Helicobacter pylori serology in elderly people: a 21-year cohort comparison in 70-year-olds and a 20-year longitudinal population study in 70–90-year-olds

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Abstract

Aims: (i) to compare Helicobacter pylori serology in two 70-year-old cohorts in Gothenburg, Sweden, born 21 years apart, (ii) to study H. pylori serology in a 70-year-old cohort over 20 years.

Population and method: H. pylori serology at the age of 70 was investigated in 98 men and 132 women born in 1901/02 and in 77 men and 113 women born in 1922. In 21 men and 40 women Helicobacter serology was monitored longitudinally with examinations at 70, 81, and 90 years of age. The analyses were performed on frozen samples by use of an in-house enzyme immunoassay with a sensitivity of 0.99, specificity of 1.00 and positive and negative predictive values of 0.96 and 1.00, respectively. Absorbance values <0.500 were interpreted as negative; values of ≥0.700 were interpreted as positive; and values in between as inconclusive.

Results: the 70-year-old cohort, born in 1922, showed a significantly lower proportion of subjects with positive H. pylori serology in both men (57.1% vs 80.6%) and women (48.7% vs 75.8%) compared with 70-year-olds born in 1901/02. There were no significant sex differences in either cohort. No longitudinal increase or decrease could be demonstrated in those who were examined at 70, 81 and 90 years of age.

Conclusions: the difference in H. pylori prevalence between the two cohorts may reflect a rapid change in socio-economic conditions in Sweden during this 20-year period.

Keywords: Helicobacter pylori, population study, Sweden

Introduction

Since the first successful culture of spiral bacteria from the human stomach in 1982 [1], Helicobacter pylori has been increasingly recognized to be one of the most common bacterial infections in man, a causative agent of chronic gastritis and associated with duodenal and gastric ulcer [2, 3].

Strong relationships exist between socio-economic conditions and infection rate, a relationship that presumably reflects differences in life-style which influence acquisition of the bacteria. In developing countries, the prevalence of infection increases steeply soon after birth and may reach levels of 80–90% by the age of 20 years [4]. In contrast, in developed countries, infection is relatively uncommon below the age of 25–30 years. From less than 20% in 25–30-year-olds, the prevalence increases gradually with age, levelling out at 60–70% in the cohorts who are now 70 years of age [4]. Infection is more common in institutions [5]. Recently, Neri et al. [6] reported prevalences of H. pylori infection of 73% in elderly patients admitted to a geriatric rehabilitation ward and 69% in a sample of institutionalized old subjects.

Longitudinal studies of long duration and cohort comparison studies offer the opportunity to determine whether infection in elderly people increases with age and to study different cohorts of elderly subjects at the same chronological age. Making use of gerontological and geriatric population studies in Gothenburg, Sweden [7, 8], we have investigated H. pylori serology in:

1. Two 70-year-old cohorts in Gothenburg, Sweden, born 21 years apart; and
2. A 70-year-old cohort followed for 20 years with examinations at ages 70, 81 and 90.

Population

Gothenburg is the second largest city in Sweden, with about 1 million inhabitants.

This study is part of the gerontological and geriatric population studies in Gothenburg, which started in 1971/72 [7-9], where a random sample of 1148 70-year-olds born in 1901/02 (520 men, 628 women) were selected, of whom 973 (85%; 449 men, 524 women) participated (cohort 1). This cohort has been reinvestigated several times over the years [8, 9]. At 81 years 145 men and 259 women were investigated and at 90 years 65 men and 158 women were investigated.

In 1992 a random sample of 753 70-year-olds (302 men, 451 women) born in 1922 were selected. The participating rate in this cohort (cohort 5) was 66% (201 men, 299 women).

H pylori serology was investigated at the age of 70 in 98 men and 132 women born in 1901/02 and in 77 men and 113 women born in 1922.

Laboratory methods

The analyses were performed on frozen samples. Antibodies to H. pylori were measured by an in-house enzyme immunoassay [10]. The enzyme immunoassay test has a sensitivity of 0.99, specificity of 1.00 and positive and negative predictive values of 0.96 and 1.00 when used in parallel with culture and histology on a material of patients with duodenal ulcer [10]. Absorbance values <0.500 were interpreted as negative, values of 0.5-0.69 as positive and values 0.69 and <0.700 as inconclusive.

Results

Cohort comparison

Figures 1 and 2 show the distribution of absorbance values at the age of 70 in men and women born in 1901/02 and 1922, respectively. Figure 3 shows the proportion of men and women born in 1901/02 and 1922 with positive serology at age 70. As can be seen, the later 70-year-old cohort shows a significantly lower proportion of people of both sexes with positive H. pylori serology.

Of men born in 1901/02, 80.6% (79/98) had a positive serology, in contrast to 57.1% (44/77) of men born in 1922 (P < 0.001). The corresponding figures for women were 75.8% (100/132) and 48.7% (55/113; P < 0.001). There were no significant sex differences in either cohort.

Longitudinal study

Figure 4 shows the mean absorbance values (mean ± SD) in the same 21 men and 40 women at ages 70, 81 and 90. Figures 5 and 6 show the distributions of absorbance at ages 81 and 90. The proportions of
probands with positive serology in men at age 70, 81 and 90 years were 67, 67 and 71%, and the proportions in women were 73, 75 and 73%. No longitudinal increase or decrease was demonstrated in this group (Figure 4).

Discussion

We observed a marked decrease in positive Helicobacter serology on a cohort comparison basis between 70-year-olds born in 1901/02 and 1922, but no significant changes in the serology over a 20-year follow-up period.

Regarding the longitudinal results, we conclude that no significant new infections with Helicobacter occurred after the age of 70 in this population. Spontaneous eradication may occur but seems to be of a magnitude of less than 1% per year [11]. It seems unlikely that this small spontaneous eradication rate could mask an occurrence of new infection between age 70 and 90.

A marked cohort effect was, however, noted in a 21-year perspective. We have repeatedly shown cohort differences in the gerontological and geriatric population studies in Gothenburg in both medical and social factors. In a comparison of 70-year-olds born in 1901/02 and 1911/12, Steen [12] found that the latter group felt better, smoked less (males), and had better dental health. Furthermore, education was better and possession of a car was much more common.

In a 20-year cohort difference comparison of dietary habits in 70-year-olds from the same studies, Rothenberg and collaborators [13] showed that older people followed the same trends in choice of food as other age groups. An increasing trend for nutrient density was, however, evident in that study, and an increasing diversity regarding food items was obvious.

Furthermore, we have reported a markedly better cognitive performance in the latest cohort of 70-year-olds, to which better living conditions and in some respects better somatic health might contribute [14]. A longer period of education is certainly such a factor.

If we presume that infection is likely to occur in early childhood, and overcrowding is of special relevance to transmission, the difference in H. pylori prevalence between the two cohorts born in 1901/02 and 1922 may reflect a rapid change in socio-economic conditions in Sweden over that 20-year period. Thus, many concurrent factors might explain the lower degree of positive H. pylori serology in the ‘young elderly’ of today, compared with those of 20 years ago.

Key points

- When cohorts of 70-year-olds born in 1901/02 and 1922 were compared, the latter cohort showed a significantly less positive Helicobacter pylori serology.
- The difference in Helicobacter pylori prevalence between the two cohorts may reflect changes in socio-economic conditions.
- No longitudinal increase or decrease in Helicobacter pylori serology was demonstrated in those who were examined at 70, 81 and 90 years of age.
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