Epidemiology and risk factors of colorectal cancer in Syria: a single-center retrospective study


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Abstract. – OBJECTIVE: Colorectal cancer represents the third most common malignancy and the second leading cause of cancer deaths worldwide. Many factors contribute to the risk of developing colorectal carcinoma including diet, lifestyle, age, and genetic abnormalities. Recent findings have shown a considerable increase in the incidence rate of CRC in developing countries. However, there is little information regarding its incidence in the Middle East countries, including Syria. With our manuscript we aimed at presenting the first large epidemiological study regarding colorectal carcinoma incidence in Syria.

PATIENTS AND METHODS: We conducted a retrospective study on colorectal carcinoma cases at our institution from 2014 to 2018. The data include the cases that were diagnosed and recorded based on multiple parameters including gender, age, year of diagnosis, city of origin, and profession.

RESULTS: The number of colorectal cancer cases was 1,117 out of 13,589 cases of all malignant tumors recorded from 2014 to 2018, with an annual average incidence of 8.2%. There was a statistically significant difference in CRC cases according to age and gender. We also found a statistically significant difference according to physical activity and occupation.

CONCLUSIONS: These results demonstrate that risk factors related to colorectal cancer incidence in Syria mainly include male sex, age over 50 years old, and occupation with no physical activity.

Key Words: Colorectal cancer, Characteristics, Epidemiology, Syria.

Introduction

Colorectal Carcinoma (CRC) is defined as the growth of abnormal cells in the colon and rectum with the potential to spread and metastasize to other organs. Many factors contribute to the risk of developing CRC including diet, lifestyle, age, and genetic abnormalities. Furthermore, gastrointestinal diseases including chronic ulcerating colitis, Crohn’s disease, and familial adenomatous polyposis are also considered potential risk factors.

About 9.8 million deaths from cancer were recorded in 2018 according to the World Health Organization (WHO) statistics. CRC ranks third among the most widespread cancers and the second leading cause of cancer deaths worldwide with considerable international and geographical variations.

The largest incidence of CRC was stated in the Republic of Czech, Australia, New Zealand, Canada, and in the United States, while the least were registered in Central Africa, India, and Central Asia. Considering the different embryonic origins of the colon and the rectum, these two organs have different anatomical and histological features. Hence, different chemical receptors, PH levels, and exposure to fecal lead to different risk factors and severity of cancer. Also, the absence of the protective serosa in the rectum in contrast to the colon plays a significant role in increasing the risk of cancer spreading to the adjacent organs, and hence, a worse prognosis and greater incidence. Reports from the American Cancer Society display that rectal carcinoma’s overall 5-year sur-
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Survival rate of 66.5% is slightly higher than that of colon cancer (64.2%), but stage-specific survival has similar rates, the mortality rate is 30-40% and is higher in men than in women.

Recent findings have shown a considerable increase in the incidence rate of CRC in developing countries. However, in those countries, the rise in incidence rate is related to the influence of dietary patterns, obesity, and lifestyle factors. On the other hand, a lower mortality rate is seen in developed countries which reflects the improvements in the practice of cancer treatment and management.

Although the Middle East is considered as a low-risk region for CRC incidence (with 37/100,000 cases in most Middle East countries), recent studies suggest a growing incidence of CRC with a variation in recorded cases between different parts of this region, given the common cultural characteristics and dietary habits.

Researchers suggest that high fat and meat intake, family history, physical activity, body mass index, and hormone replacement therapy are the main risk factors for CRC. Nevertheless, there is little information regarding CRC in the Middle East, and the database is limited to the Middle Eastern countries, including Syria.

In this research, we aimed at providing records of CRC cases that were admitted to the Tishreen University Hospital, which was considered the second-largest oncology center in Syria during the period 2014-2018. Furthermore, we managed to study the demographic and occupational characteristics of patients including age, gender, occupation and geographical distribution in addition to discussing their possible relationship with the increase in colorectal cancer cases in our region.

Patients and Methods

We conducted a retrospective study for the cases of CRC in Tishreen University Hospital, Latakia city, in Syria, from 2014 to 2018. Our study was reviewed and approved by the Institutional Review Board at Tishreen University, and we collected our data from the database of the Center of Oncology at Tishreen University Hospital in the city of Latakia.

Data include cases that were diagnosed between 2014 and 2018 and recorded based on multiple parameters including gender, age, year of diagnosis, city of origin, and profession. We performed statistical analysis using SPSS v.20 (IBM Corp., Armonk, NY, USA). Association was considered significant when p-value is lower than 0.05. The data provided had not been published before, as the study included registered cancer cases within the past 5 years.

Statistical Analysis

Statistical analysis was applied using the Chi-square test and SPSS statistical program. According to our data, 1,117 subjects were diagnosed with CRC out of 13,587 registered cancer cases during the studied period, which represents 8.2% of all cancer cases. The number of recorded cases is shown in Table I.

Results

According to our data, the percentages of CRC cases that were recorded at our Institution were 7.35%, 8.38%, 8.82%, 8.65%, and 8.07% of all tumor cases during the years 2014, 2015, 2016, 2017 and 2018, respectively.

In total, 1,117 subjects were diagnosed with CRC out of 13,589 registered cancer cases during the studied period, which represents 8.2% of all cases. The highest number of cases was 236 in 2018, while the highest percentage of all cancer cases was in 2016, as shown in Table I.

According to our data, we found a statistically significant difference between females and males in CRC cases during the 5 years with a p-value < 0.05, and cases among males were more frequent than among females. There was a difference between CRC cases according to age. The number of cases was higher among patients older than 50 years compared patients under 50 years old, and this difference was statistically significant with a p-value < 0.05.

We also found a statistically significant relationship between both geographic site and occupation with CRC cases. As we can notice from Table II, there was a statistically significant difference between active and inactive occupations, 81.3% of CRC cases were working in non-active occupations (teachers, housekeepers, freelancer), while 18.7% of CRC cases were working in occupations which require more activity (construction workers, police officers, health care workers).

Discussion

Colorectal cancer is considered the third deadliest cancer of all cancer types; this paper is the
first to statistically discuss CRC cases in Tishreen University Hospital in Latakia city, Syria, which contains the second-largest oncology center of Syria. The collected data represent the incidence of CRC among all cancer cases: 8.07% in 2018, which is slightly lower if compared to the worldwide incidence rate of 10.2%, according to American Cancer Society – Global Cancer Statistics 2018.

The number of annual cases of colorectal cancer over a period of 5 years varied, but the number of diagnosed cases of colorectal cancer in 2018 amounted to 236 cases, a percentage of 21.13%, which represents the highest recorded number in all 5 years.

According to our study, the mean age of CRC patients is 58 years old and 24% were under 35 years old, which is in correspondence with Siaman and Jerf, who inferred that the mean age of CRC patients was 51 years old and 23% were under 35 years old. Our results showed a significant difference between males and females, and this is similar to White et al who highlighted that the overall incidence is higher in men.

The percentage of CRC among males is 52.73%, which is higher than that of women (47.27%), and it was observed that 75.65% of all patients were over 50 years old. Whereas, for those under the age of 30, their number was 17 cases, which is the lowest among people with colon and rectal cancer, equivalent to 1.52%.

Our study found an inverse relationship between physical activity and risk of colorectal cancer, whereas 86.03% of CRC patients from both genders had occupations without physical activity (p-value < 0.05), and this result is consistent with several previously published works.

The number of registered cases of colorectal cancer in Latakia is 462, with a percentage of 41.36%; this percentage was higher than that of the rest of other Syrian cities. We can attribute this large number to the increase in diagnostic methods at Tishreen University Hospital in Latakia and the emphasis on cases recorded in colon and rectal cancer in the oncology center database from which data were collected.

Conclusions

In our manuscript, we managed to present the first study that highlights the epidemiology and

**Table I.** Number of CRC cases and other types of cancer during 2014-2018.

<table>
<thead>
<tr>
<th>N</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRC cases</td>
<td>226</td>
<td>211</td>
<td>221</td>
<td>223</td>
<td>236</td>
<td>1,117</td>
</tr>
<tr>
<td>Other tumor cases</td>
<td>2,846</td>
<td>2,304</td>
<td>2,282</td>
<td>2,353</td>
<td>2,687</td>
<td>12,472</td>
</tr>
<tr>
<td>Percentage of CRC cases</td>
<td>7.356%</td>
<td>8.396%</td>
<td>8.829%</td>
<td>8.650%</td>
<td>8.073%</td>
<td>8.219%</td>
</tr>
<tr>
<td>Total</td>
<td>3,072</td>
<td>2,515</td>
<td>2,503</td>
<td>2,576</td>
<td>2,923</td>
<td>13,589</td>
</tr>
</tbody>
</table>

**Table II.** Characteristics of patients with CRC and other types of cancer registered in the oncology center database during the period 2014-2018.

<table>
<thead>
<tr>
<th>Year</th>
<th>2014</th>
<th>2015</th>
<th>2016</th>
<th>2017</th>
<th>2018</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>226</td>
<td>211</td>
<td>221</td>
<td>223</td>
<td>236</td>
<td>1,117</td>
</tr>
<tr>
<td>%</td>
<td>7.36</td>
<td>8.39</td>
<td>8.83</td>
<td>8.66</td>
<td>8.07</td>
<td>21.13</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
<th>F</th>
<th>528</th>
<th>6,691</th>
<th>53.65</th>
<th>7,219</th>
<th>53.12</th>
<th>0.000043</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>589</td>
<td>6,781</td>
<td>46.35</td>
<td>6,780</td>
<td>46.88</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
<th>≤ 50</th>
<th>≥ 50</th>
<th>382</th>
<th>4,951</th>
<th>39.70</th>
<th>5,333</th>
<th>39.2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>272</td>
<td>845</td>
<td>4,749</td>
<td>38.08</td>
<td>5,021</td>
<td>36.95</td>
<td>&lt; 0.00001</td>
</tr>
</tbody>
</table>

| Geographic Site | Costal | 735 | 7,521 | 60.30 | 8,256 | 60.75 |
|                | Inner  | 382 | 4,951 | 39.70 | 5,333 | 39.2  |

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Active</th>
<th>Inactive</th>
<th>156</th>
<th>961</th>
<th>10,136</th>
<th>81.27</th>
<th>11,097</th>
<th>81.66</th>
</tr>
</thead>
<tbody>
<tr>
<td>n</td>
<td>156</td>
<td>961</td>
<td>10,136</td>
<td>81.27</td>
<td>11,097</td>
<td>81.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>p-value</td>
<td>0.000043</td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Conclusions

In our manuscript, we managed to present the first study that highlights the epidemiology and
risk factors of colorectal cancer in Syria. Our study demonstrated that the incidence of CRC among all cancer cases was slightly lower than the worldwide incidence rate. Our study also revealed that colorectal carcinoma was associated with male gender, older ages, and occupations with no physical activity.

Conflict of Interest
The authors declare that they have no competing interests.

Funding
This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors.

Availability of Data and Material
The data are represented in the manuscript, additional data is available upon request.

Code Availability
Not applicable.

Ethics Approval
Our study was reviewed and approved by the Institutional Review Board at Tishreen University.

Informed Consent
Written informed consent was obtained from the patients for participating in this study.

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References

