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# Quality of Life after Gastrectomy

## ABSTRACT

**Introduction:** Until recently, gastric cancer represented the most common visceral neoplasm. In Japan, the prevalence of disease is 58.4 per 100,000 inhabitants for men and 29.9 for women. Here, the incidence is lower. Gastrectomy is the most common surgical method of treating carcinomas of the stomach.

**Aim of the Study:** To determine which method of reconstruction after gastrectomy improves the quality of life optimally.

**Patients and Methods:** We analyzed 221 patient operated on for gastric cancer at the Surgical Clinic of the University Clinical Center in Banja Luka, and the subject of a detailed analysis of the 111 patients who were operated with the intention of achieving curability.

**Results:** Reflux esophagitis is dominant modality in reconstruction with omega loop ( $p < 0.05$ ). Analyzing GIQLI, we found dominant modality GIQLI II in the total gastrectomy and reconstruction options RY, while predominantly GIQLI III was registered in HLR reservoir reconstruction method ( $p < 0.01$ ). And two hours after the ingestion of a meal labeled with a radioisotope Tc99m in artificial gastric reservoir (HLR) showed signs of radioactivity (about 10% amount). "H0 performance" (AJCC / UICC) was the most frequently recorded in subtotal gastrectomy, while there was significant appearance of "H1" and "H2" modalities with the total gastrectomy statistically. In RY reconstruction, statistically significant was participation modalities "H1", while "H1" performance (AJCC / UICC) was the dominant modality at the HLR options reconstruction with statistically significant frequency of occurrence ( $p < 0.01$ ).

**Conclusion:** The results of the assessment of quality of life are comparable with the results of other statistical series. They confirm antireflux component Roux en Y reconstructions and its intestinoanastomoses and highlight the advantage of the nutritional components loop modifications (creation pouch-a).

**Keywords:** gastrectomy, quality of life

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**Jovan Ćulum<sup>1</sup>,  
Branislava Jakovljević<sup>1</sup>,  
Darko Jović<sup>1</sup>,  
Aleksandar Jakovljević<sup>1</sup>,  
Ljiljana Tadić Latinović<sup>2</sup>,  
Marinko Domuzin<sup>2</sup>,  
Gordana Guzijan<sup>3</sup>**

<sup>1</sup> Clinica "S-tetik" Banja Luka,

<sup>2</sup> University Clinical Center of the  
Republic of Srpska, Banja Luka

<sup>3</sup> Institute for Transfusion medicine  
of the Republic of Srpska, Banja  
Luka

## Contact address:

Jovan Ćulum,

Street address: Braće Ćubrilović 16

78000 Banja Luka,

Republic of Srpska

Bosnia and Herzegovina

e-mail: cumumj1961@gmail.com

phone number: +387-65-580-088

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## Introduction

Until recently, gastric cancer represented the most common visceral neoplasm. In Japan, the prevalence of disease is 58.4 per 100,000 inhabitants for men and 29.9 for women. In the United States of America, it ranks eighth on the list of causes of death related to malignancy. The five-year survival rate in Western countries is approximately 20% on the average, while in Japan it reaches up to 50% (for early gastric cancer – EGC even up to 90%).<sup>1-5</sup> The concept of extensive surgery for visceral neoplasms is currently topical and it further actualized the problem of restoration of digestive continuity, as the reduction of surgical radicality in an attempt to reduce the intensity of postoperative sequelae is unjustified.<sup>6-11</sup>

## Aim of the Study

Aim of the study is to determine whether the construction of a gastric pouch has a beneficial effect on the nutritional status, i.e. whether it improves the quality of life of those who underwent surgery.

## Patients and Methods

We analysed 221 patients surgically treated for gastric cancer at the Surgery Clinic of the Clinical Centre in Banja Luka, while 111 patients who were operated with the intention of achieving curability were the subject of a detailed analysis. In the study, documentation of the Surgery Clinic and the Institute for Pathology of the University Clinical Centre in Banja Luka was used. The patients were classified based on gender and age, while gastric malignancy was classified based on the macroscopic and microscopic appearance, tumor location and stage of the disease. The study covered 64 male patients (57.7%) and 47 female patients (42.3%). Most patients belonged to the age group between 60 and 70 years (36%). The dominant type of cancer was adenocarcinoma (92%), while 5% of these were lymphoma and 3% were sarcoma. There were 5% patients who underwent surgery of limited extensiveness, 43% of them underwent subtotal resection, 46% total gastrectomy and 6% of patients underwent extended total gastrectomy. For total gastrectomy, in 52.63% of cases the reconstruction was done with the RY method, in 43.86% of cases an HLR pouch was made, and in 2 patients (3.51%) an omega loop was made.

## Results

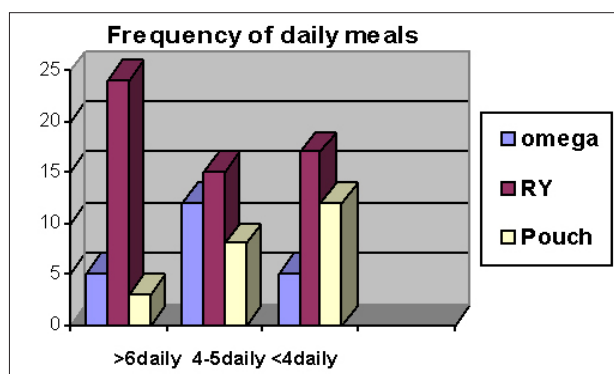
1. Reflux oesophagitis - *in certain gastric substitution options: (a sample of 53 patients who underwent gastroscopy and reflux was confirmed.*

Based on the calculated value of Fisher test (Fisher:

$p=0.030$ ), in the overall sample of those included in the analysis, there was a statistically significant difference ( $p < 0.05$ ) in the occurrence of reflux gastritis and oesophagitis in patients with respected to certain gastric substitution options, with grade 1 reflux being the dominant modality. Among the different reflux modalities, grade 2 reflux and grade 3 reflux were significant in omega-loop reconstruction.

2. Meal frequency - *in certain gastric substitution options*

**Chart 1. Daily Meal Frequency in Different Reconstruction Methods**



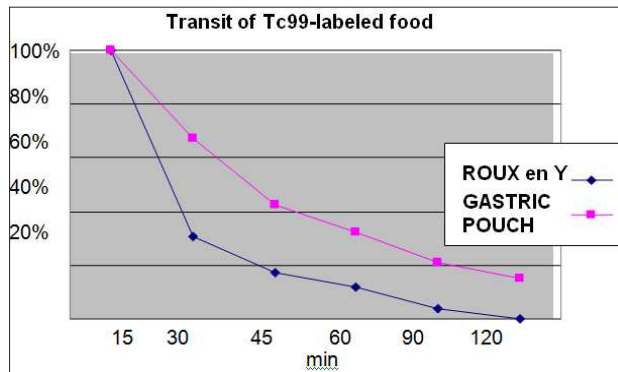
Based on the calculated value of  $\chi^2$  test ( $\chi^2 = 12.103$ ;  $p = 0.0166$ ), in accordance with the established contingency table, in the overall sample of those included in the analysis, there was a statistically significant difference ( $p < 0.05$ ) in the daily meal frequencies in patients with different gastric substitution options, with 4 to 5 meals per day being the dominant modality. (Chart 1.)

3. Food transit (food clearance) - *in certain gastric substitution options*

Food transit was monitored using a SOPHA gamma camera, made in France.

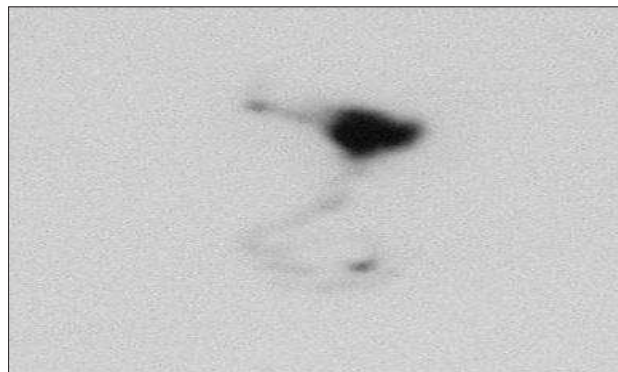
A radiopharmaceutical (isotope) Tc99 sulfur colloid was given perorally, at a dose of 2-3 mCi (74-111 kBq), with a small amount of water. A comparison was made between RY reconstruction option and Hunt-Lawrence-Rodino pouch reconstruction. For Roux-en-Y method, rapid emptying of food labeled with radioactive Tc99 was registered. After 30 minutes, only about 30% of the total amount of food was registered in the Roux-Y loop region and after 45 minutes about 18%, while after 60 minutes signs of radioactivity were barely displayed (about 10%). For HLR pouch reconstruction, over 60% of the total amount of food was registered in the pouch after 30 minutes and about 35% after 60 minutes. (Chart 2.)

**Chart 2. Food Transit (emptying time)**



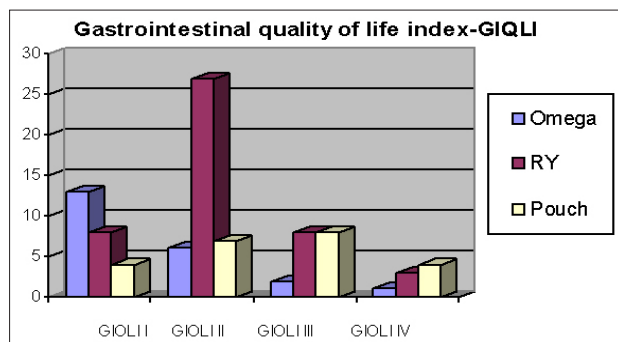
Even after two hours, the artificial gastric pouch showed signs of radioactivity (about 10% of the total amount). (Figure 1.)

**Figure 1. Food transit (food clearance) – scintigraphy with radioactive colloid Tc<sup>99m</sup>; Transit after 30 min (HLR pouch)**



4. *Gastrointestinal quality of life index- GIQLI - in certain gastric substitution options* To estimate the postoperative quality of life, we used questionnaire of index quality of life by Eypasch, Williams, Troidl - in 36 questions (Gastrointestinal Quality of Life Index - GIQLI).<sup>1-4</sup>

**Chart 3. Gastrointestinal Quality of Life Index (giqli)**



Based on the calculated value of  $\chi^2$  test ( $\chi^2 = 21.858$ ;  $p = 0.0013$ ), in accordance with the established contingency table, in the overall sample of those included in the analysis there was a statistically highly significant difference ( $p < 0.01$ ) in the GIQLI in patients with different gastric substitution options, with GIQLI II being the dominant modality. (Chart 3.)

5. *»H performance« (AJCC/UICC) - in certain gastric substitution options* Based on the calculated value of  $\chi^2$  test, for omega loop reconstruction method ( $\chi^2 = 1.455$ ;  $p = 0.4831$ ), there was no statistically significant difference ( $p > 0.05$ ) in the share of the “H2 performance status” modality. For Roux-en-Y reconstruction option ( $\chi^2 = 7.087$ ;  $p = 0.0289$ ), there was a statistically significant difference ( $p < 0.05$ ) in the share of the “H1 performance” modality. For Hunt-Lawrence-Rodino pouch reconstruction option ( $z = 6.572$ ;  $p = 0.0000$ ), there was a statistically highly significant difference ( $p < 0.01$ ) in the share of the “H1 performance” modality. Based on the calculated value of  $\chi^2$  test ( $\chi^2 = 30.171$ ;  $p = 0.0000$ ), in accordance with the established contingency table, in the total number of analysed patients there was a statistically highly significant difference ( $p < 0.01$ ) in the “H performance status” between different gastric substitution options. The share of the “H1 performance status” modality was dominant.

### Discussion

Despite the declining incidence, gastric cancer remains in the focus of attention of medical experts due to its high mortality rate. From the surgical perspective, only radical resection of the primary tumor lesion, including lymphatic drainage, while achieving safe resection margins (tumor-free margins) offers a realistic hope for an adequate control of the disease. Standardisation of luminal resection levels has already been achieved, while the surgical research is dominated by the still unresolved question of which level of lymph node dissection should be performed for what stage of the disease.<sup>1-3</sup> The rate of late morbidity is high, as more than two thirds of those who underwent surgery failed to reach the preoperative body weight. Most frequent were patients for whom the modality of moderate malnutrition (loss up to 10 kg of body weight) was most commonly recorded. Statistically significant moderate to severe malnutrition was observed for total gastrectomy and the reconstruction option involving Roux-en-Y method. Reflux gastritis and oesophagitis is a sequela that is registered in 28.3% of patients who underwent surgery, most frequently for the option of reconstructing the digestive tract with omega loop. Disordered eating occurring due to the loss of gastric reservoir results in an increase in number of meals and a decrease in quantity of meals. Different

methods of substituting lost gastric reservoir (so far, over 60 options are known) are the subject of numerous studies nowadays, with the aim of improving the quality of postoperative life. The authors generally agree the quality of life assessment must be multidimensional and include, according to some of them, three dimensions: psychological, social and emotional (Cella and Tulskey), or even more than 10 categories, as advocated by Spitzer, Troidl and Kusche (psychological status, functional status, family and emotional well-being, spirituality, satisfaction with treatment, orientation towards the future, sexuality, social and occupational functions).<sup>4-10</sup> To assess the postoperative quality of life, the Gastrointestinal Quality of Life Index (GIQLI) Questionnaire by Eypasch, Williams and Troidl, consisting of 36 questions required for the assessment of the postoperative state of the patient, was used in the study. Each question referred to the patient's state for the last 15 days and there were five options to be chosen from in the answer: always, mostly, sometimes, rarely, never. The variants of the answer to each question were: a) never-4 points, b) rarely-3 points, c) sometimes - 2 points, d) mostly-1 point, e) always-0 points.

The most favourable option is 4 points, while the least favourable one is 0 points. Points are added to obtain the result which is calculated in the result scale.<sup>11-17</sup>

In accordance with the American Joint Committee on Cancer/Union Internationale Contre le Cancer (AJCC/UICC) Classification, "H performance" was applied as follows:

- A) "H0" - asymptomatic, normally active patient;
- B) "H1" - moderate-intensity symptoms, requiring no treatment;
- C) "H2" - patients requiring ambulatory treatment more than 50% of time;
- D) "H3" - patients requiring medical care more than 50% of time;
- E) "H4" - patients who need hospitalisation or are bedridden.<sup>13,14</sup>

The ratio of current and ideal body weight (Blackburn) served to assess the postoperative nutritional status of the patient.<sup>15</sup> It was applied as follows:

1. Blackburn <1 ----- malnutrition;
2. Blackburn 1-1,2 - optimal nutrition;
3. Blackburn >1,2 - adiposity.

An analysis of the quality of life is an integral part of most statistical series. K. Buhl et al. from the University of Heidelberg, analysing the quality of life after gastric substitution, find the highest prevalence of heartburn after the reconstruction without a pouch, which is

confirmed by the endoscopic findings of symptoms of reflux oesophagitis.<sup>15-17</sup> Similar findings resulted from the quantification of the severity of postprandial dumping syndrome with dominant symptoms in patients who underwent the reconstruction without a pouch. The daily meal frequency was highest in the gastric substitution option with Hunt-Lawrence-Rodino pouch, while the quantity of meals was slightly higher in the same option of digestive continuity reconstruction (Hunt-Lawrence-Rodino). Nutritional status was assessed based on the ratio of current and optimal body weight (Blackburn); the best results were recorded for the reconstruction option with a pouch.<sup>18,19</sup> Visick grade, Karnofsky Performance Scale Index, Spitzer Index, Troidl scoring system were the parameters used and they indicate more optimal postoperative results achieved by creating a gastric pouch with an antireflux and nutritive component. Fass J. Et al. from the Department of Surgery in Aachen, Germany, performing a conversion of omega loop into Roux-en-Y option in 4 patients due to reflux oesophagitis, reported complete resolution of reflux symptoms immediately after surgical treatment.<sup>20,21</sup> The current Visick grading was 1, 2, 2, 3. Korenaga assessing the quality of life using the Visick scale in 40 patients who underwent surgery due to gastric atony, found a significant improvement in comparison with the values of the Visick scale preoperatively.<sup>22</sup> A.C. Takiguchi assessed the quality of life for certain gastric substitution options, coming to the following results: patients with omega loop (Braun) had heartburn, and grade 2 reflux oesophagitis was endoscopically confirmed. In two patients omega loop was converted into antireflux Roux-en-Y option (Schloffer reconstruction), resulting in a complete remission of symptoms. "H performance status" (AJCC/UICC) indicates that the best results are achieved by creating Roux-en-Y option ("H0", "H1").<sup>23</sup> In the analysed sample of patients who underwent surgery, in terms of the daily meal frequency, there is a significant difference for certain reconstruction options. For the reconstruction method with a pouch, less than 4 meals per day is the dominant modality, while for Roux-en-Y reconstruction method the most common modality is more than 6 meals per day. In terms of quantity, the largest meal was consumed by patients who underwent reconstruction with a pouch; one third provided data about approximately the same quantity of food consumed per one meal as before the surgery. Comparing the food emptying time from the artificial gastric pouch and simple Roux-en-Y reconstruction method, we came to results that indicate that Roux-en-Y method was characterised by rapid emptying of food labeled with radioactive Tc99. After 30 minutes, only about 30% of the total amount of food was registered in the Roux-Y loop region, after 45 minutes about 18%, and after 60 minutes about 10%. For the pouch reconstruction, over



60% of the total amount of food was registered in the pouch after 30 minutes and about 35% after 60 minutes. Even after two hours, the artificial gastric pouch showed signs of radioactivity (about 10% of the total amount). Analysing the Gastrointestinal Quality of Life Index (GIQLI), we found that the GIQLI II modality was dominant for total gastrectomy and RY reconstruction option, while GIQLI III was dominant for HLR pouch reconstruction method. Karnofsky Performance Scale Index 60-100% appeared to a statistically significant extent for total gastrectomy, while HLR reconstruction option had a statistically highly significant share of the same value index. "Ho performance" (AJCC/UICC) was most commonly recorded for subtotal gastrectomy, while total gastrectomy had a statistically highly significant occurrence of "H1" and "H2" modalities. For RY reconstruction option, there was a statistically significant share of "H1" modality, while "H1 performance" (AJCC/UICC) was the dominant modality for HLR reconstruction option, with a statistically highly significant frequency of occurrence.

### Conclusion

Results of the quality of life assessment are comparable with results of other statistical series. They confirm the antireflux component of Roux-en-Y loop and its intestinoplasty, emphasising the advantage of the nutritional component of loop modification (creation of a pouch).

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## Kvalitet života nakon gastrektomije

### SAŽETAK

**Uvod:** Karcinom želuca je jedna od najučestalijih visceralnih neoplazmi. U Japanu je učestalost obolijevanja 58,4 na 100 000 stanovnika za muškarce i 29,9 za žene. Kod nas je incidencija nešto niža. Gastrektomija je najčešća hirurška metoda liječenja karcinoma želuca.

**Cilj rada:** Utvrditi koja metoda rekonstrukcije nakon gastrektomije optimalno poboljšava kvalitet života operisanih.

**Ispitanici i metode:** Analiziran je 221 pacijent operisan zbog malignoma želuca na Hirurškoj klinici Univerzitetskog Kliničkog centra u Banjaluci, a predmet detaljne analize je 111 pacijentata koji su operisani sa namjerom postizanja kurabilnosti.

**Rezultati:** Refluks ezofagitis je dominantni modalitet morbiditeta kod rekonstrukcije omega vijugom ( $p < 0.05$ ). Analizirajući GIQLI, dominiralo je učešće modaliteta GIQLI II kod totalne gastrektomije i opcije rekonstrukcije RY, dok je GIQLI III najčešće registrovan kod metode rekonstrukcije HLR rezervoarom ( $p < 0.01$ ). I nakon dva sata nakon ingestije obroka obilježenog radioaktivnim izotopom Tc99 artefijelni želudac (HLR) je pokazivao znake radioaktivnosti (oko 10% unijete količine). „H0 performance” (AJCC/UICC) je najčešće zabilježen kod subtotalne gastrektomije, dok je kod totalne gastrektomije statistički visoko značajno pojavljivanje “H1” i “H2” modaliteta. Kod RY opcije rekonstrukcije, statistički značajno je učešće modaliteta “H1”, dok je “H1” performance (AJCC/UICC) dominantan modalitet kod HLR opcije rekonstrukcije sa statistički visokom značajnom učestalošću ( $p < 0.01$ ).

**Zaključak:** Dobijeni rezultati procjene kvaliteta života su komparabilni sa rezultatima drugih statističkih serija. Oni potvrđuju antirefluksnu komponentu Roux en Y vijuge i njene intestinoplikacije i naglašavaju prednost nutritivne komponente loop modifikacije (kreacije pouch-a).

**Ključne riječi:** gastrektomija, kvalitet života