The epidemiology of oesophageal cancer with special reference to England and Wales


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The incidence of cancer of the oesophagus is increasing in England and Wales. In 1978 there were 3,708 deaths, with a crude death rate of 8.7 per 100,000 for males and 6.4 for females. The number of deaths in this country due to cancer of the oesophagus has increased by about one-third in the last ten years. On international comparisons the rate for females in Scotland is the highest in the world with England and Wales second. Males in England and Wales also have a high rate and are ranked sixth in the world. The various sources for obtaining data are easily accessible to clinicians and are described.

TABLE I. Subdivision of ICD codes for cancer of the oesophagus and related alimentary tract

<table>
<thead>
<tr>
<th>Site</th>
<th>ICD 8th Revision (1968-78)</th>
<th>ICD 9th Revision (1979-)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypopharynx</td>
<td>148</td>
<td>148</td>
</tr>
<tr>
<td>148.0 (includes post-cricoid region)</td>
<td>148.0</td>
<td></td>
</tr>
<tr>
<td>Oesophagus</td>
<td></td>
<td></td>
</tr>
<tr>
<td>150.0 no official subdivision includes</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>150.0 Upper third</td>
<td></td>
<td>150.0 Cervical part</td>
</tr>
<tr>
<td>150.1 Middle third</td>
<td></td>
<td>150.1 Thoracic part</td>
</tr>
<tr>
<td>150.2 Lower third</td>
<td></td>
<td>150.2 Abdominal part</td>
</tr>
<tr>
<td>* gastro-oesophageal junction</td>
<td>150.3 Upper third</td>
<td></td>
</tr>
<tr>
<td>150.9 oesophagus-no further details</td>
<td>150.4 Middle third</td>
<td></td>
</tr>
<tr>
<td>Stomach</td>
<td></td>
<td>150.5 Lower third</td>
</tr>
<tr>
<td>151.0 includes cardia, (cardia, orifice)</td>
<td>150.8 Other</td>
<td></td>
</tr>
<tr>
<td>151.0 includes cardia, oesophageal junction</td>
<td>150.9 oesophagus unspecified</td>
<td></td>
</tr>
</tbody>
</table>

* This is an OPCS subdivision for cancer registry data and was not used internationally in 8th Edition

Cancer of the oesophagus is becoming more common in Britain. From the clinical point of view both the histological division into squamous-cell or adeno-carcinoma as well as the anatomical location of the cancer are important in determining whether the patient should have surgery, radiotherapy or palliative intubation.

The purposes of this study were (i) to investigate the true incidence of carcinoma of the oesophagus; (ii) to discover whether the increased incidence of cancer of the oesophagus was due solely to squamous-cell carcinoma; (iii) to find out whether adeno-carcinoma of the stomach and cardia was partially responsible for the increase; (iv) to compare the experience of England and Wales with other countries.

CLASSIFICATION PROBLEMS (Table I)

Information source: International Classification of Disease (ICD) 8th Ed (1) and ICD 9th Ed (2)

Site The international Classification of Disease (ICD) is used for coding the site of a cancer; although some anatomical and pathological detail is included in these codes, in practice the system copes with whatever the doctor writes rather than forcing him into an agreed classification. Indeed doctors use many methods and the 9th Revision of the ICD (2) gives codes for the oesophagus to accommodate two different systems. This departure from the principle that categories should be mutually exclusive is deliberate, since both forms of terminology are currently encountered on medical records. In the 8th Edition (1) there was no official sub-division at all but there was an OPCS subdivision for Cancer Registry Data, not used internationally. At the proximal end posteriorcoid cancer has been separated from cancer of the oesophagus in both revisions. At the distal end there is confusion because some clinicians use the terms lower one-third, cardia and gastro-oesophageal junction as synonyms. It is apparent that the gastro-oesophageal junction and "cardio-oesophageal" junction are dealt with differently in the 8th Revision (OPCS version) and 9th Revision. The overlap at both ends needs to be considered when analysing the true incidence and mortality of carcinoma of the oesophagus.

Histological Type The first internationally agreed histological classification was published in 1976 (3) but the coding of mortality data does not allow for histological detail because it is given so infrequently on death certificates. Cancer registration data in England and Wales has included histological data using previous systems but no analyses have yet been published. Not only are the data of variable quality in different parts of the country, but
the information is incomplete so no reliable facts have been obtained which can be helpful to the clinicians from this particular source.

MORTALITY IN ENGLAND AND WALES
Information sources: Mortality Statistics, Cause: OPCS Series DH2 (4); Mortality Statistics, Area: OPCS Series DH5 (5)

In England and Wales, with a population of about 49 million in 1978, there were 3,708 deaths where cancer of the oesophagus was the underlying cause on the death certificate; 2,085 were men and 1,623 were women. The crude death rates (all ages combined) were respectively 8.7 and 6.4 per 100,000 population. The average age of death in males was 68.0 and in females 72.4, compared with the average expectation of life of 70.2 and 76.3 respectively. Since there is such a difference in the rates between the sexes, specific figures must always be considered separately for men and women. At many ages the death rate for men is more than twice that for women; the overall ratio is rather less because the male population is younger than the female population and death rates from cancer of the oesophagus rise markedly with age. The number of deaths per year have been increasing rapidly over the past ten years. 2801 people died from oesophageal cancer in 1968, and there were one-third more deaths in 1978 than in 1968 (Figure 1). For men the death rates, adjusted for change in the age distribution of the population, have been increasing since the early 1960's (Figure 2). Up until then, there had actually been a decrease from 1911 (6), the first time good data were available. For women there has been a slower but steady increase throughout this whole period.

The small amount of information that can be obtained from death certificates concerning the relationship between cancer of the stomach and the oesophagus in the past ten years is shown in Figure 3. Cancer of the stomach as a whole is three to four times more common than cancer of the oesophagus but is decreasing. When the anatomical site has been specified, cancer of the cardia is about one-third as common as cancer of the oesophagus but has slightly increased. However, about one-half of all the cases of cancer of the stomach have no anatomical detail specified, which means that the death rate for cancer of the cardia could be twice that shown. Since there is a cross over between cancer of the cardia and the oesophagus it may be that the increase in cancer of the oesophagus is in part due to adenocarcinoma of the stomach,
cardia or gastro-oesophageal junction and not just confined only to squamous-cell cancer of the oesophagus. Histological information is not given in routine data, so this particular question cannot be answered from the available epidemiological data.

**CANCER REGISTRATION FOR ENGLAND AND WALES**

*Information sources:* Cancer Statistics, registrations: OPCS Series MB1, Nos 1 & 2 (7)

Since 1962 a national system of cancer registration giving basic information relating to all newly diagnosed cases of cancer has been in operation co-ordinated by the General Register Office, now the Office of Population, Censuses and Surveys (OPCS). Histological data are obtained but few analyses have yet been made and the quality is even more variable than for site. Staging and TNM data have not been collected nationally since 1970. Experience has led most epidemiologists away from the collection of large and possibly ideal amounts of information to the practical solution of obtaining minimum details, partly because clinicians do not seem interested or motivated. One study in Finland (8) and one in America (9) are exceptions because they were designed by clinicians who collected very good data and represent the best available studies, but no similar work has been done in England or Wales.

The distribution of newly diagnosed cases of oesophageal cancer by anatomical site is shown in Figures 4a and b. It is apparent that even for site, apart from histology, the great majority of the information supplied to the Cancer Registry is lacking in specificity. Over two-thirds of the cancers of the oesophagus have no anatomical specificity. In the upper and middle thirds of the oesophagus where squamous-cell carcinoma only would be expected, there has been no great rise in recent years. Similarly there is probably no real change in the lower third where both squamous-cell and adenocarcinoma occur. The main increase of the disease is in those where the anatomical site is unspecified and this matches the rise in cardia of the stomach cancer. At the upper end of the oesophagus the entity of postcricoid carcinoma is included in the ICD subheading hypopharynx. Postcricoid carcinoma has about the same number of registrations in men as cancer of the upper third of the oesophagus, but about four times as many as cancer of the upper third of the oesophagus in women. There are about 440 cases per annum of which 160 are estimated to be true postcricoid tumours (10). It is unlikely that these tumours are confused with cervical oesophageal cancers because clinically they can be easily separated. In any case the number of postcricoid tumours has not increased recently.

**SURVIVAL DATA**

*Information sources:* Cancer Statistics, Survival: OPCS Series MB1 No 3 (11)

The natural history of any disease — the relationship between incidence, survival and mortality — affects the prevalence and thus medical and surgical workload. In an attempt to assess these data for cancer of the oesophagus, information from over 83,000 patients from papers published throughout the world has been analysed in a previous publication (12). It appears that out of 100 patients with squamous-cell oesophageal cancer in a community, 58 will be explored surgically and 39 will have the tumour resected, which implies that 61 have an extensive inoperable growth. Of the 39 operated on, 13 die in hospital post-operatively and 26 leave hospital with the tumour resected. 18 survive one year and four will live for at least five years. These figures were obtained from non-epidemiological papers. However the survival rates for patients registered in England and Wales in 1971-1973 are identical, with about 18% living for one year and 5% alive at five years (11). If 82% of patients with oesophageal cancer die within one year of diagnosis the relationship between incidence and mortality is close. This is useful epidemiologically because the prevalence of the disease in the community can be assessed. It is also very important clinically because the effect of changes in treatment and management should be obvious at the
end of one year and it would not be necessary to wait five years before detecting differences as is the practice with other diseases.

**HOSPITAL INPATIENT ENQUIRY DATA FOR ENGLAND AND WALES (HIPE)**

*Information source: Hospital Inpatient Enquiry: OPCS Series MB4 (13)*

In most hospitals in England and Wales, clerks fill out Hospital Activity Analysis (HAA) forms (the so-called HMR1) giving data on admission and discharge, diagnosis, operations, and other details. This is done by lay staff after the medical staff have done an inpatient summary. The accuracy of diagnosis will only be improved when doctors are persuaded that useful data can be accumulated. The system has other limitations; discharges can be multiple for each patient, but deaths are not. Data published in the Hospital Inpatient Enquiry are based on a 10% sample in each of the fourteen regions in England and Wales. The analyses of total HAA data are not published nationally.

In Figure 5 the total number of discharges and deaths with a diagnosis of cancer of the oesophagus is shown to have increased rapidly between 1968 and 1976. This type of hospital data alone should not be used to imply any true increase in the disease unless it were known that there had been no significant changes in admission and discharge policy and length of stay in hospital. Figure 5 also shows that approximately one-third of all the episodes in hospital with a diagnosis of cancer of the oesophagus end with death in hospital. These deaths in hospital amount to approximately one-half of all the deaths from cancer of the oesophagus in each year. The other half die at home under the care of their family doctor.

It must be emphasised that data obtained from HIPE gives only a rough estimate about the numbers of patients with any given disease who are treated in hospital. It does not include patients treated at home by family doctors. It does not help in assessing the true incidence of a disease.

**HOSPITAL INPATIENT DATA FOR THE NORTH EAST THAMES REGION**

*Information sources: a) North East Thames Regional Statistical Office; b) London Hospital, John Eliott Computer Centre*

The North East Thames Region has a population of 3.7 million people. All the hospitals except King George's, Ilford, and the North Middlesex complete forms for the accumulation of HAA data. It is possible to separate individuals in the total workload of each hospital because multiple admission can be recognised by their hospital unit number, although most analyses available do not separate them.

There are 2,905 surgical beds in the North East Thames Region. The two hospitals who do not contribute at all and the two who only started in October 1978 contain 250 of the total surgical beds so the figures for the region must be underestimated by about 10%. In 1978 there was a total of 584 deaths and discharges with a diagnosis of cancer of the oesophagus (424 discharges and 160 deaths in hospital). This excludes the 38% of all episodes where patients had multiple admissions. Using the national mortality rates for men and women we estimated that 281 deaths from cancer of the oesophagus would be expected in the North East Thames Region in 1978. Mortality statistics for 1977 show that there were 227 deaths in the Region. Of the total expected number of deaths calculated for 1978, 57% were actually recorded in the HAA system as deaths in hospital. The HAA system does not have details about histology nor anatomical site, nor does it represent a true epidemiologically based figure for incidence, but there does appear to be an increase in the number of patients admitted to hospital with oesophageal cancer in the North East Thames Region.

**MORTALITY DATA FOR OTHER COUNTRIES**


There is very wide variation in rates from cancer of the oesophagus in men and women throughout the world (15). Data from a selection of countries from 1967 and 1977 are shown in Figure 6a and b. The rates for men in England, Wales and Scotland are very high and for women in Scotland they are the highest recorded. Alcohol and smoking have been indicated as causes for this high incidence (16).

**DISCUSSION**

The sources of information used in this paper are easily accessible to all clinicians and rely on medical records or other documents completed by doctors. Computer analyses and epidemiological studies using routine data are
only as accurate as the data fed into them. The message of this study is clear. Gastroenterologists wanting reliable figures will have to collect the data themselves and this must be done prospectively because the clinical notes themselves are generally found inadequate in regard to histological and anatomical data. The authors have designed a form for collecting such data on a prospective basis and would encourage others to do the same. Population based studies, using a Health Authority Region, for example, are needed because patients treated by any one individual in a single district may not be representative of the population as a whole, and a large population is necessary because the disease is relatively rare.

At present there is no useful routinely published information about histology of carcinoma of the oesophagus. Clinicians know that true adeno-carcinoma of the oesophagus probably accounts for between one and two per cent of all oesophageal cancer (16). These probably arise from either isolated islets of columnar cells in the body of the oesophagus or in the very rare columnar-cell lined oesophagus (Barrett's). Adenocarcinoma may be gastric in origin and spread upwards involving the lower oesophagus (12). These distinctions of anatomy and histology are important to surgeons, radiotherapists and pathologists. It is clear that the statistical classifications in present use have their limitations and could be improved. It is possible that four anatomical divisions of the oesophagus (1. cervical, 2. upper third, 3. middle third and 4. lower third) and three of the stomach (1. cardia and gastro-oesophageal junction, 2. body or fundus and 3. pylorus and antrum) would provide simpler choices of more practical value because different pathological entities could be identified without necessarily having histological details. Given the limitations of the data it is apparent that cancer of the oesophagus in England and Wales is increasing. Little is known of the cause of cancer of the oesophagus in Britain other than the part played by alcohol and smoking. More research of a combined clinical and epidemiological nature is obviously required.

REFERENCES

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Italian abstract L'incidenza del cancro dell'esofago è in aumento nell'Inghilterra e nel Galles. Nel 1978 sono stati registrati 3.708 decessi con un tasso di mortalità lordo pari a 8,7 per 100.000 nei maschi e di 6,4 nelle femmine. Nei due paesi il numero di decessi per cancro nell'esofago è aumentato di circa un terzo negli ultimi 10 anni.

Da un confronto internazionale appare che il tasso di mortalità nel sesso femminile ha il valore massimo in Scozia, con Inghilterra e Galles al secondo posto. Anche nel sesso maschile, il tasso in questi paesi è elevato e si situa al 6° posto nel mondo. Sono indicate le varie sorgenti facilmente accessibili cui attingere dati.