

Post - Doctoral Fellowship Programme in Esophageal Surgery

Syllabus

DURATION OF THE COURSE : ONE YEAR

I Anatomy

II Pathophysiology

III Peri operative Care

Subunit A General Principles

Subunit B Radiology

Subunit C Oncology

IV Clinical

Subunit A Non-neoplastic oesophageal disorders

Subunit B Oesophageal Tumours

V Research and Education

Anatomy

1. Objectives:

(a) Embryology of the development of foregut, dorsal mesogastrium (liver, biliary tract, pancreas and spleen), diaphragm, thoracic structures, oesophagus, azygos system, thoracic duct etc) and potential anomalies.

(b) The anatomy of the thorax, oesophagus, diaphragmatic hiatus.

2. Content

2.1 Embryology of the oesophagus, mediastinum, azygos system, chest, oesophagus, stomach, biliary tract, spleen and diaphragm with knowledge of developmental anomalies.

2.2 Endoscopic anatomy of oesophagus

2.2.1 Endoscopic anatomy of the oesophagus:

- Cricopharyngeus, cervical oesophagus landmark
- Atrial and aortic arch relationships

- Squamo-columnar junction
- Lower oesophageal sphincter

2.3 Anatomy of oesophagus

2.3.1 Anatomy and relationships of the cervical and thoracic oesophagus

- Relationships to mediastinal structures including recurrent laryngeal nerves, azygos veins, heart, great vessels, bronchi and thoracic duct.

2.3.2 Lymphatic drainage of oesophagus

2.3.3 Neural innervation of oesophagus

2.3.4 Lower oesophageal sphincter

- Embryology and composition of the diaphragm

Anatomy and relationships of the diaphragmatic hiatus

- Knowledge of the attachments of the diaphragm
- Intrinsic anatomy of the sphincter mechanism

2.3.5 Histological Structure

- Microscopic anatomy of oesophageal wall
- Correlations with endoscopic ultrasound

Pathophysiology

1. Objectives:

1.1 Have a thorough knowledge and understanding of the normal physiology of the oesophagus.

1.2 Have a thorough knowledge of relevant investigations including interpretation of manometry, pH profile and gastro-oesophageal motility and its correlation with the clinical situation.

1.3 A thorough knowledge of the underlying aetiology, pathogenesis and natural history of pathological conditions of the oesophagus, stomach, duodenum and spleen.

2. Content

2.1 Physiology of the Oesophagus

2.1.1 Cricopharyngeal function

2.1.2 Peristalsis

2.1.3 Lower Oesophageal Sphincter Physiology

2.1.4 Epithelial physiology (squamous, gastric, junctional epithelium)

2.1.5 Oesophageal motility

2.1.6 Oesophageal epithelium and the transitional zone

2.1.7 Factors in the production of oesophageal pain

2.2 Interpretation of Normal Manometry

2.2.1 Resting pressure of LOS

2.2.2 Factors in relaxation

2.2.3 Neurohormonal control

2.3 Interpretation of Normal 24 hour pH studies

2.3.1 The normal range

2.3.2 Correlation

2.4 Pathology of the Oesophagus

Non neoplastic disorders

2.4.1 Oesophageal Infections

- Viral epidemiology, molecular aspects of carcinogenesis, mechanisms of chronic inflammation, serological markers of disease activity prognosis and complications.
- Pyogenic and fungal infections:
classification, incidence, microbiology and pathogenesis of bacterial abscess, risk factors and natural history.
- Amoebiasis and other parasitic infestations.

2.4.2 Reflux oesophagitis

- Aetiology and pathophysiology, complications and prognosis
- Barrett's epithelium
- Classifications

2.4.3 Caustic and acid ingestion

2.4.4 Motility disorders

- Achalasia
- Primary spasm
- Diabetes
- Scleroderma
- Involvement in neurological disorders

2.4.5 Trauma : (blunt and penetrating)

Classification and mechanisms of injury, pathophysiology and complications

- Foreign body
- Iatrogenic perforation
- Boerhaave's syndrome

- Aetiology and pathophysiology

Neoplasms of the Oesophagus

This section implies a knowledge of the basic pathophysiology of neoplasia: This includes mechanisms of carcinogenesis, genetic alterations, mechanisms of chronic inflammation and principles of tumour biology including the metastatic process.

2.4.6 Benign neoplasms: Classification, histology, aetiology and pathogenesis natural history

- Leiomyoma
- GIST
- Lipoma
- Other benign lesions

2.4.7 Primary malignancies

- Adenocarcinoma oesophagus

Epidemiology and risk factors, staging, pathology and pathogenesis, complications and natural history

- SCC oesophagus
- Epidemiology and risk factors, staging, pathology and pathogenesis, complications and natural history

2.4.8 Secondary malignancies. Staging, pathogenesis, prognostic variables including molecular markers, natural history.

- Melanoma
- Neuroendocrine
- Other secondaries

Peri-operative Care

This module will consist of 3 subunits. These include:

- (a) General principles in the perioperative care of patients with esophageal disorders
- (b) Principles of Imaging
- (c) Principles of Oncology.

Subunit I

General Principles

Objectives

During this module the fellow should learn the following concepts

1. Demonstrate the ability to manage the peri-operative assessment and complications of patients with esophageal disorders
2. Develop a detailed peri-operative and operative strategy for esophageal resections based on preoperative assessment and imaging of the patient with esophageal disease.
3. Assess the overall risk of surgery by recognizing the implications of abnormalities

Content

1.1 Demonstrate a detailed knowledge of the impact of co-morbidities and other risk actors on the impact of management of esophageal disease.

1.1.1 Evaluation of the high-risk patient in esophageal Surgery - correlation Of ASA and APACHE scores with operative morbidity and mortality.

1.1.2 Prognostic effect of poor nutritional state (depletion and obesity) on peri-operative morbidity and measures to minimise these effects.

1.1.3 The impact of respiratory disease on gastro-oesophageal surgery and strategies to minimise these effects.

Disorders of coagulation and management.

Minimising the impact of diabetes and cardio-respiratory disorders.

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1.2 Peri operative complications and critical care management in patients with complex esophageal disorders including

1.2.1 Preoperative assessment of respiratory function prior to surgery including

- History
- Lung function tests

1.2.2 Prophylaxis against common complications

- Understanding of DVT prophylaxis and treatment
- Measures to prevent sepsis

1.2.4 Detailed operative plan based on preoperative Imaging

1.3 Management of complications

1.3.1 Gastro paresis

1.3.2 Anastomotic leak (thoracic and intra-abdominal)

1.3.3 Bleeding and coagulation disorders

1.3.4 Recurrent laryngeal nerve palsy

1.3.3 Thoracic duct and lymphatic leaks

1.3.4 Bronchopleural fistula

1.4 Sepsis

1.4.1 Acquire a detailed knowledge of the various syndrome of systemic sepsis and its management including multi organ failure and supportive therapy.

1.4.2 Management of abdominal collections and abscesses, radiological percutaneous techniques for abdominal collections: indications and outcomes.

1.4.3 Approaches to peritoneal sepsis.

1.4.4 Knowledge of the spectrum of organisms involved in sepsis associated with Upper GI diseases.

1.4.5 Knowledge of common antibiotics used in the treatment of Upper GI sepsis including indications and toxicity.

1.4.6 Gut enteric organisms - translocation and pathogenesis in sepsis

1.5 Nutrition

1.5.1 Nutritional assessment: identification of malnutrition and nutritional risk factors

1.5.2 Specific metabolic and nutritional problems associated with Upper GI disease: dysphagia, gastric outlet obstruction

1.5.3 alterations in metabolism following major oesophago-gastric resection.

1.5.4 Indications and timing for peri-operative nutrition enteral or parenteral. methods of administration: jejunostomy, naso-enteric, parenteral.

1.5.5 The role of preoperative nutrition in malignancy, severe achalasia, caustic injury.

Principles of dietary immunomodulation.

Basic understanding of calorific requirements and protocols in nutrition.

1.5.6 Complications of parenteral and enteral nutrition.

Subunit II

IMAGING

1. Objectives

Upon completion of this unit, the Fellow will:

- 1.1 Understand the physics and technology of Ultrasound and Doppler, CT Scan, MRI Scan, PET Scan and other nuclear imaging procedures
- 1.2 Understand the relative advantages, disadvantages and indications of each modality.
- 1.3 Interpret the detailed information provided by the imaging of the Oesophagus to the clinical situation.
- 1.4 Understand the role and application of endoscopic ultrasound in upper GI surgery

2. Content

- 2.1 The applied physics and technology of Ultrasound, Doppler, CT scan, MRI scan, PET Scan, radionuclide Liver Spleen Scan and other nuclear medicine imaging procedures.
- 2.2 The interpretation of images and application to clinical investigation.
- 2.3 Imaging algorithm for the investigation of oesophageal disorders including:
 - 2.3.1 Malignancy of the oesophagus
 - 2.3.2 Benign neoplasms oesophagus
 - 2.3.3 Reflux disease and hiatus hernia
 - 2.3.4 Motility disorders particularly achalasia

3. Clinical Skills

- 3.1 Apply the understanding of the relative merits of each imaging modality to efficiently investigate and stage lesions of the oesophagus.
- 3.2 Interpret images to correctly identify normal structure, anomalies and pathological abnormalities.
- 3.3 Integrate the findings of the various images with the clinical situation.
- 3.4 Perform and interpret endoscopic and laparoscopic ultrasound.

Subunit III

ONCOLOGY

Objectives

1.6.1 Understand the mechanisms of action of the classes of chemotherapeutic agents currently available for esophageal malignancies.

1.6.2 Understand the physics, mechanism of action and technology of radiation therapy.

1.6.3 Apply this understanding to the multidisciplinary management of esophageal malignancies.

1.6.4 *Chemotherapy*

Knowledge should include:

- (1) Classes of drugs
- (2) Mechanisms of action
- (3) Toxicities
- (4) Combination therapy and available protocols

1.6.5 *Radiation therapy*

- (1) Applied physics and technology
- (2) Mechanism of action
- (3) Toxicity
- (4) Combination protocols with chemotherapy

1.6.6 *Multidisciplinary management*

1.6.7 *Relative roles of surgery, ablation, chemotherapy and radiation therapy as:*

- (a) Definitive management
- (b) Neo- and adjuvant therapy
- (c) Therapy for recurrent disease
- (d) Palliative therapy

1.6.8 *Clinical Skills*

- (a) Apply knowledge of tumour biology, chemotherapy and radiation therapy to recommend an appropriate treatment strategy for the management of individual Upper GI malignancies.
- (b) Participate regularly in multidisciplinary tumour review conferences.
- (c) Interact with interventional Radiologists, Medical Oncologists, Radiation Oncologists, Oncology Nurses and Allied Health Professionals, Palliative Care Physicians and Nurses.

CLINICAL

Objectives:

Upon completion of this unit the fellow will understand:

- (a) The pathophysiology, presentation and natural history of disorders of the oesophagus.
- (b) The investigative procedures available to efficiently diagnose the disease.
- (c) The treatment options available for the condition and the results, including the risks and benefits of the operative and non-operative procedures.
- (d) The pre, intra- and postoperative management, including the management of complications of therapy.

GASTROESOP HAGEAL REFLUX DISEASE (GERD)	Describe and differentiate the clinical symptoms of this condition	Describe and evaluate the management of these conditions.	Endoscopic assessment and Techniques
- Minimal change	Describe the appropriate investigations (gastroscopy, manometry, 24 hr pH, barium swallow)	Indications and options of conservative management, laparoscopic minimally invasive and open surgical techniques.	- Laparoscopic fundoplication
- Ulcerative esophagitis			- Laparoscopic repair hiatus hernia
- Stricture			- Re-operative fundoplication
- Barrett's			- Medical management
- Respiratory	Detailed knowledge of operative and postoperative complications of fundoplication	Describe early and late complications of operative intervention	
	Detailed knowledge of outcomes following various treatment		

	options including QOL		
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HIATUS HERNIAS	Describe the clinical features and various presentations of mechanical complications	Detailed knowledge of the management including abdominal and thoracic approaches versus conservative management.	Laparoscopic trans-abdominal repair.
Para-oesophageal	Determine the optimum imaging techniques.	Detailed knowledge of various surgical techniques.	Open trans-abdominal repair.
traumatic	Describe the acute clinical presentation of this condition.	Detailed knowledge of indications and options of management including immediate surgery.	Revisional surgery
Congenital	Have a detailed knowledge of the optimum imaging techniques in characterising this problem.	Knowledge of complications and outcomes	Materials and techniques of mesh repair.
Hiatus Hernia			
Acute gastric volvulus			

OESOPHAGEAL PERFORATION and FOREIGN BODIES			
Boerhaave's syndrome	Describe the aetiology and mechanism of spontaneous perforation	Principles of non-operative, endoscopic and operative management	Endoscopic Assessment. Conservative Management Surgical Management of acute Perforation.
Iatrogenic perforation	Assess the clinical symptoms and signs of perforation		Endoscopic management.
Foreign bodies	Describe the role of gastroscopy, contrast barium swallow, CXR and CT scan.		Delayed surgical options

OESOPHAGEAL STRICTURES (BENIGN) Peptic and corrosive strictures Schatzki ring and webs	Describe the lesion and aetiology of each type. Assess the clinical Symptoms Describe the role of gastroscopy and barium swallow.	Principles of non-operative, endoscopic and operative management. Management of acute corrosive ingestion	Endoscopic assessment of Stricture. Conservative Management of acute corrosive injury. Surgical Management of acute corrosive injury. Endoscopic dilatation. Delayed surgical options Anti-reflux surgery
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OESOPHAGEAL MOTILITY DISORDERS	Detailed knowledge of clinical presentation, classification and pathophysiological changes.	Appreciation of appropriate options in management of achalasia including myotomy, balloon dilatation, Botox injection.	Endoscopic assessment.
Achalasia			Laparoscopic myotomy with or without fundoplication.
Diffuse spasm			
Non-specific			Open cricopharyngeal Myotomy
Hypomotility	Optimum imaging, and manometric techniques to define nature of problem.	Appreciation of surgical options (open myotomy versus endoscopic stapled management of pharyngeal pouch.	Endoscopic stapled cricopharyngeal myotomy
Zenker's diverticulum		Role of diverticular resection when present with achalasia.	Epiphrenic diverticulectomy (transabdominal or transthoracic)
Epiphrenic diverticulum		Influence of dysmotility in decision making in GERD	

Subunit B OESOPHAGEAL TUMOURS

BENIGN TUMOURS Leiomyoma GIST Lipoma	Awareness of clinical presentation, natural history Knowledge of imaging modalities to distinguish between malignant and benign tumours of the esophagus	Principles of management including indications expectant, resection and follow up protocols	Endoscopic assessment and diagnosis Endoscopic ultrasound Principles of resection Thorascopic or laparoscopic or open surgical approaches
BARRETT's METAPLASIA High-grade dysplasia Carcinoma-in situ	Appreciates the natural history and has a detailed knowledge of risks of malignant transformation and concomitant invasion	Principles of management: Anti-reflux measures versus ablation Screening issues Follow-up protocols and their merits	Anti-reflux medication Anti-reflux surgery Endomucosal resection HALO RF ablation APC ablation esophagectomy
CARCINOMA THORACIC OESOPHAGUS Adenocarcinoma SCC Neuroendocrine Metastatic Other	Awareness of clinical presentation Knowledge of imaging and other investigations to diagnose and stage disease Complications	General principles of peri-operative management Indications for curative or palliative procedures and likely outcomes	Staging laparoscopy and/or biopsy Esophagectomy – Two, three stage, Open, or total laparoscopic

Carcinoma of oesophagogastric junction Resectable Non-resectable	Clinical presentation Knowledge of radiology, laparoscopy and nuclear tests to assess and stage disease Staging classification complications	The role of chemotherapy or radiotherapy in a palliative, neoadjuvant or adjuvant role Appreciate the management options for cervical, mid-thoracic and distal thoracic carcinoma Follow up protocols General principles of peri-operative management Indications for curative or palliative procedures and likely outcomes. The role of chemotherapy or radiotherapy in a palliative, neoadjuvant	Percutaneous or endoscopic stenting procedures Lymph node clearance Reconstructive techniques Staging laparoscopy and/or biopsy Gastro-Esophagectomy – Open, or total laparoscopic, left thoracic approaches Total gastrectomy with esophagectomy Percutaneous or endoscopic
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		or adjuvant role. Appreciate the management options for cervical, mid-thoracic and distal thoracic carcinoma. Follow up protocols	stenting procedures Lymph node clearance Reconstructive techniques
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