



Clinicopathologic Characteristics of Stomach Cancer among Patients Admitted to the Surgical Departments of Teaching Hospitals in Sana'a, Yemen

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ABSTRACT

Objective: To describe the characteristics of stomach cancer among patients admitted to the surgical departments of teaching hospitals in Sana'a city, Yemen.

Methods: This retrospective, descriptive study was conducted to identify the characteristics of stomach cancer among patients admitted to the surgical departments of two major teaching hospitals in Sana'a; namely, Kuwait University Hospital of Sana'a University and University of Science & Technology Hospital, in the period from January 2011 to June 2015. Sociodemographic and clinical data in addition to the characteristics of stomach cancer among 106 documented cases admitted over the study period were retrieved from the medical records and analyzed.

Results: Of the stomach cancer patients admitted over the study period, 55.7% were males and 52.8% were aged 50–70 years old. The most frequent symptom was dyspepsia (96.2%) followed by weight loss (88.7%) and loss of appetite (81.1%). Dysphagia was present in 56.6% of the patients, while upper and lower gastrointestinal bleedings were present in 15.1% and 6.0% of the patients, respectively. Palpable masses were present among 35.8% of the patients, being most frequently observed in the pylorus and antrum (22.1%) and the body of the stomach (18.9%) as revealed by abdominal computed tomography. Regarding the histopathologic findings of endoscopic biopsies, tumors were well-differentiated in 32.1% and moderately or poorly differentiated in 26.4% of the patients each. However, moderately-to-poorly differentiated and lymphoma were less frequent (5.7%, each) and the gastrointestinal stromal tumor was observed in 1.9% of the patients.

Conclusions: Clinicopathologic characteristics of stomach cancer among Yemeni patients are consistent with those documented internationally.

Keywords: Stomach cancer, Teaching hospital, Sana'a

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1. Introduction

The incidence and death rates of stomach cancer have been dramatically decreased in the United States and most western industrialized countries (1). However, such a decrease has been mostly in the intestinal form rather than the diffuse form. Globally, stomach cancer remains a leading cause of cancer death, particularly in Asia and Eastern Europe (2). In general, stomach cancer affects the elderly and is twice as common among blacks as whites. Nevertheless, tumors are often more diffuse and tend to be large, aggressive, and more poorly differentiated in younger patients, sometimes infiltrating the whole stomach (3). In addition, the incidence of stomach cancer is higher among groups of lower socioeconomic status (4).

Pain, weight loss, early satiety and anorexia are the most common symptoms of the gastric disease. Nausea, vomiting, bloating and anemia are also frequent complaints (5). Although none of such symptoms alone is specific for the gastric disease, these can clearly indicate a probable differential diagnosis that can then be confirmed with certain tests (6). The most common primary malignant gastric cancers are adenocarcinoma (95%), lymphoma (4%) and gastrointestinal stromal tumor (GIST) (1%). Other rare primary malignancies include carcinoid, angiosarcoma, carcinosarcoma and squamous cell carcinoma. Occasionally, stomach cancer results from metastasis from other sites (7). More commonly, the stomach is invaded by malignant tumors in adjacent sites by either direct extension or peritoneal seeding (3). The present study was designed to identify the characteristics of stomach cancer among Yemeni patients admitted to the surgical departments of teaching hospitals in Sana'a.

2. Methods

2.1. Study design and setting

This descriptive study retrospectively analyzed the medical records of 106 patients with confirmed stomach cancer and admitted to the surgical departments of Kuwait University Hospital of Sana'a University and (KUH) and the University of Science and Technology Hospital (USTH). These are referral hospitals that receive patients from different areas of Yemen.

2.2. Data collection and analysis

Sociodemographic and data related to the presenting symptoms, clinical and intraoperative findings, radiologic, endoscopic and histopathologic reports, follow-up notes and discharge status of the patients admitted in the period from January 2011 to June 2015 were retrieved and analyzed. Frequencies and proportions were used to describe the categorical variables of the study.

3. Results

3.1. Sociodemographic and clinical characteristics of the study population

Table (1) shows that most of the patients admitted to the two teaching hospitals with confirmed stomach were males (55.7%; 59/106), aged 50–70 years (82.8%; 56/106), housewives (45.3%; 48/106) and rural residents (62.3%; 66/106). Khat chewing and smoking were reported by 56.6% and 38.7% of the patients, respectively, while none of the patients reported alcohol consumption.

Regarding the clinical history of patients on presentation, the most frequent symptom was dyspepsia (96.2%) followed by chronic abdominal pain and weight loss (88.7%, each), vomiting (86.8%) and loss of appetite (81.1%). Dysphagia and abdominal distension were pre-



sent in 56.6% and 47.2% of the patients, respectively, while upper and lower gastrointestinal bleedings were present in 15.1% and 6.0% of the patients, respectively. However, the least frequent symptom was jaundice, being present among 1.9% of the patients (Figure 1).

Table 1. Sociodemographic characteristics of Yemeni patients admitted to teaching hospitals in Sana'a (2011–2015)*

| Characteristic | n (%) |
|--------------------|-----------|
| Gender | |
| Male | 59 (55.7) |
| Female | 47 (44.3) |
| Age (years) | |
| 20–50 | 36(34.0) |
| 50–70 | 56(52.8) |
| >70 | 14(13.2) |
| Occupation | |
| Housewife | 48 (45.3) |
| Farmer | 30 (28.3) |
| Clerk | 10 (9.4) |
| Other | 10 (9.4) |
| Not mentioned | 8 (7.5) |
| Residence | |
| Rural | 66(62.3) |
| Urban | 40 (37.7) |
| Habits | |
| Khat chewing | 60 (56.6) |
| Smoking | 41 (38.7) |
| Alcohol drinking | 0 (0.0) |

* Total number of cases was 106.

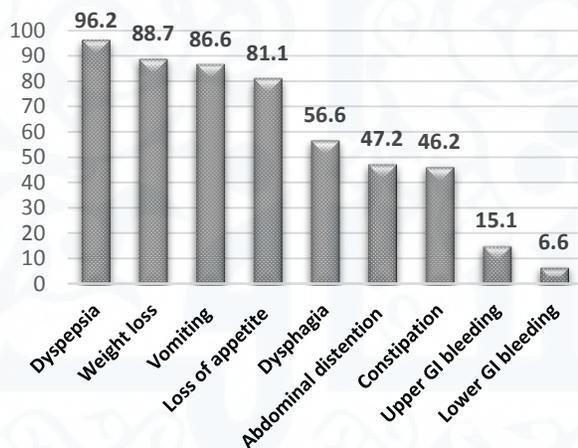


Figure 1. Clinical history of Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)

Regarding the clinical findings on examination, pallor was most frequent sign observed among 67.9% of the patients. This was followed by presence of palpable masses, ten-

derness, lymph node enlargement and lower limb edema, being observed among 35.8%, 25.5%, 21.7% and 19.8% of the patients, respectively. However, fever was observed among 6.6% of the patients (Figure 2). In addition, 79.2% of the patients were anemic as indicated by their low hemoglobin concentration.

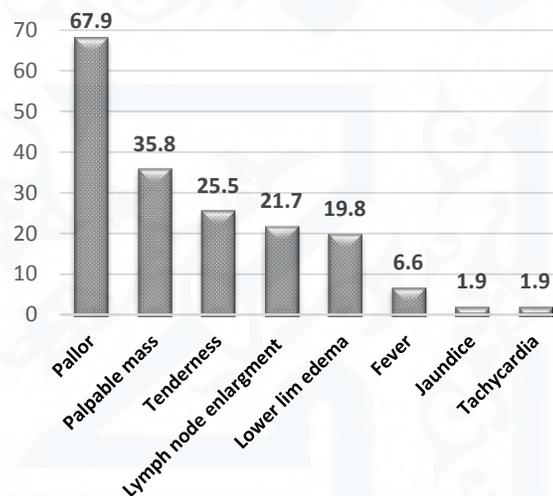


Figure 2. Clinical findings observed during the examination of Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)

3.2. Location, size and metastasis of stomach cancer

According to the abdominal computed tomography (CT) scan findings, 22.6% of the patients had masses in the pylorus and antrum followed by those having masses in the body (18.9%), cardia plus lower esophageal sphincter and body plus antrum (11.3%, each), while 1.9% of the patients had masses in the fundus. On the other hand, the masses involved most of the stomach in 8.5% of the patients (Table 2).

Regarding the size of the mass and its metastasis, it was greater than 5 cm in 86.8% of the patients, and the masses were locally spread with no nodal or distant metastasis in 56.6% of the patients compared to 43.4% of those with metastasis to perigastric lymph nodes (Table 2).



Table 2. Tumor location, size and of metastasis among Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)*

| Stomach cancer characteristic | n (%) |
|---------------------------------------|-----------|
| Location | |
| Fundus | 2 (1.9) |
| Cardia and lower esophageal sphincter | 12 (11.3) |
| Body | 20 (18.9) |
| Antrum | 13 (12.3) |
| Pylorus | 14 (13.2) |
| Antrum and pylorus | 24 (22.6) |
| Antrum and body | 12 (11.3) |
| Most of stomach | 9 (8.5) |
| Size (cm) | |
| <5 | 14 (13.2) |
| >5 | 92 (86.8) |
| Metastasis | |
| None | 60 (56.6) |
| Perigastric lymph nodes | 46 (43.4) |
| Distant lymph nodes | 0 (0.0) |
| Other structures | 0 (0.0) |

* Total number of cases was 106.

Histopathologic examination of endoscopic biopsies revealed that 32.1% of the patients had well-differentiated adenocarcinoma, followed by those having moderately differentiated and poorly differentiated adenocarcinomas (26.4% each). However, lymphoma and GIST were found in 5.7% and 1.9 % of the cases, respectively (Table 3).

Table 3. Histopathologic findings of endoscopic biopsies from Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)*

| Histopathologic finding | n (%) |
|--|-----------|
| Well-differentiated adenocarcinoma | 34 (32.1) |
| Moderately differentiated adenocarcinoma | 28 (26.4) |
| Moderately-to-poorly differentiated adenocarcinoma | 6 (5.7) |
| Poorly differentiated adenocarcinoma | 28 (26.4) |
| Lymphoma | 6 (5.7) |
| Gastrointestinal stromal tumor | 2 (1.9) |
| Undifferentiated adenocarcinoma | 2 (1.9) |

* Total number of cases was 106.

3.4. Types of operations and post-operative fasting and complications

According to the type of operation, subtotal gastrectomy was performed in 43.4% of the pa-

tients, while 38.6% and 17.9 % of the patients underwent total gastrectomy and gastric bypass with small bowel, respectively. Regarding post-operative fasting, none of the patients fasted for less than 3 days. On the other hand, 74.5% of the patients fasted for more than 3 but less than 5 days, while the remaining 25.5% of the patients fasted for more than 5 days (Table 4). Figure (3) shows that most of the patients suffered from fever and cough post operations (33.0%, each), while vomiting and obstruction were recorded in 5.7% and 1.9% of the patients, respectively. However, no post-operative deaths were recorded.

Table 4. Types of operations and duration of post-operative fasting among Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)

| Parameter | n (%) |
|--|-----------|
| Type of operation | |
| Total gastrectomy | 31 (29.2) |
| Subtotal gastrectomy | 46 (43.4) |
| Esophagogastrectomy | 10 (9.4) |
| Triple bypass only | 19 (17.9) |
| Duration of post-operative fasting (days) | |
| 3–5 | 80 (74.5) |
| >5 | 26 (25.5) |

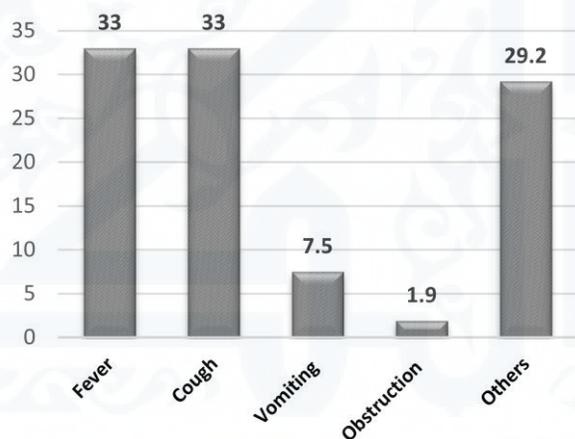


Figure 3. Post-operative complications among Yemeni patients with stomach cancer admitted to teaching hospitals in Sana'a (2011–2015)



4. Discussion

Stomach cancer is one of the most common cancers worldwide (8). However, no previously published study was encountered about the clinicopathologic characteristics of stomach cancer among Yemeni patients. The finding that more than half of Yemeni stomach cancer patients in the present study were elderly males aged between 50 and 70 years old is consistent with those reported for patients from the United Kingdom, Chile and China (8–13). Smoking was reported in 38.7% of the patients. This is consistent with the finding of a previous study in Chile, where only 44.8% of the cases were smokers (12). Tobacco smoking was reported to moderately increase the risk of stomach cancer among the Japanese population (14). Khat chewing was reported by 56.6% of the cases, but there is a lack of studies from other countries for comparison because of the absence of this habit. Alcohol consumption was reported by 61.8% of stomach cancer patients from Chile (12), while it was not reported by the case of the present study.

The most frequent symptoms reported by stomach cancer patients in the present study were dyspepsia, abdominal pain, weight loss, vomiting and loss of appetite. It is noteworthy that epigastric pain in stomach cancer is similar to that caused by peptic ulcer. Dyspepsia is prominent if the tumor is close to the fundus, while vomiting is more associated with tumors in the pylorus (15). However, these non-specific symptoms often accompany a number of gastrointestinal diseases and not necessarily suggestive of the early stages of stomach cancer (16, 17). Advanced stages of the disease are often associated with weight loss, loss of appetite, and anemia (18). It is to be considered that dyspepsia, weight loss, pain, vomiting are the most frequent presenting symptoms among stomach cancer patients, being differ-

ent from study to study and from country to another for unclear reasons (18–21).

The proportions of presenting symptoms in the present study are much higher than those recently reported by Selcukbiricik et al. (22) among Turkish stomach cancer patients, where initial symptoms were dyspepsia (39.3%), abdominal pain (24.8%), nausea and vomiting (16.3%), weight loss (7.5%), bleeding (6.4%) and acute abdominal pain (1.6%). At early stages, stomach cancer patients may be asymptomatic or may present with dyspepsia, mild epigastric pain, nausea or anorexia. Because of active screening programs in Eastern Asia, many patients are now detected while asymptomatic (18). However, most stomach cancer patients in Yemen are presented in advanced stages as indicated by the high proportion (56.6%) of cases presented with dysphagia. This could be attributed to the lack of active screening programs and policies in the country. High proportions of the patients in the present study were anemic on admission to hospitals, as indicated by the low hemoglobin and pallor at presentation. It is worth mentioning that anemia could be considered as a warning sign suggestive of invasive disease in patients with early stomach cancer (19).

In addition to gastroscopy and endoscopic ultrasonography, CT scanning remains the most accurate and widely used tool for the pre-operative staging of stomach cancer besides being the radiologic modality of choice for planning curative or palliative surgeries and evaluating chemotherapy in those with inoperable carcinomas (23, 24).

According to the CT findings, the size of masses among 86.8 % of the patients exceeded 5 cm which could be attributed to the late presentation of the Yemeni patients, shortage of the diagnostic tools and lack of screening programs. Moreover, about a half of the patients were lo-



cally spread to perigastric lymph nodes, with no nodal or distant metastasis as revealed by CT scans. It is noteworthy that the depth of gastric carcinoma mural invasion is improved with the application of multidetector devices and multiphase reconstructions (24–26). On the other hand, the finding that stomach cancer was locally spread to the perigastric lymph nodes without distal metastasis is consistent with a study among Korean patients (23).

Histopathology and anatomic localization of the primary tumor are best obtained by upper gastrointestinal endoscopy, where upper endoscopy is more sensitive and specific for diagnosing a variety of gastric, esophageal and duodenal lesions than alternative diagnostic strategies (27, 28). The early use of upper endoscopy in patients presenting with gastrointestinal complaints enhances the detection of early gastric cancers (29). Since up to 5% of malignant ulcers appear benign grossly, such lesions should be evaluated by biopsy and histopathologic assessment (30, 31). The present study revealed that about a fifth of stomach cancer had masses in the pylorus and antrum followed by those having masses in the body (18.9%). Collectively, the distal location of the non-cardia masses (body + antrum + pylorus) represented 78.3% of the patients, while the proximal location (cardia or cardia and lower esophageal sphincter) was found in only 13.2%. This is consistent with previous reports from China and Korea (32, 33). The most frequent types of stomach cancers in the present study were well-differentiated adenocarcinomas while lymphoma and GIST were the least frequent types, and this is consistent with the published literature (33, 34).

In the present study, 43.4% and 38.6% of stomach cancer patients underwent subtotal and total gastrectomies, and these ratios are related to the extension of most lesions to the dis-

tal third of the stomach. This finding is in line with that by Kim et al. (32) among Korean patients, where subtotal and total gastrectomies were performed for 65.5% and 15.7% of patients, respectively. In contrast, Medina-Franco (35) found that the most type of operations was total gastrectomy (46.4%), either for curative or palliative treatment. In the present study, about three-quarters of the patients stayed fasting in hospital for more than three but less than five days, and about two-thirds were normal in that period without any complications. In addition, fever and cough were the most frequent post-operative complications among about a third of patients, while vomiting and obstruction were the least recorded complications. This is in contrast to those reported among Mexican patients, where intra-abdominal abscesses and anastomotic leaks and fistulae were the most frequent complications (36).

5. Conclusions

From an epidemiologic point of view, the clinicopathologic characteristics of stomach cancer among Yemeni patients are somewhat similar to those in other parts of the world, where the majority of patients are elderly and males. The most frequent presenting symptoms are dyspepsia, weight loss and epigastric pain. Most patients are anemic and presented with palpable abdominal masses. Histopathologically, adenocarcinomas with their different types are the most common types of stomach cancers among Yemeni patients, and subtotal gastrectomy is the most common procedure performed among them.

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Authors' contributions

All authors contributed equally to the study design, data collection, interpretation of results and manuscript drafting and revising. They also approved the final draft.

Competing interests

The authors declare that they have no competing interests associated with this article.

Ethical approval

The study protocol of the present study was approved by the Ethics Committee of Faculty of Medicine and Health Sciences, Sana'a University, Sana'a, Yemen. Patients' data retrieved from the records were processed anonymously.

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