



Review Article

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## *An Overview on Gastric Cancer Surgical Management Approach*

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### ABSTRACT

Gastric carcinoma is considered one of the most aggressive malignancies that is related to the late discovery of the disease. Feature of the disease is usually non-specific and can be misleading. Diagnosis is mainly depending on endoscopic biopsy, after that many steps should be done to assess the extent of the disease. Treatment will purely rely on the stage, since early disease is completely different from the metastasis one. The Medline, Pubmed, Embase, NCBI, and Cochrane databases were searched for studies of patients who developed gastric carcinoma symptoms. In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics: gastric carcinoma recent diagnosis and treatment. All other articles that did not have one of these topics as their primary endpoint were the exclusion criteria. The incidence, etiology, and management options were analyzed. Gastric carcinoma is a very wide topic, many aspects still unclear about it, and many needs more works to improve the outcome of the patient.

**Key words:** Gastric carcinoma, Ascites, Adenocarcinoma, Krukenberg's tumor, Sister Mary Joseph node

### INTRODUCTION

Gastric Carcinoma is one of the most aggressive malignancies worldwide these days. The reason behind this is usually late detection of the disease because of lack of screening programs worldwide except in Japan since they developed a very high-quality screening program there because gastric cancer is very common in Japan and it is the most common site of gastric cancer [1].

This review aims to discuss gastric carcinoma from a surgical point of view, risk factors to avoid, diagnosis of different stages and treatment depending on each stage, and the need for non-surgical treatment.

### MATERIALS AND METHODS

For the selection of articles, PubMed database was used and the following keys were used in the mesh ((“gastric carcinoma” [Mesh]) AND (“diagnosis and treatment” [Mesh]) OR (“gastric carcinoma diagnosis and treatment Mesh))).

In regards to the inclusion criteria, the articles were selected based on the inclusion of one of the following topics: gastric carcinoma recent diagnosis and treatment.

All other articles that did not have one of these topics as their primary endpoint were the exclusion criteria. Around 90 publications were chosen as the most clinically relevant out of 1,202 articles indexed in the previous two decades, and their full texts were evaluated. After a thorough examination, a total of 31 of the 90 were included. Using reference lists from the recognized and linked studies, additional research and publications were found. Expert consensus recommendations and commentary were added where relevant to help practicing physicians assess cirrhosis most simply and practically possible.

## RESULTS AND DISCUSSION

Gastric carcinoma is the fourth most common malignancy worldwide nowadays, and it is the second cause of death within malignancies [2]. Usually, the 5-year survival rate of gastric carcinoma is very poor, about 10-30%, except in Japan it exceeds 90% 5 years survival rate, and this is due to the high-quality screening programs and early detection of most of the cases and early intervention with resection or other treatment options [3]. The incidence is generally declining due to faster eradication therapy of H. Pylori, better hygiene, improved food intake in terms of quality and amount, and increased fruit and vegetable intake. Southern Asia, North and East Africa, North America, New Zealand, and Australia are classified as low-risk areas [4]. The high-risk areas include Central and South America, East Asia, and Eastern Europe [4].

### *Risk factors*

One of the most important risk factors in developing gastric cancer is H.Pylori infection, there is some studies say that 75% of gastric cancer cases are directly caused by H.pylori infection [5]. The main proteins that are responsible for gastric carcinoma, in this case, are the Vacuolization protein (VacA) and Cytotoxic antigen (CagA), and as we discussed before there is a decrease in the incidence of the disease because of proper eradication therapy of the H.Pylori infection [5]. Diet is a significant factor in malignancies of GIT in general, and it plays an important role in gastric cancer. Scientists postulate that there is a relationship between a low fiber diet, low vegetables, and fruits, high salt intake with gastric cancer [6]. Eating processed meat (N-nitroso compounds) is also a risk factor for gastric carcinoma [6]. In addition to excess alcohol intake, also tobacco smoking shows a high relationship since male smokers have 60% more chance to develop gastric cancer than nonsmoker males and 20% for females [7]. Gastric surgeries also are important risk factors to develop gastric cancer, especially Gastrojejunostomy since there is reflux of pancreatic juices and bile into the stomach and this will lead to intestinal metaplasia and the result will be carcinoma of the stomach, also gastrectomy and gastroduodenostomy but they carry a lower risk than gastrojejunostom [8]. The last thing to mention is EBV infection, new studies suggest that there is a relation between EBV infection and gastric carcinoma since there is a positive EBV infection frequently with gastric cancer patients, the studies indicate that the EBV produces a gastric microenvironment that is suitable for carcinogenesis [9].

### *Pathology*

World Health Organization classifies gastric carcinoma into adenocarcinoma, signet ring cells, and undifferentiated type [10]. There is also Lauren classification which divides the gastric carcinoma into the intestinal type and diffuse type. The intestinal type is associated with atrophic gastritis and intestinal metaplasia and it has a better prognosis than the diffuse type [10]. Diffuse type originates from normal gastric tissue [10]. It has a very poor prognosis since it lacks E-Cadherin activity, so it has a higher chance of spreading and is also associated with the Krukenberg tumor. Intestinal is more common overall and it is usually in the distal part of the stomach [11]. The more common in young patients than elderly is Diffuse and the resection depends on Lauren's classification, which we will discuss in the treatment section [11].

### *Symptoms and signs*

Patient with gastric carcinoma usually present with non-specific symptoms such as weight loss, anorexia, nausea, hematemesis, persistent abdominal pain, dysphagia, dyspepsia, and early satiety [12]. In a patient who presents with a local advanced or metastatic disease, he/she presents with weight loss, potential ascites, crucial abdominal pain, fatigue, and have visceral metastasis on scans, and can have a gastric-outlet obstruction. In regards to examination, the most common physical examination finding is a palpable abdominal mass, which shows advanced disease. A patient may also have signs of metastatic lymphatic spread, including Sister Mary Joseph's

node (peri-umbilical nodule), Virchow's node (left supraclavicular adenopathy) [12]. Direct metastasis to the peritoneum can present as an ovarian mass which is called (Krukenberg's tumor), ascites (peritoneal carcinomatosis), or hepatomegaly (often diffuse disease burden) [12].

### *Diagnosis*

Sometimes the patient is presented early for surveillance endoscopy, and most of the cases, unfortunately, presented very late due to symptoms such as weight loss, dysphagia, vomiting and signs of gastric outlet obstruction syndrome, gastrointestinal bleeding, and anemia [13]. In such patient direct endoscopy is required to assess the patient's problem and a mass or ulcer in the stomach found, a direct biopsy is required and sends it to the pathology lab, the report will come with gastric cancer and tells which type it is, intestinal, diffuse or indeterminate type [13]. Direct workup for cancer staging is highly important to know what the best intervention in this patient is so starting with endoscopic ultrasound will be beneficial, especially in early tumors (T1 staging, which is limited to the submucosal layer) [14]. Also, it can assess the lymph nodes involvement, then CT neck to the pelvis is of a big value since it provides very important information, especially about distant metastases, in some cases, PET/CT is preferable on CT scan to detect the tumor activity and sites [14]. The laparoscopic investigation is very important in the case of gastric carcinoma to detect any peritoneal deposition of tumor or metastases if it is found that the cancer staging now is directly staging 4 gastric cancer, and the treatment will go toward the palliative treatment. Nowadays, there are some studies and centers advise that we should go for Microsatellite instability testing for diagnosing and this will make a good impact on decision making since cancer with high MSI is not that much sense for chemotherapy or radiotherapy so the most suitable intervention for this patient is surgical resection [15]. Early staging is a crucial step in the treatment and management of gastric carcinoma and other malignancies, so it is better to start the staging workup as soon as possible after confirmation of the diagnosis and don't delay the staging program and investigations [16].

### *Treatment*

When we speak about the management plan for any malignancies, we mention both local treatment and systemic, since cancer is a systemic disease and may metastasize or disseminate for proximal or distal structures. Local treatment of gastric cancer mainly depends on the staging system. Nowadays, many studies suggest that preoperative chemotherapy shows a better prognosis than doing surgery alone, in addition to postoperative chemoradiotherapy. perioperative chemotherapy is administered for a patient with resectable clinical T2N0 patient or greater it is given before surgery as a neoadjuvant therapy followed by surgical resection and then adjuvant therapy [16]. In some cases, we give neoadjuvant therapy for downstaging of the tumor, and then we can do surgical resection with a greater chance of survival rate, there is 3 drugs regimen for perioperative chemotherapy, they are epirubicin, cisplatin, and fluorouracil [17]. Some studies suggest a role for HER2 targeted agents and VEGF inhibition in dealing with metastatic gastric cancer, but it is not confirmed yet [18]. Adjuvant chemotherapy is recommended in patients with T3 and T4 gastric cancer and they went for surgical resection (D2 resection with lymph nodes dissection). Adjuvant chemoradiotherapy, radiotherapy is less recommended in patients with gastric cancer. Still, chemoradiotherapy is used as compensation for inadequate surgical resection [16]. There is a lot of questions about their efficacy inpatient is already gone for D2 gastrectomy and lymphadenectomy. The results are controversial, this is usually recommended for patients after R1 or R2 resection also pathological T3 and T4 or positive lymph nodes if the surgeon will perform any surgery less than D2. Endoscopic resection is recommended in patients with early gastric cancer T1a and this is usually undetected in the Western world this procedure is done in Japan since they discover the disease in early stages and they have an advanced screening program for gastric cancer, even though endoscopic resection has its main criteria: well to moderately differentiated tumor histology, size  $\leq 2$  cm, without invasion of the deep submucosa, and without lymphovascular invasion in addition to free margin should be achieved [16]. Surgical resection that is usually done is subtotal or total gastrectomy and total gastrectomy is more preferred due to some reasons: 75% of gastric cancer are poorly differentiated and they are diffuse so they achieve fast spread and complete resection is much better [19]. Lymph nodes involvement is usually seen since detection is late, thirdly proximal gastrectomy with vagotomy will predispose the patient for chronic reflux disease and this will be highly uncomfortable and lastly to achieve adequate D2 resection and lymph nodes dissection total gastrectomy is required [19]. For metastatic gastric carcinoma, the main intention in this patient is palliative management so cytotoxic agents are usually administered such as, platinum, taxanes, and irinotecan, a combination of cytotoxic agents, shows better results in increasing the life expectancy than single

therapy [19]. Inpatient with amplification or overexpression of HER2 Trastuzumab should be added to the cytotoxic agents [19].

## CONCLUSION

Gastric cancer is one of the most aggressive tumors since it is usually detected late because there are no specific symptoms, pathologically it is divided into an intestinal, diffuse and undifferentiated tumor, diagnosing is mainly depends on endoscopy with biopsy, and treatment options depend on the TNM staging for early detected tumors we can go for endoscopic mucosal resection (T1a), we can go for total or subtotal gastrectomy with or without chemotherapy with a patient with T2, T3 +/- lymph nodes involvement we go for D2 dissection and for advanced tumors we mainly go for palliative treatment by some cytotoxic agents, targeted therapy or immunotherapy.

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