Ann Agric Environ Med 2008, 15, 193–197

RETROSPECTIVE ANALYSIS OF HOSPITAL ADMISSIONS OF PATIENTS WITH ULCERATIVE COLITIS AND CROHN'S DISEASE FROM SEMI-RURAL AND RURAL REGIONS IN THE DEPARTMENT OF GASTROENTEROLOGY IN LUBLIN BETWEEN 2000–2006

Barbara Skrzydło-Radomańska, Piotr Radwan, Karolina Radwan-Kwiatek

Department of Gastroenterology, Medical University of Lublin, Lublin, Poland

Skrzydło-Radomańska B, Radwan P, Radwan-Kwiatek K: Retrospective analysis of hospital admissions of patients with ulcerative colitis and Crohn's disease from semi-rural and rural regions in the Department of Gastroenterology in Lublin between 2000–2006. *Ann Agric Environ Med* 2008, **15**, 193–197.

Abstract: Inflammatory bowel disease (IBD), comprising of ulcerative (UC) colitis and Crohn's disease (CD), are chronic relapsing disorders of unknown etiology. The environmental factors in addition to genetic predisposition are thought to play an important role in the pathogenesis of these diseases. IBD was found to be more common in urban areas than in the rural environment. So far, there have been no reports of the frequency of IBD in Polish rural regions. The aim of the study was to describe the characteristics of IBD in patients from semi-rural and rural regions hospitalized in the Department of Gastroenterology of the Medical University of Lublin between 2000–2006. Methods: A retrospective systematic search of clinical records, identifying cases of inflammatory bowel disease. Results: In the 2000–2006 period of the study, 727 cases of IBD were recorded, of which 334 (46%) originated from semi-rural and rural regions. UC accounted for 69.2% (231 patients) while CD for 30.8% (103 patients). The total number of patients with IBD was higher in the last 3 years (435 patients), compared to 2000–2003 (292 patients). Demographic data, clinical presentation and the location of the disease in patients with IBD from rural and semi-rural regions are similar to patients from urban communities. Conclusion: The rise in hospital admission rates of patients with UC and CD from rural and semi-rural regions confirms the observation of an increasing incidence of IBD in areas, where these diseases were less common in the past.

Address for correspondence: Piotr Radwan, MD, PhD, Department of Gastroenterology, Medical University of Lublin, Jaczewskiego 8, 20-950 Lublin, Poland.
E-mail: piotr_radwan@wp.pl

Key words: inflammatory bowel disease, ulcerative colitis, Crohn's disease, rural regions.

INTRODUCTION

Crohn's disease (CD) and ulcerative colitis (UC) are chronic inflammatory bowel diseases (IBD) of unknown etiology. The disorders are characterized by their relapsing course and result in long-term morbidity. They usually affect young and middle-aged patients and place significant demands upon healthcare sources [1].

Numerous studies have shown that the incidence of IBD varies within different geographical areas. The highest incidence rates and prevalence for both CD and UC have been reported from developed countries in northern Europe, especially the United Kingdom and Scandinavia [8, 14, 20] and North America [10]. Much lower indices were observed in southern or central Europe [13, 18], Asia and Africa [10, 17]. North-south gradient of incidence reflects the fact that IBD is about 40–80% more frequent in northern European countries, than in the southern regions of the continent. [16]. It is interesting that in the last decades the incidence and prevalence of UC and CD are beginning to

Received: 16 August 2007
Accepted: 24 September 2008

stabilize in this high-incidence areas, while the number of patients with IBD, especially CD, continues to rise in regions where IBD was less common [5, 18].

The differences in incidence across time and geographical region suggest that environmental factors, in addition to genetic predisposition, play an equally important role in the development of these diseases. IBD was found to be more common in urban areas than in the rural environment [4, 12]. Some studies indicate that living on a farm may have some protective effect against the development of IBD [2]. The incidence of IBD in Polish rural regions is unknown, and there are no studies of the clinical and pathological aspects of these disorders in patients originating from this environment.

The aim of our study was to obtain an estimation of some epidemiological features and to evaluate clinical aspects, extraintestinal manifestations and the treatment of Crohn's disease and ulcerative colitis of patients coming from rural areas of Lublin region hospitalized in the Department of Gastroenterology of the Medical University of Lublin between 2000–2006.

MATERIALS AND METHODS

The medical records of CD and UC patients coming from semi-rural and rural areas hospitalized in the Department of Gastroenterology of the Medical University of Lublin between 2000–2006 were reviewed. The diagnosis of CD and UC based on clinical, investigative or histological findings was a prerequisite to inclusion in the study. Confirmatory evidence for the diagnosis was sought in the form of endoscopic, radiological, histological or operative findings, at least one of which had to support the clinical diagnosis [7]. Those patients verified were included in the study. If a CD or UC patient had been in hospital several times, only the first medical record was reviewed. The date of diagnosis was taken as the date the patient was admitted. Case findings used predefined codes to systematically search computer diagnostic. These codes covered all the likely diagnostic terms applicable to inflammatory bowel disease. To achieve a complete and clear medical record of incident cases, a comprehensive data form for CD and UC was established. Every incidence case was recorded in detail on the form. Patient data were collected on age, gender, main clinical manifestations, their duration, endoscopic and radiological investigations, biopsies taken and histological abnormalities, type of diagnosis, complications, medical treatment and any surgery performed.

UC was defined as "proctitis" – when limited to the rectum, "left-sided" – not extending beyond the mid-transverse colon or "pancolitis" – involving the entire colon. CD was characterized as ileal and concerning the large bowel. Involvement of one or more of these sites was also recorded.

Patients were separated into 2 groups according to their place of residence. The first group included residents of urban regions, the second of semi-rural and rural areas. Any patients who resided within cities with a population over 10,000 inhabitants was regarded as belonging to an urban population, in large villages (2,000–9,999 inhabitants) as a semi-rural population, and in small villages (below 1,999 inhabitants) as a rural population.

RESULTS

Between 2000–2006 we identified 727 patients with inflammatory bowel disease (IBD) in the Department of Gastroenterology of Medical University of Lublin. 292 of them were hospitalized between 2000–2003, whereas 435 between 2004–2006. A total of 334 IBD patients (46%) were residents of semi-rural and rural regions. 147 of these patients were hospitalized between 2000–2003, whereas 187 were treated between 2004–2006 (Tab. 1). The total ratio of ulcerative colitis: Crohn's disease was 1.60 : 1, whereas in patients from semi-rural and rural regions this ratio was 2.24 : 1.

There were 448 patients with ulcerative colitis (230 males, 218 females, ratio male : female 1.05 : 1), and 231 (51%) out of them were semi-rural and rural residents, 112 males, (mean age 53.4 years, median 53 years), and 119 females (mean age 51.2 years, median 48 years); ratio male : female 1 : 1.06. Patient age ranged from 18–78 years old, the mean age at diagnosis was 35.8 ± 21.5 (mean ± SD) (Tab. 2). The peak age of onset was 30–39 years (interquartile range 38–51). Age distribution of UC patients is presented in the Table 3.

Table 1. Inflammatory bowel disease hospitalization between 2000–2006.

Inflammatory bowel disease patients	Hospitalization n (%)		
	Total	2000–2003	2004-2006
Total	727 (100)	292 (40)	435 (60)
Semi-rural and rural residents	334 (46)	147 (20)	187 (26)

Table 2. Demographic data of UC and CD patients from semi-rural and rural regions.

	n	%	Mean ± SD	Min	Max
Number	334	100			
Ulcerative colitis	**231**	**69.16**			
Male	112				
Female	119				
Age			52.3 ± 18.4	18	78
Age at diagnosis			35.8 ± 16.2	18	69
Crohn's disease	**103**	**30.8**			
Male	44				
Female	59				
Age			49.4 ± 17.6	18	76
Age at diagnosis			32.7 ± 19.4	12	65

Table 3. Age distribution of ulcerative colitis and Crohn's disease patients from semi-rural and rural regions.

Age group (years)	Ulcerative colitis patients		Crohn's disease patients	
	n	%	n	%
10–19	16	6.92	13	12.62
20–29	49	21.21	21	20.39
30–39	65	28.14	29	28.15
40–49	39	16.88	18	17.47
50–59	28	12.12	11	10.68
60–69	20	8.66	9	8.74
70–	14	6.06	2	1.95
Total	231	100	103	100

97 (45.54%) out of 231 patients with UC were diagnosed less than 5 years ago, 74 (34.74%) between 5–10 years ago, while 42 (19.72%) patients had more than a 10-year disease history.

There were 279 patients with Crohn's disease (133 males, 146 females, ratio male : female 1 : 1.09). 103 (37%) of whom resided in semi-rural or rural regions – 44 males, (mean age 46.2 years, median 45 years), and 59 females (mean age 52.6 years, median 48); ratio male : female 1 : 1.34. Patients' age ranged from 18–76 years, the mean age at diagnosis was 32.7 ± 19.4. The peak age of onset was 30–39 (interquartile range 38–62). Age distribution of CD patients from semi-rural and rural regions hospitlized in the Department of Gastroenterology is illustrated in Table 3.

46 (44.66%) out of 103 patients with CD had less than a 5-year disease history, 44 (42.72%) patients were diagnosed between 5–10 years ago, while 13 (12.63%) patients had 10 and more than a 10-year disease history.

A confirmatory histology report was available in the clinical records for 191 (82.6%) UC patients, and for 83 (80.58%) CD patients. Confirmatory evidence came from radiological, endoscopic or surgical findings present in the records.

Between 2000–2006 there were totally 206 new cases of UC, 98 of whom lived in semi-rural and rural regions. 37 patients of this group were admitted between 2000–2003, whereas 61 between 2004–2006. During the 7-year period study, 145 new cases of Crohn's disease were treated in the Department of Gastroenterology in Lublin, 51 out of whom were from semi-rural and rural communities. 22 newly-diagnosed patients with CD were hospitalized between 2000–2003, whereas 29 cases were newly-diagnosed between 2004–2006.

As far as the extent of the disease is concerned, 104 (45.02%) patients from semi-rural and rural regions had UC limited to the rectum (proctitis) or to the rectum and sigmoid colon (proctosigmoiditis), 86 (37.23%) had left – side colitis, and extensive involvement of the colon was found in 41 (17.75%) cases. 168 (72.72%) patients were admitted due to an acute attack of the disease (relapse), whereas 63 (27.27%) were in remission. According to the Truelove-Witts' score, 61 (36.30%) patients had a mild attack of UC, 72 (42.85%) had moderate UC, while 35 (20.83%) had a severe attack of UC.

Table 4. Disease extension, degree and stage of UC and CD patients from semi-rural and rural regions.

Disease	Items	Patients	
		n	%
Ulcerative colitis	**Disease extent**		
	Proctitis/proctosigmoiditis	104	45.02
	Left-sided colitis	86	37.23
	Extensive colitis	41	72.72
	Degree		
	Mild	61	36.30
	Moderate	72	42.85
	Severe	35	20.83
	Stage		
	Active	168	72.73
	Remission	63	27.27
Crohn's disease	**Disease extent**		
	Small bowel	42	40.78
	Colon	25	24.27
	Ileum - colon	36	34.95
	Degree		
	Mild	26	25.24
	Moderate	56	54.37
	Severe	21	20.39
	Stage		
	Active	89	86.41
	Remission	14	13.59

Crohn's disease was most commonly limited to the small bowel (42 patients, 40.78%) and 25 (24.27 %) patients had colonic disease, while 36 (34.95%) patients had both small bowel and colonic involvement. According to the CD Activity Index (CDAI), 26 (25.24%) patients had mild CD, 56 (54.37%) had moderate CD and 21 (20.39%) patients had severe attack of CD. At diagnosis, 89 (86.41%) patients had active CD, whereas 14 (13.59%) patients were in remission (Tab. 4).

Within the group of UC patients from semi-rural or rural region, 36 (15.58%) had the history of smoking more than 20 cigarettes per day, 48 (20.78%) smoked between 10–20 cigarettes per day in their lives, 42 (18.18%) had a history of smoking less than 10 cigarettes per day, whereas 105 (45.45%) patients denied smoking.

Within the group of CD patients in the present study, 12 (11.65%) were severe smokers (more than 20 cigarettes per day), 23 smoked 10–20 cigarettes/d, 10 (9.7%) had the history of smoking less than 10 cigarettes per day, while 58 (56.31%) patients denied smoking in their lives.

In our study, 14 (6.06%) patients with UC and 9 (8.73%) patients with CD from rural areas had a family history of IBD.

Table 5. Clinical manifestations of UC and CD patients from semi-rural and rural regions.

Disease	Clinical manifestations	Patients	
		n	%
Ulcerative colitis	**Symptoms**		
	bloody diarrhea	217	93.94
	abdominal pain	194	83.98
	weight loss	142	61.47
	fever	62	26.84
	Complications		
	iron deficiency anemia	142	61.47
	toxic megacolon	29	12.55
Crohn's disease	**Symptoms**		
	abdominal pain	89	86.41
	diarrhea	48	46.60
	weight loss	44	42.71
	fever	29	28.15
	anemia	78	75.73
	abdominal mass	21	20.39
	Complications		
	hemorrhage	42	40.78
	subileus / obstruction	38	36.89
	fistula	29	28.15
	abscess	12	11.65

Table 6. Main drugs of medical therapy in UC and CD patients from semi-rural and rural regions.

Items	Patients (n, %)	
	Ulcerative colitis	Crohn's disease
SASP/5ASA	**231 (100)**	**103 (100)**
SASP	112 (48.48)	41 (39.8)
Mesalazine	119 (51.52)	62 (60.19)
Glucocorticoids	**151 (63.37)**	**87 (84.47)**
Oral steroids	142 (61.47)	64 (62.12)
Prednisolone	87 (37.66)	48 (46.60)
Methylprednisolone	55 (23.80)	16 (15.53)
Intravenous steroids		
Hydrocortisone	113 (48.91)	59 (57.28)
Topical steroids		
Hydrocortisone	34 (14.72)	9 (8.74)
Immunosupressants	**27 (11.69)**	**29 (28.15)**
Azathioprine	19 (8.22)	23 (22.33)
6 – mercaptopurine	8 (3.46)	6 (5.82)
Antibiotics	**126 (54.55)**	**58 (56.31)**
Ciprofloxacine	26 (11.25)	14 (13.59)
Metronidazol	123 (53.25)	58 (56.31)
Others	87 (37.66)	42 (40.78)

UC was most commonly manifested by diarrhea and the presence of the blood in the stool's (217 patients, 93.94%). 194 patients (83.98%) complained of abdominal pain, while loss of weight was observed in 142 patients (61.47%). The most common complication was hemorrhage causing iron deficiency anemia (142 patients, 61.47%), whereas toxic megacolon was observed in 29 patients (12.55%).

The most common manifestation of CD was abdominal pain (89 patients, 86.41%), followed by diarrhea (48 patients, 46.60%), loss of weight (44 patients, 42.71%), fever (29 patients, 28.15%), abdominal mass (21 patients, 20.39%). The most common complication was hemorrhage (42 patients, 40.78%), subileus and intestinal obstruction (38 patients, 36.89 %), fistula (29 patients, 28.15%) and abscess (12 patients, 11.65%) (Tab. 5).

The most common drug therapy in UC patients from semi-rural and rural regions was oral: mesalazine (5-aminosalicylic acid preparations, 5-ASA) or sulfasalazine (SASP) – only (80, 34.63%), or as a dual therapy with steroids (124, 53.68%) as the most frequently applied therapy. The combined treatment with 5ASA/SASP, steroids and immunosuppresants (azathioprine) was administered in 27 patients (11.69%) (Tab. 6).

The most common therapeutic approach in CD patients was a dual therapy with 5ASA-SASP and steroids (58 patients, 56.31%), while oral salicylates, steroids and immunosuppresants were given to 29 patients (28.15%). There were 5 patients (4.85%) with CD diagnosis from semi-rural and rural regions who received infliximab infusions.

41 patients diagnosed with UC were affected by extensive colitis, of whom 21 had a history of total colectomy. Overall, 50 (14.97%) patients in this study had undergone total colectomy.

Among patients with Crohn's disease, 59 (57.28%) had undergone at least one surgical resection; in 19 patients (18.44%) this was a total colectomy.

DISCUSSION

Several large epidemiological studies have shown an accumulation of cases of IBD in urban compared with rural communities [1, 4, 12]. It was found that patients with IBD, especially with CD, are less likely to have lived on a farm and drunk unpasteurized milk. They tended more likely to have used tap water as their primary source as compared to well water or other non-tap water source. Patients suffering from CD are also less likely to have had pets in their childhood, and usually have a smaller family size compared to controls [2]. These observation support the hypothesis that patients with IBD are less likely to have encountered environmental organisms than non-affected controls. With the hygiene hypothesis, it is theorized that a lack of exposures to enteric pathogens makes one susceptible to these diseases [9]. It has been also suggested that

the urban diet contains large quantities of inert inorganic non-nutrient microparticles, such as natural contamitants (soil and dust) and food additives, which may combine with intestinal luminal components such as bacterial cell wall lipopolisaccharides to form antigenic particles. They can mediate immune reactions in the intestinal mucosa and promote inflammation [12]. Our study shows that in general 46% patients with IBD admitted to the Department of Gastroenterology lived in rural and semi-rural regions, but only 37% of them had CD, which may confirm the observations of the lower incidence of CD in the rural communities [4]. We realize that our study, like many others published so far in the literature, examined hospital admission rates only, and the results might simply indicate patients' accessibility to health care. Nevertheless, we estimate that these observation reflect the epidemiological situation in our region.

The number of patients with IBD admitted to our hospital has increased considerably in the last 3 years compared to 2000–2003, which is consistent with other Polish studies [5, 7]. The contribution of CD to IBD in the present study was much higher (31%) than 20 years ago in Poland 6.7% [3], although it was still about 2-fold less common than UC. This confirms the observation of an increasing incidence of IBD, especially CD, in central Europe in recent decades [5, 7, 13, 19,].

Demographic data, clinical presentation and the location of the disease in patients with IBD from rural and semi-rural regions are similar to patients from urban communities.

Contrary to other gastrointestinal disorders, there are no studies of the incidence and clinical description of patients with IBD from rural regions in Poland [6, 15]. This study represents the first attempt to estimate the increasing problems of UC and CD in the inhabitants of rural areas.

CONCLUSIONS

1. The rise in hospital admission rates of patients with UC and CD from rural and semi-rural regions confirms observation of an increasing incidence of IBD in areas where these diseases were less common in the past.

2. The contribution of CD to IBD is much higher, but it is still 2-fold less common than UC.

3. Demographic data and clinical presentation of IBD in patients from rural and semi-rural regions are similar to patients from urban communities.

REFERENCES

1. Baumgart DC, Sandborn WJ: Inflammatory bowel disease: clinical aspects and established and evolving therapies. *Lancet* 2007, **369**, 1641-1657.

2. Bernstein CN, Rawsthorne P, Cheang M, Blanchard JF: A population-based case control study of potential risk factors for IBD. *Am J Gastroenterol* 2006, **101**, 993-1002.

3. Bielawski W, Butruk E, Gibiński K, Górski M, Hermanowicz A, Knapik Z, Marlicz K, Pokora J, Popiela T, Radwan P: Nieswoiste zapalne choroby jelit w Polsce i na świecie. *Pol Arch Med Wewn* 1983, **70**, 27-34.

4. Blanchard JF, Bernstein CN, Wajda A, Rawsthorne P: Small-area variations and sociodemographic correlates for the incidence of Crohn's disease and ulcerative colitis. *Am J Epidemiol* 2001, **154**, 328-335.

5. Bołdys A, Hartleb M, Bołdys H, Kajor M, Rudzki K, Nowak A: Demographic characteristics of patients with inflammatory bowel disease – twenty years later. *Gastroenterol Pol* 2005, **12**, 9-12.

6. Celiński K, Kurzeja-Mirosław A, Słomka M, Cichoż-Lach H, Mądro A, Kasztelan-Szczerbińska B: The effects of environmental factors on the prevalence of *Helicobacter pylori* infection in inhabitants of Lublin Province. *Ann Agric Environ Med* 2006, **13**, 185-191.

7. Kempiński R, Paradowski M, Paradowski L: Odcinkowe zapalenie jelit w 100 lat od pierwszego opisu choroby. *Gastroenterol Pol* 2004, **11**, 615-623.

8. Lapidus A, Bernell O, Hellers G, Persson PG, Lofberg R: Incidence of Crohn's disease in Stockholm County 1955-1989. *Gut* 1997, **41**, 480-486.

9. Lashner BA, Loftus EV: True or false? The hygiene hypothesis for Crohn's disease. *Am J Gastroenterol* 2006, **101**, 1003-1004.

10. Loftus EV: Clinical epidemiology of inflammatory bowel disease: incidence, prevalence, and environmental influences. *Gastroenterology* 2004, **126**, 1504-1517

11. Loftus EV, Silverstein MD, Sandborn WJ, Tremaine WJ, Harmsen WS, Zinsmeister AR: Ulcerative colitis in Olmsted County, Minnesota, 1940-1993: incidence, prevalence, and survival. *Gut* 2000, **46**, 336–343.

12. Mahmud N, Weir DG: The urban diet and Crohn's disease: is there a relationship? *Eur J Gastroenterol Hepatol* 2001, **13**, 101-106.

13. Mate-Jimenez J, Munoz S, Vicent D, Pajares JM: Incidence and prevalence of ulcerative colitis and Crohn's disease in urban and rural areas of Spain from 1981 to 1988. *J Clin Gastroenterol* 1994, **18**, 27-31.

14. Rubin GP, Hungin AP, Kelly PJ, Ling J: Inflammatory bowel disease: epidemiology and management in an English general practice population. *Aliment Pharmacol Ther* 2000, **14**, 1553-1559.

15. Schabowski J, Pitera J: Peptic ulcer among rural population in a selected region of south-eastern Poland. *Ann Agric Environ Med* 2004, **11**, 323-327.

16. Shivananda S, Lennard-Jones J, Logan R Fear N, Price A, Carpenter L, van Blankenstein M: Incidence of inflammatory bowel disease across Europe: is there a difference between north and south? Results of the European Collaborative Study on Inflammatory Bowel Disease (EC-IBD). *Gut* 1996, **39**, 690-697.

17. Sood A, Midha V, Sood N, Bhatia AS, Avasthi G: Incidence and prevalence of ulcerative colitis in Punjab, North India. *Gut* 2003, **52**, 1587-1590.

18. Trallori G, Palli D, Saleva C, Bardazzi G, Bonanomi AG, d'Albasio G, Galli M, Vannozzi G, Milla M, Tarantino O, Renai F, Messori A, Amorosi A, Pacini F, Morettini A: A population-based study of inflammatory bowel disease in Florence over 15 years (1978-1992). *Scand J Gastroenterol* 1996, **31**, 892-899.

19. Vucelic B, Korac B, Sentic M Milicic D, Hadzic N, Juresa V, Bozikov J, Rotkvic I, Buljevac M, Kovacevic I: Ulcerative colitis in Zagreb, Yugoslavia: incidence and prevalence 1980-1989. *Int J Epidemiol* 1991, **20**, 1043-1047.

20. Yapp TR, Stenson R, Thomas GA, Lawrie BW, Williams GT, Hawthorne AB: Crohn's disease incidence in Cardiff from 1930: an update for 1991-1995. *Eur J Gastroenterol Hepatol* 2000, **12**, 907-911.