic risk
  (a) Assessment of liver function, portal hypertension
  (b) Volumetric assessment of liver remnant
  (c) Portal vein embolization

Preoperative management
- Prophylaxis against common complications such as DVT, infection
- Neuroendocrine hormonal blockade

- Detailed operative plan based on preoperative imaging

Liver resection

1. Anaesthetic considerations: Agents, coagulation, CVP
2. Blood loss conservation including cell saver and blood product administration
3. Laparoscopic techniques
   (a) Patient and port placement
   (b) Hand port
4. Parenchymal transection techniques
   (a) Relative advantages and disadvantages
   (b) Normal, fatty, fibrotic and cirrhotic parenchyma
   (c) Laparoscopic or open
5. Concomitant resection and reconstruction of the (i) Diaphragm (ii) IVC (iii) Portal vein (iv) Bile duct and (v) hepatic artery

Post-operative management

Complications and management, including liver failure

E. Liver Transplantation

- History of Liver Transplantation
- Liver Transplantation in India
- Indications and Contraindications for Liver Transplantation
- Organ Preservation in Liver Transplant
- Anesthetic Management in Liver Transplantation
- Immunology of Liver Transplantation
- Pediatric Liver Transplant
- Liver Transplantation in Acute Liver Failure
- Deceased Donor Liver Transplantation
- Living Related Liver Transplantation
- Complications in Living Donor Liver Transplantation
- Machine perfusion, split liver transplants, reduced size organ transplants, domino transplants

5.5 The Biliary Tract including Gallbladder

A. Anatomy, Embryology, Physiology, Investigations

1. Embryology of the biliary tract
   - Relationship to liver, pancreas and other portal and foregut structures
2. Anatomy of the hepatic duct and biliary plate
   - Segmental anatomy and variants of normal
   - Blood supply and lymphatic drainage
   - Relationship with other portal structures
3. Anatomy of the gallbladder and cystic duct
   - Blood supply and lymphatic drainage

- Variants of normal and anomalies

4. Anatomy of the bile duct
    - Blood supply, lymphatic drainage and regional lymph nodes
    - Variants of normal and anomalies
    - Relationship with other portal structures and the pancreatic duct
    - Sphincter of Oddi and ampulla of Vater
5. Bile metabolism and biliary physiology
    - Bile-salt dependent and independent bile production
    - Hormonal influences
    - Biliary epithelium and gallbladder function
    - Sphincter of Oddi motility
6. Interpretation of biochemical investigations
7. Imaging
    - Axial and body imaging techniques: U/S, CT scan and MRI scan, including MRCP
    - Endoscopic U/S
    - Direct contrast imaging
        (a) Percutaneous transhepatic cholangiogram (PTC) and cholecystography
        (b) Endoscopic retrograde cholangio-pancreatography (ERCP)
    - Endoscopic assessment of ampulla of Vater
    - Nuclear biliary excretion imaging (HIDA scan) – qualitative and quantitative

B. Congenital and Non-neoplastic Biliary Disease

a. Congenital and paediatric

Choledochal cyst, Caroli's disease, congenital hepatic fibrosis, biliary atresia and Alagille's syndrome

1. Presentation, classification, evaluation and natural history
2. Treatment options and indications for intervention

b. Gallstones

1 Pathogenesis

2 Presentation and investigation of biliary colic, cholecystitis, cholangitis, Mirrizzi's syndrome, gallstone ileus

3 Treatment: Percutaneous, laparoscopic and open

4 Cholecystectomy-related biliary injuries

(a) Mechanism of injury and classification

(b) Associated injuries

(c) Management

c. Benign strictures

1 Primary sclerosing cholangitis (PSC)

(a) Aetiology, pathophysiology, natural history and non-operative management

(b) Complications and management

i. Screening for cholangiocarcinoma

ii. PTC with biliary drainage (PTBD), ERCP with endobiliary stent

iii. Resection
iv. Transplantation

(2) Post-traumatic and idiopathic
(a) Mechanism of injury and classification
(b) Management options

d. Intrahepatic stones
1. Pathophysiology, presentation and investigation
2. Common infectious bacteria
3. Surgical options including liver resection and biliary access (Hutson)
choledochojejunostomy, hepaticojejunostomy with transhepatic stents

C. Neoplastic Biliary Disease

a. Gallbladder

(1) Polyps
1. Presentation, natural history
2. Indications for resection
3. Principles of resection

(2) Adenocarcinoma
1. Presentation, staging (including histology) and natural history
2. Investigation
3. Surgical options: Extent and timing of resection
4. Chemo and radiotherapy including neo- and/or adjuvant therapy
5. Palliative care options

b. Bile duct

(1) Adenoma of ampulla of Vater
1. Presentation, natural history, investigation
2. Resection options: Endoscopic, transduodenal resection and reconstruction

(2) Adenocarcinoma
1. Location: Hilar (Klatskin), intrapancreatic, ampulla
2. Type: papillary, sclerosing
3. Presentation, investigation and staging, including laparoscopic staging
4. Resection and reconstruction: indications and contraindication
5. Palliative options
    1. PTBD or endoscopic stent
    2. Surgical bypass

5.6 The Pancreas and Duodenum

A. Anatomy, Embryology, Physiology, Investigations

- Embryology of the pancreas and duodenum
    (1) Relationship to liver, bile duct and other foregut structures
    (2) Aetiology of anomalies including pancreas divisum and annular pancreas
- Anatomy of the pancreas

(1) Spectrum of normal anatomy and variants
(2) Arterial supply and venous drainage
(3) Lymphatic drainage and regional lymph nodes.
(4) Relationship with:
- Portal structures: duodenum, bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
- Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
- Adjacent organs: stomach, spleen, colon, small intestine

- Anatomy of the pancreatic duct
  - Variants of normal and anomalies
- Anatomy of the duodenum
  (1) Spectrum of normal anatomy and variants
  (2) Arterial supply and venous drainage
  (3) Lymphatic drainage and regional lymph nodes.
  (4) Relationship with:
    - Portal structures: bile duct, hepatic artery, portal vein, splenic and superior mesenteric veins and their branches
    - Retroperitoneum: IVC and its branches, aorta and SMA and their branches, adrenal gland, kidneys
    - Adjacent organs: pancreas, stomach, spleen, colon, small intestine
- Pancreatic metabolism and physiology
  (1) Exocrine enzyme physiology
  (a) Synthesis, excretion and activation (b) Neural and hormonal influences
  (2) Endocrine metabolism
  (a) Islet cell function, neuroendocrine hormones
- Duodenal physiology
  (1) Motility
  (2) Neuroendocrine ("gut") hormone physiology
  (3) Biochemical investigation and interpretation
- Biochemical investigations
  (1) Markers of pancreatic injury
  (2) Measures of pancreatic exocrine function
  (3) Urinary and serum neuroendocrine hormones
- Imaging
  (1) Axial and body imaging techniques: U/S, CT scan and MRI scan, including MRCP
  (2) Endoscopy and endoscopic U/S
  (3) Direct contrast imaging: Endoscopic retrograde cholangio-pancraetography (ERCP)
  (4) Nuclear studies:
    - PET scan
    - Neuroendocrine imaging (Octreotide scan)
  (5) Application of investigations and imaging to pancreatic and duodenal surgery

B. Congenital and Acquired Non-neoplastic Pancreatic Disease

1. Pancreatitis
   (1) Acute
      1. Pathogenesis, staging and prognosis
      2. Management, including surgical options and complications
      3. Indications for surgical intervention
   (2) Chronic
      1. Pathogenesis, complications and nonoperative management
      2. Pancreatic stents and endoscopic/percutaneous drainage procedures
      3. Surgical options and indications
      4. Pain control
2. Pancreas Divisum
   (1) Pathogenesis, staging and prognosis
   (2) Management, including surgical options and complications
   (3) Indications for surgical intervention
3. Annular Pancreas
   (1) Pathogenesis, staging and prognosis
   (2) Management, including surgical options and complications
   (3) Indications for surgical intervention

C. Neoplastic Diseases

1. Benign cysts and neoplasms of the pancreas
   (1) Microcystic serous cystadenoma
      (a) Presentation, investigation, diagnosis, and natural history
      (b) Histology and indications for biopsy
      (c) Treatment options and indication for resection
   (2) Mucinous cystic neoplasm
      (a) Presentation, investigation, diagnosis, and natural history
      (b) Histology and indications for aspiration/biopsy
      (c) Treatment options and indication for resection
   (3) Intraductal papillary mucinous neoplasm (IPMN)
      (a) Presentation, investigation, diagnosis, and natural history
      (b) Histology and indications for aspiration / biopsy
      (c) Treatment options and indication for resection
   (4) Solid pseudopapillary neoplasms
      (a) Presentation, investigation, diagnosis, and natural history
      (b) Histology and indications for aspiration / biopsy
      (c) Treatment options and indication for resection
   (5) Cystic neuroendocrine tumours
      (a) Presentation, investigation, diagnosis, and natural history
      (b) Histology and indications for aspiration / biopsy
      (c) Treatment options and indication for resection
   (6) Von Hippel Lindau syndrome
      (a) Pathology, associated lesions, investigation
      (b) Management
2. Malignancies of the pancreas
   (A) Primary
   (1) Adenocarcinoma

a) Presentation, investigation and staging
b) Assessment of resectability
c) Pre-, peri- and postoperative management
d) Palliative procedures

(2) Neuroendocrine tumours
a) Presentation, investigation and staging
b) Assessment of resectability
c) Pre-, peri- and post-operative management

(3) Lymphoma
a) Presentation, staging
b) Role of surgery

(B) Secondary
(a) Renal cell carcinoma: Presentation and management
(b) Melanoma: Presentation and management

D. Diseases of the Duodenum

1. Congenital disorders of the duodenum
   (1) Duodenal atresia and duplication
   (2) Duodenal diverticulae
2. Duodenal ulcer disease
   (1) Pathogenesis, investigation and diagnosis
   (2) Nonoperative treatment
   (3) Operative management
3. Benign neoplasms
   (1) Adenoma
   (2) Hereditary Familial Polyposis: Genetics, presentation, investigation and management
4. Malignant neoplasms of the duodenum
   (1) Adenocarcinoma: Presentation, investigation, staging and management
   (2) Gastrointestinal stromal tumour (GIST) and sarcomas: Presentation, investigation, staging and management
   (3) Neuroendocrine tumour: Presentation, investigation, staging and management
   (4) "Secondary" to direct invasion of adjacent malignancy
   - Carcinoma of the stomach or colon
   - Renal cell carcinoma
   - Investigation, staging
   - Operative management

5.7 Peritoneum

- Omentum, Retroperitoneum Recesses, reflections, subdiaphragamatic spaces, peritonitis

- Primary secondary and tertiary, tuberculosis, mesenteric cyst, pseudomyxoma peritonei, ascites (diagnosis, investigation and management), retroperitoneal tumors, inguinal hernia, ventral hernias, peritoneoscopy

5.8 Spleen

- Anatomy, splenic function, haemolytic anaemias, splenomegaly hypersplenism, splenic trauma, cysts and granulomas, physiological effects of splenectomy, OPSI, splenic vein thrombosis, splenic artery aneurysms, splenectomy, splenic preservation.

5.9 Small Intestine

- Mesenteric vascular anatomy, intestinal physiology, Ladd's band, malrotation, volvulus, hernia, intestinal obstruction, ileocaecal TB, lymphoma, Benign and malignant tumors of small intestine

- Meckel's diverticulum, intussusception, small bowel gangrene, intestinal resections, lengthening and transplantation, acute and chronic mesenteric ischaemia, short gut syndrome, small bowel fistulae

- Crohn's and other inflammatory bowel diseases enteral feeding, home/parenteral nutrition.

5.10 Colon, Rectum and Anal Canal

- Anatomy, physiology, colonic motility, physiology of defecation and anal continence; Hirschsprung's disease, anorectal malformations, rectal prolapse, SRUS, pseudo-obstruction (Ogilvie syndrome), descending perineum syndrome, anismus and constipation, anal incontinence

- Haemorrhoids, fissure, fistulae and anal stricture; polyps and other benign tumors hereditary and familial polyposis syndrome, ulcerative colitis and Crohn's amoebic colitis, ischemic colitis, diverticulitis, lower GI hemorrhage, carcinoma of the colon, rectum, anal canal

- Operations: Abdominoperineal, low and ultra-low anterior resection, segmental colectomies, pelvic exenterations, colostomy, ureterosigmoidostomy, hemicolectomies, urinary diversions, surgery for anal incontinence, rectal prolapse and complex fistulae, restorative proctocolectomy and ileoanal pouch anastomosis

5.11 Imaging

- The applied physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and the other nuclear medicine imaging procedures
- The clinical protocols available for each technology
- (1) The information provided by each protocol
- (2) The interpretation of images
  (3) The application to clinical investigation
- Imaging algorithm for the investigation of luminal, hepato-biliary and pancreatic lesions:

5.12 Oncology

1. Basic pathophysiology of neoplasia
    (1) Mechanisms of carcinogenesis
    (2) Genetic alterations
    (3) Viral carcinogenesis
    (4) Chronic inflammation
    (5) Tumour biology including the potential for metastases
2. Chemotherapy
    (1) Classes of drugs
    (2) Mechanisms of action
    (3) Toxicities
    (4) Combination therapy and available protocols
3. Radiation therapy
    (1) Applied physics and technology
    (2) Mechanism of action
    (3) Toxicity
    (4) Combination protocols with chemotherapy
4. Multidisciplinary management: Relative roles of surgery, ablation, chemotherapy and radiation therapy as:
    (a) Definitive management
    (b) Neo- and adjuvant therapy
    (c) Therapy for recurrent disease
5. Palliative therapy

5.13 Trauma

1. Liver trauma
    (1) Mechanisms of injury and presentation
    (2) Diagnosis and classification of liver lacerations
    (3) Management
        - Angiography and embolization
        - Liver parenchyma haemostasis techniques
        - Total vascular exclusion with or without IVC shunt or veno-venous bypass for retrohepatic IVC and/or hepatic vein injuries
        - Resection
    (4) Complications: diagnosis and management
2. Biliary tract and portal structures
    (1) Mechanisms of injury and presentation
        1. "External" trauma
        2. Operative injury during cholecystectomy
    (2) Investigation, diagnosis and classification of bile duct injuries: Identification of associated injuries
    (3) Management
        (a) Timing and role of ERCP + stent and PTBD
        (b) Principles and techniques of biliary reconstruction
    (4) Complications: diagnosis and management
3. Pancreatic and duodenal trauma
    (1) Mechanisms of injury and presentation

(2) Investigation, diagnosis
(a) Identification of pancreatic duct disruption
(b) Identification of duodenal injury
(3) Management
(a) Indications for pancreatic resection
(b) Techniques for repair of duodenal injuries
(4) Complications: diagnosis and management

5.14 Transplantation

a. Organ procurement

- Brain death and donor management
- Deceased donor hepatectomy and pancreatectomy
- Living donor assessment
  (a) Living donor left or right hepatectomy
- Organ preservation: Principles and application

b. Transplantation

(1) Indications for liver transplantation
(a) Acute and chronic liver failure
(b) Hepatocellular carcinoma and other liver tumours
(c) Childs' and MELD scores and organ allocation
(2) Liver
(a) Transplant hepatectomy
(b) Liver transplant techniques
(3) Pancreas
(a) Back bench reconstruction
(b) Pancreas transplant
(4) Immunosuppression: Drugs, mechanisms of action, toxicities and combination therapy
(5) Complications of transplantation (a) Surgical (b) Infectious (c) Immunologic

5.15 Miscellaneous

- Variceal Upper Gastrointestinal Bleeding Management of Nonvariceal Hemorrhage
- Approach to the Management of Lower Gastrointestinal Hemorrhage
- Bariatric and Metabolic Surgery
- Robotics in Gastrointestinal Surgery
- Tumor Markers in Gastrointestinal Malignancy Chylous Ascites
- Acute Postoperative Pain and its Management in Major Abdominal Surgeries
- Telemedicine: Principles and the Surgery for Portal Hypertension
- System based approach and
- Role of Disease Management Groups (DMG) or Multi-Disciplinary Teams (MDT) for GI Oncology and Chronic GI disorders

5.16 General

1. Approach to a Patient of Digestive Disease
2. Gastrointestinal Imaging

3. Infections and Antibiotics in Gastrointestinal Surgery, Response Syndrome (SIRS), multiple organ dysfunction syndrome (MODS), immunology in relation to transplantation and rejection, intensive care and respiratory support
4. Nuclear Medicine Imaging in Gastrointestinal Diseases and GI Oncology
5. Radiation Therapy
6. Minimal Access Surgery in GI Surgery and GI Oncology
7. Chemotherapy Principles and Techniques for Gastrointestinal Cancers
8. Nutritional Support to Hospitalized Patients, Surgical nutrition- parenteral and enteral, iatrogenic complications of surgery like enterocutaneous fistulae, biliary strictures, intrabdominal sepsis/collections, AIDS, hepatitis and surgeons, renal failure, shock, disorders of coagulation, Surgery for morbid obesity
9. Research Methodology, Data Science Management and Statistics for Surgeons
10. Interventional Radiology of the Gastrointestinal Tract and Hepatobiliary System
11. Tumour genetics- oncogenes, tumor markers, Systemic Inflammatory
12. Biostatistics, Data management, Research Methodology and Clinical Epidemiology
13. Ethics
14. Medico legal aspects relevant to the discipline
15. Health Policy issues as may be applicable to the discipline

6. TEACHING AND LEARNING PROGRAM

Teaching programs will need to be held on all working days. (at least one hour per day)

Activities
Journal Club
Didactic lectures
Seminars/ Webinars
Hospital (Grand Rounds/Clinical meeting/Audit meet)
Clinical Case Presentation/ presentation to multidisciplinary tumour boards

6.1 *TEACHING AND LEARNING METHODS*

Post graduate teaching programme

Teaching methodology

General principles

Acquisition of practical competencies being the keystone of post graduate medical education, PG training should be skills oriented. Learning in PG program should be essentially self-directed and primarily emanating from clinical and academic work. The formal sessions are merely meant to supplement this core effort.

Teaching Methodology

The post graduate student should be given the responsibility of managing and caring for patients in a gradual manner under supervision.

Formal teaching sessions

This should include regular bedside case presentations and demonstrations, didactic lectures, seminars/Webinars, journal clubs, clinical meetings, and combined conferences with allied departments, Audit meet, clinical case presentation etc. as per sample schedule given below:

Didactic Lectures

In addition, 10 lectures per year covering recent advances in all aspects of gastrointestinal diseases with particular emphasis on their surgical and medical management would be taken by faculty. All post graduate students will be required to attend these lectures. The students are also required to attend short term basic and clinical courses on:

- Bio-statistics,
- Research methodology,
- Laboratory medicine techniques/courses relevant to management of gastrointestinal diseases,
- Use of computers/ data science management in medicine,
- Bioethics, ethical issues involved in management of gastrointestinal diseases
- hospital waste management,
- health economics.

- In addition, student should attend accredited scientific meetings (CME, symposia, and conferences) once or twice a year.

6.1. The M.Ch. Surgical Gastroenterology training will include two main arms:

6.1.1. Formal training and learning
6.1.2. Experiential learning

6.1.1. Formal training and learning will include:

1. Clinical GI & HPB surgery (including history taking, physical examination, diagnosis, selection and planning of investigations and management).
2. Essentials of gastroenterology.
3. Basic medical science applicable to GI & HPB surgery.

4. Principles and interpretation of relevant investigations.
5. Performance of common GI & HPB operations.
6. Knowledge of history and recent advances in GI & HPB surgery.
7. Preparation of scientific papers for publication and presentation in conferences, statistics and research methodology.
8. Familiarity with the principles and practice of Evidence Based Medicine.
9. Behavioral and ethical skills training.

The modalities for formal training will be as follows:

1. **Seminars/ Webinars:** To be held once a week and presented by the trainee under supervision of teaching faculty.

2. **Journal Clubs:** To be held once a week under supervision of teaching faculty. It should include discussion on recent articles, which relate to various topics in HPB surgery**.**

3. **Treatment Planning Sessions:** The trainee is to discuss the planning of a given patient who is being worked up for surgery. The idea of this academic exercise is to familiarize the trainee with the objectives of planning in a given patient through a group discussion/ multidisciplinary tumour boards based on evidence-based medicine.

4. **Clinical grand rounds:** A clinical grand round, involving presentation of unusual and difficult cases, to be done by a resident, once a week, in the presence of all the clinical staff belonging to the department of Surgical Gastroenterology. The exercise is to develop the clinical acumen of the trainee.

5. **Teaching and training responsibilities (Pedagogy skills):** A final year M.Ch. trainee should be entrusted with the responsibilities of teaching post-graduate students of General Surgery and Surgical gastroenterology.

6. **Attending CME (Mandatory):** The trainee must attend one accredited national CME/conference of GI & HPB surgery per year, during the second and third year of the training period.

7. **Research Publication (Research skills):** The trainee is to be encouraged to publish clinical or original research material in scientific journals. This is to be done under the direct supervision of the supervisor or his associate(s). Through this exercise the trainee would learn how to collect and analyze data, make observations in a scientific manner, and use appropriate statistical methodology. The trainee would learn the art of putting the outcome of observations and results in an appropriate format of a scientific paper that is relevant to a particular journal.

8. **Training in research methodology:** All M.Ch. trainees must complete research projects as per requirement of concerned universities, under the supervision of a principal supervisor and appropriate number of co-supervisors which would enable the trainee to attain proficiency in collecting clinical / experimental data and analyze them

in a scientific way using appropriate statistical methods. The purpose of the exercise is imparting proficiency to the trainee in research methodology. This would be a mandatory component of training**.**

9. **Lecture/discussion:** Lectures on newer topics by faculty, in place of seminar, as per need.

10. **Case presentation**: Post graduate students will present a clinical case for discussion before a faculty and discuss the management.

11. **Radiology conference** should be held once a week in which the radiological features of various cases are discussed.

12. **Surgico-pathological conference**: Special emphasis is made on the surgical pathology and the radiological aspect of the case in the Pathology department.

13. Training / experience in Liver Transplant Programme

    Each PG student is expected to be conversant with the Departmental protocols (viz. recipient selection and workup, pre-transplant evaluation, Indian brain death law, brain dead donor management - before and during retrieval, donor harvesting procedures, recipient management - operative and post-transplant care and follow up).

14. Departments of Surgical Gastroenterology should have facility for organ transplantation. However in the transition period, if department does not have such facility, trainee must be posted to a transplant centre for a period of 3 months.

6.1.2. Experiential learning

The training should consist of a programme that provides learning experience to the trainees by being posted in routine and emergency wards, outpatient departments (OPD), and operation theatres (OT). The following are the various areas of patient care and management during the M.Ch. training period:

1. **Emergency postings:** All these are done under direct supervision. The clinical acumen of the trainees and their ability and promptness to deal with emergencies is well developed during this posting. These would include:

    a. Resuscitation of emergency patients.
    b. Initial assessment and prioritization of the problems.
    c. Planning appropriate investigations.
    d. Initiating treatment as per management plan.
    e. Liaising with ancillary departments for planning further work up and/or management

2. **Routine postings:** In this posting, the candidate is posted in various subunits of the Department of Surgical Gastroenterology in the form of regular postings, namely main Surgical Gastroenterology ward, Surgical Gastroenterology operation theatre, routine Surgical Gastroenterology OPD.

3. **Clinical Postings:** In addition to posting to ward, OPD, operation theatre, emergency and investigative facilities of GI & HPB Surgery, it is desirable to rotate the trainees to various allied/ancillary disciplines including medical gastroenterology, hepatology, interventional radiology, pathology, etc.

4. **Administrative experience:** The senior-most trainee should be entrusted with administrative responsibilities including academic programme, patient management, functioning of the ward and outpatient department. These may include:

    1. Admission of patients.
    2. Preparing the operation theatre lists.
    3. Improving the functioning in the ward through the supervisor.
    4. Preparing list of topics for teaching of junior trainees posted in the department.
    5. Organizing the posting of trainees in various work stations of the department as per the demand of the situation

5. **Log Book**

    The trainees must maintain a log book of the work carried out by them and the training program undergone during the period of training including details of surgical operations assisted or done independently. The log book should be checked and assessed periodically by the faculty members imparting the training.

During the training programme, patient safety is of paramount importance; therefore, skills are to be learnt initially on the models, later to be performed under supervision followed by performing independently. For this purpose, provision of skills laboratories in medical colleges is mandatory.

7. ASSESSMENT

A. FORMATIVE ASSESSMENT during the training includes:

General Principles
Assessment

• Personal attributes	Ongoing after each clinical posting
• Clinical skills and performance	-do-
• Academic activities	-do-
• Theory assessment	End of 1-, 2- and at 2 years 9 months
• Practical assessment	-do-

Clinical skills and performance, academic performance and personal attributes shall be graded on a scale of 1 to 5 (5 being the highest). The academic presentations shall be graded at the time of presentation by the consultant in-charge. Evaluation on clinical skills and personal attributes others shall be done by the unit/department in-charge at the end of every semester.

The student to be assessed periodically as per categories listed in postgraduate student appraisal form (Annexure I).

B. Summative assessment:

The M.Ch. examination shall be in two parts:

1. **Theory**: There shall be four theory papers as follows:

   Paper I: Basic Sciences as applied to Surgical Gastroenterology

   Paper II: Clinical and operative Surgical Gastroenterology

   Paper III: Surgical Gastroenterology including Transplantation and Minimal access.

   Paper IV: Recent advances in Surgical Gastroenterology

   The theory examination shall be held in advance before the clinical and practical examination, so that the answer books can be assessed and evaluated before the commencement of the clinical/practical/oral examination. The post graduate students for M.Ch in Surgical Gastroenterology will be examined also in surgical procedures.

2. **Practical**: The practical examination should consist of the following and should be spread over two days, if the number of candidates appearing is more than one.

   1. Four cases from various sections of Surgical Gastroenterology: History taking, physical examination, interpretation of clinical findings, differential diagnosis, investigations, prognosis and management.
   2. Ward rounds comprising of discussion of practical problems in the management of patients undergoing Surgical Gastroenterology.
   3. Viva-voce examination
      - Instruments
      - Radiology
      - Surgical Pathology
      - Videos
      - Logbook

3. Theory and Practical examination will be conducted as per University guidelines.

Other recommendations:

1. Systematic and periodic formative assessment should be done every 6 months and feedback should be given to trainee.

RECOMMENDED TEXT BOOKS AND JOURNALS

A. BOOKS (latest edition)

- Blumgart L.H. : Surgery of the Liver, Pancreas and Biliary Tract
- Bockus H.L. : Gastroenterology
- Cotton and Williams : Practical Gastroenterological Endoscopy
- Cuschieri and Berci : Laparoscopic Biliary Surgery
- DeVita, Lawrence, and Rosenberg's Cancer: Principles and Practices of Oncology
- Goligher J.C.: Surgery of the Anus, Rectum and Colon
- Haribhakti S Surgical Gastroenterology 3rd Edition.
- Keighley M.R.B.: Surgery of the Anus, Rectum and Colon
- Maingot's Abdominal Operations
- Michael Trede : Surgery of the Pancreas
- Mishra PK Textbook of Surgical Gastroenterology (2 Volumes)
- Nyhus, Baker and Fischer : Mastery of Surgery
- Rob and Smith's Operative Surgery
- Sabiston Textbook of Surgery- The Biological Basis of Modern Surgical Practice
- Sherlock and Dooley: Diseases of the Liver and Biliary System
- Zuidema and Shackelford :Shackelford's Surgery of the Alimentary Tract

B. JOURNALS

- Alimentary Pharmacology and Therapeutics
- American Journal of Gastroenterology
- Annals of Surgery
- BMC Surgery
- British Journal of Surgery
- Clinical Gastroenterology and Hepatology
- Current Problems in Surgery

- Current Opinion in Gastroenterology
- Digestive Surgery
- Disease of Oesophagus
- Diseases of Colon and Rectum
- Gastroenterology
- GI Surgery Annual
- Gut
- Hepatology
- JAMA Surgery
- Lancet
- Liver Transplantation
- New England Journal of Medicine
- Recent Advances in Surgery: UK and Indian Editions
- Surgery Today
- Transplantation
- Tropical Gastroenterology
- Journal of Gastrointestinal Surgery

C. WEB RESOURCES: These could include UpToDate, Clinical Keys, etc.

Annexure I

Postgraduate Students Appraisal Form

Clinical Disciplines

Name of the Department/Unit :

Name of the PG Student :

Period of Training : FROM……TO……

Sr. No.	PARTICULARS	Not Satisfactory	Satisfactory	More Than Satisfactory	Remarks
		1 2 3	4 5 6	7 8 9	
1.	Journal based / recent advances learning				
2.	Patient based /Laboratory or Skill based learning				
3.	Self directed learning and teaching				
4.	Departmental and interdepartmental learning activity				
5.	External and Outreach Activities / CMEs				
6.	Thesis / Research work				
7.	Log Book Maintenance				

Publications Yes/ No

Remarks*_____

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***REMARKS: Any significant positive or negative attributes of a postgraduate student to be mentioned. For score less than 4 in any category, remediation must be suggested. Individual feedback to postgraduate student is strongly recommended.**

SIGNATURE OF ASSESSEE SIGNATURE OF CONSULTANT SIGNATURE OF HOD