The Fellowship Council
ADVANCED GI SURGERY CURRICULUM FOR MINIMALLY INVASIVE SURGERY

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1. Introduction

While general surgical training now requires basic skills in minimally invasive surgery, advanced training is usually required to achieve expertise in not only the technical aspects of performing minimally invasive surgery, but also an understanding of how minimally invasive surgery is used for the global care of patients with disorders of the GI tract, other intraabdominal organs, abdominal wall, and retroperitoneum.

a. The purpose of Fellowship education in Minimally Invasive Surgery is to provide a structured educational and training experience necessary to achieve expertise in minimally invasive surgery techniques relating to advanced GI surgery.
b. This curriculum provides
    i. Minimally Invasive Surgery Program Directors with a framework for instruction and evaluation of fellows
    ii. Fellows with a guide to the study of Minimally Invasive Surgery and defines the essential areas of knowledge and technical skills that need to be mastered.
    iii. An overview of the significant areas of focus within the discipline of minimally invasive surgery. This document acknowledges the variety and different emphases which may exist between individual programs, and describes the concepts which are deemed essential in the curriculum for each.

2. Curriculum Structure

c. This Curriculum for Minimally Invasive Surgery Fellowship should be considered within the broader context of the Core Curriculum for Advanced GI Surgery Fellowship. This document, as produced and maintained by The Fellowship Council details the core requirements common to all Fellowships in Advanced GI Surgery, including those denoted as providing advanced training in:
    i. Minimally Invasive Surgery (MIS) (SAGES)
    ii. Bariatric Surgery (ASBMS)
    iii. Hepato-pancreatic & biliary surgery (AHPBA)
    iv. Flexible endoscopy (SAGES)
    v. GI Surgery (SSAT)
d. It is intended that each of the respective National Societies will be responsible for establishing and maintaining a Curriculum that describes the specific goals, and detailed objectives that are relevant to their sub-specialty Fellowship, and that these Curricula be included in the Core Curriculum for Advanced GI Surgery Fellowship.
e. The Core Curriculum for Advanced GI Surgery Fellowship describes the following goals and objectives of the core competencies that are common to and required by all Fellowships in Advanced GI Surgery including:
    i. Patient care, including minimum laparoscopic surgical skills
    ii. Medical knowledge
    iii. Practice-based learning and improvement
    iv. Interpersonal and communication skills

v. Professionalism
vi. Systems based practice

These are also fundamental requirements of this Curriculum for Minimally Invasive Surgery Fellowship. The present document will describe the distinct Medical Knowledge and Technical Skills required by a Fellow to become an expert in Minimally Invasive Surgery.

f. This Curriculum for Minimally Invasive Surgery Fellowship has been approved by the Executive Committee of SAGES.

3. Overview of the Curriculum for Minimally Invasive Surgery Fellowship

At the conclusion of the Fellowship in Minimally Invasive Surgery, the Fellow should be able to provide comprehensive, state-of-the-art medical & surgical care to patients with surgical diseases approachable through minimal access techniques. This will include the abilities to investigate, diagnose, recommend appropriate treatment options, perform the operative procedures and provide the pre-, peri-, and post-operative care. To achieve this goal, this Curriculum provides a guide to the topics for study, and the knowledge and skills required to become a Minimally Invasive Surgeon.

This National Curriculum consists of 7 Major Units, some with Subunits:

- Unit 1- Advanced Laparoscopic Skills
- Unit 2- Foregut
  - A. Esophagus
  - B. Stomach and Duodenum
- Unit 3- Midgut
- Unit 4- Hindgut
  - A. Appendix
  - B. Large intestine and Rectum
- Unit 5- Solid Organ
  - A. Adrenal Gland
  - B. Pancreas
  - C. Kidney
  - D. Spleen
- Unit 6- Abdominal Wall and Retroperitoneum
- Unit 7- Hepatobiliary System

Each Unit or Sub-unit is organized into 3 Sections:

1. Objectives: description of the topics the Fellow must understand and the specific knowledge to be acquired.
2. Content: description of the specific areas of study necessary to achieve the unit objectives
3. Clinical Skills: description of the clinical activities and technical skills that are to be mastered

Unit 1 – Advanced Laparoscopic Skills

Objectives

Upon completion of this unit the fellow will be able to understand and describe the following:

1. Physiology of pneumoperitoneum.
2. Proper selection and placement of trocars in a safe and effective manner.
3. Proper positioning of patients for a given procedure with emphasis on safety and protection of patient and personnel.
4. Proper placement of monitors and personnel to optimize operative approach.
5. Proper choice of instrumentation, equipment, and energy sources.
6. Trouble shoot MIS equipment including monitors, insufflation, and recording components.
7. Safe use of Energy sources with advantages and limitations of each.

Content

1. Physiology of Pneumoperitoneum- describe the effect on the following:
    a. Renal function
    b. Cardiovascular function
    c. Pulmonary function
    d. Abdominal Wall and Diaphragm
2. Laparoscopic Equipment
    a. Monitor
    b. Insufflator
    c. Light Sources
    d. Camera
    e. Operating Table- standard, split leg
    f. Trocar choices- bladed, bladeless, optical
3. Energy Sources
    a. Ultrasonic dissector
    b. Monopolar cautery
    c. Bipolar cautery

Clinical Skills

1. Demonstrate the following:
    a. Laparoscopic exposure of all intraabdominal areas, including use of retractors.
    b. Proper tissue handling and two handed surgical technique
    c. Intracorporeal and extracorporeal laparoscopic suturing
    d. Endoscopic stapling
    e. Intracorporeal anastomosis- linear and circular
    f. Laparoscopic adhesiolysis
    g. Laparoscopic running of bowel
    h. Placement and fixation of prosthetic materials
    i. Use and interpretation of intraoperative ultrasound
    j. Use and interpretation of intraoperative endoscopy

Unit 2 – Foregut

A. Esophagus

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the esophagus. The fellow will have expertise in the investigation and treatment of esophageal disorders, with a focus on minimally invasive approaches.

2. Content:
    a. Embryology, anatomy, and physiology of the thoracic and abdominal esophagus and the gastroesophageal junction
    b. Physiologic and radiographic tests used in the evaluation and treatment of esophageal disorders
        i. Esophageal manometry
        ii. Barium/Gastrograffin swallow
        iii. Computed tomography
        iv. pH studies- Bravo probe, 24-hour with proximal and distal measurements
    c. Endoscopic procedures
        i. Esophagogastroduodenoscopy
            -Biopsy
            -Dilation
            -Ablative therapy
            -Plication of GE junction
        ii. Endoscopic ultrasound
    d. Achalasia
        i. Epidemiology
        ii. Natural History
        iii. Pathophysiology
        iv. Diagnosis
        v. Treatment
    e. Gastroesophageal reflux disease
        i. Epidemiology
        ii. Pathophysiology
        iii. Complications
        iv. Diagnosis
        v. Treatment
    f. Esophageal Diverticula
        i. Epidemiology
        ii. Pathophysiology
        iii. Diagnosis
        iv. Treatment
    g. Hiatal Hernia
        i. Epidemiology
        ii. Pathophysiology
        iii. Diagnosis
        iv. Treatment
    h. Esophageal Carcinoma
        i. Epidemiology
        ii. Pathophysiology
        iii. Diagnosis
        iv. Treatment
        v. Management

3. Clinical Skills:
    a. Identify and recognize the anatomic structures of the gastroesophageal junction both on imaging and intra-operatively
    b. Understand the salient features of the esophageal physiologic studies and interpret them.
        i. Esophageal manometry
        ii. Barium/Gastrograffin swallow
        iii. Computed tomography
        iv. pH studies- Bravo probe, 24-hour with proximal and distal

measurements
c. Describe the indication for and perform esophagogastroduodenoscopy, with biopsy or ablation where indicated
d. Describe the indication for endoscopic ultrasound and interpret reports.
e. Describe indication, patient selection, and outcomes for endoscopic plication of the gastroesophageal junction. This may include performing the procedure in some programs.
f. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the esophagus:
i. Achalasia
ii. Epiphrenic diverticula
iii. Hiatal hernia
iv. Adenocarcinoma
g. Develop an operative strategy, including port positioning, patient positioning for the following minimally invasive esophageal procedures:
i. Laparoscopic Heller myotomy
ii. Laparoscopic diverticulectomy with or without myotomy
iii. Laparoscopic hiatal hernia repair
iv. Fundoplication
-Nissen fundoplication
-Toupet fundoplication
-Dor fundoplication
-Collis gastroplasty
v. Laparoscopic esophagectomy

B. Stomach and Duodenum

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the stomach and duodenum. The fellow will have expertise in the investigation and treatment of stomach and duodenal disorders, with a focus on minimally invasive approaches.

2. Content
a. Embryology, physiology, and anatomy of the stomach and duodenum
b. Physiologic and radiographic tests used in evaluation of stomach and duodenal disorders.
i. Computed tomography
ii. Magnetic resonance imaging
iii. Upper gastrointestinal series
iv. Gastric emptying study
c. Endoscopic procedures
i. Esophagogastroduodenoscopy
ii. Endoscopic ultrasound
d. Benign gastric disease
i. Peptic ulcer disease
-Epidemiology
-Natural History
-Pathophysiology- including importance of Helicobacter pylori infection
-Diagnosis- including malignant potential
-Treatment- medical and surgical
-Complications- stricture, gastric outlet obstruction
ii. Gastric Polyps
-Classification
-Epidemiology

-Natural History
-Pathophysiology
-Diagnosis
-Treatment- endoscopic, surgical, medical

e. Malignant gastric tumors
i. Carcinoid tumor
-Epidemiology
-Pathophysiology- multiple vs. single
-Diagnosis
-Treatment
-Management- medical and surgical
ii. Adenocarcinoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- adjuvant therapies
iii. Lymphoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- indications for surgery, adjuvant therapies

f. Bariatric procedures
i. Roux-Y Gastric Bypass- open or laparoscopic
ii. Laparoscopic adjustable gastric banding
iii. Duodenal Switch

3. Clinical Skills
a. Identify and recognize the structures associated with the stomach and duodenum with particular attention to blood supply.
b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the stomach and duodenum:
i. Computed tomography
ii. Magnetic resonance imaging
iii. Upper gastrointestinal series
iv. Gastric emptying study
c. Interpret the results of and perform esophagogastroduodenoscopy
d. Interpret the findings of endoscopic ultrasound
e. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the stomach and duodenum:
i. Peptic ulcer disease
ii. Gastric Neoplasms
-Polyps
-Carcinoid
-Adenocarcinoma
-Carcinoid
iii. Morbid Obesity
-Roux-Y Gastric bypass
-Laparoscopic adjustable gastric banding
-Biliopancreatic diversion
f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.
i. Partial Gastrectomy
-Wedge resection

ii. Antrectomy
-Bilroth I reconstruction
-Bilroth II reconstruction
-Roux-Y reconstruction
iii. Total gastrectomy
iv. Vagotomy
-Truncal- transabdominal or transthoracic
-Highly selective
v. Omental Patch for ulcer disease (Graham patch)
vi. Palliative intestinal bypass for unresectable or intractable duodenal or pyloric disease
vii. Bariatric procedures

Unit 3- Midgut

A. Small Intestine

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the small intestine. The fellow will have expertise in the investigation and treatment of small intestinal disorders, with a focus on minimally invasive approaches.

2. Content
a. Embryology, physiology, and anatomy of the small intestine
b. Physiologic and radiographic tests used in evaluation of small intestinal disorders.
i. Computed tomography
ii. Magnetic resonance imaging
iii. Upper gastrointestinal series
iv. Small bowel through
c. Endoscopic procedures
i. Enteroscopy- including intraoperative
ii. Pill camera enteroscopy
d. Benign gastric disease
i. Small bowel obstruction
-Etiology
a. mass
b. hernia
c. adhesive disease
--Pathophysiology
-Diagnosis
-Treatment
-Complication
ii. Crohn's Disease
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Treatment- surgical, medical
iii. Meckel's diverticulum
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Indications for resection

iv. Intussusception
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Indications for operation

e. Malignant small intestinal tumors
i. Carcinoid tumor
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- medical and surgical

ii. Adenocarcinoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- adjuvant therapies

iii. Lymphoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- indications for surgery, adjuvant therapies

3. Clinical Skills
a. Identify and recognize the structures associated with the small intestine.
b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the small intestine:
i. Computed tomography
ii. Magnetic resonance imaging
iii. Upper gastrointestinal series
iv. Small bowel through
c. Interpret the results of enteroscopy and pill camera studies
d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the small intestine:
i. Small bowel obstruction
ii. Crohn's disease
iii. Meckel's diverticulum
iv. Intussusception
v. Malignant small intestinal disease
-Polyps
-Adenocarcinoma
-Carcinoid
f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.
i. Laparoscopic small bowel resection with anastomosis
ii. Laparoscopic creation of Roux-Y limb

Unit 4- Hindgut

A. Appendix

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the appendix. The fellow will have expertise in the investigation and treatment of appendiceal disorders, with a focus on minimally invasive approaches.

2. Content
    a. Embryology, physiology, and anatomy of the appendix
    b. Physiologic and radiographic tests used in evaluation of appendiceal disorders.
        i. Computed tomography
    c. Endoscopic procedures
        i. Colonoscopy
    d. Benign appendiceal disease
        i. Appendicitis
            -Etiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Complication
        ii. Crohn's Disease
            -Epidemiology
            -Natural History
            -Pathophysiology
            -Diagnosis
            -Treatment- surgical, medical
    e. Malignant appendiceal tumors
        i. Carcinoid tumor
            -Epidemiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Management- medical and surgical
        ii. Adenocarcinoma
            -Epidemiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Management- adjuvant therapies
        iii. Lymphoma
            -Epidemiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Management- indications for surgery, adjuvant therapies
3. Clinical Skills
    a. Identify and recognize the structures associated with the appendix.
    b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the small intestine:
        i. Computed tomography
    d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the appendix:
        i. Appendicitis
        ii. Crohn's disease
        iv. Malignant appendiceal disease
            -Polyps
            -Adenocarcinoma
            -Carcinoid
    f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.
        i. Laparoscopic appendectomy

ii. Laparoscopic ileocolic resection

B. Large Intestine and Rectum

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the large intestine and rectum. The fellow will have expertise in the investigation and treatment of colorectal disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology, physiology, and anatomy of the large intestine and rectum
b. Physiologic and radiographic tests used in evaluation of colorectal disorders.
i. Computed tomography
ii. Magnetic resonance imaging
iii. Contrast enema- barium or gastrograffin
iv. Defacography
v. Sitz marker study
c. Endoscopic procedures
i. Flexible Sigmoidoscopy
ii. Colonoscopy
iii. Colonoscopic stenting
iv. Endorectal ultrasound
d. Benign colorectal disease
i. Large bowel obstruction
-Etiology
a. Mass
b. Hernia
c. Adhesive disease
d. Diverticular stricture
e. Volvulus
--Pathophysiology
-Diagnosis
-Treatment
ii. Crohn's Disease
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Treatment- surgical, medical
iii. Ulcerative Colitis
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Indications for resection
iv. Volvulus
-Etiology- sigmoid, cecal
-Natural History
-Pathophysiology
-Diagnosis
-Treatment
v. Rectal prolapse
-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis

-Indications for resection

vi. Colorectal polyps

-Epidemiology
-Natural History
-Pathophysiology
-Diagnosis
-Indications for resection

e. Malignant colorectal tumors

i. Carcinoid tumor

-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- medical and surgical

ii. Adenocarcinoma

-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- adjuvant therapies

3. Clinical Skills

a. Identify and recognize the structures associated with the large intestine and rectum.

b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the large intestine:

i. Computed tomography
ii. Magnetic resonance imaging
iii. Contrast enema- barium or gastrograffin
iv. Defacography
v. Sitz marker study

c. Interpret the results of the following endoscopic procedures:

i. Flexible Sigmoidoscopy
ii. Colonoscopy
iii. Colonoscopic stenting
iv. Endorectal ultrasound

c. Perform colonoscopy

d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the large intestine:

i. Large bowel obstruction
ii. Crohn's disease
iii. Ulcerative colitis
iv. Volvulus
v. Rectal Prolapse
vi. Colorectal polyps
vii. Malignant colorectal disease

-Adenocarcinoma
-Carcinoid

f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.

i. Laparoscopic mobilization of the flexures
ii. Laparoscopic partial colectomy with or without anastomosis
iii. Laparoscopic subtotal colectomy
iv. Laparoscopic mobilization of rectum with or without resection

Unit 5- Solid Organ

A. Adrenal Gland

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the adrenal gland. The fellow will have expertise in the investigation and treatment of large intestinal disorders, with a focus on minimally invasive approaches.

2. Content
   a. Embryology, physiology, and anatomy of the adrenal gland with particular attention to blood supply
   b. Physiologic tests used in evaluation of adrenal disorders.
      i. Biochemical studies
      ii. Hormone level studies
      iii. 24 hour urine studies
   c. Radiographic test used in evaluation of adrenal disorders
      i. Computed tomography
      ii. Magnetic resonance imaging
      iii. Selective venous hormonal sampling
      iv. MIBG scan
   d. Adrenal mass
      i. Nonfunctioning adrenal mass/Incidentoloma
      ii. Functioning adrenal mass
         -Addison's Disease
         -Cushing's Disease
         -Gonadotropin secreting tumors
         -Pheochromocytoma
      iii. Etiology
      iv. Pathophysiology
      v. Diagnosis
      vi. Treatment
   e. Malignant adrenal tumors
      i. Metastasis
         -Epidemiology
         -Diagnosis
         -Treatment
         -Management- medical vs. indication for resection
      ii. Adenocarcinoma
         -Epidemiology
         -Pathophysiology
         -Diagnosis
         -Treatment
         -Management- adjuvant therapies
      iii. Pheochromocytoma
         -Epidemiology
         -Pathophysiology
         -Diagnosis
         -Treatment
         -Management

3. Clinical Skills
   a. Identify and recognize the structures associated with the adrenal gland.
   b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the small intestine:
      i. Computed tomography
      ii. Magnetic resonance imaging
      iii. Selective venous hormonal sampling
      iv. MIBG scan

d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the appendix:
    i. Incidentaloma
    ii. Functioning adrenal masses
    iii. Malignant adrenal disease
        -Metastasis
        -Adenocarcinoma
        -Pheochromocytoma
f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection. Particular focus on preoperative preparation for surgery.
    i. Laparoscopic adrenalectomy

B. Pancreas

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the pancreas. The fellow will have expertise in the investigation and treatment of pancreatic disorders, with a focus on minimally invasive approaches.

2. Content
    a. Embryology, physiology, and anatomy of the pancreas with particular attention to other retroperitoneal structures.
    b. Physiologic tests used in evaluation of pancreatic disorders.
        i. Biochemical studies
        ii. Hormone level studies
    c. Radiographic test used in evaluation of pancreatic disorders
        i. Computed tomography
        ii. Magnetic resonance imaging
        iii. Selective venous hormonal sampling
        iv. PET scan
        v. Intraoperative ultrasound
    d. Endoscopic procedures used in evaluation of pancreas
        i. Esophagogastroduodenoscopy
        ii. Endoscopic ultrasound with aspiration, biopsy, or drainage
        iii. ERCP with or without stent
    e. Benign pancreatic disease
        i. Pancreatitis
            -Epidemiology
            -Diagnosis
            -Treatment
            -Management- medical vs. indication for surgery
            -Complications- Bleeding, infection, necrosis, fistula, pseudocyst
        ii. Cystic Lesions- mucinous and serous
            -Epidemiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Management
    f. Malignant pancreatic disease
        i. Adenocarcinoma
            -Epidemiology
            -Pathophysiology
            -Diagnosis
            -Treatment
            -Management- adjuvant therapies

ii. Lymphoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management
iii. Neuroendocrine
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management

3. Clinical Skills

a. Identify and recognize the structures associated with the pancreas.
b. Interpret the significance of the reports and images from the following physiologic studies of the pancreas:
i. Biochemical studies
ii. Hormone level studies
c. Interpret the images and significance of reports from the following radiographic studies of the pancreas:
i. Computed tomography
ii. Magnetic resonance imaging
iii. Selective venous hormonal sampling
iv. PET scan
v. Intraoperative ultrasound
d. Interpret the reports of the following endoscopic evaluations of pancreatic disorders:
i. Esophagogastroduodenoscopy
ii. Endoscopic ultrasound with aspiration, biopsy, or drainage
iii. ERCP with or without stent
d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the pancreas:
i. Pancreatic pseudocyst
ii. Pancreatic necrosis
iii. Cystic lesions of the pancreas
iv. Malignant tumors of the pancreas
-Adenocarcinoma
-Neuroendocrine
f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection. Particular focus on preoperative preparation for surgery.
i. Laparoscopic distal pancreatectomy with or without splenectomy
ii. Laparoscopic enucleation
iii. Laparoscopic intraoperative ultrasound

C. Kidney

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the kidney. The fellow will have expertise in the investigation and treatment of renal disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology, physiology, and anatomy of the kidney with particular attention to other retroperitoneal structures.
b. Physiologic tests used in evaluation of renal disorders.

i. Biochemical studies
ii. Hormone level studies
iii. Urine studies

c. Radiographic test used in evaluation of renal disorders
i. Computed tomography
ii. Magnetic resonance imaging
iii. Renal Scan

d. Benign renal disease
i. Chronic renal Failure
-Epidemiology
-Diagnosis
-Treatment
-Indications for transplantation

f. Malignant renal disease
i. Renal Cell Carcinoma
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- adjuvant therapies

3. Clinical Skills

a. Identify and recognize the structures associated with the kidney.

b. Interpret the significance of the reports and images from the following physiologic studies of the pancreas:
i. Biochemical studies
ii. Hormone level studies
iii. Urine studies

c. Interpret the images and significance of reports from the following radiographic studies of the kidney:
i. Computed tomography
ii. Magnetic resonance imaging
iii. Renal Scan

d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the pancreas:
i. Transplantation for chronic renal disease
ii. Renal cell carcinoma

f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection. Particular focus on preoperative preparation for surgery.
i. Laparoscopic nephrectomy

D. Spleen

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the spleen. The fellow will have expertise in the investigation and treatment of splenic disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology, physiology, and anatomy of the spleen with particular attention to other retroperitoneal structures.

b. Physiologic tests used in evaluation of splenic disorders.
i. Biochemical studies
ii. Hematologic studies

c. Radiographic test used in evaluation of splenic disorders
i. Computed tomography

ii. Magnetic resonance imaging

d. Benign splenic disease

i. Hematologic disorders- ITP, TTP, polycythemia vera

-Epidemiology
-Diagnosis
-Treatment
-Indications for splenic resection

ii. Splenic cysts

-Epidemiology
-Diagnosis
-Treatment
-Indications for splenic resection

f. Malignant splenic disease

i. Lymphoma

-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management- adjuvant therapies

3. Clinical Skills

a. Identify and recognize the structures associated with the spleen.

b. Interpret the images and significance of reports from the following radiographic studies of the spleen:

i. Computed tomography
ii. Magnetic resonance imaging

c. Describe the indications, limitations, options and potential complications of minimally invasive procedures done for the following disorders of the spleen:

i. Hematologic disorders of spleen
ii. Splenic cysts
iii. Lymphoma

f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection. Particular focus on preoperative preparation for surgery.

i. Laparoscopic splenectomy

Unit 7- The Abdominal Wall and Retroperitoneum

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the abdominal wall and retroperitoneum. The fellow will have expertise in the investigation and treatment of abdominal wall disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology and anatomy of the abdominal wall and retroperitoneum.

b. Radiographic test used in evaluation of abdominal wall and retroperitoneal disorders

i. Computed tomography
ii. Magnetic resonance imaging

c. Hernia

i. Inguinal

-Epidemiology
-Diagnosis
-Treatment

ii. Ventral

-Classification- incisional, flank, spigelian
-Epidemiology

-Diagnosis
-Treatment

iii. Graft materials
-Synthetic grafts- gore-tex, polypropylene, polyester
-Biomaterials- cadaver, porcine

d. Spinal Exposure

3. Clinical Skills

a. Identify and recognize the structures associated with the abdominal wall and retroperitoneum.

b. Interpret the images and significance of reports from the following radiographic studies of the abdominal wall and retroperitoneum:

i. Computed tomography
ii. Magnetic resonance imaging

c. Describe the characteristics and indications for use of the following abdominal wall grafts

i. Synthetic mesh- goretex, polypropelene, polyester
ii. Biomaterials- cadaver and porcine grafts

c. Describe the indications, limitations, options and potential complications of minimally invasive procedures done for the following disorders:

i. Inguinal hernia
ii. Ventral hernia
iii. Spinal exposure

f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection. Particular focus on preoperative preparation for surgery.

i. Laparoscopic inguinal hernia repair
-TEP (Totally extraperitoneal hernia repair)
-TAPP (Transabdominal preperitoneal hernia repair)
ii. Laparoscopic ventral hernia repair
iii. Laparoscopic spinal exposure

Unit 8- The Hepatobiliary System

A. Liver

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the liver. The fellow will have expertise in the investigation and treatment of liver disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology, physiology, and anatomy of the liver

b. Physiologic tests used in evaluation of liver disorders.

i. Biochemical studies
ii. Tumor markers

c. Radiographic test used in evaluation of liver disorders

i. Computed tomography
ii. Magnetic resonance imaging
iii. Angiography
iv. PET scanning
v. Ultrasound

d. Liver mass

i. Cystic liver lesions
-Etiology
-Pathophysiology

-Diagnosis
-Treatment

ii. Hemangioma
-Etiology
-Pathophysiology
-Diagnosis
-Treatment

iii. Hepatic adenoma
-Etiology
-Pathophysiology
-Diagnosis
-Treatment
-Indications for resection

iv. Hepatoma
-Etiology
-Pathophysiology
-Diagnosis
-Treatment
-Indications for resection

v. Metastases
-Etiology
-Pathophysiology
-Diagnosis
-Treatment
-Indications for resection

3. Clinical Skills

a. Identify and recognize the structures associated with the liver.

b. Interpret the significance of the reports and images from the following physiologic and radiographic studies of the liver:

i. Computed tomography
ii. Magnetic resonance imaging
iii. PET scan
iv. Angiography

d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the liver:

i. Cystic Lesions
ii. Hemangioma
iii. Hepatic adenoma
iv. Hepatoma
v. Metastasis

f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.

i. Laparoscopic wedge resection
ii. Laparoscopic intraoperative ultrasound of liver

B. Biliary Tree

1. Objectives: Upon completion of this unit, the Fellow will have a comprehensive understanding of the embryology, anatomy, and physiology of the biliary tree. The fellow will have expertise in the investigation and treatment of biliary disorders, with a focus on minimally invasive approaches.

2. Content

a. Embryology, physiology, and anatomy of the biliary tree.

b. Physiologic tests used in evaluation of biliary disorders.

i. Biochemical studies

ii. Tumor markers
c. Radiographic test used in evaluation of biliary disorders
i. Computed tomography
ii. Magnetic resonance imaging/MRCP
iii. HIDA scan
iv. Percutaneous cholangiography
d. Endoscopic procedures used in evaluation of the biliary tree
i. ERCP
e. Biliary disease
i. Cholelithiasis
-Epidemiology
-Diagnosis
-Treatment
-Management- medical vs. indication for surgery
-Complications- cholecystitis, choledocholithiasis, gallstone pancreatitis
ii. Gallbladder polyp
-Epidemiology
-Pathophysiology
-Diagnosis
-Treatment
-Management
iii. Biliary stricture
-Epidemiology
-Pathophysiology- primary or secondary
-Diagnosis
-Treatment
-Management

3. Clinical Skills
a. Identify and recognize the structures associated with the biliary tree.
b. Interpret the significance of the reports from the following physiologic studies of the liver:
i. Biochemical studies
ii. Tumor markers
c. Interpret the images and significance of reports from the following radiographic studies of the liver:
i. Computed tomography
ii. Magnetic resonance imaging
iii. HIDA scan
iv. Percutuaneous cholangiography
d. Interpret the reports of the following endoscopic evaluations of pancreatic disorders:
i. ERCP
d. Describe the indications, options and potential complications of minimally invasive procedures done for the following disorders of the pancreas:
i. Cholelithiasis
-Cholecystitis- calculous and acalculous
ii. Gallbladder polyp
iii. Biliary stricture
f. Develop an operative strategy and perform the following procedures, including port positioning, patient positioning, and instrument selection.
i. Laparoscopic cholecystectomy
ii. Laparoscopic cholangiogram
iii. Laparoscopic intraoperative ultrasound
iv. Laparoscopic common bile duct exploration

Appendix

While there is general consensus that skill improves with more experience, the minimum number of procedures to attain competence in Minimally Invasive Surgery procedures remains unclear. Currently the Fellowship Council Accreditation Committee recommends 150 cases in advanced Minimally Invasive Surgery.