RESEARCH ARTICLE

Presentation and Outcomes of Gastric Cancer at a University Teaching Hospital in Nepal

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Abstract

Background: Gastric cancer is the most common gastrointestinal cancer and a leading cause of cancer mortality in Nepal. Survival of gastric cancer patients depends on the stage at which diagnosis is made. The aim of this study was to analyze the presentation and outcomes of gastric cancer patients treated at a tertiary care hospital in Nepal. Materials and Methods: A retrospective analysis of 140 consecutive histologically proven gastric adenocarcinoma cases managed at the Department of Surgery, Tribhuvan University Teaching Hospital, Kathmandu, Nepal for the period of January 2009 to December 2013 was carried out. Results: One hundred forty out of the total 186 patients with histologically proven gastric adenocarcinoma, were admitted for surgery. The mean age was 59.6±12.4 yrs (range 29 to 78 yrs) and the male: female ratio was 2:1. Sixty three (45%) patients featured Tibeto-Burman descent though this ethnic group accounts for only 18% of the Nepalese population. Two-thirds or more patients presented with abdominal pain, anorexia, weight loss and/or vomiting. In 86 (61.5%) of the patients the tumor was located in the lower 3rd of the stomach and in only 15% of the patients the tumor was located at the upper 3rd. Early gastric cancer was diagnosed postoperatively in only 4%. In 54%, the disease was locally advanced and metastatic lesions were found in 14% of the patients. Subtotal (73) or total (11) curative gastrectomies (D1, D1+ or D2) were performed in 84 (60%) patients with average lymph node retrieval of 16.6±8.2. Palliative gastrectomies or procedures were performed in 23% of the patients and no intervention (open & close/biopsy) was employed in 15% of the patients. Perioperative morbidity was seen in 10% and mortality in 4%. Three, four and five year survival rates up to the recent follow-up were 17.9%, 11.9% and 8.3%, respectively. Conclusions: Gastric cancer in Nepal is usually diagnosed at an advanced stage and has a poor prognosis. Thus, early detection is the key to improve the survival of gastric cancer patients.

Keywords: Curative surgery - Gastric cancer - Stage of disease - Survival - Nepal

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Introduction

Gastric cancer is the fifth commonest cancer (after cancer of the lung, breast, colorectal, prostate) which accounts 6.8% of all cancer worldwide, and third commonest cause of cancer related mortality (after cancer of the lung and liver) which accounts 8.8% of cancer mortality (Ferlay et al., 2013). Incidence of gastric cancer varies according to geographic locations in different parts of world. According to GLOBOCAN 2012, more than 70% of cases (677,000 cases) occur in developing countries and half the world total occurs in Eastern Asia (mainly in China).

Studies done in Nepal showed gastric cancer as the 3rd most common cancer in males preceded by lung cancer and oral cancers where as it is the 2nd most common cause of cancer related mortality in males. In females, it is the 6th most common cancer and is the 5th most common cause of cancer related mortality (Pradhananga et al., 2009).

Currently, the only potentially curative treatment for gastric cancer is surgery. Curative intent surgery includes radical resection of the stomach along with adequate regional lymph node dissection. Gastric cancer usually presents in advanced stage with five year survival of 10 - 20% and early diagnosis confers five year survival of 90% (Berrino et al., 1999; Kikuchi et al., 2004).

This study was undertaken to evaluate the demographic profile, presentation and outcomes of the gastric cancer patients treated in Department of Surgery of the Tribhuvan University Teaching Hospital, a tertiary care hospital of Nepal.

Materials and Methods

This was a retrospective study conducted over a period of five years (January 2009 to December 2013) at the Department of Surgery, Tribhuvan University Teaching Hospital (TUTH) Kathmandu, Nepal. TUTH was established in 1983 and is a 700 beded tertiary care and teaching hospital and serves as a referral center for tertiary

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specialist care in the country. Average number of patients attending the outpatient department and admissions are 23858 and 5486 patients in surgical gastroenterology units of the Department of Surgery, respectively; with average number of patients operated 2310 patients annually. All patients with histologically proven adenocarcinoma of the stomach, admitted for surgery, were included in this study and patients with incomplete data were excluded.

The patient's details were collected from patients' records kept in the medical record department, the surgical wards, operating theater and pathology department. Patient's data regarding demographics, ethnicity, geographical distribution, presenting symptoms, location, AJCC (TNM) staging (Edge et al., 2010), management, survival, perioperative morbidity and mortality, and follow-up were analyzed.

The diagnosis of gastric cancer was confirmed pathologically by upper GI endoscopic and laparotomy biopsies. Treatment modalities included surgery, chemotherapy and radiotherapy. With regard to curative gastrectomy, dissection of regional lymph node was regarded as an important step of the surgery. According to Japanese gastric cancer treatment guidelines (JGCA 2010), lymphadenectomy was defined by D1: lymph node station (Nos.) 1-7; D1+: D1 + Nos. 8a, 9, 11p; D2: D1 + Nos. 8a, 9, 10, 11p, 11d, 12a, in total gastrectomy, whereas, D1: Nos. 1, 3, 4sb, 4d, 5, 6, 7; D1+: D1+ Nos. 8a, 9; D2: D1+ Nos. 8a, 9, 11p, 12a in distal subtotal gastrectomy. If there was a gross disease after resection, palliative gastrectomy was considered.

Follow-up period was up to five years or death. Survival analysis was carried out with survival defined as the time between the date of commencement of treatment and the date of last follow-up or death. The recurrence of disease was confirmed by physical findings, radiological studies, endoscopic examination with biopsy and surgery.

All data were analyzed by SPSS for windows version 17 and simple descriptive methods were used.

Results

One hundred forty (75.3%) out of the total 186 patients with histologically proven gastric adenocarcinoma, were admitted for surgery. Operative procedures were deferred in remaining 46 patients (24.7%) because of metastatic disease or patient denied surgery. Mean age of presentation was 59.6±12.4 years with 125 (89.3%) patients were above 40 years (Table 1). Of the 140 patients 93 were males and 47 females, with the male to female ratio of 2:1. Male to female ratio was 1:1.5 in less than 40 years of age. Seventy eight (55.7%) patients were in age group of 50-70 years. Seventy seven (55%) patients belonged to the Indo-Aryan decent where as 63 (45%) patients belonged to Tibeto-Burman decent. Out of 63 patients, 40 patients belonged to Gurung, Sherpa, Lama (Janajatis-Hill). According to 2011 census of Nepal, Indo-Aryan group comprises of 79% and Tibeto-Burman 18% of population. When we consider this fact, a significant portion of the patients with carcinoma stomach belonged to the Tibeto-Burman group, moreover belonged to Gurung, Sherpa, Lama (Janajatis-Hill).

The common complaints at presentation were pain abdomen (87%), anorexia (81%), and weight loss (77%). Lower third of stomach was common site for gastric cancer (61.5%) followed by middle third (20%) and upper third (15%). In 5 patients, the whole stomach was involved. One hundred thirty five (96%) patients had advanced gastric cancer whereas 5 (4%) patients had early gastric cancer which was diagnosed post-operatively. Thirty four patients (24%) were of stage IIIB followed by 31 patients (22%) of stage IIIA and 11 patients (8%) of stage IIIC. Twenty patients (14%) were with metastatic disease and the remaining patients (32%) were of either stage I or II (Table 1).

Surgery with curative intent (D1, D1+ or D2) was undertaken in 84 (60%) patients, out of which subtotal gastrectomy was done for 73 (87%) patients and total gastrectomy was done for 11 (13%) patients; with average number of lymph node retrieval was 16.6±8.2 (Range 5-47 lymph nodes). Palliative surgery was done in 32 (23%) of which palliative subtotal gastrectomy was done for 14 (44%) patients, Gastrojejunostomy for 13 (41%), Feeding jejunostomy for 3 (9%) and Ileocolic anastomosis was done for two patients with obstruction of transverse colon (Table 2). No intervention was done in 21 (15%) patients. Three patients had presented with gastric cancer perforation and were operated in the emergency. Patient was referred for post-operative chemotherapy for all patients with T3/T4 tumors and/or node positive tumors.

Post - operatively, 11 (8%) patients had surgical site infection, 3(2%) had anastomotic leakage and 5 (4%)

Table 1. Presentation of the Gastric Cancer Patients

Presentation		No. of patients (%)
Age (Mean: 59.6±12.4 years)		
	<40 years	15 (10.7)
	>40 years	125 (89.3)
Sex	Male	93 (66)
	Female	47 (34)
Ethnicity Nepal Census 2011 *		
	Indo-Aryan 79%	77 (55)
	Tibeto-Burman 18%)	63 (45)
Presenting Symptoms		
	Pain abdomen	122 (87)
	Anorexia	113 (81)
	Weight loss	108 (77)
	Vomiting	92 (66)
	Malena	42 (30)
	Abdominal lump	17 (12)
	Hematemesis	14 (10)
Location	Upper 3rd	21 (15)
	Middle 3rd	28 (20)
	Lower 3rd	86 (61.5)
	Whole stomach	5 (3.5)
Staging **	Stage IA	4 (3)
	Stage IB	8 (6)
	Stage IIA	12 (9)
	Stage IIB	20 (14)
	Stage IIIA	31 (22)
	Stage IIIB	34 (24)
	Stage IIIC	11 (8)
	Stage IV	20 (14)

*National Census (2011), Mother Tongue, Central Bureau of Statistics, Nepal;**American Joint Committee on Cancer (AJCC), Chicago, Illinois; Cancer Staging Manual, Seventh Edition (2010)

Table 2. Gastric Cancer Surgery

Surgery	No. of patients (%)
Surgery with Curative Intent	
Subtotal Gastrectomy	73 (87)
Total Gastrectomy	11 (13)
Surgery with Palliative Intent	
Palliative gastrectomy	14 (44)
Gastrojejunostomy	13 (41)
Feeding jejunostomy	03 (9)
Iliocolic anastomosis	02 (6)

Table 3. Outcomes of Gastric Cancer Patients

Outcomes	No. of patients (%)
Perioperative morbidity & mortality	
Surgical Site Infection	11 (8)
Anastomotic leakage	03 (2)
Mortality	05 (4)
Survival	
3 years survival	15/84 (17.9)
4 years survival	10/84 (11.9)
5 years survival	07/84 (8.3)

mortalities. Three year, four year, five year survival upto recent follow up were 15 (17.9%), 10 (11.9%), 7 (8.3%), respectively (Table 3).

Discussion

Gastric cancer is the commonest gastrointestinal malignancy and one of the most common causes of cancer related death in Nepal. The incidence of gastric cancer is known to increase with age with the peak incidence occurring at 60-80 years (Nagini et al., 2012). In our study also, more than half of the patients (55.7%) were in age group of 50-70 years with the mean age of 59.6 years and male to female ratio of 2:1. Similar finding was observed in other study which showed 80.5% patients of more than 45 years and male to female ratio was 1.97:1 (Khan et al., 2012).

Fifty percent of patients belonged to Brahmin and Chhetris (Hill) followed by Janajatis (Hill) 35% and Newars 11%, both of whom belonged to the Janajatis and amongst them it was more frequently observed in the Gurung and Sherpa community (Ghosh et al., 2010; Ghimire et al., 2014). In our study, sixty three (45%) patients with gastric cancer belonged to Tibeto-Burman decent though they comprise only 18% of the Nepal population, moreover belonged to Gurung, Sherpa, Lama (Janajatis-Hill). Since these patients belong to the hilly region and practice of traditional medicine, limits their accessibility to health care facilities (Raut et al., 2011). As their beliefs on witchcraft and reliance on traditional faith healer for treatment is quite strong among all the ethnic communities, visit to a health facility becomes inevitable only when problem gets worse or unbearable (Subba et al., 2004).

Eighty seven (61.5%) patients had gastric cancer in lower third of stomach. In western world, the commonest gastric cancer sites are proximal lesser curvature, cardia, and the esophago-gastric junction (Blot et al., 1991; Theuer et al., 2000; Schwarz et al., 2002; Yao et al., 2002; Verdecchia et al., 2003; Strong et al., 2010). On the contrary, distal gastric cancer remains predominate in Japan and other parts of the world (Parkin et al., 1992).

Surgery remains the mainstay of curative treatment of resectable gastric cancer and complete resection of a gastric tumor with resection of adjacent lymph node is the only chance for a cure (Alatise et al., 2007; Bakari et al., 2010). In our study, surgery with curative intent was performed in 84 (60%) patients with average number of lymph node retrieval was 16.6±8.2 (Range 5-47 lymph nodes), and palliative surgery was done in 32 (23%). For localized resectable gastric cancer, D1 or modified D2 lymph node dissection with a goal of examining at least 15 lymph nodes is done (Schwarz et al., 2007; Songun et al., 2010). Patients who underwent D2 lymph node dissections, there was a trend toward improved survival for patients with T3/T4 gastric cancer as confirmed by recent meta-analysis (Seevaratnam et al., 2012).

Majority of patients (24%) were of stage IIIB followed by stage IIIA. Data were obtained from National Cancer Data Base (NCDB) reports of 50,169 gastric carcinoma cases diagnosed during the years 1985-1996 and treated with gastrectomy revealed similar findings (Hundahl et al., 2000). The prognosis of gastric cancer has remained poor in most developing countries where most patients are already in an advanced stage of the disease at the time of diagnosis (Edwards et al., 2004; Verdecchia et al., 2004; Tsugane et al., 2007).

Five years survival up to recent follow up was only 8.3%. This is an ongoing study, exact results of 5 years survival is still awaited. Five-year survival rate of all patients with gastric cancer in United States is 29%, where as Japan has 5 years survival rate of 60% (Kamangar at al., 2006). This difference is because of mass screening programs using photofluorography differences in tumor biology and location with more intestinal subtypes and distal locations, and stage migration due to higher lymph node yield in Japanese series (Bunt at al., 1995; Hamashima et al., 2008).

Early diagnosis of gastric cancer confers five year survival of 90% and is the only way to improve survival rate (Antonioli et al., 1994; Berrino et al., 1999; Kikuchi et al., 2004). Early diagnosis is difficult since symptoms appear late. In a study by Look et al, epigastric pain (63.3%) and gastrointestinal hemorrhage (27.3%) were the important symptoms, whereas according to Haugstvedt et al, weight loss was common symptom (Haugstvedt et al., 1991; Look et al., 2003). In our study, presenting symptom was pain abdomen (87%), anorexia (81%), and weight loss (77%).

Poor survival can be explained in gastric cancer patients, when symptoms occur, the cancer has usually spread and only a few patients are only suitable for curative surgery. Therefore, mass screening can only pick up asymptomatic early gastric cancer. In our series, effective risk population for gastric cancer e.g. Janajatis (Hill) is to be screened selectively (Ghimire et al., 2014).

In conclusion, gastric carcinoma is a male predominant malignancy usually of old age and commonly observed in the Tibeto-Burman group of peoples in distal third of stomach in Nepal. It is usually diagnosed at an advanced

stage and has poor prognosis. Thus, early detection is the key to improve the survival of gastric cancer patient.

References

Alatise O, Lawal OO, Adesunkanmi AK, et al (2007). Clinical pattern and management of gastric cancer in Ile-Ife, Nigeria. *Arab J Gastroenterol*, **8**, 123-6.

Antonioli DA (1994). Precursors of gastric carcinoma: a critical review with brief description of early (curable) gastric cancer. *Hum Pathol*, **25**, 994-1005.

Bakari AA, Ibrahim AG, Gali BM, Dogo D, Nggada HA (2010). Pattern of gastric cancer in northeastern Nigeria: a clinicopathological study. *J Chinese Clin Med*, **51**, 211-5.

Berrino F, Capocaccia R, Esteve J (1999). Survival of cancer patients in Europe: The EUROCARE-2 study. *IARC Scientific Publications*, **151**.

Bunt AM, Hermans J, Smit VT, et al (1995). Surgical/pathologic-stage migration confounds comparisons of gastric cancer survival rates between Japan and Western countries. *J Clin Oncol*, **13**, 19-25.

Edge SB, Compton CC (2010). The American Joint Committee on Cancer: the 7th edition of the AJCC cancer staging manual and the future of TNM. *Ann Surg Oncol*, **17**, 1471-4.

Edwards P, Blackshaw GR, Lewis WG (2004). Prospective comparison of D1 vs modified D2 gastrectomy for carcinoma. *Br J Cancer*, **90**, 1888-92.

Ferlay J, Soerjomataram I, Ervik M, et al (2013). GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer.

Ghimire B, Singh YP, Timalsina S (2014). Post operative diagnosis of early gastric cancer in a low risk population and the possibility of risk stratified screening. *Kathmandu Univ Med J*, **45**, 32-37.

Ghosh A, Sathian B, Gharti DM, Narasimhan R, Talwar OP (2010). Epidemiologic analysis of gastric carcinoma in the western region of nepal. *Nepal Journal of Epidemiology*, **1**, 27-32.

Hamashima C, Shibuya D, Yamazaki H, et al (2008). The Japanese guidelines for gastric cancer screening. *Jpn J Clin Oncol*, **38**, 259-67.

Haugstvedt TK, Viste A, Eida GE, Soriede O (1991). Patients and physicians delay in patients with stomach cancer in Norway; is it important? *Scand J Gastroenterol*, **26**, 611-19.

Hundahl SA, Phillips JL, Menck HR (2000). The national cancer data base report on poor survival of U.S. gastric carcinoma patients treated with gastrectomy: Fifth edition american joint committee on cancer staging, proximal disease, and the "different disease" hypothesis. *Cancer*, **88**, 921-32.

JGCA Japanese Gastric Cancer Association (2010). Gastric cancer treatment guidelines, kanehara & Co Ltd, Tokyo, Japan

Kamangar F, Dores GM, Anderson WF (2006). Patterns of cancer incidence, mortality, and prevalence across five continents: defining priorities to reduce cancer disparities in different geographic regions of the world. *J Clin Oncol*, 24, 2137-50

Khan D, Hassan MK, Rehman A, et al (2012). Gastric carcinoma: location, morphological and histological profile. *J Postgrad Med Inst*, **26**, 170-5.

Kikuchi S, Katada N, Sakuramoto S, et al (2004). Survival after surgical treatment of early gastric cancer: surgical techniques and long-term survival. Langenbeck's archives of surgery / *Deutsche Gesellschaft fur Chirurgie*, **389**, 69-74.

Look M, Tan YY, Vijayan A, Teh CH, Low CH (2003). Management delays for early gastric carcinoma in country without mass screening. *Hepatogastroentrology*, **50**, 873-6.

Nagini S (2012). Carcinoma of the stomach: A review of epidemiology, pathogenesis, molecular genetics and chemoprevention. *World Journal of Gastrointestinal Oncol*, **4**, 156-69.

Parkin DM, Muir CS (1992). Cancer incidence in five continents. Comparability and quality of data. *IARC Sci Publ*, 45-173.

Pradhananga KK, Baral M, Shrestha BM (2009). Multi-institution hospital-based cancer incidence data for Nepal - An initial report. *Asian Pac J Cancer Prev*, **10**, 259-62.

Raut B, Khanal DP (2011). Present status of traditional healthcare system in Nepal. *Int J Research in Ayurveda & Pharmacy*, **2**, 876-82.

Schwarz RE, Smith DD (2007). Clinical impact of lymphadenectomy extent in resectable gastric cancer of advanced stage. *Ann Surg Oncol*, **14**, 317-28.

Schwarz RE, Zagala-Nevarez K (2002). Ethnic survival differences after gastrectomy for gastric cancer are better explained by factors specific for disease location and individual patient comor-bidity. *Eur J Surg Oncol*, **28**, 214-9.

Seevaratnam R, Bocicariu A, Cadoso R, et al (2012). A meta-analysis of D1 versus D2 lymph node dissection. *Gastric Cancer*, **1**, 560-69.

Songun I, Puttar H, Kranenbarg EM, et al (2010). Surgical treatment of gastric cancer: 15-year follow- up results of the randomised nationwide Dutch D1D2 trial. *Lancet Oncol*, **11**, 439-449.

Strong VE, Song KY, Park CH, et al (2010). Comparison of gastric cancer survival following R0 resec¬tion in the United States and Korea using an internationally validated nomogram. *Ann Surg*, **251**, 640-6.

Subba NR (2004). Health seeking behavior of rajbanshi community in katahari and baijanathpur of morang district. *Nepal Journal of Nepal Health Research Council*, **2**, 14-18.

Theuer CP (2000). Asian gastric cancer patients at a southern Califor¬nia comprehensive cancer center are diagnosed with less ad¬vanced disease and have superior stage-stratified survival. *Am Surg*, **66**, 821-6.

Theuer CP, Kurosaki T, Ziogas A, et al (2000). Asian patients with gastric carcinoma in the United States ex¬hibit unique clinical features and superior overall and cancer specific survival rates. *Cancer*, **89**, 1883-92.

Tsugane S, Sasazuki S (2007). Diet and the risk of gastric cancer: review of epidemiological evidence. *Gastric Cancer*, **10**, 75-83.

Verdecchia A, Corazziari I, Gatta G, et al (2004). Explaining gastric cancer survival differences among European countries. *Int J Cancer*, **109**, 737-41.

Verdecchia A, Mariotto A, Gatta G, Bustamante-Teixeira MT, Ajiki W (2003). Comparison of stomach cancer incidence and survival in four continents. *Eur J Cancer*, **39**, 1603-9.

Yao JC, Schnirer II, Reddy S, et al (2002). Effects of sex and racial/ethnic group on the pattern of gastric cancer localization. *Gastric Cancer*, **5**, 208-12.