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## COLORECTAL CANCER TRENDS BY AGE AND SEX DISTRIBUTION, ANATOMIC SUBSITE AND SURVIVAL (1989 - 2002)

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**SUMMARY** – Recent epidemiological studies have suggested that the anatomic distribution of colorectal carcinoma, especially in developed countries may have undergone a distal to proximal shift over several decades, which has been attributed variously to environmental and genetics factors as well as preventive measures. The aim of the study was to compare some colorectal cancer features (age and sex distribution, anatomic localization, and survival) during fourteen years, in order to assess the possible changing trends of these disease during the observed period and to compare observed data with our previous study published in 1985 as well as with similar colorectal cancer features reported worldwide. The mean age of patients with right-sided carcinomas was slightly higher than in patients with left-sided colorectal carcinomas (65.9 vs. 65.2). Sex distribution showed male predominance (57.3% vs. 42.7%). Males and females had similar anatomic distribution. Recto-sigmoid was the most common site (77.9%) followed by transverse colon cancers (6.8%), ascending colon cancers (6.5%), cancers in cecum (6.2%) and descending colon cancers (2.6%). In the last four years of the observed period (1999 to 2002) the incidence of right-sided cancers was increased compared to the previous period. Our study showed a continuing trend of the increased incidence of right-sided carcinomas that is similar with reports from western European countries and North America.

*Key word: right-sided colorectal carcinomas, left sided colorectal carcinomas, changing trend*

### Introduction and aim

The rates of colorectal cancer incidence vary considerably when observed worldwide, according to sex, age and anatomic subsite and have changed over time.<sup>1</sup> Colorectal malignancies are less common in developing (Africa, Asia and South America) than developed (North America, western Europe and Australia) countries. The intermediary rates are found in eastern Europe.<sup>2</sup> As far as Croatia is concerned, colorectal carcinoma is the second most common tumor in females and the fourth most common tumor in males.<sup>6</sup> The most prevalent site of colorectal carcinoma is rectum and sigmoid colon. Our previous study performed in middle eighties showed that approximately 95% of analyzed patients had carcinoma in rectum (74.8%) and sigmoid colon (19.1%).<sup>7</sup> Recent epidemiological studies have suggested that the anatomic distribution of col-

orectal carcinoma, especially in developed countries may have undergone a distal to proximal shift over several decades, which has been attributed variously to environmental and genetics factors as well as preventive intervention.<sup>1-4,8-13</sup> One of the prominent risks of colorectal cancer is diet, although the nutrients that cause the disease remain the subject of research. Red meat may increase the risk of colorectal cancers, while diets rich in folate may have a protective effect, although other dietary components as higher fibers consumption have been shown to be related to colorectal cancer risk, as well.<sup>4</sup> Some epidemiological studies showed higher proportions of poorly differentiated adenocarcinomas and mucinous carcinomas in proximal colon and poorer prognosis for these patients.<sup>4,5</sup> Changes in anatomic distribution might have clinical implications for the use of diagnostic or screening tools for large bowel cancers.<sup>4,13</sup> This study was undertaken to examine the

anatomic localization, age and sex distribution of the left and right sided colorectal carcinomas and to analyze whether there is any difference in survival rate for left or right-sided colorectal cancers observed during fourteen-year (1989-2002) period. We also tried to compare the findings connected to anatomic distribution observed in our previous study performed in 1985 and with similar colorectal cancer features reported worldwide.<sup>5,8-13,15</sup>

## Patients and methods

A total of 2603 patients with colorectal carcinomas were analyzed. Patient data were obtained from the computer based colorectal cancer registry at the Ljudevit Jurak University Department of Pathology, for the period between January 1, 1989 and December 31, 2002. The database contains all personal data for each patient as well as macroscopic and microscopic findings and pathohistologic diagnosis. The following parameters were analyzed: anatomical site of cancer, age and sex distribution and survival. Survival data were obtained from Croatian Cancer Registry. For the purpose of the study large bowel was divided into five segments: cecum, ascending colon, transverse colon, descending colon and recto-sigmoid. Large bowel cancers located proximally from splenic flexure were categorized as right-sided and cancers distally from splenic flexure were considered as left-sided carcinomas.

## Results

The mean age of patients was 65.3 years and the mean age of patients with right-sided carcinomas was slightly higher than in patients with left-sided colorectal carcinomas (65.9 vs. 65.2). Sex distribution showed male predominance (57.3% vs. 42.7%). Males and females had similar anatomic distribution (Fig 1). Right-sided cancers (prox-

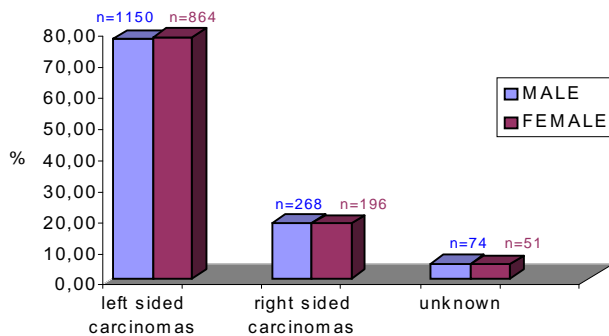


Fig 1. Percentage of left and right-sided colorectal carcinoma in men and women (1989 to 2002)

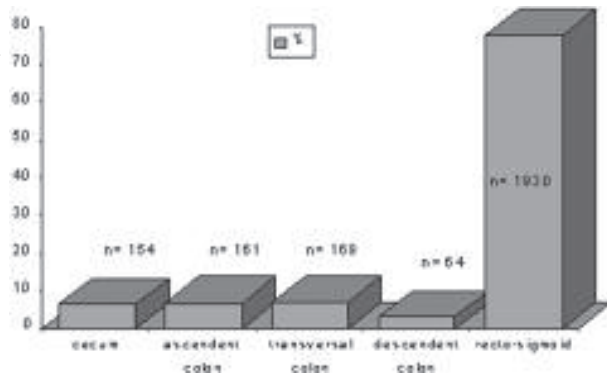


Fig 2. Anatomic subsite distribution of the colorectal carcinomas for 1989-2002 period

imal from splenic flexure) represented 17.8% and left-sided (distal from splenic flexure) represented 77.4%. In 4.8% of cases the localization of colorectal carcinomas was not specified. When excluded carcinomas with unspecified localization, recto-sigmoid was the most common site (77.9%) followed by transverse colon cancers (6.8%), ascending colon cancers (6.5%), cancers in cecum (6.2%) and descending colon cancers (2.6%) (Fig 2). The proportion of lesions in the colon proximally from splenic flexure was found to have the highest incidence in 1993 when 26.2% patients had carcinomas in the right side of the colon. In 1998 only 13.6% colorectal carcinomas affected the right side of the colon. In the last four years of the observed period (1999 to 2002) the incidence of right-sided cancers was increased comparing to previous period but have not reached the highest incidence in 1993 (Table 1, Fig 3). One-year survival for left-sided carcinomas was 85.9%, two years survival was 75.2% and three years survival was 70.9%. Survival rate for right-sided carcinomas was slightly lower in the first year (82.9%) than in left-sided carcinomas but higher in the second (76.4%) and the third year (73.7%).

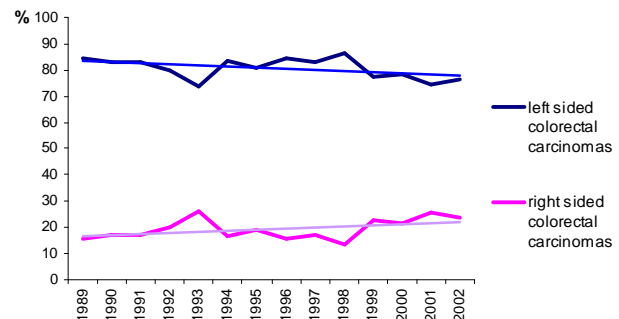


Fig 3. Percentage and trend-lines of left and right-sided carcinomas by years (1989-2002)

Table 1. Total number and percentage of anatomic subsite distribution of colorectal carcinomas by years (1989-2002)

| Localization      | 1989 |        | 1990 |        | 1991 |        | 1992 |        | 1993 |        | 1994 |        |
|-------------------|------|--------|------|--------|------|--------|------|--------|------|--------|------|--------|
| cecum             | 2    | 1,6%   | 11   | 6,7%   | 11   | 7,2%   | 10   | 7,4%   | 8    | 5,7%   | 14   | 8,5%   |
| ascendent colon   | 7    | 5,7%   | 7    | 4,3%   | 4    | 2,6%   | 10   | 7,4%   | 15   | 10,6%  | 6    | 3,7%   |
| transversal colon | 10   | 8,2%   | 10   | 6,1%   | 11   | 7,2%   | 7    | 5,1%   | 14   | 9,9%   | 7    | 4,3%   |
| descendent colon  | 4    | 3,3%   | 1    | 0,6%   | 7    | 4,6%   | 3    | 2,2%   | 5    | 3,5%   | 2    | 1,2%   |
| recto-sigmoid     | 99   | 81,1%  | 134  | 82,2%  | 120  | 78,4%  | 106  | 77,9%  | 99   | 70,2%  | 135  | 82,3%  |
| TOTAL             | 122  | 100,0% | 163  | 100,0% | 153  | 100,0% | 136  | 100,0% | 141  | 100,0% | 164  | 100,0% |
| Localization      | 1996 |        | 1997 |        | 1998 |        | 1999 |        | 2000 |        | 2001 |        |
| cecum             | 8    | 4,5%   | 12   | 6,6%   | 13   | 6,6%   | 15   | 6,9%   | 15   | 7,8%   | 12   | 5,2%   |
| ascendant colon   | 10   | 5,6%   | 6    | 3,3%   | 7    | 3,5%   | 16   | 7,4%   | 20   | 10,4%  | 24   | 10,4%  |
| transversal colon | 10   | 5,6%   | 13   | 7,1%   | 7    | 3,5%   | 17   | 7,9%   | 7    | 3,6%   | 23   | 10,0%  |
| descendent colon  | 3    | 1,7%   | 3    | 1,6%   | 6    | 3,0%   | 7    | 3,2%   | 3    | 1,6%   | 5    | 2,2%   |
| recto-sigmoid     | 148  | 82,7%  | 148  | 81,3%  | 168  | 83,4%  | 161  | 74,1%  | 148  | 76,7%  | 166  | 72,2%  |
| TOTAL             | 179  | 100,0% | 182  | 100,0% | 201  | 100,0% | 216  | 99,6%  | 193  | 100,0% | 230  | 100,0% |

## Discussion and conclusion

The aim of the study was to compare some colorectal cancer features (age and sex distribution, anatomic localization, and survival) during fourteen years, in order to assess the possible changing trends of these disease during the observed period and to compare the observed data with our previous study published in 1985 as well as with similar colorectal cancer features reported worldwide.<sup>7-13,15</sup>

Age distribution showed no significant sex difference, and confirmed that colorectal carcinoma is primarily a disease of elderly people. The majority of cases, for both sexes were diagnosed in the age group 60-69. Some other previous studies showed higher incidence of proximal colorectal cancers in female and in older age groups as well as the increased number of poorly differentiated and mucinous carcinomas.<sup>3,15</sup> These findings indicated that different etiological risk factors may act on cancer of the proximal and distal part of large bowel.<sup>5</sup> In our study patients with right-sided carcinomas were only slightly older than those with left sided disease (65.9 vs 65.2) and results of sex distribution showed a male predominance (57.3% vs 42.7%). The current study showed an increased number of right-sided carcinomas and decreased number of left-sided carcinomas. The percentage of right-sided carcinomas especially increased in the last four years. In our previous study performed in 1985 we found that 95.5% colorectal carcinomas were localized in the left part of the colon, and only 4.5% carcinomas affected cecum, colon ascendens or colon transversum.<sup>7</sup> The pattern of change is similar to findings reported in high incidence countries

such as the U.S. and western part of Europe.<sup>1,3,5,8-13</sup> These findings suggest that raising preventive intervention and early capabilities together with dietary change might play an important role in this trend.<sup>5,8,9,12</sup> Comparison of one-year survival showed slightly better survival for left sided carcinomas but two and three-year survivals were better for carcinomas situated in the right part of the colon. The differences in survival rate are minor and for a better comparison five-year survival data are needed.

Our study showed a continuing trend of the increased incidence of right-sided lesions and decreased incidence of recto-sigmoidal but have not proved higher incidence in elderly people and females.

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#### Sažetak

#### PROMJENE U POJAVNOSTI KARCINOMA DEBELOG CRIJEVA S OBZIROM NA DOB, SPOL, ANATOMSKU LOKALIZACIJU I PREŽIVLJAVANJE (1989. – 2002.)

*Davor Tomas, Mladen Belicza, Drinb Baličević, Dora Brezovečki-Biđin, Dražen CiglarTanja Leniček, Domagoj Dokozić, Ante Dujmović, Vladna Radotić, Vedrana Gladić and Božo Knšlin*

Novije epidemiološke studije pokazuju da je u razvijenim zemljama došlo do pomaka sijela karcinoma debelog crijeva iz sigme i rektuma prema desnoj strani, odnosno prema cekumu i uzlaznom kolonu što se u prvom redu pripisuje promjenama u načinu prehrane, genetskim činbenicima te preventivnim mjerama. Svrha ovog istraživanja je da uspoređi određene karakteristike karcinoma debelog crijeva i njihove promjene tijekom četrnaest promatranih godina (1989 do 2002) te da ih uspoređi s našim prethodnim istraživanjem provedenim 1985. godine i novijim svjetskim istraživanjima. Prosječna dob pacijenata s karcinomom smještenim u desnoj polovini crijeva bila je neznatno viša od dobi pacijenata s lijevostranim karcinomima (65,9 vs. 65,2). Muškarci su oboljevali češće od žena (57.3% vs. 42.7%) međutim anatomska lokalizacija karcinoma u oba spola bila je podjednaka. Rekto-sigmoidni dio crijeva bio je najčešće zahvaćen tumorom (77.9%), zatim slijedi poprečni kolon (6.8%), uzlazni kolon (6.5%), cekum (6.2%) i silazni kolon (2,6%). U posljednje četiri godine promatranog razdoblja (1998. do 2002.) vidljiv je stalni porast incidencije karcinoma smještenih u desnoj polovini debelog crijeva. Ovo istraživanje pokazalo je da je broj karcinoma desne strane debelog crijeva u naših pacijenata u stalnom porastu što se podudara s istraživanjima provedenim u razvijenim zemljama Europe i Sjeverne Amerike.

**Ključne riječi:** *desnostrani karcinomi debelog crijeva, lijevostrani karcinomi debelog crijeva, promjena, anatomska lokalizacija*