Increased risk of irritable bowel syndrome after bacterial gastroenteritis: cohort study

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Evidence exists of an increased risk of irritable bowel syndrome after an episode of bacterial gastroenteritis.[1 2] In one study, 12 out of 38 patients presented with bowel dysfunction 1 year after salmonella gastroenteritis.[1] In another study, 386 patients with bacterial gastroenteritis were surveyed by questionnaire 6 months after infection, and 27 (7%) had developed irritable bowel syndrome.[2] Both studies, however, lacked a control group.[3]

Subjects, methods, and results

Our source population came from the General Practice Research Database, which contains clinical information on patients recorded by general practitioners in the United Kingdom.[4]

We identified patients aged 25 to 74 with a bacteriologically confirmed first episode of gastroenteritis, from a recent study that examined the association between acid suppressing drugs and the development of gastroenteritis.[5] We excluded all patients with a history of irritable bowel syndrome, cancer, or alcoholism. We sampled a comparison cohort from the source population from which patients with gastroenteritis had been ascertained. We applied the same eligibility criteria as were used for the ascertainment of the gastroenteritis cohort, but the subjects had to be free of gastroenteritis at the start of follow up. We then followed up both cohorts during 1 year until the earliest occurrence of one of the following end points: diagnosis of irritable bowel syndrome, cancer, alcohol misuse, or death. To confirm diagnoses, we sent a questionnaire to the doctors of all patients with irritable bowel syndrome in the gastroenteritis cohort and a 10% random sample (n = 216) to the doctors of patients with irritable bowel syndrome in the general population. We used Poisson regression to calculate incidence, relative risk, and 95% confidence intervals of irritable bowel syndrome associated with gastroenteritis. The general population cohort was used as the reference group, and the estimates were adjusted for age, sex, and body mass index.

Our study included 584 308 subjects in the general population cohort and 318 patients in the gastroenteritis cohort (table). During the 1 year follow up, 2027 (0.3%) subjects in the general population cohort and 14 (4.4%) in the gastroenteritis cohort had a diagnosis of irritable bowel syndrome recorded on computer. One hundred and sixty nine subjects (78%) from the random sample of the general population cohort, and 12 (86%) subjects in the gastroenteritis cohort, had confirmed irritable bowel syndrome on the basis of the questionnaire. We analysed all patients in the general population with a diagnosis of irritable bowel syndrome recorded on computer and all cases confirmed by the doctor in the gastroenteritis cohort. The adjusted relative risk of irritable bowel syndrome was much higher in the gastroenteritis cohort than in the general population cohort (difference 11.9, 95% confidence interval 6.7 to 21.0).

Comment

We found that, in the year after an episode of gastroenteritis, patients were 10 times more likely to have irritable bowel syndrome than were subjects in the general population. All incident cases of irritable bowel syndrome in the gastroenteritis cohort were confirmed by the doctor, but we obtained only a random sample of patients with irritable bowel syndrome in the general population owing to the large number of cases (>2000 patients). When we adjusted for this, the incidence of irritable bowel syndrome was reduced to 2.7 per 1000 per year in the general population, and the crude relative risk associated with gastroenteritis was increased to 14.4.

Only one other study has analysed the risk of irritable bowel syndrome in an unselected group of patients with gastroenteritis.[2] The authors estimated a rate of newly diagnosed irritable bowel syndrome of about 7%, similar to our finding (4%). Our study, however, is the first to include a control group and therefore to provide estimates of relative risk.[3] We conclude that bacterial gastroenteritis is a major independent risk factor for irritable bowel syndrome.

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Contributors: LAGR designed the study protocol, participated in data analysis, and wrote the paper; he will act as guarantor for the paper. AR helped with data analysis and contributed to the paper.

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Characteristics of study cohorts, and incidence and relative risk of irritable bowel syndrome associated with gastroenteritis. Values are numbers (percentages) unless stated otherwise

Variable	General population (n=584 308)	Gastroenteritis cohort (n=318)
Age (years)		
25-39	189 521 (32)	80 (25)
40-59	268 077 (46)	150 (47)
60-74	126 710 (22)	88 (28)
Sex		
Male	304 187 (52)	163 (51)
Female	280 121 (48)	155 (49)
Bacteria		
Campylobacter	—	172 (54)
Salmonella	—	119 (37)
Other organisms	—	27 (9)
One year follow up		
Person years	575 169	303
No of cases of irritable bowel syndrome	2027	12
Incidence/1000 person years (95% CI)	3.5 (3.4 to 3.7)	39.7 (22.5 to 69.9)
Relative risk (95% CI)*	1.0	11.9 (6.7 to 21.0)

*Adjusted for age, sex, and body mass index.

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Cross sectional study of social variation in use of an out of hours patient transport service

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Out of hours primary care has undergone radical reorganisation in recent years, with increasing numbers of general practitioner cooperatives operating from primary care emergency centres.[1] A major issue continues to be equity of access, particularly in areas of socioeconomic deprivation where demand is high but access to transport is poor.[2,3] In Glasgow, 52% of the population reside in areas of deprivation (Carstairs and Morris deprivation categories 6 or 7).[4]

The Glasgow Emergency Medical Service was established in February 1996: it covers around 950 000 patients and 95% of the city's 219 general practices, and operates from six centres across the city. The service offers free transport for patients between their homes and the centres.

Subjects, methods, and results

We collected data on all patient contacts with the emergency service over one week in October 1996 (n = 3193). The socioeconomic category of the patients was derived from their postcode sector of residence (depcats 1 and 2, affluent; 3-5, intermediate; 6 and 7, deprived).[4] Time of first contact with the service was categorised as evening until midnight, night, and weekend daytime. To standardise the distribution of contacts over time, we calculated rates of contact per million person hours then analysed these by Poisson regression. We analysed service response by logistic regression. Independent variables for both models were age, socioeconomic category, and time of first contact.

Sociodemographic data were available for 2882 contacts (90.3%), giving a crude contact rate of 28.1 per million person hours (equivalent to 157.8 contacts per 1000 patients per annum). We found an interaction between socioeconomic category and age group ($P = 0.002$), with 60% higher contact rates for children and adults from deprived areas (aged < 5: affluent, 79.4 per million person hours; deprived, 130.9; schoolchildren: affluent, 19.4; deprived, 31.3; adults: affluent, 15.1; deprived, 24.1). In elderly people the contact rate was 38% higher for the affluent group (affluent, 51.7; deprived, 37.5).

Of the 3193 contacts, 1713 (53.7%) attended centres, 726 (22.7%) received home visits, 449 (14.1%) were given telephone advice, 63 (2.0%) were sent an ambulance, and 144 (4.5%) did not attend as arranged (unknown for 98 (3.1%)). Socioeconomic category influenced the probability of receiving a home visit ($P = 0.037$), with adults and elderly people in deprived areas more likely to receive one. Socioeconomic category did not affect the likelihood of receiving telephone advice ($P = 0.42$) or attending a centre ($P = 0.29$) (table).

Full data were available for 1607 (93.8%) patients attending centres, of whom 304 (18.9%) used the patient transport service. Patients from deprived areas were four times more likely to use patient transport (affluent, 6.3%; deprived, 25.2%: $P < 0.0001$): this trend was most apparent at night, when there was a sevenfold difference between affluent (6.3%) and deprived areas (44.6%: $P < 0.0001$).

Response for different age groups by patient socioeconomic category (full data available for 2641/3193 (82.7%) contacts). Values are percentages (numbers) of patients

	Patients aged <5 years (n=620)			Patients aged 5-14 years (n=312)			Patients aged 15-74 years (n=1465)			Patients aged ≥75 years (n=244)		
Socioeconomic category	Home visit	Centre attendance	Telephone advice	Home visit	Centre attendance	Telephone advice	Home visit	Centre attendance	Telephone advice	Home visit	Centre attendance	Telephone advice
Affluent	0	79.2 (57)	20.8 (15)	7.9 (3)	73.7 (28)	18.4 (7)	23.7 (46)	59.3 (115)	17.0 (33)	75.9 (44)	8.6 (5)	15.5 (9)
No of patients in category		72			38			194			58	
Intermediate	3.7 (7)	81.8 (153)	14.4 (27)	3.4 (3)	83.1 (74)	13.5 (12)	26.2 (101)	59.2 (228)	14.6 (56)	80.3 (61)	9.2 (7)	10.5 (8)
No of patients in category		187			89			385			76	
Deprived	3.9 (14)	80.9 (292)	15.2 (55)	4.3 (8)	78.9 (146)	16.8 (31)	29.0 (257)	56.3 (499)	14.7 (130)	88.2 (97)	2.7 (3)	9.1 (10)
No of patients in category		361			185			886			110	