

Short Communication

The histopathology of gastric cancer in rural and urban areas of North Wales

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Although decreasing in most parts of the world, gastric cancer is still a major cause of cancer mortality, being the third commonest fatal cancer in the UK and the commonest site in much of Eastern Asia, and South and Central America. It has a poor prognosis, partly because the diagnosis is usually made too late and it does not respond well to treatment. Consequently there is a lot of interest in determining the cause of the disease and the means of its prevention or early diagnosis.

Within the UK there is considerable regional variation in the incidence of gastric cancer (Chilvers & Adelstein, 1980); in general the incidence is lowest in the south and east of England and highest in Wales, Scotland and Northern Ireland. Amongst the many histopathological classifications, that described by Lauren (1965) has proved to be of particular interest to those studying the aetiology of the disease. On the basis of their histology and cytology, secretion of mucin and mode of growth, he divided gastric cancers into two main types—intestinal and diffuse (Table I, Figure 1), and studies by Correa (1981) and others have indicated that the intestinal type is caused by environmental factors whilst the diffuse form has a genetic predisposition. The evidence for this was reviewed recently by Lehtola (1978). Intestinal type gastric cancer predominates in areas with a high incidence of the disease, and populations which moved from a high to a low incidence area experienced a decline in the incidence of intestinal type gastric cancer, whilst the number of diffuse type cancers remained unchanged. At the family level Kekki *et al.* (1975) found that the first degree relatives of patients with diffuse gastric cancer are liable to develop atrophic gastritis.

Anecdotal reports from pathologists in North Wales suggested that gastric cancer in this region was almost always of the diffuse pattern, indicating that this local high incidence of gastric cancer was

Table I A comparison of the characteristics of diffuse and intestinal type gastric cancers (Summarised from Lehtola, 1978)

	<i>Diffuse</i>	<i>Intestinal</i>
Relative age at onset	Younger	Older
Ratio of males: females	1	>1
Type of tumour	Ulcerous	Polypoid
Site of tumour	higher proportion in the cardia	Mainly antral
Associated blood groups	Group A	None
Prognosis	Poor	Better
Suggested aetiology	Genetic predisposition	Environmental

due to a genetic predisposition (Ashley & Davies, 1966). If this was so it would be of great importance in evaluating the results of studies of environmental factors in the causation of gastric cancer. We therefore decided to study the relative proportion of the two histological types of gastric cancer in North Wales.

Histological sections from cases of gastric cancer diagnosed at the Royal Alexandra Hospital, Rhyl, between 1952 and 1979, were located and examined. These were mainly from gastrectomy specimens with some biopsy material. H and E stained sections were examined, supplemented in some cases by stains for mucin, viz PAS after diastase digestion combined with alcian blue, and high iron diamine combined with alcian blue. The cancers were classified as diffuse, intestinal and unclassifiable (other) using the criteria of Lauren (1965). In addition, a fourth category, designated mixed, was employed for those cases where both the intestinal and diffuse type patterns were present in the same resected tumour.

Slides from 356 resected specimens and 134 biopsy specimens contained 115 diffuse, 265 intestinal, 38 mixed and 72 unclassifiable cases

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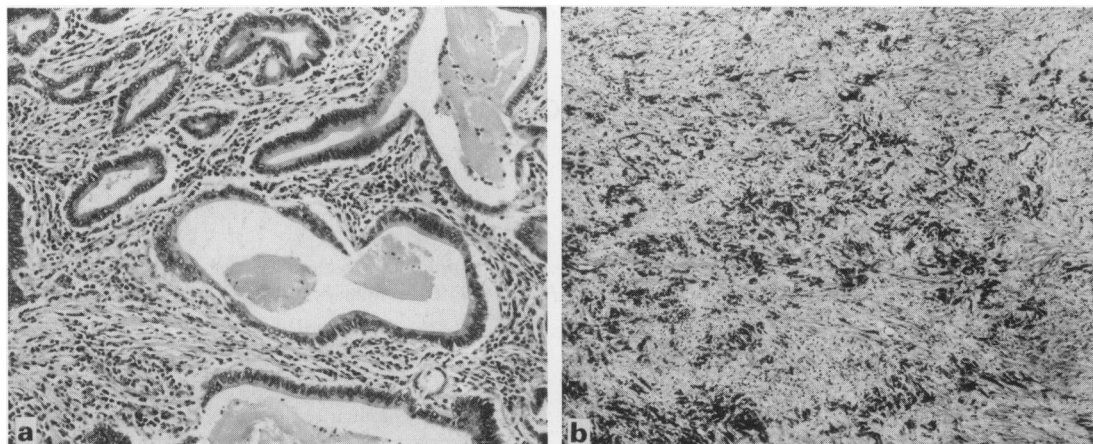


Figure 1 Intestinal and diffuse types of gastric cancer (a) Intestinal type gastric cancer. Glands lined by columnar cells with prominent brush border. H&E $\times 150$. (b) Diffuse type gastric cancer. Individual and small groups of tumour cells with markedly fibroblastic stroma. H&E $\times 75$.

(Table II) giving an intestinal to diffuse ratio of 2.30. These relative proportions are similar to those reported elsewhere for "normal" European populations (Lauren 1965; Lehtola, 1978; Munoz *et al.*, 1968) and offer no support for the suggestion of a high proportion of diffuse gastric cancers.

Table II Histopathology of gastric cancer cases

Type of specimen	Histological type			
	Intestinal	Diffuse	Mixed	Unclassifiable
Resection—number	199	82	38	37
percentage	56	23	11	11
Biopsy—number	66	33	—	35
percentage	49	25	—	26

Addresses of the patients were found from the hospital records, and those having diffuse intestinal gastric cancer were plotted on an ordnance survey map (OS-116 Denbigh and Colwyn Bay). Much of the information available to us was old and incomplete. The names and addresses of the cases were taken from a card index file and many addresses were absent. Where possible the original notes were then traced, but many had been destroyed and it was not possible to find the addresses for 61/380 cases. Those patients whose cancer was either mixed or unclassifiable were not plotted. The population figures were obtained by taking the mean of the figures for the areas from the 1951, 1961 and 1971 Census for England and Wales.

Of the intestinal and diffuse cases, 319 had a usable address and could be plotted. Of these, 82

were diffuse and represent 70% of all the diffuse cases examined, and 237 were intestinal, representing 90% of all cases examined. The overall ratio of intestinal-to-diffuse cases plotted geographically was 2.89. When the 226 cases from the coastal and urban areas were considered (Rhyl, Colwyn Bay, Prestatyn, Abergele, Denbigh, and the towns bordering on to England, population 94,640) the ratio of intestinal-to-diffuse cases was 2.42 whilst in the inland rural areas (population 30,759) almost all the 94 cancers were of the intestinal type, and the intestinal-to-diffuse ratio was 4.81.

Table III shows the average age at diagnosis and the sex ratio of all the cases of intestinal and diffuse cancer examined. With diffuse type cancers, the male-to-female ratio was approximately unity whereas intestinal type gastric cancer was twice as common in men (Table III) in agreement with

Table III Characteristics of the gastric cancer patients studied

	Males		Females		Total	
	Number	Mean age at diagnosis (years)	Number	Mean age at diagnosis (years)	Number	Mean age at diagnosis (years)
All cases						
Diffuse	56	62	59	66	115	64
Intestinal	179	66	86	69	265	67
Total	235	65	145	68	380	66
Those plotted geographically						
Diffuse	38	63	43	65	81	64
Intestinal	159	66	79	70	238	67
Total	197	66	122	68	319	66

previous reports (Correa *et al.*, 1970; Lehtola, 1978; Correa, 1981).

The identification of environmental agents in North Wales responsible for the high incidence of gastric cancer in that region has still to be achieved, although many have been suggested, including bracken fern (Evans & Osman, 1974) and imbalances in the heavy metal content of soils (Stocks and Davies, 1964). The data presented in this paper suggest that more than one agent may be involved and that the factors which are most

important in the rural areas may be less so in the urban and coastal regions.

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