NEWSPAPER POST

TheSynapse

The Medical Professionals' Network

MEDICAL IMAGING

Imaging Oesophageal Cancer

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The prevalence of oesophageal cancer has increased dramatically in the past 30 years, with increases of 350% – 800% reported during this period. Oesophageal cancer is often detected late with 75% of patients having diseased lymph nodes at initial diagnosis.

The 5-year survival rate is only 3% for patients with lymph node involvement, whereas it is 42% for patients who do not have nodal involvement. Approximately 18% of patients will have distant metastases; of these 45% will be to abdominal lymph nodes, 35% to the liver, 20% to the lungs, 18% to supraclavicular nodes, 9% to bone, and 5% to adrenal glands. Consequently, the prognosis is poor, with surgical cure achieved in less than 10% of patients. Surgeons differ in their approach to patients with advanced-stage disease. Palliative therapies include surgery, laser resection, radiation therapy or chemotherapy, and oesophageal stent placement or dilation. Surgery, whether curative or palliative, carries a significant risk of mortality that ranges from 5% to 20% depending on the surgeon's experience. Therefore, accurate preoperative staging, particularly with regard to depth of wall invasion, mediastinal invasion, nodal involvement, and distant metastases, is vital in determining the most appropriate therapy and in helping avoid inappropriate attempts at curative surgery.

Clinical Presentation

Dysphagia is the most common presenting complaint in patients with oesophageal cancer, however it is also present in patients with benign oesophageal strictures. The duration of dysphagia is a useful clinical parameter for differentiating benign from malignant strictures. In general, benign strictures are associated with long-standing, intermittent, nonprogressive dysphagia, whereas malignant strictures are associated with recent onset of rapidly progressive dysphagia and weight loss.

Chronic or severe esophagitis from a variety of causes may lead to scarring and fibrosis with the development of oesophageal strictures. Therefore, the clinical setting is crucial in determining the underlying cause of these strictures. In some cases, the correct diagnosis may be suggested by a temporal relationship between stricture formation and precipitating factors such as mediastinal irradiation, ingestion of caustic substances, and nasogastric intubation. In other cases, important clinical clues may be provided by findings such as high serum gastrin levels in Zollinger-Ellison syndrome, an allergy history or peripheral eosinophilia in eosinophilic esophagitis, or bullous skin eruptions in epidermolysis bullosa dystrophica or benign mucous membrane pemphigoid. Therefore, all strictures should be evaluated in the clinical context in which they develop.

Imaging Methods

Oesophageal strictures are best evaluated with biphasic oesophagography (also known as Barium Swallow) that includes both double-contrast and single-contrast spot X-ray images. The single-contrast phase optimises distension of the oesophagus, thereby improving detection of strictures, whereas the double-contrast phase optimises visualization of the mucosa for nodules, ulcers, or other radiographic findings associated with these strictures.

Reflux-induced (gastro-oesophageal reflux disease – GORD) strictures classically appear as smooth, tapered areas of concentric narrowing in the distal oesophagus and range from 1 to 4 cm in length (Figure 1). Other peptic strictures may be associated with a focal cluster of oesophageal intramural pseudodiverticula (Figure 1).

Figure 1. *Peptic stricture (large arrow) above a hiatal hernia with oesophageal intramural pseudodiverticulae (small arrows) some forming track like structures (open arrows).*

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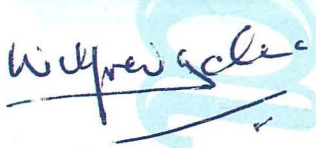
Editor's Word

Welcome to second issue of TheSynapse Magazine for 2007. This issue is once again packed with articles which will surely be enjoyed by all healthcare professionals. Apart from the regular contributions on radiology and avian influenza, you will also find articles on **Management of Behavioural and Psychological Symptoms of Dementia, Negligence and Malpractice, Do's and Don'ts in the management of acne,** part 2 of **Invertebrates in the medical service of man** and **The diversity of Occupational Therapy Services for older persons in Malta.** We also proudly present the second interviewee for this year – Dr Victor Camilleri.



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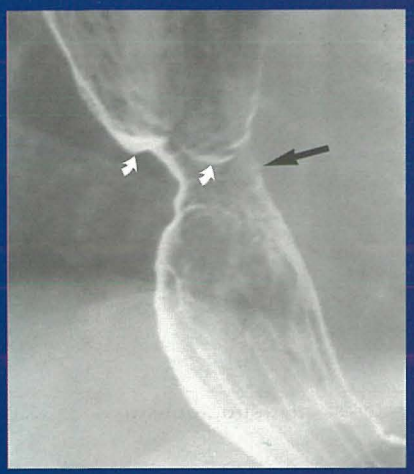

Figure 2. *Asymmetric peptic stricture (arrow) due to scarring from reflux esophagitis (white arrows indicate wide pseudodiverticulae).*

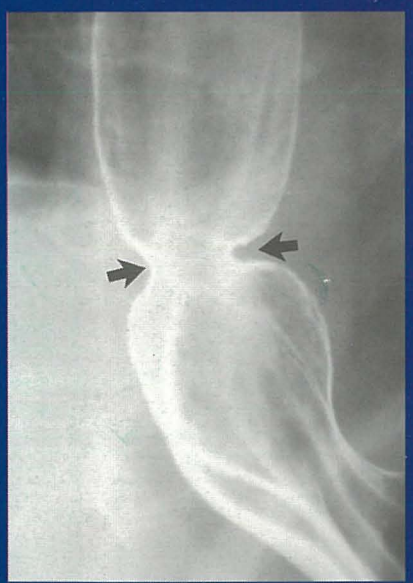

Figure 3. *Ring-like peptic stricture (arrows) above a hiatal hernia, resembling a Schatzki ring, but more asymmetric, having more tapered borders and a greater length than do most Schatzki rings.*

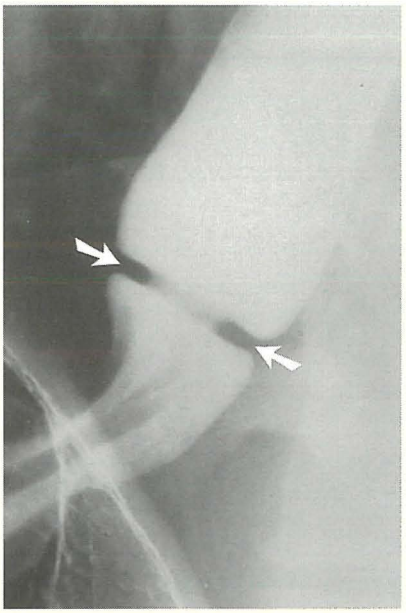

Figure 4. *Schatzki ring (arrows) appears as a smooth, symmetric, ring-like constriction at the gastroesophageal junction above a hiatal hernia with a length of only 2 mm and has more abrupt borders than does a ring-like peptic stricture.*

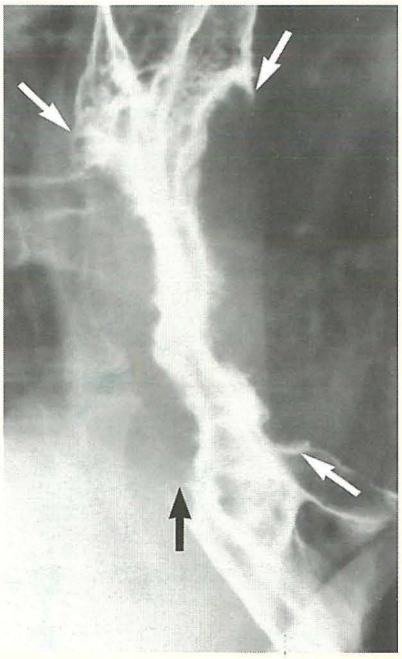

Figure 5. *Infiltrating esophageal carcinoma presenting as a stricture with a markedly irregular contour and abrupt, shelflike proximal and distal margins (arrows).*

However, asymmetric scarring can lead to asymmetric narrowing and may resemble malignant strictures (Figure 2).

Some patients may have a very short segment of ring-like narrowing at the gastro-oesophageal junction above a hiatal hernia (Figure 3). This may resemble a Schatzki ring (Figure 4), which is a normal oesophago-gastric sphincter. Schatzki rings usually appear as smooth, symmetric ring-like constrictions with abrupt borders and a length of only 1–3 mm, whereas annular peptic strictures have more tapered borders and a length of over 4 mm.

Hiatal hernias are seen at barium examination in more than 90% of patients with peptic strictures, so that the possibility of malignant tumor should be considered when a distal oesophageal stricture is detected in the absence of a hernia. Nevertheless, malignant strictures usually have more irregular and nodular contours and more abrupt or "shouldered" proximal and distal margins than do benign peptic strictures (Figure 5).

Barrett esophagus is an acquired condition in which there is progressive columnar metaplasia of the distal oesophagus as a result of chronic gastroesophageal reflux and reflux esophagitis. Barrett oesophagus is only detected by oesophagoscopy and requires confirmation by endoscopic biopsy.

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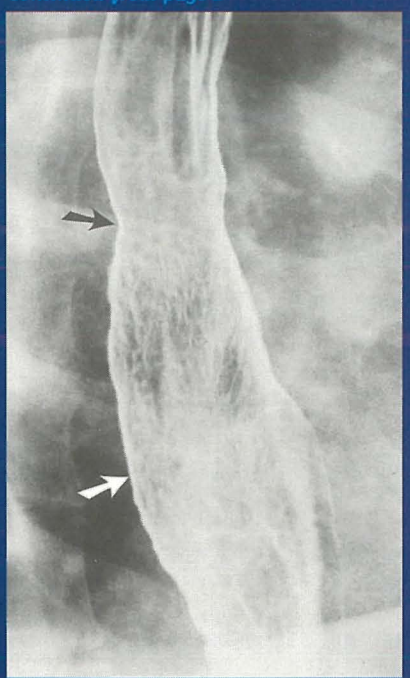

Figure 6. *Barrett's esophagus with a midesophageal stricture (black arrow) and a reticular mucosal pattern (white arrow) thought to result from intestinal metaplasia in Barrett mucosa.*

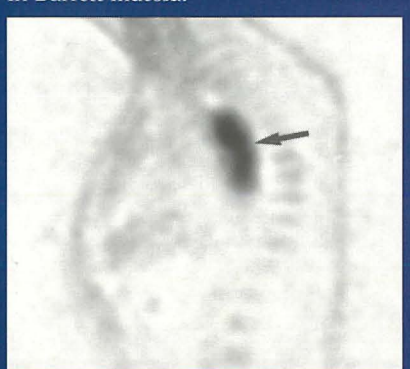

Figure 7. *PET-FDG scan showing a proximal oesophageal squamous cell carcinoma.*

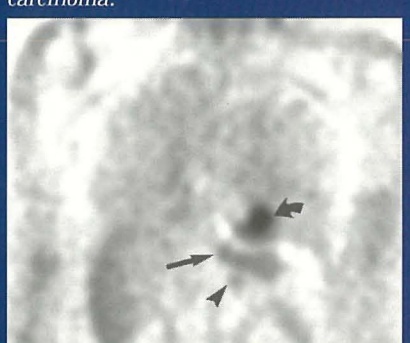

Figure 8. *Coronal FDG PET showing primary adenocarcinoma of the gastroesophageal junction (straight arrow), a left-sided gastric lymph node (arrowhead) and normal uptake in the left ventricle (curved arrow).*

Because Barrett esophagus is a premalignant condition associated with an increased risk of developing oesophageal cancer, many investigators advocate endoscopic surveillance of patients with known Barrett esophagus to detect dysplastic or early carcinomatous changes before the development of overt carcinoma (Figure 6).

Spiral Computed Tomography (CT) determines the extent of oesophageal cancer based on morphologic features such as direct infiltration of adjacent structures and on the size of mediastinal and coeliac lymph nodes. Nodes measuring 10mm or larger are considered malignant while smaller ones are deemed reactive, however this threshold is only based on statistical analyses and consequently smaller nodes may contain metastases and larger ones may be reactive. CT can also detect metastases to other structures such as the lungs, liver and bone.

Most malignant tumours metabolise glucose at a much higher rate than normal tissue; as a result, there is an increased accumulation of the glucose analog 2-[fluorine-18]fluoro-2-deoxy-d-glucose (FDG) in malignant tissue. Positron emission tomography (PET) provides diagnostic information based on this increased FDG uptake and may demonstrate early-stage disease before any structural abnormality is evident. Studies have shown that 90% of oesophageal cancers demonstrate avid FDG uptake (Figure 7), while normal or inflamed gastric mucosa may demonstrate significant FDG uptake and may be difficult to differentiate from tumors. Therefore PET-FDG is not ideal for the detection of the primary tumour in oesophageal cancer due to lack of specificity and the financial expense of the test. Furthermore, FDG PET is not helpful in detecting local invasion by the primary tumor or involved local lymph nodes due to its limited intrinsic spatial resolution, which is approximately 5 mm (Figure 8).

The major advantage of FDG PET over anatomic imaging modalities is its ability to detect distant metastases. The limited spatial resolution of FDG PET is not a problem with metastases that are distant from the primary tumour and from sites of normal increased uptake. Metastases to the liver, lungs, and skeleton can readily be identified at FDG PET (Figure 9). Involvement of the supraclavicular, cervical, and celiac nodes by oesophageal cancer is

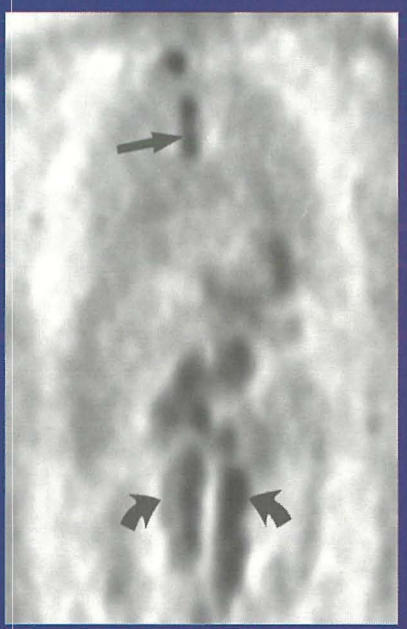

Figure 9. *Coronal FDG PET shows nodal metastases in the paratracheal region (straight arrow) and extensive retroperitoneal involvement (curved arrows) from adenocarcinoma of the gastroesophageal junction.*

considered distant metastasis (M1) rather than nodal metastasis (N1) and precludes curative surgery; FDG PET can also detect disease at these sites. Thus an FDG PET covering the whole body (skull base to pelvis) can improve the ability to classify disease as either resectable or unresectable based on the presence of distant metastases. CT or magnetic resonance (MR) imaging may at times be unable to distinguish postoperative scar from tumor recurrence. FDG PET may be useful in this setting and for monitoring response to radiotherapy or chemotherapy.

In summary, oesophageal cancer is usually detected by oesophagography and oesophagoscopy. Accurate staging of oesophageal cancer is crucial for therapeutic planning and is best done with Spiral CT, which can assess resectibility and can provide a baseline study to assess subsequent response to therapy. FDG PET is useful as an adjunct to Spiral CT for detecting distant metastatic disease and for distinguishing scar from recurrent tumour when CT findings are equivocal.

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