Radiotherapy

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Summary

The author examines the place of radiotherapy in the management of oesophageal cancer. Many of these tumours are locally curable with radiotherapy. This is so particularly with the proliferative, poorly differentiated tumour. The upper and middle thirds of the oesophagus are the most suitable sites for attempted cure by radiotherapy; surgery is always the better method in the lower third.

Before adopting a definitive treatment policy it is important to eliminate metastatic spread as far as is possible. The overall prognosis is poor: long unnecessary courses of treatment or extensive operations should be avoided unless there is a reasonable chance of long-term cure.

THE place of radiotherapy in the management of oesophageal cancer must be considered against the whole background of the disease. If all cases of oesophageal cancer are taken into account, the 5-year survival rate lies between 3 and 7%. The prognosis is therefore comparable to that of cancer of the bronchus and stomach and it is extremely important that the appalling outlook for the patient should not be made worse by treatment.

Attempted curative treatment

Many oesophageal cancers are extremely radio-sensitive. Unfortunately this does not mean that many are radio-curable, because a large number of patients develop widespread metastases early on in the course of the disease. Some types of oesophageal cancer are particularly suitable for treatment by radiotherapy.

Tumour localization

Upper third. Cancer arising in the upper third of the oesophagus, either true post-cricoid carcinoma or carcinoma originating in the sub-cricoid region, is most commonly treated by radiotherapy. Attempted curative surgery involves an extensive and mutilating operation and this is attended by a high morbidity rate and failure occurs as frequently as after radiotherapy. Under these circumstances radiotherapy may be regarded as the less unpleasant of two

methods. Recently, attempts have been made to improve the outlook by combining radiotherapy and radical surgery. Such efforts are justified by the particularly bad prognosis of cancer arising in this region of the oesophagus.

Lower third. In this region, surgery is the treatment of choice. The lateral spread of the lymphatic drainage, the frequent involvement of the upper end of the stomach and the excellent surgical techniques which have been evolved, make radiotherapy the second best method of treatment in this type of oesophageal cancer.

Middle third. When cancer arises in this site, radiotherapy is a reasonable alternative to oesophagectomy in certain cases.

Macroscopic appearance

A proliferating exophytic oesophageal cancer usually responds well to radiotherapy. The excellent blood supply improves radiosensitivity and the relatively intact mucosal surface allows healing with minimal scarring and later stricture formation. More commonly, oesophageal cancer presents as a long tight stricture of the oesophagus. Frequently the blood supply of this type of cancer is poor and this, combined with extensive destruction of the mucosal surface, make cure by irradiation less likely and resumption of normal swallowing improbable. Under these circumstances surgery may be considered the better method of treatment.

Microscopical appearance

A poorly differentiated cancer carries a worse prognosis. As with cancer arising in the upper third of the oesophagus, there is the same chance of local cure with surgery as with radiotherapy. The likelihood that an extensive operation will be followed by distant metastases after a very short interval of time makes radiotherapy the more acceptable method of treatment with anaplastic tumours.

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Pre-treatment assessment

Radical treatment in the presence of distant metastases is usually a waste of precious time, of which

the unfortunate patient possesses all too little. Every effort must therefore be made to detect metastases before embarking unnecessarily on a prolonged course of treatment.

Liver metastases are common and may be difficult to detect at an early stage. Liver function tests are of no value, external gamma scanning of the liver is rarely helpful and needle biopsy of the liver frequently fails to demonstrate the scattered deposits.

Weight loss is a common symptom indicating hepatic metastases. Weight loss due to this cause can be differentiated from the weight loss due to simple starvation by intubating the stomach and feeding the patient for at least 2 weeks. A rapid gain in weight suggests that much of the weight loss was due to starvation. An added benefit from this procedure is the improvement in the patient's nutritional status, which allows him to tolerate any subsequent treatment more comfortably.

Radiotherapeutic technique

Radical irradiation must include at least 5 cm of apparently normal oesophagus above and below the tumour limits demonstrated by barium swallow. Frequently there is submucosal spread present which cannot be demonstrated macroscopically. In practice, it is usually necessary to treat almost the whole of the oesophagus.

With modern megavoltage equipment it is possible to treat any patient adequately regardless of obesity. Treatment takes from 3–6 weeks depending on the technique used.

Complications during treatment

Early effects. Radiation sickness after each dose is seen in some patients. When present this is usually tolerable and should not interfere with treatment. Symptoms may include languor, drowsiness, anorexia, nausea and vomiting. The onset of symptoms occurs usually 1–2 hr after irradiation and the symptoms may persist for a few hours.

Late effects. These include radiation oesophagitis which must be regarded as inevitable if treatment has been directed accurately. Dysphagia occurring towards the end of treatment is usually due to this complication. There is a well marked mucositis present in the oesophagus and the barium swallow will demonstrate a reversible narrowing due to spasm.

Should a fistula occur during or immediately after irradiation, it is traditional to attribute this to the evil effects of radiotherapy. This is nonsensical. A broncho-oesophageal fistula developing after irradiation has almost always been preceded by tumour infiltration joining the oesophagus to the trachea or

main bronchus. Radiotherapy destroys the tumour successfully but unfortunately cannot reconstitute the hole left after disappearance of the cancer. Obviously if one could forecast which patient was likely to develop this complication, this would be an indication for surgery rather than radiotherapy.

Complications after treatment

With careful beam direction and protection of normal structures, damage to the spinal cord and lungs can be avoided. It is impossible to avoid completely the possibility of oesophageal stricture. Above a dose of 4000 rad in 4 weeks an asymptomatic radiological oesophageal narrowing becomes increasingly common. If the dose is increased to 6000 rad in 5–6 weeks stricture formation may produce symptoms and rarely may require periodic dilatation.

Results of treatment

There are no adequately documented controlled investigations comparing the results of radiotherapy with those of surgery.

Pearson (1966) reviewed 1640 cases of oesophageal cancer treated in South East Scotland from 1931–1964. Before 1948 both radiotherapy and surgery were primitive and the results were appalling. Between 1948 and 1955 with improvements in surgical techniques, the 5-year survival rate with surgery improved to 14%. From 1956–1964 radiotherapeutic improvements led to the wider use of irradiation with a 5-year survival rate of up to 22%.

Recently, pre-operative radiotherapy has been recommended. The evidence that this approach improves the prognosis is difficult to assess statistically, but the efficacy of radiotherapy in eradicating local disease appears to be definite. Most patients dying of the disease after surgery alone had active cancer present in the oesophagus, but after pre-operative radiotherapy it was exceptional to find residual tumour at the primary site.

Other factors may be involved in the recent improvement in the results of treatment of oesophageal cancer. The figures quoted above do not indicate that either surgery or radiotherapy is a better method of treatment in all cases. However, either method can be curative and all patients with oesophageal cancer must be carefully considered as possible candidates for either radiotherapy or surgery before the patient is finally committed to a definite treatment policy.

Reference

- PEARSON, J.G. (1966) The radiotherapy of carcinoma of the oesophagus and post-cricoid region in South-East England. *Clinical Radiology*, 17, 242.