



Incidence of inflammatory bowel disease in the province of Styria, Austria, from 1997 to 2007: A population-based study[☆]

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Abstract

Background: The incidence of inflammatory bowel disease (IBD) varies widely between different countries. This large variation is also observed for the incidence of its main two forms, ulcerative colitis (UC) and Crohn's disease (CD). Controversy exists whether IBD incidence is increasing, especially in western countries. Currently no data are available for Austria. This study therefore aimed to evaluate for the first time the incidence of IBD over an eleven-year period in Styria, a province of Austria with a population of 1.2 million.

Methods: All patients with an initial diagnosis of IBD between 1997 and 2007, who were Styrian residents, were eligible for this retrospective study. Data were acquired from electronically stored hospital discharge reports and individual reports by patients and physicians. According to population density Styria was divided into two rural and one urban area.

Results: Throughout the study period 1527 patients with an initial diagnosis of IBD were identified. The average annual incidence was 6.7 (95% CI 6.2–7.1) per 100,000 persons per year for CD and 4.8 (95% CI 4.5–5.2) for UC. The average annual incidence increased significantly ($p < 0.01$) for both diseases during the 11 year study period. Median age at initial diagnosis was 29 years (range 3–87) for CD and 39 years (range 3–94) for UC. At diagnosis, 8.5% of all IBD patients were <18 years of age. The incidence of both CD and UC was significantly higher in the urban

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area than in rural areas (CD: 8.8, 95% CI 7.8–9.8 versus 5.5, 95% CI 4.7–6.4 and 5.9, 95% CI 5.3–6.7; [$p < 0.001$]; UC: 5.8, 95% CI 5.1–6.6 versus 4.0, 95% CI 3.4–4.7 and 4.7, 95% CI 4.1–5.4; [$p = 0.04$]).

Conclusion: We observed an overall increase in the incidence of ulcerative colitis and Crohn's disease in a part of Austria during an eleven year period. IBD was more predominant in the largest urban area than in rural areas.

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1. Introduction

During the last 50 years inflammatory bowel disease (IBD) with its major forms, ulcerative colitis (UC) and Crohn's disease (CD) raised to one of the major challenges in gastroenterology. In spite of the multitude of studies available it remains unclear whether IBD has definitely become more frequent in Europe within the last 15–20 years or if merely diagnostic accuracy has improved. Moreover, the change of incidence rates is not uniform but rather varies depending on time and location of studies performed and disease assessed. In the 1950s Evans already found in a carefully performed study a crude incidence of 6.5 for UC in the Oxford area.¹ This incidence is similar to more recent results from numerous European studies (Table 1). In contrast, the development in the incidence of CD differs widely. While the incidence has remained stable since the 1970s in the United States² and in Western Europe^{3–5} a sharp increase in incidence of CD was noted in several eastern European countries such as Hungary and Croatia.^{6,7}

In Austria no data exist on the incidence of IBD at all. Styria, a province in the southeast of Austria, is particularly well defined with respect to geography and administration. It has a dominant public health care provider (KAGES) and a low migration rate. Its capital, the city of Graz, has a catchment area representing an urban and highly industrialized region and is in sharp contrast to the sparsely populated rural parts of the province. The primary aim of this study was to determine the incidence of IBD and its development over an eleven year period in this province of Austria considering all age groups. Furthermore, we aimed to elucidate differences in incidence between rural versus the largest urban area.

2. Methods

2.1. Study area

Styria is the second largest province of Austria (Fig. 1A) with a population of 1.2 million. It is divided into 3 areas (Fig. 1B). The northern part, named "Upper Styria", is an alpine region characterized by a rough climate and a population density averaging merely 52 inhabitants/km².⁸ The southern part, called "Lower Styria", is distinguished by a mild, almost Mediterranean climate and hilly landscape. Its population density amounts to 83/km².⁸ The third part comprises Graz, the capital of Styria and its surrounding suburbs called "Graz-surroundings". It is a mainly urban and highly industrialized area with a high

population density of 946 inhabitants/km².⁸ For data analysis, we therefore divided Styria into two rural and one urban area.

2.2. Study population

In Styria a census is performed every 10 years and in 2002 a central population registry was installed. These data are collected by the Austrian Federal Institute of Statistics. During the investigation period from 1997 to 2007 the population grew from 1,184,587 to 1,202,483. Migration rate was relatively constant, with an average immigration of 4000 persons/year. Inter-regional migration in Styria was much higher. In 2008 88,000 inhabitants changed their domicile; the trend is that people abandon their rural domiciles in upper Styria and move to new urban residences in the neighborhood of Graz.^{8,9}

2.3. Acquisition of data

Nearly 80% of all hospitals in Styria are public facilities and managed by the governmental holding company "KAGES". In addition, there are 5 private hospitals owned and managed by different religious organizations. All hospitals participated. To optimize acquisition of data, we used three different approaches.

2.3.1. First: search for ICD 9 and 10 codes

The search was performed in all Styrian hospitals (public and private). Table 2 summarizes the ICD 9/10 codes sought for IBD. We were searching for patients with at least one matching ICD code present in ICD 9 or ICD 10. By this approach a total of 23,274 cases were found (Fig. 2). The hospital discharge records and/or other reports were then subjected to case review and further selected according to concurrence with our diagnostic criteria (detailed below) and date of initial diagnosis. In the study period from Jan. 1, 1997 to Dec. 31, 2007 a total of 1458 patients with an accepted initial diagnosis of IBD were identified. Another 1157 patients with the diagnosis of IBD had been found through data review but were excluded as diagnosis had been established before or after the investigated time period.

2.3.2. Second: information of physicians

The study was announced and introduced to all general practitioners, internists, surgeons and pediatricians in Styria, explaining motives for this study and the aims we wanted to achieve. Patients could be registered by phone or internet. The requested master data comprised name, gender,

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