

Epidemiologic characteristics of gastric malignancies among Jordan University Hospital patients

Heyam A. Awad, MD, FRCPath,
Manar H. Hajeer, MD, FRCPath, Mohand W. Abulihya, MD,
Mohammad A. Al-Chalabi, MB, ChB, Ali A. Al Khader, MD.

ABSTRACT

Objectives: To discover the epidemiologic distribution of gastric malignancies among Jordan University Hospital patients and to compare this distribution with the neighboring Arab countries.

Methods: Retrospective study covering the period between January 2006, and May 2016, in Jordan University Hospital, Amman, Jordan. All cases were retrieved from the computer system and analyzed using IBM SPSS version 23 software.

Results: One hundred and sixty-five cases were analyzed. Male-to-female ratio was 1.2:1. The mean age was 58.6 with 32.1% of patients aged 50 or younger. Primary adenocarcinoma was the most common tumor, half of which were diffuse type, followed by carcinoid tumors (15.2 %), lymphomas (10.3%), and gastrointestinal stromal tumors (8.5%). Proximally located tumors accounted for 15.4%. *Helicobacter pylori* were present in approximately half of the cases and 34.6% of cases contained intestinal metaplasia.

Conclusion: Jordan is a low-risk area for gastric cancer, but carcinoma occurs at a young age and is associated with gastritis, *Helicobacter pylori* infection, and intestinal metaplasia in a large proportion of cases. Better strategic health planning and early detection is needed, especially in young patients suffering from gastritis.

Saudi Med J 2017; Vol. 38 (9): 965-967
doi:10.15537/smj.2017.9.19371

Gastric carcinoma is the 5th most common cancer worldwide and the third leading cause of cancer death.¹ The incidence and mortality rates of gastric malignancies have declined since 1970s;² dietary modifications, *Helicobacter pylori* (*H. pylori*) control, screening, and early detection are the main reasons for this decline.³⁻⁴ The information regarding incidence, risk factors, and success of screening has been obtained from research carried out in Western countries; there are only a few published papers regarding the epidemiologic distribution of gastric cancer in developing countries

and the Middle East.⁵⁻¹⁰ It is not known whether the incidence has changed in the Middle East, and the actual epidemiologic distribution of cases according to age, gender, tumor location, and tumor type are not fully established in this part of the world.

This study aims to provide insight into gastric cancer epidemiology among Jordan University Hospital (JUH), Amman, Jordan patients as a model for Jordanian patients. This and similar studies are needed to establish epidemiologic data that are essential for strategic health care planning to decide regarding prevention, screening, detection, and treatment of gastric malignancies.

Methods. This is a retrospective study covering a 10-and-a-half-year period from January 2006 to May 2016, aiming to discover the epidemiologic distribution of gastric malignancies among Jordan University Hospital patients. Jordan University Hospital is a referring center for central Jordan. During 2015, a total of 51,425 patients were seen in the outpatient clinics or admitted to JUH.¹¹ All cases of gastric malignancies in the study period were retrieved from the JUH computer system. The information in the histopathology reports of all the cases was used to categorize the tumors and collect epidemiological data. For cases in which the patient underwent a biopsy and resection specimen procedure, only the resection specimen was included so cases would not be duplicated.

The histopathological slides for all patients were reviewed by 2 pathologists to confirm the tumor subtype and search for the presence of risk factors for developing gastric malignancies, namely *Helicobacter pylori* (*H. pylori*), intestinal metaplasia, and gastritis where possible. The sites of tumors were assessed pathologically and divided into tumors affecting the antrum, body, pylorus, or gastro-esophageal junction (GEJ). Only gastro-esophageal junction tumors with the bulk of the tumor (>50% of tumor) present in the stomach were considered primary gastric malignancies. Gastro-esophageal junction tumors in which the bulk was in the esophagus were excluded from this study. Ethical approval from the institutional review board (IRB) at JUH was obtained and the study is carried out according to Helsinki declaration.

Statistical analysis. The collected data was analyzed statistically, using the Statistical Package for the Social Sciences version 23 (IBM Corp., Armonk, NY, USA)

Disclosure. Authors have no conflict of interest, and the work was not supported or funded by any drug company.

Results. During the study period, a total of 165 were newly diagnosed cases of gastric malignancies among patients attending JUH. The number of cases has increased since 2008. Only 6 cases were diagnosed in 2006 and 8 cases in 2007. This number rose to 19 in 2008 and remained roughly at this figure with no significant change until 2015. The average of new cases diagnosed in these 8 years (2008 to 2015) was 18.3 cases per year. The study period covered only half of 2016, during which 6 cases were diagnosed.

The age range of the patients was between 21 and 89, with a mean of 58.6 (58.2 in males and 58.9 in females), with 55.2% male patients (91 cases) and 44.8% female (74 cases). A relatively large number of young patients were diagnosed with gastric malignancies. Fifty-three of our patients (32.1%) were 50 years old or younger, and 9 patients were 30 or younger (5.5%). Primary adenocarcinoma occurred at a younger age than non-primary adenocarcinoma. Of the cases of primary adenocarcinoma, 34 of the 53 cases (64.2%) occurred in patients 50 years old or younger; of these, 70.6% (24/34 cases) were signet-ring carcinomas. Regarding tumor types, most of gastric malignancies were primary adenocarcinomas, which accounted for 61.8% of the total (102 cases). Most of these were of diffuse, signet ring type (52%, 53 cases), whereas 40% were intestinal type (41 cases). The rest were primary mucinous carcinomas.

The second most common tumor was carcinoid tumor (25 cases, 15.2%), followed by lymphomas (17 cases, 10.3%) and gastrointestinal stromal tumors (GIST) (14 cases, 8.5%). Six cases were metastatic tumors to the stomach, 3 of which were of primary renal cell origin, 2 of ovarian primary, and the last of breast origin. Information regarding tumor location was collected for 123 cases, most of which (57.7%) were in the antrum (71 cases). The second most common location was the body of the stomach, where 31 cases were, accounting for 25.2%. Only 2 cases (16%) were located in the pylorus. Proximally located tumors (gastroesophageal junction) accounted for 15.4% (19 cases). Gastritis was assessed in 130 cases; all but two cases showed gastritis of varying degrees. In 129 cases, the presence of *H pylori* could be assessed, and they were present in approximately half of the total number of cases (64 cases). Both signet ring and intestinal-type adenocarcinomas showed a high incidence of *H. pylori* infection; 55.6% (20/36) were cases of intestinal tumors, and 48.8% (21/43) were cases of the signet ring subtype. The presence of intestinal metaplasia (IM) was assessed in 127 cases, and 34.6% of these contained foci of IM (44 cases).

Thirty-six of our patients underwent a resection specimen procedure performed at JUH. Advanced stages T3 and T4 accounted for 2-thirds of the cases. Twenty-nine cases had lymph node metastasis, accounting for 80.5%. In nine cases, the tumors were metastatic at diagnosis, and sites of metastasis included liver, pancreas, colon, duodenum, and appendix.

Discussion. This study describes the demographic characteristics of JUH patients diagnosed with gastric malignancies and highlights the differences of these characteristics from other parts of the world. Since 2008, the number of newly diagnosed cases of gastric malignancies remained constant and was higher than those diagnosed in 2006 and 2007. The reason for the low number of cases in 2006 and 2007 is obscure and not in line with reported trends in Jordan.¹³ The Jordan Cancer Registry (JCR) indicated that gastric cancer was the tenth most common cancer in Jordan, accounting for 2.7% of all tumors. The age-standardized rate (ASR) of gastric malignancies among the Jordanian population was 3.9 per 100,000 population, which puts Jordan in the low-risk area. High-risk areas include Costa Rica, Japan, China, and Brazil, which have an ASR of more than 20 per 100,000. Italy, the United Kingdom, and Turkey are considered intermediate risk areas, with an ASR of 10–20 per 100,000, whereas low-risk areas have an ASR of fewer than 10/100,000.⁴ The ASR in Jordanian males was 4.9 and in females 2.9 per 100,000.¹³ These figures are slightly higher than those reported from neighboring Kingdom Saudi Arabia (KSA), where the ASR is 3.1 for males and 2.3 in females¹⁴ but significantly fewer than those reported from Oman at 10.1 for males and 5.6 for females.⁷

There are differences of the reported ASR among different Arab countries. The rates are even different among the Gulf countries; for example, the ASR of gastric cancer is 4.0 per 100,000 in Kuwait, 6.6 in the United Arab Emirates (UAE), and 7.8 in Qatar;⁷ however, all these countries are still in the low-risk area.

Males are affected more than females, and the overall male-to-female ratio within the population of our study was 1.2:1. This ratio is less than that reported in the JCR and in a study conducted in North Jordan between 1991 and 2001,⁵ where the male-to-female ratio was 1.8:1 in both references. Despite differences in ASR among Arab countries, the male-to-female ratio is very similar, 1.8:1 in KSA, 1.7:1 in Kuwait, and 1.9:1 in Oman and the United Arab Emirates.⁷ However, this ratio is reported in Sudan to be 3.3:1.¹⁰ Worldwide, it is believed that males are affected twice to 3 times more often than females.²

Within our population, gastric malignancies occurred at a young age. The mean age of this study's population was 58.6, and 5.5% of our patients were 30 or younger. A study in North Jordan conducted between 1991 and 2001 confirms this trend; the mean in that study was 61.2, and 8.5% of their patients were <40. An even higher percentage (12.2%) of our patients are younger than 40. The occurrence of gastric carcinoma at a young age is reported in KSA at the mean age of 57.7 in a study conducted in King Faisal Hospital.⁶ In Oman, 10% of male patients and 17% of females were younger than 45⁷, so it seems that gastric carcinomas in the Arab countries occur at a younger age than that reported in the West. The mean age in the United States is reported to be 70, with only 1% of gastric malignancies occurring in patients younger than 34 years old,² compared with 6.7% of our patients in the same age group. In the United Kingdom, around half (51%) of reported cases were diagnosed in people aged 75 and over.¹⁵

Approximately 70% of the intestinal tumors and more than 90% of signet ring tumors were distally located. Only 15% of our cases were located proximally. Worldwide, it is reported that proximal gastric carcinoma is constant or increasing, whereas distal gastric carcinomas are decreasing, probably due to early treatment of *H. pylori* infection.² This trend was not seen in our study or in the North Jordan study.

Thirty-six of our patients underwent resection specimen procedures performed at JUH. Two-thirds of these were advanced tumors (T3 or T4). Moreover, 80.5% of the resection specimens had lymph node metastases, and 25% were metastatic at diagnosis. These results reveal that gastric carcinoma is being diagnosed at a late stage when palliative treatment rather than cure is the main treatment goal.

Although the population of the study is small and covers only one institution, the epidemiologic characteristics of JUH patients suffering from gastric malignancies are similar to those in the rest of the country and in other Arab countries. This study and other reports from Arab countries show that gastric carcinoma is rare in these countries but it occurs at a younger age than that in the West. There is association with gastritis, metaplasia, and *H. pylori*, which dictates the importance of good management of gastritis, especially in young individuals.

In conclusion, it seems that good strategic health planning, improving the public health care system, and a high index of suspicion will decrease the incidence of gastric cancer among our patients, but more research is needed to confirm this.

Received 25th February 2017. Accepted 25th July 2017.

From the Department of Histopathology, Forensic Medicine and Microbiology (Awad, Hajeer), University of Jordan, Histopathology Department (Awad, Hajeer, Abulihya, Al-Chalabi, Al Khader), Jordan University Hospital, Amman, Jordan. Correspondence and reprints request to: Dr. Heyam Awad, Department of Histopathology, Microbiology and Forensic Medicine, University of Jordan, Amman, Jordan. E-mail: heyamawad2000@yahoo.com
ORCID: orcid.org/0000033050136x

References

- Worldwide cancer mortality statistics. cancer research uk (Accessed on 15 January 2017) Available from: <http://www.cancerresearchuk.org/health-professional/cancer-statistics/worldwide-cancer/mortality#heading-One>.
- Karimi P, Islami F, Anadasabapathy S, Freedman N, Kamangar F. Gastric cancer: descriptive epidemiology, risk factors, screening, and prevention. *Cancer epidemiol biomarkers prev* 2014; 23: 700- 713.
- Saghier A, Kabanja J, Afreen S, Sagar M. Gastric cancer: environmental risk factors, treatment and prevention. *J Cacinogene Mutagene* 2013; 14: 8-19.
- Hussein N. Helicobacter pylori and gastric cancer in the Middle East: a new enigma? *World J Gastroenterol* 2010; 16: 3226-3234.
- Bani-Hani K, Yaghan R, Heis H, Shatnawi N, Katalka I, Bani-Hani A, et al. Gastric malignancies in Northern Jordan with special emphasis on descriptive epidemiology. *World J Gastroenterol* 2004; 10: 2174-2178.
- Alahmadi R, Hamour O, Al-Enizi H, Tashkandi A. Incidence of gastric carcinoma at King Faisal Specialist Hospital – Jeddah Saudi Arabia: A hospital- based study. *Integr Mol Med* 2016; 3: 606- 611.
- Al-Mahrouqi H, Parkin L, Sharples K. Incidence of stomach cancer in Oman and the other Gulf Cooperation Council countries. *Oman Med J* 2011; 26: 258-262.
- Hamdi J, Murad H. Gastric cancer in southern Saudi Arabia. *Ann Saudi med* 1994; 14: 195-197.
- Al-Radi AO, Ayyub M, Al-Mashat FM, Barlas SM, Al-Hamdan NA, Ajarim DS. Primary gastrointestinal cancers in the Western Region of Saudi Arabia. Is the pattern changing? *Saudi Med J* 2000; 21: 730-734.
- El Hassan A, El Hassan L, Mudawi H, Gasim B, Own A, Elamin E, Ibn Ouf M, et al. Malignant gastric tumors in Sudan: a report from a single pathology center. *Hematol Oncol Stem Cel Ther* 2008; 1: 130-132.
- Alzyadat A. JUH annual report 2015. In: health care statistics. JUH department of public relations. 2015; p 128-129.
- http://census.dos.gov.jo/wp-content/uploads/sites/2/2016/02/Census_results_2016.pdf, accessed on 5/1/2017
- <http://www.moh.gov.jo/EN/Pages/Periodic-Newsletters.aspx> accessed on 11/11/2016
- Cancer Registry reports, Saudi Health Council Available from: <http://www.chs.gov.sa/En/HealthRecords/CancerRegistry/Pages/CancerRegistryRecords.aspx> (Accessed 5 October 2016)
- Stomach cancer incidence statistics, cancerresearchuk Available from: <http://www.cancerresearchuk.org/health-professional/cancer-statistics/statistics-by-cancer-type/stomach-cancer/incidence> (Accessed on 22 December 2016)