

**THE ASSOCIATION OF UPPER  
GASTROINTESTINAL SURGEONS**

**THE PROVISION OF SERVICES FOR  
UPPER GASTROINTESTINAL SURGERY**

## Introduction

A previous document defining the role of the Association of Upper Gastrointestinal Surgeons was published in 1999 and described the provision of services required for patients with upper gastrointestinal surgical disease (1). Since then there have been many changes in the requirements of patients and surgeons working with these diseases and the opportunities for patients have clearly improved. The provision of upper GI surgery in the UK needs to reflect these changes. In 2001 the Improving Outcomes Guidance for Upper GI Cancers (2) stipulated that all cancer surgery should be undertaken in specialist surgical centres. As a result upper GI surgery has been provided in Units (mainly based in District Hospitals) and Specialist Centres (mainly based in University Teaching Hospitals). At Unit level upper GI surgery includes elective treatment of benign oesophago-gastric and pancreato-biliary conditions, diagnostic workload for malignant conditions and emergency management of non-complex acute gastrointestinal disorders. Specialist Cancer Surgery Centres provide services for major oesophagogastric (OG) and hepato-pancreatic-biliary (HPB) cancer surgery as well as complex tertiary referral benign surgery. The last few years has also seen the development of bariatric surgery for the surgical treatment of morbid obesity. Mainly for logistical reasons bariatric units have tended (but not exclusively) to develop in Cancer Units rather than in Cancer Centres. Upper GI surgery has thus evolved so that as well as general upper GI surgery there are 3 main subspecialties (HPB, OG and bariatric) which cover both the core work of upper GI surgery and the specialist work of cancer, complex benign work and bariatric surgery.

It is intended that this document will be a guide to surgeons, healthcare commissioners and patient representatives so that high quality services can continue to be provided to improve the outcome of patients with these diseases.

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## Section 1      The Nature of Upper Gastrointestinal Disease

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##### Definition

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##### Definition

## **Definition**

Diseases or conditions affecting the oesophagus, stomach, liver, spleen, pancreas, biliary tract and duodenum which are primarily managed by surgeons. The Association of Upper Gastrointestinal Surgeons (AUGIS) is the recognised representative body for Upper Gastrointestinal Surgeons in the UK.

## **The nature of oesophago-gastric (OG) disease**

### **Definition**

Diseases or conditions affecting the oesophagus and stomach which are managed by surgeons.

OG disease can be broadly divided into the following categories:

- Gastro-oesophageal reflux disease (GORD)
- Achalasia and other motility disorders
- Rupture and trauma
- Peptic ulcer disease
- Benign tumours
- Malignant tumours

### **Gastro-oesophageal reflux disease (GORD)**

Symptomatic GORD is the commonest OG disorder encountered in medical practice. A small minority of patients will be referred for investigation and assessment with a view to surgical treatment when lifestyle and medical interventions have been found to be ineffective or poorly tolerated. Surgical therapy involves a combination of hiatal repair and some form of gastric fundoplication. Around 10 in 100,000 people will undergo antireflux surgery.

#### Benign oesophageal stricture

Benign strictures are a complication of GORD in around 10%. Patients present with dysphagia and require investigation by endoscopy. Management may include endoscopic dilatation in addition to acid suppression therapy. A small minority of patients may be considered for antireflux surgery.

#### Para-oesophageal (giant) hiatus hernia

Hiatus hernias are associated with GORD and are repaired as part of an antireflux operation. Large paraoesophageal hiatus hernias may contain most or all of the stomach, as well as small bowel and colon. In addition to presenting with symptoms of GORD patients may present with a variety of non-specific symptoms including vomiting, upper abdominal pain and anaemia. Laparoscopic repair of such hernias requires advanced technical skills (3). Rarely patients present as emergencies with signs of gastric ischaemia due to volvulus, requiring urgent surgical management.

### **Achalasia and other motility disorders**

Achalasia affects 1-3 per 100,000 people. Patients with achalasia present with dysphagia, often with heartburn and odynophagia. Surgical management of achalasia consists of a longitudinal lower oesophageal myotomy (Heller's procedure), usually combined with some form of fundoplication. Surgery may be considered after non-surgical therapies such as botulinum toxin injection and balloon dilation have failed, but increasingly surgery is being performed as a first line therapy (4). Patients suffering from a range of rare primary oesophageal motility disorders such as diffuse oesophageal spasm or secondary disorders such as scleroderma may present with common upper gastrointestinal symptoms requiring investigation and management (2).

### **Rupture and trauma**

#### Spontaneous oesophageal rupture (Boerhaave's syndrome)

Oesophageal rupture secondary to repetitive forceful vomiting carries a high mortality due to mediastinal sepsis. This mechanism accounts for around 15% of oesophageal perforations. Treatment may require urgent thoracotomy for decontamination and debridement of the mediastinum and thoracic cavity.

#### Mallory Weiss tear

Mucosal tears of the lower oesophagus can result in dramatic upper gastrointestinal haemorrhage. The treatment of such injuries however is usually conservative.

#### Iatrogenic, penetrating and blunt trauma

Direct injury of the oesophagus, stomach or duodenum as a result of blunt or penetrating external trauma is rare, accounting for less than 1% of cases of perforation. Blunt trauma is usually associated with multiple injuries of the thorax and abdomen following high energy impact. Iatrogenic perforation of the oesophagus during endoscopy is more common, occurring in 0.01 - 0.05% of endoscopies and accounting for over 80% of perforations. Although management may be conservative, therapeutic options may also include oesophageal stenting, surgical debridement, repair or oesophageal resection (5).

### **Peptic ulcer disease**

Peptic ulcers are present in up to 4% of the adult population. Patients present with common upper gastrointestinal symptoms and are normally diagnosed by endoscopy and treated by acid suppression therapy in combination with eradication of *Helicobacter pylori*. Occasionally peptic ulcers present with complications of perforation or bleeding (6).

#### Gastric ulcer

Benign gastric ulcers must be distinguished from ulcerated gastric carcinoma by histology. Gastric ulcer perforation is rare and results in peritonitis requiring urgent surgical management. Occasionally partial gastric resection is required. Bleeding gastric ulcers are normally treated by endoscopic therapies but occasionally surgical treatment by underrunning, resection or partial gastrectomy is required.

#### Duodenal ulcer

Perforated or bleeding duodenal ulcers requiring urgent surgical intervention are still relatively common. Perforation usually requires direct suture closure often with an

omental patch, whereas bleeding is treated by underrunning. Rarely a more complex procedure such as pyloroplasty will be required.

#### Gastric outlet obstruction

Gastric outlet obstruction due to benign peptic stricture is rare and must be distinguished from malignant obstruction by biopsy and histology. Patients who do not respond to conservative therapy may be treated by balloon dilation of the pylorus. Resistant cases may require pyloroplasty or surgical bypass in the form of gastrojejunostomy, or partial gastric and duodenal resection.

### **Benign tumours**

Management decisions about patients with oesophagogastric neoplasia, included suspected benign tumours, should be made in the context of an upper gastrointestinal cancer multidisciplinary team as described in the Improving Outcomes Guidance document (2).

#### Gastrointestinal stromal tumour (GIST)

Oesophagogastric GISTS are usually asymptomatic small submucosal lesions discovered coincidentally during endoscopy for unrelated symptoms. They may however present with obstructive symptoms or bleeding. There is a relationship between tumour size and malignant potential which may necessitate surgical resection of asymptomatic lesions (7).

#### Adenomas

The majority of gastric polyps are hyperplastic or fundic gland polyps with very little or no malignant potential. Polyps over 1cm in diameter should be biopsied. Neoplastic polyps or adenomas usually occur in the distal stomach and have a significant risk of malignant transformation.

### **Malignant tumours**

All patients are discussed at a specialist OG MDT meeting. Surgical resection in combination with oncological therapies remains the mainstay of treatment for potentially curable oesophagogastric carcinoma. Effective staging protocols and multidisciplinary discussion are mandatory. The models for management of upper GI tumours and the organisation of services are described in the Improving Outcomes Guidance document (2).

#### Oesophageal carcinoma

Carcinoma of the oesophagus affects 16 per 100,000 men and 6 per 100,000 women in the UK (8). Squamous cell carcinoma (SCC) of the oesophagus is decreasing in incidence in the UK and Ireland. The development of improved oncological therapies with outcomes similar to surgical resection has led to a reduction in surgical treatment of SCC. Resection may however form part of the treatment algorithm.

The incidence of oesophageal adenocarcinoma at or near the gastroesophageal junction is increasing rapidly (8). Surgical resection, usually in combination with oncological therapy offers the only hope of cure in a small proportion of patients. Staging protocols usually involve laparoscopy. Resection may require a three phase approach with anastomosis in the neck or a two phase approach with a thoracic

anastomosis. Some centres prefer a single left thoracoabdominal approach and lower tumours may be resected via a purely abdominal approach.

#### Barrett's oesophagus

Barrett's oesophagus is a premalignant condition. However the natural history of progression from non-dysplastic Barrett's mucosa, through dysplasia to invasive malignancy is still poorly understood and the subject of ongoing controversy and debate. The management of patients with non-dysplastic Barrett's oesophagus may include an endoscopic biopsy surveillance program. It is generally agreed that the finding of severe dysplasia within Barrett's oesophagus requires some form of therapy. This may include endoscopic ablative therapies such as radiofrequency ablation, endoscopic mucosal resection, or surgical resection (9).

#### Stomach cancer

Carcinoma of the stomach affects 13 per 100,000 men and 5 per 100,000 women in the UK (8). Gastric adenocarcinoma, other than carcinoma of the gastroesophageal junction, is decreasing in incidence. Surgical resection in the form of radical total or subtotal gastrectomy including locoregional lymph node resection, in combination with chemotherapy, may be curative. Selection of patients suitable for surgical treatment is dependent on accurate staging protocols which include laparoscopy.

#### Gastric lymphoma

The stomach is the commonest site for gastrointestinal lymphoma. Accurate staging and MDT discussion are mandatory. Treatment may involve surgical resection although improving chemotherapeutic regimes have reduced the need for surgical intervention.

## **The nature of hepato-pancreato-biliary (HPB) disease**

### **Definition**

Diseases or conditions affecting the liver, pancreas, biliary tract and duodenum which are primarily managed by surgeons. The Great Britain and Ireland Hepato-Pancreato-Biliary Association, a section of AUGIS) is the recognised representative body for HPB surgeons in the UK.

HPB disease can be broadly divided into the following categories:

- Pancreato-biliary neoplasia
- Pancreatitis
- Benign biliary disease including stone disease
- Liver tumours
- Transplantation
- Trauma

### **Pancreato-biliary neoplasia**

#### **Malignant tumours**

Ductal carcinoma of the pancreas (known as pancreatic cancer) is a relatively common and highly lethal malignant tumour with an annual incidence of 100 patients per million population. Long-term survival is only 1.7% and only 15 - 20% of patients have resectable disease. In addition 35 patients per million population

present annually with related malignant tumours which include tumours of the periampullary region, lower bile duct, duodenum as well as pancreatic cystic tumours (10). These related tumours have a combined resection rate of 40-50%. The overall pancreatic resection rate for neoplasia is therefore approximately 35-40 per million population. Resection rates have doubled in the UK in the last 10 years and are expected to rise further with full implementation of Improving Outcomes Guidance (IOG) (2) and more acceptance of pancreatic resection as a safe procedure in the elderly. The majority of patients with pancreatic cancer, however, do not undergo surgery but usually require medical treatments including endoscopic therapy for relief of jaundice. In addition these patients are often referred for chemotherapy.

#### Benign tumours

The majority of benign tumours of the pancreas are cystic lesions. The incidence of new cystic tumours of the pancreas is 10 – 15 per million population per year. The majority of these are benign lesions such as serous cyst adenomas or have malignant potential such as mucinous cystic neoplasms or intra-ductal papillary mucinous neoplasms (IPMN). Duodenal adenomas may occur as part of familial adenomatous polyposis whereas ampullary and bile duct adenomas are more likely to be sporadic.

### **Pancreatitis**

#### Acute pancreatitis

Acute pancreatitis is an acute inflammatory condition characterised by severe upper abdominal pain and hyperamylasaemia. It varies in incidence between 5-40 per 100,000 population and has an overall mortality of 5%, with 25% of cases fulfilling the criteria of severe pancreatitis (local or systemic complications) which may necessitate admission to the HDU/ITU for supportive care (11). Severe pancreatitis carries a 25% mortality. The most common causes are gallstones or alcohol. Uncommon causes include viral infections, drugs, injury or surgery around the pancreas, parasites, hypercholesterolaemia and hypercalcaemia, pancreas divisum, hereditary pancreatitis and autoimmune pancreatitis. In 10% of cases the cause remains unknown. However, a number of these cases are probably due to tiny gallstones or biliary sludge.

#### Chronic pancreatitis

Chronic pancreatitis is a chronic painful condition which usually starts as recurrent episodes of acute pancreatitis before developing into a chronic condition characterised by pain, weight loss and often diabetes. It affects around 8 per 100,000 population each year in the UK. It is more common in men than women and most commonly occurs in people around 40-50 years. In 70% of cases the cause is alcohol. Other causes include genetic causes, autoimmune disease and malnutrition. In 20% of cases no cause is found.

### **Benign biliary disease including stone disease**

#### Gall stones

Gallstones represent the vast majority of benign biliary disease and are extremely common, affecting up to 25% males and 40% females by age 75 years. Only a

minority of patients with gallstones are symptomatic and treatment, usually in the form of laparoscopic cholecystectomy, is reserved for those patients (100 per 100,000 population) with symptoms. Gallstones present with a whole host of symptomatology including gallbladder disease (acute cholecystitis, biliary colic, mucocele and empyema of the gallbladder, gallbladder perforation) symptoms of choledocholithiasis (including obstructive jaundice and acute pancreatitis) and fistulation of the gallbladder into other organs, most commonly the duodenum which may result in gallstone ileus (small bowel obstruction).

#### Benign biliary stricture

The majority of benign biliary strictures is secondary either to gallstone disease or to complications of gallbladder surgery. A minority of patients with gallstones presents with inflammatory disease of the gallbladder causing a benign stricture at the hilum of the liver or within the common hepatic duct which may be complicated by Mirizzi's syndrome.

Bile duct injury is a potentially serious complication of cholecystectomy which may manifest itself as overt bile duct damage during surgery or may result in the development of jaundice or bile leak following cholecystectomy. The injury may be associated with damage to the portal vein or hepatic artery and in the most serious cases, perfusion of the liver may be affected. Bile leak may also occur from the cystic duct stump. The incidence of bile duct injury in the UK is approximately 2 to 5 cases per 1000 cholecystectomies.

#### Choledochal cyst

Choledochal cyst is a rare condition consisting of a localised or fusiform swelling of the bile duct which may extend into the liver. There are various types and they can be associated with intra-hepatic cysts and can predispose to malignancy. Presentation may be as jaundice or recurrent pancreatitis and treatment is usually surgical by excision of the bile duct and hepaticojejunostomy.

## **Liver tumours**

### Primary liver tumours

#### Hepatocellular Carcinoma:

In the Far East, Hepatocellular carcinoma affects up to 1% of the population. In Europe the annual incidence is only 1-3 per 100,000. The main risk factors for hepatocellular carcinoma are alcohol, hepatitis B and C infection, exposure to aflatoxin and haemochromatosis. In addition when hepatocellular adenomas grow to a size of more than 5 cm there is an increased risk of hepatocellular carcinoma. Surgical resection or transplantation remain the mainstays of treatment.

#### Gall Bladder Cancer

Gall bladder cancer is rare. Approximately 500 people are diagnosed in the UK each year. It is rare in people under 50 and is most often seen in people over the age of 70 and more commonly in women. The cause of most gall bladder cancers is unknown however a number of risk factors have been identified including gall stones and

cholecystitis, gall bladder polyps >10mm, porcelain gall bladder and primary sclerosing cholangitis. Presentation is usually late and surgery the only curative treatment. Gall bladder cancer is staged according to depth of penetration through the wall of the gall bladder, the stage of disease dictating the extent of surgical resection.

#### Bile duct cancer

Only 1,000 people are diagnosed each year in England. Intrahepatic bile duct cancer accounts for 20% cases, distal bile duct cancers 20%, and hilar/Klatskin tumours about 50%. Multifocal cancers affect 5% patients. Risk factors include cholangitis, biliary stones, and parasitic infestation. Surgical resection is the only curative treatment.

#### Secondary liver tumours

Many malignant tumours metastasise to the liver particularly those originating in the abdomen. Some tumours produce small numbers of liver metastases which may be suitable for surgical treatment such as resection or ablation. Colorectal cancer, in particular, commonly gives rise to metastases which are suitable for resection. The majority (60-70%) of patients undergoing liver surgery for malignancy have colorectal liver metastases. With the increases in resection rates due to more effective systemic agents it is expected that 7-8% of colorectal cancer patients would undergo liver resection for metastatic disease which equates to 40 resections per million population per year.

An additional 20 resections per million would be carried out for other indications including primary tumours of the liver making a total of 60 liver resections per million per year, 30 of which would be expected to be 'major' that is 3 segments or more.

### **Disorders of the spleen**

Disorders of the spleen are mainly related to haematological disease, although trauma is a common reason for surgical intervention. Elective splenectomy is now usually carried out laparoscopically.

### **Transplantation of the liver and pancreas**

Liver transplant is carried out in seven UK HPB Units and there is overlap between HPB and transplant surgery. Indications are both acute and chronic liver disease or liver failure including cirrhosis induced by alcohol, autoimmune disease, hepatitis infection, poisons or drugs. Every year an estimated 600 liver transplants are carried out in the UK, the majority of which are cadaveric transplants. Living donor transplants are performed in small numbers. One year survival from liver transplant is around 85% and about 65% of people survive at least five years.

Pancreas transplant is performed less frequently than liver transplant. The main indication is end-stage diabetes. Pancreatic islet transplantation is also an option for these patients.

## **HPB Trauma**

Pancreatic and liver trauma are uncommon in the UK. In the USA liver trauma accounts for 15-20% of blunt abdominal injuries but the international / worldwide incidence of liver trauma is not known. Although blunt liver trauma accounts for 15-20% of abdominal injuries, it is responsible for more than 50% of deaths resulting from blunt abdominal trauma. The mortality rate is higher with blunt abdominal trauma than with penetrating injuries. Gallbladder injury is uncommon, occurring in 2-8% patients with blunt liver trauma. Prior to the availability of CT scanning and ultrasonography, gallbladder injuries were rarely diagnosed before surgery.

In the past, most of these injuries were treated surgically but the surgical literature confirms that as many as 86% of liver injuries have stopped bleeding by the time surgical exploration is performed, and 67% of operations performed for blunt abdominal trauma are non-therapeutic. More recently, due to increased reliance on imaging the vast majority of cases of blunt trauma are now treated conservatively. Use of CT scanning has had a great impact on the treatment of patients with liver trauma resulting in a marked reduction in the number of patients requiring surgery. Almost 80% of adults and 97% of children are now treated conservatively.

Several systems have been devised to classify liver injuries; however, the lack of consistency of scoring severity in organ injury is a problem. The American Association for the Surgery of Trauma (AAST) has developed a system based on the amount of anatomic disruption of an individual organ which includes six grades of trauma based on CT findings.

Pancreatic trauma is uncommon with an incidence of 0.4/100,000 and 3% of abdominal trauma requiring surgery. It is graded 1-4 based on the location and severity of the injury.

## **HPB Disease in Children**

Children only rarely require cholecystectomy for symptomatic gallstones. Complex HPB disease is rare in children that the most significant conditions requiring specialist surgical care are biliary atresia, choledochal cyst, paediatric liver tumours, paediatric pancreatic tumours and hereditary pancreatitis.

## **The nature of severe obesity**

### **Definition**

The UK & Ireland is facing an epidemic of obesity such that these countries are the most obese in Europe. One in 4 of the population is now reported to be obese (BMI>30). The definitions of obesity are as follows:

Overweight = BMI>25

Obese = BMI>30

Severe obesity = BMI >35 plus obesity-related disease

Super obesity = BMI > 50

As the epidemic continues, treating obesity-related disease such as type 2 diabetes, sleep apnoea and hypertension will threaten to bankrupt healthcare resource. Currently the recommended diet and lifestyle changes and the available anti-obesity medication (orlistat) have made little or no difference to the progression of the epidemic. Bariatric surgery is an extremely effective therapy to reduce the impact of the medical complications of obesity.

## **Section 2                    Components of the Upper Gastrointestinal Surgical Service**

Upper gastrointestinal surgery is managed in all acute hospitals in the UK and Ireland. Initially patients may be seen by non-specialist general surgeons but the majority of patients should be referred to a specialist upper GI surgeon as soon as possible. This section of the document describes the services which should be provided within an upper gastrointestinal service.

Patients with suspected OG and HPB malignancy should be referred to the specialist OG or HPB Centres. The essential components of services for the diagnosis and management of oesophagogastric (OG) and hepato-pancreatic-biliary (HPB) malignancy are described in the Improving Outcomes Guidance document (2). These components, as well as those that are necessary for the diagnosis and management of non-neoplastic disease, are described below. The conflict between the centralisation of specialist elective surgery and the need for emergency provision has led to a debate about the “general GI surgeon” (12). The demands of emergency general surgery will require the surgeons who are participating in the general surgery on call rota to have expertise in the management of common oesophagogastric, duodenal and pancreato-biliary emergencies. Future developments in sub-specialisation are likely to lead to further concentration of both elective and emergency upper GI surgery with increased networking and partnership between smaller and larger centres.

### **General Practice and Commissioning of Services**

The General Practitioner (GP) will often be the first point of contact for the patient with upper gastrointestinal disease. GPs should be able to initiate early investigation where appropriate and be fully aware of agreed local protocols and pathways for referral into secondary care. This is of particular importance in the case of patients presenting with emergencies (for example jaundice) to prevent any delay in further patient management. General Practitioners also have an important role in both population screening for serious disease (e.g. weight loss, anaemia) and coordinating ongoing management after diagnosis and treatment. The GP should also be aware of local protocols for postoperative follow-up after major resection. For patients who need palliative care, the GP will have a key role in coordinating services between the hospital and the community. In many units GPs provide diagnostic endoscopy. For bariatric services, a proportion of regions/PCTs operate a policy of referral of bariatric patients to a medical Level 3 Clinic which acts as the gatekeeper to the local surgical service. General Practitioners may have an important role in screening obese patients for endocrine disorders before referral to a medical service. The recent NHS White Paper is likely to result in decreased centralization of diagnostic services (13). GPs should be involved in the organisation and commissioning of upper gastrointestinal services.

## Referral mechanisms

Referral mechanisms for patients with upper GI disease essentially operate at 3 levels:

- Referral from General Practice into secondary care
- Referral from an Accident and Emergency (A&E) Department into secondary care
- Referral from secondary care into a tertiary specialist OG or HPB centre usually from gastroenterology, upper gastrointestinal and colorectal departments or MDTs within district hospitals.

### Referral from General Practice into secondary care

Rapid access referral mechanisms for suspected upper GI malignancy must allow direct referral for upper GI endoscopy and/or ultrasound as well as outpatient appointments using the “two week wait” system. The choose and book scheme allows referral to appropriate specialists for non-urgent consultation. Patients should have 24 hour access to teams with experience of the emergency management of oesophagogastric and HPB disease, via the GP on-call system and hospital emergency medicine departments. There must also be a robust mechanism for in-hospital referral between specialties, for instance between gastroenterologists and upper GI surgeons.

Patients with suspected OG or HPB disease will usually present to their GP in one of a number of ways:

- With non-urgent symptoms of a benign condition (for example intermittent abdominal pain suggestive of uncomplicated gallstone disease or peptic ulcer disease)
- With acute symptoms suggestive of an urgent benign condition (for example severe acute abdominal pain suggesting acute pancreatitis)
- With symptoms of a suspected OG or HPB cancer (such as dysphagia or painless obstructive jaundice)
- With the incidental finding of OG or HPB pathology during investigation for another condition (for example a liver lesion detected on ultrasound imaging)

For each of these specific scenarios there should be in place locally agreed referral mechanisms defining the appropriate pathway to ensure timely review of the patient within the secondary care setting. Depending upon the nature of the presentation this could be into an outpatient clinic, for an urgent assessment in the A&E Dept or emergency surgical unit, or for further investigation by the GP. In the case of a suspected cancer then referral should be as set out by the Department of Health referral guidelines for suspected cancer (HSC 200/013), and more recently the NICE referral guidelines for suspected cancer (CG027).

Patients referred to secondary care with upper gastrointestinal disease may be referred to an upper gastrointestinal surgeon or gastroenterologist or patients may be

admitted as emergencies and be under the care of a non-specialist admitting surgeon or physician. In such cases hospitals should have clear processes for ensuring that these patients are referred internally to the appropriate upper GI specialists as soon as possible.

Because of the elective nature of the disease there is no 'two-week' wait target for bariatric patients, however the '18-week' target from referral to treatment still applies.

Patients may also present to their local A&E Dept with symptoms of upper GI disease and then be referred to the on-call surgical team. Again where possible further management should be under the responsibility of an upper GI specialist.

## **Structure of Upper Gastrointestinal Surgery Units in Secondary Care**

### **Surgical Units**

Upper gastrointestinal surgery within secondary care is delivered by upper GI surgeons. Within a local upper GI surgical team, the majority of upper GI surgeons will manage patients with non-complex OG and HPB disease but will not engage in major resectional surgery. The local UGI surgeon would be expected to initiate the management of all patients referred from primary care with OG and HPB disease, including those presenting acutely. In such a hospital it would be expected that only upper GI surgeons (or general GI surgeons depending on the future structure of the specialty) would manage such patients. The management of gastro-oesophageal reflux disease, acute, simple gallstone disease and uncomplicated acute pancreatitis would fall within their remit.

In units which do not provide cancer resection, surgeons with an interest in upper GI surgery may provide benign oesophagogastric surgery and non-complex benign biliary surgery including cholecystectomy, bile duct exploration, and endoscopic biliary intervention, as well as acting as diagnostic centres for upper GI cancer as part of a cancer network. Such centres usually develop links with bigger units where complex OG and HPB surgery is performed. A proportion of upper GI surgeons will also have a major interest in bariatric surgery.

Within district hospitals other departments will provide support for the surgical service. These will include endoscopy, radiology, pathology, dietetics and palliative care.

In smaller units there may be a single surgeon with a subspecialty interest in upper GI surgery, often combined with another interest such as colorectal surgery. Such a surgeon typically has expertise in laparoscopic surgery and is supported by colleagues with an interest in GI surgery. The range of surgery provided is dependent on local expertise but surgeons participating in the general surgery on call rota must have experience and skills in managing common oesophagogastric and duodenal emergencies including perforated and bleeding peptic ulcer disease (12). Larger local units with more than one surgeon with an upper GI interest will often provide a range of non-cancer upper GI surgery and increasingly are providing bariatric surgery services.

## **Endoscopy**

Upper GI endoscopy is the core diagnostic procedure for patients with symptoms of oesophagogastric disease. Services must have easy access to both diagnostic and therapeutic endoscopy, including 24 hour availability for emergency endoscopy to assess and manage upper GI bleeding (14), open access endoscopy for direct referral from primary care and protocols for urgent assessment of potential upper GI malignancy under the “two week wait” system. Endoscopy is increasingly performed by nurse practitioners and general practitioners. Surgeons with an interest in upper GI disease must have training and experience in advanced therapeutic endoscopy and facilities for therapeutic endoscopy, including X-ray screening must be available. Appropriate facilities for endoscopic training and service provision are described in the JAG document (15).

Endoscopic ultrasound (EUS) is a highly skilled procedure, restricted to cancer centres. ERCP, on the other hand is available in larger district hospitals. The number of ERCPs being performed is less than it was previously because diagnostic ERCP is hardly used because MRCP and EUS are safer alternatives. The number of units performing ERCP is therefore reducing. ERCP practitioners should perform at least 75 procedures per year according to JAG Guidance.

## **Radiology**

The assessment and management of oesophagogastric disease is dependent on high quality diagnostic and interventional radiology. Fluoroscopy, ultrasound and CT scanning are essential components of diagnostic algorithms. These facilities are supported by radiology teams with an interest in upper GI disease and skills in therapeutic intervention. A radiologist must be a core member of the upper GI cancer multidisciplinary team (2).

Within an HPB cancer network, basic diagnostic services are currently available in all referring cancer units. High resolution CT scanners are now present in most acute hospitals and the quality of cross sectional imaging on CT scanning used to assess HPB malignancies is usually of a high standard. Pre-operative imaging should always be carried out according to evidence-based protocols. Patients should undergo definitive imaging by CT as soon as the diagnosis of HPB cancer is suspected and images should be electronically transferred to the specialist centre via PACS.

## **Pathology**

The accurate pathological diagnosis of biopsy and resection specimens is necessary for appropriate management decisions. Services should include the facility for urgent tissue assessment by frozen section histology as well as protocols for the rapid assessment of potential malignancy. The diagnosis of some conditions e.g. dysplasia in Barrett’s oesophagus, requires the consensus of at least two experienced pathologists.

### **GI physiology**

The assessment of GORD, achalasia and other motility disorders of the oesophagus requires oesophageal manometry and 24hr oesophageal pH monitoring. Surgeons performing antireflux surgery must have access to upper GI physiology services. Such services are often provided in conjunction with anorectal physiology studies in combined GI units (16).

### **Dietetics**

All patients with upper gastrointestinal disease are at risk of dietary problems and should have access to full dietetic inpatient and outpatient services. Dieticians should be available to see patients during regular outpatient clinics and available for consultation on ward rounds and MDT meetings.

### **Palliative care**

All cancer units and cancer centres should have a network of palliative care consultants and nurses linked with community palliative care services. Patients who need palliative care should be able to obtain those services locally. The palliative care service should be available 24 hours a day, seven days a week. There should be a palliative care presence at the unit and centre MDT meetings

## Section 3

# Specialist Oesophago-Gastric (OG) Surgery

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- Early diagnosis and screening
- Specialist Radiology
- Specialist Endoscopy
- Specialist Pathology
- Intensive Care
- Non-surgical oncology

Service demands and predicted changes

- Subspecialization
- Manpower
- Institution and surgeon volumes
- Audit and data collection
- Research
- Education and training

### Introduction

The Improving Outcomes Guidance document details the arrangements for the centralisation of OG cancer surgery in cancer centres (2). This has also resulted in the concentration of expertise in advanced benign oesophagogastric surgery in these specialist centres, although the development of bariatric surgery (see later) has also led to the concentration of surgeons with such expertise in larger non-cancer centres. The size and location of OG cancer centres has been driven by population numbers.

### Population guidance

The Improving Outcomes Guidance document stipulates the centralisation of oesophagogastric cancer resection centres based on serving a population of at least one million (2). Whilst the guidance has resulted in the establishment of regional centres, there are still some parts of the United Kingdom where smaller units continue to perform resections. Many of the oesophagogastric conditions described at the beginning of this document increase in incidence with increasing age. An ageing population therefore will be expected to produce an increase in numbers of patients presenting with oesophagogastric disease.

## **Location and distribution of services**

A “hub and spoke” or network arrangement for both benign and malignant, elective and emergency oesophagogastric surgery allows the concentration of expertise and resources in larger centres but providing high quality care locally where possible. There are considerable challenges, both political and organisational, in developing such a model of care, but the results of the changes in oesophagogastric cancer surgery provision and the ongoing designation of bariatric surgery centres have demonstrated how future services might be organised. The centralisation of services for advanced surgery, both emergency and elective, must also take into account the desire for devolution of routine service provision which forms a central tenet of the recent White Paper (13).

## **Referral from secondary care into a tertiary specialist centre**

Referrals from secondary care into the tertiary OG centre will usually fall into one of three categories:

- Referral of a patient with known or suspected OG malignancy
- Non-urgent referral with a benign condition
- Emergency referral such as a patient with unrelieved dysphagia or ruptured oesophagus

For urgent referrals direct contact with the specialist unit should be initiated. It is expected that surgeons in the specialist centres would provide a 24 hour on call service cover for regional OG emergencies. For cancer referrals, there should be clearly defined pathways, agreed by the regional Cancer Network. It is essential that there are mechanisms in place to ensure clear communication between the secondary care and the tertiary unit. There are emergency OG conditions which demand urgent attention and often urgent transfer to specialist centres. There should therefore be clear guidelines with agreements between district hospitals and specialist units as to which emergency conditions demand transfer immediately (such as oesophageal rupture), within 24 hours (eg unrelieved dysphagia) or 48 hours, etc.

All patients with suspected OG malignancy should be referred to or discussed with, the OG centre. Whereas diagnosis will usually be made at the cancer unit, the vast majority of specialist investigations will be carried out in the OG centre. This will include, if necessary, EUS and PET scanning.

## **Specialist OG Services**

### **Specialist OG Surgery**

As a result of the Improving Outcomes Guidance document, oesophagogastric cancer resection surgery is now delivered in designated specialist centres by teams of appropriately trained surgeons (2). Centres provide services for a minimum

population of one million. Cancer resection centres usually also provide the whole range of elective and emergency benign oesophagogastric surgery.

All surgeons within the centre should contribute to the out of hours emergency oesophagogastric on-call rota for the centre and have the appropriate skills to manage all the recognized complications of elective oesophagogastric surgery and the management of oesophagogastric trauma, supported on site by available appropriately skilled colleagues in interventional radiology and gastroenterology. There are further concerns that as General Surgery further sub-specialises that there will be surgeons on the General Surgery on call rota in some hospitals who may be unfamiliar or uncomfortable in dealing with upper GI emergencies such as the emergency complications of peptic ulcer disease. The commissioning of complex oesophagogastric surgery, therefore, must take into account the need for the coexistent provision of out of hours emergency oesophagogastric surgery.

#### Team structure and workload

The structure of the surgical team providing oesophagogastric surgery is typically dependant on geographical, population density and established network factors. Surgeons with a subspecialty interest in upper GI surgery are supported by junior staff at various stages of training. Many teams also include advanced nurse practitioners and patients are typically cared for on wards where the nursing teams have specialist upper GI experience. Oesophagogastric surgery is usually performed in dedicated operating theatres where theatre nursing teams have appropriate experience and where equipment, facilities and expertise can be concentrated. The workload of oesophagogastric surgical teams is highly dependent on local and regional factors. While all acute trusts provide general emergency services, including the emergency management of oesophagogastric and duodenal diseases described above, the provision of elective oesophagogastric surgery may vary considerably. In order to avoid disadvantaging the local population, trusts which do not provide the full range of oesophagogastric surgery must establish links with other units. Mechanisms of referral and care pathways for the management of complex emergency and elective oesophagogastric surgery must be developed.

#### Complex benign work

Cancer networks have been established in which diagnostic centres refer patients to resectional centres for surgical treatment. The concentration of advanced oesophagogastric surgical and associated specialty expertise in regional centres has naturally led to the regionalisation of complex benign oesophagogastric surgery, such as revisional antireflux surgery. Regional centres provide specialist oesophagogastric cancer on call rotas for emergency cover which has resulted in the development of referral pathways for the management of complex oesophagogastric non-cancer emergencies, such as oesophageal rupture and incarcerated paraoesophageal hiatus hernia.

#### Early diagnosis and screening

There are at present no national screening programs for oesophagogastric disease in the UK and Ireland. Although there are clear associations with obesity, gastroesophageal reflux, Barrett's oesophagus and oesophageal carcinoma, as well as between *Helicobacter pylori* colonisation and gastric carcinoma, the natural history

and pathophysiology of progression to invasive cancer is poorly understood. Nevertheless an increased awareness of risk factors and alarm symptoms should allow targeted referral and investigation of those most at risk. Open access endoscopy, Barrett's oesophagus surveillance programs as well as national guidance on whom to refer and "test and treat" protocols for Helicobacter eradication should lead to earlier diagnosis. An increasing understanding of the genetic risk factors associated with development of malignancy may allow targeted testing of individuals by standard diagnostic methods or new investigations based on genetic changes.

### **Specialist OG radiology**

The assessment and management of oesophagogastric disease is dependent on high quality diagnostic and interventional radiology. Fluoroscopy, ultrasound and CT scanning are essential components of diagnostic algorithms. In addition the staging of oesophagogastric malignancy requires facilities for endoscopic ultrasound, PET-CT and radionuclide scanning. These facilities are supported by radiology teams with an interest in OG disease and skills in therapeutic intervention. A radiologist must be a core member of the specialist OG cancer multidisciplinary team (2).

### **Specialist endoscopy**

As well as having all the facilities for diagnostic and therapeutic endoscopy, including 24 hour availability for emergency endoscopy to assess and manage upper GI bleeding (14), and urgent assessment of potential upper GI malignancy, an OG centre must have the appropriate endoscopic equipment, staff and expertise to manage complications of resectional surgery. Surgeons with an interest in upper GI disease must have training and experience in advanced therapeutic endoscopy. Facilities for therapeutic endoscopy, including X-ray screening facilities must be available. Appropriate facilities for endoscopic training and service provision are described in the JAG document (15).

### **Specialist pathology**

A pathologist must be a core member of the upper GI cancer multidisciplinary team and resectional specimens should be reviewed at the weekly MDT meeting (2). Frozen section facilities must be available to the surgical team.

### **Intensive Care**

Complex elective and emergency oesophagogastric surgery often requires High Dependency and Intensive Therapy facilities. Patients undergoing major oesophagogastric resection must be cared for by teams including anaesthetists and intensive care specialists with a particular interest in oesophagogastric disease. Patients undergoing emergency surgery of the oesophagus, stomach or duodenum are often extremely sick, requiring a high level of intensive care in the perioperative period.

## **Non-surgical oncology**

The management of oesophagogastric cancer with intent to cure involves chemotherapy in the majority of cases. Treatment may also involve radiotherapy. Palliative treatment frequently involves chemotherapy and/or radiotherapy. Non-surgical oncology services therefore form an integral part of oesophagogastric cancer management and an oncologist must be a core member of the oesophagogastric cancer MDT. Diagnostic units must have access to oncology services for the provision of palliative care. The organisation of oncology services for upper GI cancer networks is described in the Improving Outcomes Guidance document (2).

## **Specialist Nurses**

Specialist OG Cancer teams should have access to clinical nurse specialists who should see all patients referred to the team.

## **Service demands and predicted changes**

### **Subspecialization**

Oesophagogastric surgery is typically provided by general surgeons with a subspecialty interest in upper GI surgery. The subspecialty interest may include oesophagogastric cancer resection surgery, elective and emergency complex benign oesophagogastric surgery, and bariatric surgery (see later section on bariatric surgery) depending on local and regional demands. In most acute trusts these surgeons also provide elective general surgery e.g. hernia repair, and benign pancreatobiliary surgery such as laparoscopic cholecystectomy. They usually form part of the diagnostic and therapeutic upper GI endoscopy service and participate in the general surgery emergency on call rota. With increasing subspecialisation in the provision of services there is likely to be an increased demand for upper GI surgery to be provided by specialist surgeons. As vascular surgery training separates from general surgery and breast surgeons no longer have the skills to participate in the general surgery on call rota, emergency surgery will be provided by GI surgeons. In larger units, especially cancer resection centres where there is already a requirement for an oesophagogastric cancer on call rota, it is likely that subspecialty rotas will be developed with upper and lower GI surgeons providing concurrent on call rotas.

### **Manpower**

The reconfiguration of cancer services and the requirement for an oesophagogastric cancer on call rota has resulted in cancer resection centres employing at least four oesophagogastric surgeons in most cases. The balance between performing adequate numbers of complex procedures to maintain surgical team expertise and being able to provide subspecialty cover may create conflicts since a large population base is required to generate sufficient case numbers to satisfy clinical governance demands. At the same time a minimum number of surgeons will be needed to provide a subspecialty on call rota. The subspecialisation of general surgery is challenging the

traditional view that all acute trusts will be able to offer a full range of emergency general surgery services (12).

### **Institution and surgeon volumes**

Individual surgeons will be expected to publish personal results and demonstrate adequate workload to maintain expertise for revalidation. There is a demand for openness and increasing scrutiny of both institutional and individual surgeon outcome figures. Stipulation of expected case volumes automatically generates an expected population to provide the cases. AUGIS has produced guidance on expected surgeon volumes for oesophagogastric cancer resection which indicates that an ideal OG unit would consist of 4-6 surgeons each carrying out a minimum of 15-20 resections per year serving a population of 1-2 million (17). It is likely that similar guidance will be developed for complex benign oesophagogastric surgery.

### **Audit and data collection**

Collection and audit of personal outcome measures, including case volume, morbidity and mortality will become mandatory for revalidation. The current appraisal system includes analysis and presentation of personal logbooks and these data will become freely available for public scrutiny. Audit provides a vital clinical governance and research tool and participation in local, regional and national audits and databases should be mandatory. The National Oesophagogastric Cancer Audit (18) has now reopened for new case entry. NICE, AUGIS and the BSG are discussing further oesophagogastric databases. It is vital that institutions provide adequate resource for accurate data collection and entry. Surgeons job plans should include specified time for audit and data entry as part of their Supporting Professional Activities allocation.

### **Research**

All surgeons should be encouraged to participate in clinical research as part of their Continuing Professional Development. Contribution to local and national trials is a mandatory measure for diagnostic and resectional cancer centres. Oesophagogastric teams should identify research leads to co-ordinate and develop research projects through local MDTs and Network Site Specific Groups.

### **Education and training**

#### Specialist training

The Intercollegiate Surgical Curriculum Project and the Joint Committee on Higher Surgical Training provide a framework for specialist surgical training (19, 20). The changes in junior doctors' working hours have led to concerns about the level of experience and skills of trainees at the end of their training. These concerns are being addressed in various ways including the increased provision of post CCT surgical fellowships. As subspecialisation in surgery increases it is likely that surgical training will change. Oesophagogastric surgery will be provided by GI surgeons with little or no clinical interest in breast, vascular or other general surgery subspecialties. Regional Program Directors should identify appropriate training opportunities to

allow more senior trainees who have expressed an interest in oesophagogastric surgery to work in units providing more exposure to complex cases.

### Education

Oesophagogastric surgeons should be continuously involved in education and development of their teams. This should include formal and informal education programs for theatre teams, ward staff, medical students, junior non-specialist doctors and multidisciplinary teams. Trusts are linked to medical schools with varying degrees of commitment to teaching. These may include medical student attachments to small units, medical school academies and University teaching hospitals. Participating in teaching should form an integral part of surgeons' job plans.

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## Section 4      **Specialist Hepato-Pancreato-Biliary (HPB) Surgery**

Section headings:

Introduction

Population Guidance

Location and distribution of services

Referral from secondary care into a tertiary specialist HPB centre

Specialist HPB Services

- Specialist HPB Surgery
- Early diagnosis and screening
- Radiology
- HPB Endoscopy
- Pathology
- Anaesthesia / Critical care
- Non-surgical oncology
- Palliative Care
- Liver Transplant Services
- Paediatric HPB Surgery
- Pancreatitis Services

Service demands and predicted changes

- Structure of the service
- Manpower
- Institution and surgeon volumes
- Audit and data collection
- Research

### **Introduction**

HPB surgery is an expanding specialty, particularly in light of the increasing number of patients who are undergoing liver resection for colorectal liver metastases and pancreatic resections for neoplastic disease. Most major HPB units within the UK provide services for liver and pancreatic resection from within the same team, although there are some exceptions and currently within the UK there are 34 HPB resection units, at least three of which perform liver resection only and five perform pancreatic resection only. Liver transplantation is carried out in seven HPB units within the UK and in all of these units there is significant overlap of the HPB resection and liver transplant services.

### **Population Guidance**

Improving Outcomes Guidance (IOG) has recommended that HPB units should as a minimum serve a population of at least 2 million with exceptions made in areas of remote geographical isolation (2). Cancer networks and HPB centres should work together to ensure that all centres and networks are compliant with the IOG criteria

for minimum population served and the AUGIS Recommendations on Minimum Volumes. There should also be clinical networks for the management of specific benign diseases including acute liver failure and chronic liver disease (regional liver networks) and pancreatitis.

## **Location and distribution of services**

HPB cancer units should ideally be based in large university teaching hospitals with cancer centre status and full radiology, endoscopy and oncology support provided from within the same organisation (2). Referring cancer units from the surrounding district hospitals must have easy access to the HPB centre for advice and complex cases and early transfer of patients is recommended. Electronic imaging transfer facilities are vital for the effective function of any HPB cancer centre and district hospitals must have access to robust systems of image transfer for decision making at HPB centre meetings. Cancer centres must have at least weekly multi-disciplinary team meetings and/or additional meetings for image review with mechanisms for decision feedback. All referring units should have access on a weekly basis to decision making from the specialist team, so that patients, many of whom will only be for palliative treatment, can start treatment as soon as possible.

## **Referral from secondary care into a tertiary specialist HPB centre**

Referrals from secondary care into the tertiary HPB centre will usually fall into one of three categories:

- Non-urgent referral with a benign condition
- Urgent referral with benign disease
- Referral of a patient with known or suspected HPB malignancy

For urgent referrals direct contact with the specialist unit should be initiated. It is expected that surgeons in the specialist units would provide a 24 hour on call service cover for regional HPB emergencies. For cancer referrals, there should be clearly defined pathways, agreed by the regional Cancer Network. It is essential that there are mechanisms in place to ensure clear communication between the secondary care and the tertiary unit. There are emergency HPB conditions which demand urgent attention and often urgent transfer to specialist centres. There should therefore be clear guidelines with agreements between district hospitals and specialist units as to which emergency conditions demand transfer immediately (such as HPB trauma), within 24 hours (eg bile duct injury) or 48 hours, etc.

All patients with suspected HPB malignancy should be referred to or discussed with, the regional HPB centre. The vast majority of specialist investigations will be carried out in the HPB centre. This will include, if necessary, EUS, ERCP, MRI scanning, interventional radiology and pathology. However, ERCP remains an essential service provided by some District General Hospitals. There is now strong evidence that pancreatic resection patients with a serum bilirubin less than 250  $\mu\text{mol}$  per litre should be considered for early resection without drainage (21). Close communication therefore needs to exist between the secondary and tertiary centre regarding the indications for ERCP in the jaundiced patient.

## **Specialist HPB Services**

### **Specialist HPB Surgery**

The specialist HPB surgical unit would be expected to provide the full range of both elective and emergency HPB procedures (with the exception of liver transplantation which is performed in seven units across the UK and one in Ireland). It is recognised that some units provide only hepatobiliary or pancreatic services. In these cases there should be clearly agreed local mechanisms to ensure that the assessment and treatment of patients occur within the appropriate unit and within an appropriate time frame. Tertiary HPB units should work within the population guidance of IOG and have the numbers of specialist surgeons and workload volume as outlined in the AUGIS Recommendations on Minimum Volumes 2010 (17). One HPB surgeon is required for approximately every half million population so depending on the population base of the centre, teams of between four and eight surgeons would be needed to run the service (more for a transplant centre) with 7 day cover for HPB problems provided from within the team. Many HPB surgeons will perform resection of both liver and pancreatic tumours but working in teams will allow a degree of locally agreed subspecialisation and some surgeons may provide liver or pancreatic resection only. All surgeons working in these designated centres should have the appropriate skills to manage the full range of recognised complications arising from complex elective HPB, and be competent to deal with all aspects of emergency HPB surgery and HPB trauma, supported by available appropriately skilled colleagues in interventional radiology and gastroenterology. Rare conditions requiring complex surgical management, such as hilar cholangiocarcinoma or chronic pancreatitis, will require their management to be undertaken by only two nominated consultant HPB surgeons to increase experience and prevent dilution of expertise.

### **Early diagnosis and screening**

The most common HPB resections are for pancreatic cancer and colorectal liver metastases. Pancreatic cancer has an annual incidence of 100 cases per million population but most patients present with advanced disease. Consequently resection rates are low at approximately 15-20% and there is considerable geographical variation in this. Late presentation and subsequent palliative management of pancreatic cancer has been investigated but unfortunately there is no cost effective screening test that could detect the disease at an early stage. Approximately 5% of patients with pancreatic cancer have either a family history of pancreatic cancer or belong to an identified genetic syndrome. Whilst there are not yet UK guidelines on pancreatic screening, EUS screening is being used in high-risk patients in some centres.

There are genetic disorders for which endoscopic screening is recommended, specifically patients with familial adenomatous polyposis who should undergo 3 yearly duodenoscopy from the age of 18.

Patients at risk of hepatocellular carcinoma, such as those with cirrhosis should undergo regular abdominal ultrasound according to national guidelines.

For colorectal liver metastases there are currently major variations in the resection rate within different trusts and cancer networks across the UK. Guidance from the Association of Coloproctology (ACP) has outlined recommended tests for the staging of colorectal cancer at presentation and screening in the postoperative period for the development of metastatic disease. Regional variations in resection rates are presumably therefore due to variable implementation of the ACP guidelines and subsequent detection of metastatic disease. The ACP guidelines should be fully implemented, together with the assessment of the radiology of all patients with colorectal liver metastases by the HPB MDT (including liver surgeons), should help with the early diagnosis of colorectal metastases and lead to less regional variation in resection rates.

### **Specialist Radiology**

The specialist HPB centre should have consultant radiologists with expertise in HPB imaging. This would include cross sectional imaging (including CT/MRI/FDG PET), ultrasonography (including contrast enhanced US), and interventional radiology (including TACE, embolisation procedures including PVE, tumour ablation, PTC, TIPSS). Expert HPB radiology support is an essential component of the specialist MDT. (For EUS see relevant section).

There should be 24 hour access to interventional radiology to support the delivery of an emergency HPB service.

Where specialist radionuclide imaging and therapeutic radioembolisation procedures are not available within the HPB unit, there should be established links with a centre able to provide these services.

### **Specialist HPB Endoscopy**

The specialist HPB centre should provide expertise in upper gastrointestinal endoscopy, including therapeutic biliary endoscopy (ERCP) and therapeutic endoscopic ultrasonography. The centre should provide a regional biliary endoscopy service for complex HPB patients. It is recognised that such expertise may be provided by consultants who are primarily surgeons, radiologists, gastroenterologists or hepatologists. Endoscopic biliary intervention (EUS and ERCP) should be available daily, including on an on-call basis over the weekend, to support the emergency management of HPB disease. Endoscopic ultrasound (EUS) is a highly skilled procedure and the service should be restricted to cancer centres.

### **Specialist HPB Pathology**

There should be support for a tertiary HPB unit from the pathology department, with consultant pathologists specializing in HPB disease. This support would include on-site access to immediate analysis of intra-operative frozen section specimens. There should be regular meetings for discussion of cases between pathologists and clinicians.

### **Anaesthesia and Critical Care**

It is expected that HPB surgeons would work closely with a team of anaesthetists and intensivists who would have a special interest in HPB disease. This team would ensure optimal pre-, peri- and post-operative management of patients undergoing major HPB surgery. Anaesthetists involved in liver resection surgery should be competent in low central venous pressure anaesthesia. Patients with HPB disease often present as emergencies requiring intensive care. There should be access to critical care beds (both level 2 and level 3) with on-site renal support.

### **Non-surgical Oncology**

There should be recognised medical and clinical oncology expertise to cover the range of HPB cancers (including primary and metastatic liver, biliary and pancreatic malignancies and neuro-endocrine tumours). All specialist centres should enrol patients in clinical trials of adjuvant therapy following surgery and therapy for advanced disease. The oncologists would be core members of the specialist HPB MDT.

### **Specialist Nurses**

Specialist HPB Cancer teams should have access to clinical nurse specialists who should see all patients referred to the team.

### **Liver Transplant Services**

Some patients may be better served by transplantation rather than resection. These patients are likely to have a background of acute liver failure or chronic liver disease and are best assessed and treated in a liver transplant centre. Each non-transplant HPB centre should have clear referral pathways for patients with transplantable disease.

### **Paediatric HPB Services**

Little HPB Surgery is carried out by paediatric surgeons in isolation. The majority of paediatric HPB patients should be treated by a collaborative approach between paediatricians, paediatric surgeons and adult HPB surgeons.

### **Pancreatitis Services**

Each acute hospital should identify a lead clinician for pancreatitis, as recommended in the UK Guidelines for Acute Pancreatitis, (1) and each HPB centre should provide a regional service for patients with acute and chronic pancreatitis. There should be agreed referral guidelines including the facilities to review patients' clinical details and scans electronically by clinicians at the HPB centre. Clear guidelines should exist for the transfer of patients for management at the centre and intervention should only be carried out after discussion with the HPB team at the centre. The HPB centre should have a full range of facilities and expertise to manage acute and chronic pancreatitis using up-to-date (including minimally invasive) techniques.

### **Service demands and predicted changes**

## **Structure of the service**

The demands on HPB cancer centres are constantly increasing. The implementation of IOG has resulted in an improved service to HPB patients. The resection rate for pancreatic neoplasia has doubled in the past decade in the UK and it is anticipated that this will continue to rise as pancreatic cancer resection becomes more common in elderly patients. Resection rates for primary liver tumours have not increased significantly in the last decade but resection of secondary colorectal liver tumours is increasing and, with the new chemotherapeutic agents available, this is likely to continue. Continued centralisation of major HPB resections into cancer centres inevitably has a knock-on effect on complex benign cases and an increase in referrals of patients with complex benign biliary problems to tertiary referral centres has already occurred. This trend is also likely to continue with district hospitals only dealing with routine benign biliary cases, mostly related to gallstone disease. The major effect of further centralisation of complex malignant and benign HPB cases is that there will need to be an appropriate increase in the provision of intensive care and high dependency beds to cope with the demand.

## **Manpower**

The exact manpower requirements of individual HPB cancer centres will depend on several factors including size of population covered, addition or not of a commitment to transplant services and general surgical on call rotas, and local expertise in referring units to deal with some of the complex benign work. Teams of between 4 and 8 consultant surgeons would be the most likely outcome with any subspecialisation within teams agreed at a local level.

## **Institution and surgeon volumes**

Most HPB units provide liver and pancreatic surgery from within the same team. Units serving a population of 2 million patients should be performing 60-70 pancreatic resections per year and in excess of 100 liver resections for primary and metastatic liver tumours. Surgeons within the same team should be doing an approximately equal number of major cases. A minimum of 10 pancreatic resections per surgeon and 15 liver resections per surgeon is recommended. Collection of centre-specific audit data is important (17).

## **Audit and data collection**

To maintain their status, all HPB cancer centres are required to submit their data to the national HPB audit run by the Association of Upper Gastrointestinal Surgeons (AUGIS) through GBIHPBA. Data collection is an integral part of any surgeon's appraisal and job plan review and is likely to become compulsory.

## **Research**

All HPB surgeons are encouraged to participate in clinical trials. AUGIS and GBIHPBA are keen to be involved in the design of all new trials in HPB surgery.

GBIHPBA can also provide specific advice to trainees who wish to pursue HPB research.

### **Education and Training**

The Great Britain and Ireland Hepato-Pancreatico-Biliary Association (GBIHPBA) should take a lead role in education and training in HPB surgery. GBIHPBA should be responsible for organising the HPB sessions at the AUGIS annual meeting and training day and be involved in coordinating education workshops across the UK in HPB disease. Currently training in HPB surgery is undertaken as part of training in general surgery with the ability to subspecialise in the latter three years of training programmes. Many trainees however require additional training in complex HPB surgery after award of their CCT. A national programme of post-CCT fellowships would be the ideal way forward to replace the current adhoc arrangement.

## Section 5

## Bariatric Surgery

### Section Headings:

Introduction

Population guidance

Commissioning and location of services

Referral mechanisms

Specialist bariatric services

- Structure of the specialist bariatric team
- Surgery
- Radiology
- Endoscopy
- Intensive Care
- General facilities for obese patients
- Follow-up care

Service demands and predicted changes

- Manpower
- Institution and surgeon volumes
- Audit and data collection
- Research
- Education and training

### **Introduction**

Currently approximately 1.2 million patients in the UK & Ireland would qualify for bariatric surgery according to the NICE Guidance, yet the NHS provides surgery for <1% of those eligible, estimated at 5,000-10,000 in 2010-11. It is noteworthy that the word ‘obesity’ did not feature once in the recent White Paper on the future NHS (13). The volume of bariatric surgery has been limited entirely by individual spending decisions by Primary Care Trusts, even though it has been repeatedly demonstrated to be among the most cost effective interventions that exist. As well as resulting in an increased incidence of many diseases including cardiovascular, respiratory, musculoskeletal disease and diabetes the epidemic of obesity will result in an increase in the incidence of associated diseases presenting to upper GI surgeons.

The National Bariatric Surgery Registry report 2011 demonstrated safety of surgery and reductions in incidence of obesity-related disease such as type 2 diabetes, for which 85.5% of patients returned to a “no disease” state.

There are no Phase III trials underway of any new medications for obesity and all medications have been withdrawn with the exception of orlistat, which provides only very mild weight loss. Demographically there will be an increasing need for bariatric surgery for at least the next 20-30 years.

### **Population guidance**

As noted, the population is becoming more obese and the economic argument for bariatric surgery is pressing. Apart from improving the health of the population the argument is changing to a situation where PCTs can't afford NOT to pay for surgery because of the associated costs of obesity-related disease which they are already bearing.

### **Commissioning and location of services**

Bariatric surgery is generally commissioned by the Specialist Commissioning Groups formed from the Primary Care Trusts in each region (and by individual Health Boards in Scotland) although some PCTs ignore this approach. Regions vary as to how much surgery they commission and the number of chosen providers. Providers include private hospitals or services operating with contracts from the SCGs. In Scotland all the providers are NHS.

As indicated above larger local upper GI units with more than one surgeon with an upper GI interest will often provide a range of non-cancer upper GI surgery and increasingly are providing bariatric surgery services.

### **Referral mechanisms**

Because of the elective nature of the disease there is no 'two-week' wait target, however the '18-week' target from referral to treatment still applies. Referrals for complications from elective surgery between hospitals are ad hoc arrangements, but service specifications should include transparent protocols for dealing with complications before and after discharge, including an emergency returns pathway. These mechanisms, alongside those for transfer as required must be part of the contract for NHS or private hospitals to be a provider.

For follow up, PCTs generally fund emergency care but elective reoperations need individual funding applications to the limited interventional panels before any provider can operate. The lack of commissioned follow up pathways within the NHS severely hampers attempts to provide lifelong appropriate care.

Referrals for complications from elective surgery between hospitals are ad hoc arrangements, but service specifications should include transparent protocols for dealing with complications before and after discharge, including an emergency returns pathway. These mechanisms, alongside those for transfer as required must be part of the contract for NHS or private hospitals to be a provider.

## Specialist Bariatric Services

### **Structure of the specialist bariatric team**

NHS hospitals should have a full infrastructure of allied health professionals (AHPs) available as part of the MDT team to look after these patients. It is recognized that private providers, where NHS surgery is done as an isolated episode, may not have invested in this infrastructure, but it should be an absolute service requirement that the care will be seamlessly integrated into the existing MDT in the referring NHS hospital.

In addition, there should be an established medical obesity team which acts as the referrer into the surgical system. AHPs are very likely to be shared between the medical and surgical teams, eg dietitians and specialist nurses. There should be regular formal meetings eg on a monthly or weekly basis to discuss all or selected patients as per local protocols.

Additional members of the medical team should include:

- Diabetologists
- Respiratory physicians to provide sleep studies
- Cardiologists to provide echocardiography
- Dedicated anaesthetists with an interest and expertise in bariatric anaesthesia (who should be encouraged to be members of the Society of Bariatric Anaesthesia, SOBA)
- Psychiatrists experienced in eating disorders

The individual MDT structure may vary between units as there is no single common agreed formula.

### **Surgery**

#### Elective surgery

Bariatric surgery centres have evolved via Specialist Commissioning processes over the last 10 years. This has led to the surgery being done in high volume centres with adequate staffing infrastructure to support the whole care of the patient including follow up. For gastric bypass the hospital and surgeon volume data are from the US and strongly suggest improved operative outcomes with higher volumes for both. The Surgical Review Corporation of the American Society for Metabolic and Bariatric Surgery (ASMBS) came into being in 2004 to establish a Centres of Excellence programme to improve quality of services. The current minimum numbers required for provisional registration as a CoE are 125 operations per hospital and 50 operations per surgeon per year (23).

There are no similar data for gastric banding as the operation is generally very safe. It is well established that band care is highly dependent on follow up but hospitals with low volumes may not attract the funding to provide the infrastructure required to support the service – dietitians, specialist nurses, psychologists, unit administrators (required to cope with the admin of individual funding applications for each patient) etc. Although it has not been shown in the UK, there is agreement

that the more infrastructure there is in place, the better the long-term outcomes are likely to be, which therefore favours larger centres and high volume specialization, just as for bypass surgery/sleeve. Bariatric surgery should be done in dedicated theatres familiar with advanced laparoscopic equipment and techniques, and operating tables with sufficient weight limits (>300kg).

The NBSR report showed a large number of low volume providers, but it is not known how many of these were performing NHS work. In the NBSR report 68% of NHS operations were gastric bypass, 21% were gastric bands and 10% were sleeve gastrectomy operations. Around 1% were duodenal switch procedures.

#### Emergency surgery

Acute band emergencies usually present some time postoperatively eg 1-2 years for a gastric band slippage, and the ASMBS consensus statement 2010 suggests that all patients should have access to emergency care from the provider who placed the band, or at least arrangements in place for the patient to be treated by a surgeon with expertise. Since it is unlikely that established general surgeons will have had exposure to enough bariatric patients, all patients should carry an advice card offering advice to those administering emergency care to these patients.

For bypass surgery, bariatric surgeons should be trained in the generality of emergency GI surgery as the patients can become extremely sick very quickly and need emergency expert laparoscopic reintervention. There will be a need for operations for intestinal obstruction occurring some years or more after bypass surgery due to internal hernias, and again these patients should probably have access to an established unit with experience in recognizing and treating these conditions before the onset of closed loop obstruction. Appropriate instruments should be available for emergency reoperation.

#### Surgical Workload

It has been assumed that general benign upper GI surgeons would accommodate bariatric surgery as part of their existing workload. However increasing specialization and centralization should support the development of expertise into larger units until they have reached capacity. Another advantage of larger units will be the ability to provide a dedicated cover rota. The development of teams should be driven by patient need. Team development and training should be undertaken to develop the background knowledge and clinical approach appropriate to the care of bariatric patients, together with the development of a full multidisciplinary team.

With increasing workload over time it is likely that each region will have a few dedicated bariatric units, rather than many hospitals providing a small number of operations. Each hospital will continue to need general laparoscopically trained GI surgeons to provide the rest of the benign workload, some of which will be provided by bariatric surgeons. The numbers of dedicated centres should be determined by the capacity of each centre and the numbers commissioned. The actual number of high-volume dedicated centres is presently unknown (24).

There will be an increasing requirement for revision surgery over time. Revisional surgery is inherently more risky than primary surgery and there is a strong argument

for doing this only in specialist centres with high volumes and experience of this complex surgery.

### **Radiology**

There is little need for radiology in the preoperative assessment of patients, however investigation of the acute postoperative patient necessitates the presence of CT and probably MRI scanners as well as oral contrast gastrograffin studies that have sufficient weight capacity (eg up to 250kg for the heaviest patients). There should be radiologists available with expertise in placing oesophageal/gastric stents and nasojunal feeding catheters as well as percutaneous intra-abdominal drains.

### **Endoscopy**

Upper GI endoscopy is needed occasionally for preoperative investigation of hiatus hernias. Postoperatively it is frequently needed for investigation of anastomotic strictures after gastric bypass and to assess the position of gastric bands where a slippage or erosion into the stomach is suspected. Therefore as for UGI cancer, bariatric surgeons should have skills in OGD including experience in advanced therapeutic endoscopy. Facilities for therapeutic endoscopy including X-ray screening facilities must be available.

### **Intensive Care**

Laparoscopic gastric banding patients rarely need ITU or HDU care, and the procedure is usually performed as a 24h stay or day case. Laparoscopic gastric bypass rarely needs elective ITU care; about 10% are admitted electively to HDU (Level 2/3) care. In the NBSR about 80% of bypass/sleeve patients were discharged by day 3.

The small number of bypass patients that need acute reoperation may need a prolonged and expensive ITU stay and need multiple operations. The facilities required for this are the same as for complex OG cancer surgery, with intensivists/anaesthetists and teams skilled in the care of the very obese.

### **General facilities for obese patients**

OPD suites should have large examining couches, chairs and electronic weighing scales. Nurses and other health care staff should be given sensitivity training for bariatric surgery patients. Commissioning groups should emphasize these requirements to provider units to inform their upgrade and replacement policy.

### **Follow up care**

Unlike cancer surgery where the follow up and infrastructure required to capture follow up outcomes data is deeply embedded within the NHS, follow up for bariatric surgery is lacking, or fragmented at best. Surgeons need to be able to engage with all parties to improve this and provide the dedicated lifelong care that the bariatric patient needs. There could for instance be hub and spoke mechanisms with GP networks. There are large organizational challenges that need addressing here if we are properly to establish bariatric surgery as more than a 'Cinderella specialty' in the eyes of professionals and healthcare providers.

## **Service Demands and Predicted Changes**

### **Manpower**

The manpower requirements will be determined entirely by the NHS's willingness to provide the service. The example from the US, whose obesity epidemic we lag behind by less than 10 years, was that bariatric surgery overtook cholecystectomy in ca 2008 as the commonest GI operation. With cholecystectomy now at a rate of >50,000 pa in the UK, this means at least an additional 40,000 operations a year. This would require at least 200 surgeons all doing 200 cases a year. It is not known whether there are enough training positions available for this.

### **Institution and surgeon volumes**

BOMSS has so far steered away from stipulating volumes as its overall position has been to support surgeons trying to establish services from scratch.

### **Audit and data collection**

As for the OG cancer surgeons, collection and audit of personal outcome measures, including case volume, morbidity and mortality will become mandatory for revalidation. All surgeons are strongly encouraged to enter patient data prospectively into the National Bariatric Surgery Registry (NBSR), which has been active since Jan 2009. To June 2011 this has over 15,000 patient entries.

Currently there is no funding in any unit for dedicated data entry or validation of data in the NBSR. So far all this has been done by good will, unlike equivalent cancer registries where the infrastructure required to enable audit is well established within the NHS.

### **Research**

Region-wide networks are currently informal, if they exist, and infrastructure needs to be put in place to support their development; this will facilitate participation in research in due course.

### **Education and training**

#### Specialist training

The Intercollegiate Surgical Curriculum Project and the Joint Committee on Higher Surgical Training provide a framework for specialist surgical training (19, 20). The changes in junior doctors' working hours have led to concerns about the level of experience and skills of trainees at the end of their training. These concerns are being addressed in various ways including the increased provision of post CCT surgical fellowships. As subspecialisation in surgery increases it is likely that surgical training will change. Bariatric surgery will be provided by GI surgeons with little or no clinical interest in breast, vascular or other general surgery subspecialties. Regional Program Directors should identify appropriate training opportunities to allow more senior trainees who have expressed an interest in bariatric surgery to work in units providing more exposure to complex cases.

#### Education

Bariatric surgeons should be continuously involved in education and development of their teams. This should include formal and informal educational programs for theatre teams, ward staff, medical students, junior non-specialist doctors and multidisciplinary teams. Trusts are linked to medical schools with varying degrees of commitment to teaching. These may include medical student attachments to small units, medical school academies and University teaching hospitals. Participating in teaching should form an integral part of surgeons' job plans.

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