Benign gastric ulceration in a health district: incidence and presentation

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Summary: In a survey of benign gastric ulceration conducted in the Hounslow Health District from 1981 to 1982, there was an annual incidence for this condition of 43.6 per 100,000 of the population older than 14 y, with a male:female ratio of 0.9:1. This incidence is comparable to that found in other surveys over the last 30 y, but the male:female ratio is lower than in the past. This reduction is accounted for by a rise in the peak age incidence for gastric ulcer, particularly in women, and a greater proportion of the total population in this higher age group being women. In spite of a large local Asian population, no gastric ulcers occurred in this ethnic group. Thirty-eight per cent of the patients presented with acute bleeding, and 44% of these bleeders gave a history of previous ingestion of non-steroidal anti-inflammatory drugs compared with only 14% of the non-bleeding group ($P < 0.015$).

Introduction

The epidemiology of peptic ulceration is difficult to study because of the varied presentation of the disease and the variety of doctors involved in the care of those affected, although worldwide statistics suggest that in Western populations about 10% of adults are affected by ulcer disease at some time in their lives, and many working days are lost as a result (Langman, 1979). Accurate prevalence and incidence data are thus important in order to monitor changing trends, the effects of new diagnostic aids and treatments, and possible aetiological factors. Working in a district general hospital with a large catchment population we decided to conduct one of few surveys in which an attempt has been made to record all patients newly diagnosed as having benign gastric ulceration.

Methods

The population of 203,900 studied (figures from the NW Thames Regional Health Authority statistical section) was that living in the Hounslow Health District in 1981 (consisting of the London Borough of Hounslow and that part of the London Borough of Richmond which lies north of the River Thames, i.e. Twickenham and Teddington). The hospitals designated to serve this district at that time were the West Middlesex University Hospital and two small com-

munity hospitals. Doctors working in this district who were likely to make an endoscopic, radiographic or pathological diagnosis of gastric ulceration, including consultant and junior staff of all the medical, surgical and geriatric teams, were contacted before the study and asked to report all cases to one of us (MJG). The medical records staff were also asked to report cases. All these groups were formally reminded of the study every 3 months, and new doctors joining the hospital staff were informed on arrival. This method often resulted in double and triple reporting of cases, but this was emphasized as being preferable to lack of information.

Following the reporting of a case, the hospital case notes were examined for the relevant details including age, sex, ethnic origin, presenting symptoms, smoking habits and drug history [particularly non-steroidal anti-inflammatory drugs (NSAID) ingestion], as well as the endoscopic, radiographic and pathological data. In the case of patients referred directly for radiology the general practitioner was asked to provide the necessary information.

Patients were entered into the survey if the date of their diagnostic investigation fell in the year March 1981 to February 1982. In the case of patients in whom a gastric ulcer had been previously diagnosed, there had to be reasonable clinical, radiographic or endoscopic evidence of prior healing for the patient to be included in the survey.

The diagnosis of a gastric ulcer was based on the endoscopic or radiological finding of a definite crater, hence excluding multiple superficial erosions. The

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benign nature of the ulcer was confirmed histologically where possible. In several patients with very small ulcers or acute bleeds, biopsies were not taken at endoscopy, and reliance was placed on the diagnostic expertise of a trained endoscopist. In the few patients in whom radiography was the only investigation, the diagnosis was made by one of two consultant radiologists. Two patients were found to have unexpected histological malignancy, one with carcinoma and one with lymphoma, and were therefore removed from the study.

Statistical analyses were by χ^2 test with Yates' correction, Fisher's exact test or Student's *t* test.

Results

During the 1-year study period, 71 patients were newly diagnosed as having benign gastric ulceration; 32 patients were male (45%) and 39 were female (55%). The median age of the men was 61 y (range 26–87 y) and of the women 69 y (range 36–86 y), with an overall median age of 66 y. Seventy of the ulcer patients were Caucasian and 1 was Chinese. There were no Asian patients recorded with gastric ulcers.

Out of a population of 203,900 in the Hounslow Health District 162,600 are aged over 14 y and can be considered at risk from benign gastric ulceration. In this 'at risk' group 75,800 are men and 86,800 are women. The annual incidence in the population at risk is therefore 43.6 per 100,000 (42.2 for men and 44.9 for women). This gives a male:female ratio of 0.9:1. Table I shows the incidence of ulceration broken down by age grouping and sex.

Method of diagnosis

Fifty three patients (75%) were diagnosed primarily at endoscopy and 16 (23%) had an initial barium meal, of whom 10 subsequently had a confirmatory endoscopy. Two patients (3%) were diagnosed at operation (1 with a perforation and 1 with a severe bleed). No gastric ulcers were diagnosed solely at post-mortem. Only 6 patients had neither endoscopy nor surgery to confirm the benign nature of their ulcer. These 6 all had radiological criteria of benign ulceration, and avoided endoscopy because they refused, because of

Table II Site within the stomach of 82 gastric ulcers in 71 patients.

	Male	Female	Total
Body of stomach	23	37	60
Antrum	9	11	20
(Partial gastrectomy)	1	1	2
Total			82 ulcers

medical contraindications or in one case due to an imminent move away from the area.

Clinical features of gastric ulceration

There were 6 patients with 2 ulcers, 1 patient with 3 ulcers and 1 with 4 ulcers making a total of 82 ulcers in the 71 patients. All but one of the patients with multiple ulcers were female. Table II shows the distribution of the ulcers through the stomach: there was no difference in ulcer site between men and women. Only two patients (both female) had concurrent duodenal ulceration. Table III records data regarding past history of peptic ulceration (gastric and duodenal not separated), smoking, absence of pain at any stage, and corticosteroid ingestion. There was no significant difference between men and women in any of these groups.

Presentation due to bleeding

Twenty seven patients (38%) presented with acute bleeding; 12 (44%) of these were men and 15 (56%) were women. There was no significant difference in ages between the bleeding and non-bleeding groups (average 68.3 and 66.7 respectively). Ten (37%) of the bleeding group had no history of pain whereas only 4 (9%) of those presenting without bleeding were pain free. These latter were all diagnosed while being investigated for an iron-deficiency anaemia and were all women.

History of NSAID ingestion

Of the total of 71 gastric ulcer patients, 18 (25%) gave a history of recent ingestion of NSAID; 4 were men and 14 were women ($P < 0.02$). The women tended to

Table I Annual incidence of benign gastric ulceration per 100,000 of each age group.

Age group (y)	15–44	45–64	65–74	75 +
Male	4.6	79.3	79.5	125
Female	6.9	34.5	130.4	152.9
Total	5.7	55.4	108.4	144

Table III Clinical features of gastric ulcer patients

	Male		Female		Total	
	No	(%)	No	(%)	No	(%)
Smokers	16	(48)	19	(49)	35	(49)
Past history	12	(38)	9	(23)	21	(30)
Painless	9	(27)	6	(15)	15	(21)
Corticosteroids	2	(6)	3	(7)	5	(6.5)

be older than the men (average ages 70.2 and 58.8 y respectively) but not significantly so. The average age of the NSAID group was older than the non-NSAID group (68.5 and 65.7 y) but this also did not reach statistical significance. Drugs ingested included aspirin (7 patients), indomethacin (5), piroxicam (2), benoxaprofen (2), phenylbutazone (2), naproxen (1) and ibuprofen (1). Twelve (44%) of the bleeding group gave a history of NSAID ingestion compared with only 6 (14%) of those presenting without bleeding ($P < 0.015$).

Discussion

In this study we have attempted to record all patients from a known population in whom a fresh diagnosis of benign gastric ulceration was made during a 1 y period. We have clearly not been able to record all patients in whom gastric ulceration occurred since there will have been an unspecified number of people who did not seek medical attention (and whose ulcers healed spontaneously) and a further group who were treated for dyspepsia without specific tests being undertaken. Without specifically screening a sample population no survey can include ulcers which occur in these two groups and the circumscribed type of survey which we carried out, based largely around the diagnostic services of one district general hospital, has the advantage that all the doctors involved were known personally to and were seen regularly by the investigators thus ensuring maximum compliance with the study protocol. By including patients in the survey by the date of their diagnostic investigation, we have made no allowance for the fact that there will have been a variable length time between the onset of symptoms and diagnosis. However, since this very variable time is affected by many factors, a lot of which are not related to the specific disease entity, we feel the method which we used to define incidence is the most appropriate to the condition which we were studying and the most comparable with other studies.

The population used to calculate the incidence figures was the resident one and not the catchment population since we did not include patients living outside the area. There were 4 such patients removed from the study, all of whom attended the West Middlesex University Hospital because of acute bleeding. Although this hospital is the only district general hospital within the Hounslow Health District, it is inevitable that in London some local patients will seek medical attention elsewhere. Regional statistical data shows that in 1981 80% of district residents admitted to hospital for medical care received it locally (76% for surgery). Comparable out-patient figures are not available. While this movement of patients introduces some error into our incidence figures, it is unlikely to

affect the figures for sex ratio and bleeding. There are some implicit errors in the collection of data such as smoking and drug history from case notes without specific interview or a control population.

The best available data concerning the proportion of Asians (those originating from the Indian sub-continent) in our local population gives a figure of 10% for the London Borough of Hounslow (Department of the Environment, 1979). There is a significant difference between this figure and the zero figure recorded by us for benign gastric ulceration in Asians, an observation previously unreported in the UK. Epidemiological data for peptic ulceration in India are scanty, but a survey of 30,000 Madras railway workers and their families showed a comparably low annual incidence of 18:100,000 for gastric ulcer (Malhotra, 1967). However, we do not have data concerning the age distribution of the local Asian population and a younger than average distribution might account for the differences which we have observed, a difference which might also be affected by differing referral patterns between racial groups and differing habits of drug ingestion.

Since 1950 there have been eight good studies which give incidence figures for benign gastric ulceration (Pulvertaft, 1959; Sponheim, 1960; Litton & Murdoch, 1963; Dunlop, 1968; Bennevie, 1975; Mowat *et al.*, 1975; Ostensen *et al.*, 1982; Ostensen *et al.*, 1985a). These are selected on the basis that they examine clearly defined populations at risk, use accurate diagnostic criteria, separate new from chronic ulcers and distinguish gastric from duodenal ulceration. Basic data and comparable results from these surveys together with our own are shown in Table IV.

Except for those from Norway, the figures for incidence in these studies are remarkably close and contrary to the general impression of a decreasing incidence of peptic ulceration in Western countries since the last war. The consistently higher Norwegian figures compared to more Southern latitudes may be related to the small variety of local employment and particularly to the large fishing communities (Ostensen *et al.*, 1985b). The male:female ratio of 0.9:1 in our survey is the lowest reported in any recent study and is similar to the pattern of gastric ulceration seen in the mid-nineteenth century except that at that time the majority were female patients and much younger (Brinton, 1857). In comparing male:female ratios, surveys other than those with the strict criteria used for inclusion in Table IV can be used since the ratio can be calculated from the reported data even if exact incidence figures cannot. Figure 1 shows a scattergram of male:female ratios for the eight surveys in Table IV, our own survey and the ratios from some other incidence and post-mortem surveys (Alstad, 1953; Lipetz *et al.*, 1955; Watkinson, 1960; Pulvercraft, 1968). This tends to show a steadily decreasing ratio

Table IV Annual incidence of benign gastric ulceration per 100,000 of the population over 14 years of age for this survey and the 8 most comparable surveys

<i>Area</i>	<i>Duration</i>	<i>Number of ulcer patients</i>	<i>Annual incidence per 100,000 at risk</i>
West Norway (Sponheim, 1960)	1950–1952	139	45
York (Pulvertaft, 1959)	1952–1957	270	40
SW Scotland (Litton & Murdoch, 1963)	1957–1959	134	44
Central Scotland (Dunlop, 1968)	1962	44	44
Tromso (Ostensen <i>et al.</i> , 1982)	1962–1964	222	71
Copenhagen* (Bonnievie, 1975)	1963–1968	496	44
Aberdeen (Mowatt <i>et al.</i> , 1975)	1967	151	41
Tromso (Ostensen <i>et al.</i> , 1985a)	1980–1983	245	110
West Middlesex (Glynn & Kane)	1981–1982	75	44

* Half the county population defined by birthday between January & June.

since 1940.

The cause of this increasing incidence of gastric ulceration in women is not known (and by inference from the almost constant total incidence, a decreasing male incidence). We have shown that 25% of patients gave a history of recent ingestion of NSAID and in the drug using group there were significantly more women than men. The increased proportion of women with benign gastric ulcers could be explained by there being a higher proportion of women in the general population using NSAID, for example in the treatment of rheumatoid arthritis, a disease commoner in women.

Any change in the male:female ratio can be considered to be related to two factors: the actual incidence of ulceration for the different age ranges in each sex, and the distribution of the population at risk over those age ranges. Figures from the UK national censuses for 1951 and 1981 (Office of Population Censuses and Surveys, 1975 & 1982) show that the proportion of the population over 14 years of age who are also over 64 years of age has increased from 12% to 16% for men but from 16% to 22% for women. In addition, comparing the York survey (Pulvertaft, 1959) with our own, the annual incidence of benign gastric ulceration in the over 64 y age range has increased from 48 to 94 per 100,000 for men but from 49 to 155 for women. To account for the drop in male:female ratio, there is thus evidence both for an increasing proportion of elderly women in the population, and for their having an increased incidence of

gastric ulceration.

In the present study a presentation with bleeding was statistically associated with a history of recent ingestion of NSAID. This association was not affected by the ages of the patients in the drug and non-drug groups. Painless ulcers might be expected to present with bleeding more often than those causing pain since bleeding and pain are the two main presentations of peptic ulcer. This factor did not account for the association of bleeding and NSAID ingestion: indeed the majority (83%) of drug-related ulcers were painful.

The literature regarding the association of either peptic ulcer or gastrointestinal haemorrhage with NSAID ingestion is extensive and inconclusive (Langman, 1979). Aspirin ingestion has been shown to cause endoscopically visible multiple gastric erosions whereas paracetamol does not (Hofteizer *et al.*, 1982). There have been studies which show an association between aspirin ingestion and non-variceal upper gastrointestinal haemorrhage (although not necessarily from peptic ulcer), and also between aspirin ingestion and chronic gastric ulcer (Valman *et al.*, 1968; Levy, 1974). There is a general belief that NSAID cause dyspepsia, ulceration and haemorrhage although there are no confirmatory epidemiological studies. We have shown a tendency for NSAID-associated ulcers to present with bleeding more often than ulcers occurring in the absence of these drugs. This has been reported twice before. In New Zealand it was found that 20 out of 32 (62%) indomethacin

Key:	Survey	Reference	Date
a	Denmark	Alsted, 1953	1940
b	N Norway	Schanke, 1946	1941–44
c	Denmark	Alsted, 1953	1948
d	W Norway	Sponheim, 1960	1950–1952
e	Edinburgh	Lipetz <i>et al.</i> , 1955	1953
f	York	Pulvertaft, 1959	1952–1957
g	UK post-mortem	Watkinson, 1960	1956
h	SW Scotland	Litton & Murdoch, 1963	1957–1959
j	York	Pulvertaft, 1968	1958–1963
k	Central Scotland	Dunlop, 1968	1962
l	Tromso	Ostensen <i>et al.</i> , 1982	1962–1964
m	Copenhagen	Bonnevie, 1975	1963–1968
n	Aberdeen	Mowatt <i>et al.</i> , 1975	1967
p	Tromso	Ostensen <i>et al.</i> , 1985a	1980–1983
q	West Middlesex	Glynn & Kane (1985)	1981–1982

Figure 1 Scattergram showing the change in male:female ratio of the incidence of benign gastric ulceration from 1940 to date

associated ulcers presented with bleeding compared with 44 out of 156 ulcers (28%) in unmatched controls not on this drug (McLaurin *et al.*, 1978). In addition, a recent report from Bolton (Clinch *et al.*, 1983) showed a strong association between NSAID ingestion and peptic ulceration as well as 47% of bleeding patients having previously taken these drugs compared with 27% of non-bleeders.

Bleeding from a gastric ulcer is a serious complication with an overall mortality of about 9%, rising in

the older age groups, whom we have shown to be increasingly at risk from gastric ulceration, to above 15% (Schiller *et al.*, 1970; Allan & Dykes, 1976). We have shown that 25% of patients presenting with benign gastric ulceration gave a history of recent ingestion of NSAID, drugs which the literature quoted above suggests cause gastric ulcers and bleeding; 44% of the patients with this history presented with acute bleeding, a figure which if applicable to the country at large would have important implications for the

widespread prescription of these drugs to elderly people.

In conclusion, this survey has shown an annual incidence of fresh benign gastric ulceration which has not changed from that seen over the last 30 y, other than in Norway. However, there is a relatively higher proportion of elderly female patients, many of whom present with bleeding and have been taking non-steroidal anti-inflammatory drugs.

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