THE CHANGES IN THE INCIDENCE OF GASTRIC VERSUS COLORECTAL CANCER IN IRAQ DURING THE PERIOD BETWEEN 1965-2006

Zuhair R Al-Bahrani*, FRCS, FACS, FACG

Ahmed Z Al-Bahrani**, MD, FRCS (Glasg), FRCS (Gen.Surg)

*Emeritus professor of surgery, Medical College, Baghdad University, Baghdad, Iraq
Formerly; chairman of Iraqi Surgical Council of Gastroenterology, Medical City University Hospital, Baghdad, Iraq

**consultant upper GI surgeon; Watford general hospital, Watford, UK
Formerly; senior surgical registrar, Medical College, Baghdad University, Baghdad, Iraq
Abstract

Background:

Gastric cancer (GC) is the fourth most common cancer and the second leading cause of cancer death in the world, while the colorectal cancer (CC) is the third commonest cancer in US and second most common in Europe.

Objective:

This study is aiming to identify the incidence of both GC and CC and their stages in Iraq over a period of forty two years.

Methods:

A retrospective audit study of 2240 cases with 1237 patients with GC and 1003 patients with CC were operated on between 1965-2006 included. The age, sex, stage and the incidence of each cancer every two years for the study period were reported and compared with the Iraqi Cancer Registry and the published data.

Results:

Gastric cancer affected males more than females. The average age for GC was 53.66 for males and 50.47 year for females. The average age for CC was 56.83 year for males and 53.65 year for females. The GC counted for around 2/3 of cases in the cases in the late sixties, while in the early eighties the CC constituted around 3/4 of the total number of cases assessed in this diagnosis. There was a significant increase in earlier cancer stages for both cancers in the later half of the study period. Comparing the first half to the second half with the second one, we found an insignificant rise in the number of cases of GC while there was a significant increase number of CC comparing both periods.

Conclusion:

There was a change in the pattern of gastrointestinal cancer, particularly GC and CC in Iraq, which was attributed to dietary factors. On the other side there was a significant increase number of early staging cancer. These findings mimic the Iraqi Cancer Registry and the western results.
Introduction:

Gastric cancer (GC) is fourth most common cancer in the world with just under one million cases recorded in the year 2008, behind cancers of the lung, breast and colorectal, respectively. It is also the second leading cause of cancer death in both sexes worldwide. (1) In Iraq, it is the leading gastrointestinal malignancy (2,3) while colorectal cancer (CC) was the third after the oesophagus (3, 4). Gastric cancer include any malignant tumor (excluding gastrointestinal stromal tumours) arising from the region extending from the gastroesophageal junction (GOJ) and the pylorus, it may not be possible determine the site of origin if the cancer involve the GOJ itself; a situation that has become more common in recent years, especially with the rising incidence of Barrett’s and its related GOJ cancers. The majority of Gastric Cancers are adenocarcinoma, almost two thirds of them occur in developing countries with peak incidence in the far east regions including China, Korea and Japan.

Colorectal cancer is the third commonest cancer in USA following prostate and lung/bronchus cancer (5) and the second commonest cancer in Europe following breast cancer (6). The incidence of CC incidence in Iraq was increasing gradually within the last three decades (8). The risk of developing CC begin to increase at age 40 years and rises with age (8). Screening for colorectal cancer reduced the number of cases with late stages and increased those with early stage cancer (9).

Aim:

The aim of this study is to present the changes noticed in the rise of CC versus the GC in Iraq during the period (1965-2006), especially in the last three decades of the past century.

Patients and Methods:

A retrospective audit study on 2240 cases, 1237 patients with GC and 1003 patients with CC operated upon by the senior surgeon (Al-Bahrani ZR) at the medical city University hospital and Al-Mustansiria private hospital, Baghdad from 1965-2006, included. The majority of both cancers were adenocarcinoma.

The age, sex, stage and the incidence of each cancer every two years for the study period were reported. The stage of GC and CC were recorded according to American Joint Committee on Cancer (AJCC). (10) We divided the total number of cases between two groups of twenty one years each; period A 1965-1985 and period B 1986-2006. The stages of each cancer were compared between different the two periods. The results were compared between both cancers and with the reports from the Iraqi Cancer Registry.
Results:

Adenocarcinoma of the stomach constituted 90% of all gastric cancers (1117 out of 1237 cases), the rest of the cancers were malignant lymphoma (120 cases, 10%). Gastric cancer affects males more than females with a reducing male: female ratio of 2.3:1 in 1971 to 1.6:1 in 2006. The peak age incidence for GC was in the fifth decade for women while it was in the sixth decade for men. (Figure 1) The average age for GC was 53.66 for males and 50.47 year for females. The males exceeded the females at all age groups except in patients less than 25 years old where the incidence of GC was higher in females than males.

Almost all colorectal cancers were adenocarcinoma (985 cases, 98%); there were only 18 (2%) cases with malignant lymphoma. The same male: female distribution and same age incidence occur for CC with one exception that the incidence of males was higher than females in all age groups. (Figure 2) The average age for CC was 56.83 year for males and 53.65 year for females. It was also noticed that the difference between males and females was minimal (2-5 patients per decade) at age of 54 years and below in CC. In both cancers, the incidence dropped steadily after their peaks in both sexes.

The GC counted for around 2/3 of cases in the cases in the late sixties and continue to increase until reach the peak of around 84% in 1971/1972 where the colorectal reach the lowest incidence of 16% of cases in that period. Then the percentage of both cancers reversed to the original 2/3 for GC and 1/3 for CC by the late seventies where it remained around that figure until mid nineties where the number of CC reach almost same percentage of GC. After that there were persistent increase in the incidence of CC with continue drop in the percentage of GC until the end of the study period where CC consume 3/4 of cases versus 1/4 for GC in the year 2005/2006. Actually, the number of GC had not dropped that much but the number of CC had increased significantly to reverse the percentage ratio of the total number of cases on that period. (Figure 3)

Comparing the two period groups, we found there was slight increase in the total number of GC from 539 cases in period A to 689 cases in period B, which is statistically insignificant. On contrary, there was a statistically significant increase (over three fold) in the number of cases of CC between the two periods; from 241 cases in period A to 762 cases in period B.

Comparing the stage of each cancer between the two periods, there was an increase in stage I and II and drop in stage IV for GC from period A to period B; this was statistically significant for stage I and a trend toward significance for both stage II and IV. There was no much change in stage III between the two periods. (Table 1)
For CC, there was significant increase from period A to period B for stages II and III, while a significant drop in stage IV was demonstrated in period B compared with period A. (Table 2)

Comparing stage I and II together and stage III and IV together for both cancers during the two periods, there was significant increase in cases with stage I and II ($p$: 0.006) and significant drop in stage III and IV ($p$: 0.006) in the period B versus period A for GC. Similar changes found between both periods in CC but with a trend toward significance for both staging groups ($p$: 0.052). (Table 3)

**Discussion:**

There was a statistical significant drop in the GC incidence in the USA in the period between 1975-2004 (11). A similar drop was noticed in areas outside the USA (12), even noticed in higher risk countries at the far east of Asia (13). Such drop was reported by the Iraqi Cancer Registry (3) over the periods between 1976-2000; from 3.98% in 1976-1985 to 3.58% of the TBC in 1998-2000 (Table 4) and lately the incidence of GC was reported by AlHasnawi *et al* (7) with further drop to 3.3% of the TBC. A similar drop was found in our report. There is strong evidence for an association between environment and diet with GC. Studies of immigrants have shown that high risk population for GC from Japan or Korea has a dramatic decrease in the risk of GC when migrate to the west and change their dietary habits (8). The essential steps for prevention and control strategy for gastric malignancy would be focus on control Helicobacter pylori, healthy diet, anti-tobacco campaign, early detection and diagnosis and treatment program (14).

Gastric cancer Affect men more than women with a ratio of male/female about 1.7:1 (8), while in Iraq, we reported a ratio of 2.3 /1 in 1971 (2) and here we reporting a drop up to 1.6/1 in the year 2006. Gastric cancer prevalence increases with advancing age with the peak in the seventh decade of life (8) while in our study; the peak is in the sixth decade in the males and in the fifth decade in females. (Figure 1)

The availability of the endoscopy units with easy access for both national health and private sectors led to early diagnosis and drop in the cancer staging for GC. We reported a significant increase in earlier stages (stage I and II) of GC in the second two decades of the study. (Table 1 and 3)
Colo-rectal cancer is a major problem in western countries, ranked the third cause of death from cancer in both sexes. The environmental, nutritional, genetic and familial factors, in addition to pre-existing disease have been found to be associated with colorectal cancer. Aspirin and Celecoxib (15) appear to decrease the risk of colorectal cancer in those at high risk. Vitamin D, dietary calcium supplement and proper nutrition are important factors in reducing colorectal cancer risk and colorectal adenoma (16-19). We believe that several factors shared causing this rise of CC in Iraq, including Kurdistan region, with change pattern toward western life.

In Iraq, excluding the three Northern provinces (Sulaimanyia, Erbil and Dohouk), CC is the seventh commonest cancer following breast, lung/bronchus, leukaemia, bladder, brain/CNS and lymphoma in the period between 2000-2004 (7). There was an increase incidence of CC over the last three decades from 3.39% of the total body cancer (TBC) in 1976-1985 to 4.6% in 1998-2000. (3) There was a slight drop in CC incidence in the years between 200-2004 to 4.2% of the TBC. (Table 4) This may be due to the Iraq invasion, The Third Gulf War, in 2003 where there was a drop in the registered cancers to the ministry of health. In the Northern Iraq, Kurdistan Region, CC was the fifth commonest cancer in 2009 following leukaemia, breast, lymphoma and lung/bronchus. (20). We reported a constant increase in the number of CC over the last two decades reaching the peak in 2006 (Figure 3). Our findings of the change in the incidence of colorectal versus the gastric cancer was also reported by the data reported by the six Iraqi reports illustrated in Table 3 and by AlHasnawi 2009 et al (7).

In Colorectal cancer the mean age at presentation is 60-65 years (2). In our review, the peak incidence occurs at earlier age group; sixth decade in males and the fifth decade in females. (Figure 2)

Type of food, stress of work to both sex, smoking, use of frozen food and appearance of inflammatory bowel disease especially ulcerative colitis in the second half of last century (21) while it was rare before. Diagnostic tools, increase number of specialists trained gastroenterologist after opening several specialized centers in the country and use of flexible scopes, the awareness of the early symptoms of colonic cancer lead to the early diagnosis in the last two decades of the last centaury, on contrary to the silent and late symptom and sign of gastric neoplasm. As a result, there was an increase in number of cases and early diagnosis of CC over the last two decades compared to the first two decades of this study group of patients.
Three main screening tests are available that aided early diagnosis; faecal occult blood testing, flexible Sigmoidoscopy and colonoscopy. These tests became a widely spread and available to the public through the National Health screening programs and public awareness. Screening endoscopy reduced the risk of late stage CC diagnosis, while people lives in rural area with less education and screening facilities associated with increased rate of late stage diagnosis (9).

Similar to GC, there was a drop in the late stages of the CC in the period B with trend toward significance. (Table 3) This could be related to the availability of endoscopic units and the education of the general population about symptoms related to CC.

A new screening test is m2-pk test. Tumor pyruvate kinase M2 (tumor M2-PK) is a key enzyme in the altered metabolism of tumor tissue. Tumor M2-PK is elevated in a range of gastrointestinal malignancy, among these is CC (22). It was recommended through a recent meta-analysis that a stool tumour M2-PK to be used as a routine test for CC screening. It closes a gap in clinical practice because it detects bleeding and non-bleeding tumors and adenoma with high sensitivity and specificity (23). We need to introduce these tests in Iraq, including Kurdistan, to improve the early stage diagnosis of CC, in addition to other screening methods.

In conclusion, There is a reduction in the rate of GC and increase that of CC in Iraq over the last two decades of last century. This change could be related to westernized diet, stress and the early diagnosis with the availability of endoscopy. The last had led to early diagnosis and significant drop in the stage of both GC and CC.
References:

15. Rostom A, Dube C, 2007; Lewin G. Use of Aspirin and NSAIDs to Prevent Colorectal Cancer [Internet]. Rockville (MD): Agency for Healthcare Research and Quality (US); Mar.


Figure 1: Age distribution for Gastric Cancer (1965-2006)
Figure 2: Age distribution for Colorectal Cancer (1965-2006)
Figure 3: Percentage of gastric and colorectal cancer out of the sum of both cancers (1965-2006)
Table 1: Gastric Cancer staging compared between two periods

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</tr>
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No: number

*: Statistically significant

**: Trend toward statistical significance

**: Not statistically significant
Table 2: Colorectal Cancer staging compared between two periods

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No: number

*: Not statistically significant

**: Statistically significant
Table 3: Staging groups for both cancers during the two periods

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<td></td>
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<td>%</td>
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<td>III + IV</td>
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GC: Gastric Cancer, CC: Colorectal Cancer, No: number

*: Statistically significant

**: Trend toward statistical significance
Table 4: Percentage of Gastric vs. Colorectal cancers out of total body cancers between 1976-2000

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<th>Years of report *</th>
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<tr>
<td>1986 – 1988</td>
<td>4.1</td>
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<td>1989 – 1991</td>
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<td>1992 – 1994</td>
<td>3.8</td>
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<td>1995 – 1997</td>
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</tr>
<tr>
<td>1998 - 2000</td>
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<td>4.64</td>
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* Report of Iraqi Cancer Registry (Ministry of Health)