



A national survey on the current status of minimally invasive gastric practice on behalf of GIRCG

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Abstract

Italian Research Group for Gastric Cancer (GIRCG), during the 2013 annual Consensus Conference to gastric cancer, stated that laparoscopic or robotic approach should be limited only to early gastric cancer (EGC) and no further guidelines were currently available. However, accumulated evidences, mainly from eastern experiences, have supported the application of minimally invasive surgery also for locally advanced gastric cancer (AGC). The aim of our study is to give a snapshot of current surgical propensity of expert Italian upper gastrointestinal surgeons in performing minimally invasive techniques for the treatment of gastric cancer in order to answer to the question if clinical practice overcome the recommendation. Experts in the field among the Italian Research Group for Gastric Cancer (GIRCG) were invited to join a web 30-item survey through a formal e-mail from January 1st, 2020, to June 31st, 2020. Responses were collected from 46 participants out of 100 upper gastrointestinal surgeons. Percentage of surgeons choosing a minimally invasive approach to treat early and advanced gastric cancer was similar. Additionally analyzing data from the centers involved, we obtained that the percentage of minimally invasive total and partial gastrectomies in advanced cases augmented with the increase of surgical procedures performed per year ($p=0.02$ and $p=0.04$ respectively). It is reasonable to assume that there is a widening of indications given by the current national guideline into clinical practice. Propensity of expert Italian upper gastrointestinal surgeons was to perform minimally invasive surgery not only for early but also for advanced gastric cancer. Of interest volume activity correlated with the propensity of surgeons to select a minimally invasive approach.

Keywords Gastric cancer · Upper GI surgery · Minimally invasive surgery · GIRCG

Introduction

Gastric cancer is one of the most common cancers in the world [1] and it remains the third leading cause of tumor-related deaths worldwide [2]. The incidence and the presentation of gastric cancer depend on geographical area with

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the highest incidence seen in Eastern Asia, Eastern Europe and some Latin American countries [3–7].

In daily clinical practice, surgery remains the mainstay of therapy and the surgeon plays a central role in the multidisciplinary team managing gastric cancer patients in all steps, from the preoperative phase with staging and therapeutic strategy decision up to the follow-up.

Italian surgeons were among the first in the West, in the latter half of the last century, to follow the indications of Eastern Centers which performed an aggressive surgical approach based on extended (D2) and superextended (D3) lymphadenectomy [8].

In 2012 the Board of the Italian Society of Surgery (SIC) decided to dedicate the 2013 annual Consensus Conference to gastric cancer. During the Consensus Conference the Italian Research Group for Gastric Cancer (GIRCG) stated that laparoscopic or robotic approach should be limited only to early gastric cancer (EGC) respecting the parameters of correct oncological radicality [9] as published by GIRCG in 2015 with the guidelines for gastric cancer staging and treatment [10].

However in the last decade accumulated evidences have supported the application of minimally invasive surgery also for locally advanced gastric cancer (AGC) [23–36] and, on a clinical point of view in Italy and other European countries, many surgeons have adopted minimally invasive approach not only for EGC.

The aim of our study is to give a snapshot of current surgical propensity of each Italian upper gastrointestinal surgeon in performing minimally invasive techniques for the treatment of gastric cancer.

Methods

Experts in the field among the Italian Research Group for Gastric Cancer (GIRCG) were invited to join a web survey through a formal e-mail that included the topic of the survey, an explanation of its aim and the appropriate file to fill the questionnaire. A reminder was e-mailed 2, 3 and 4 weeks after the initial mailing to those who have not yet answered the questionnaire. Participation was entirely voluntary with no compensation offered. No institutional review board approval was required.

Survey

A 30-item survey was designed and developed by the authors evaluating the feasibility and validity of the questions. The finalized online survey was available from January 1st, 2020, to June 31st, 2020. The estimated mean time needed to complete the survey was 10 min. All questions included numerical or percentage answers. First seven questions focused

on the number of partial or total gastrectomy for early and advanced gastric cancer performed from January 1st, 2019, to December 31st, 2019, in the centers involved, other seven questions focused on the number of partial or total minimally invasive gastrectomy for early and advanced gastric cancer performed from January 1st, 2019, to December 31st, 2019, investigating both robotic and laparoscopic approach with a further twelve questions. The last four questions focused on procedures performed in obese patients, elderly patients, patients with Charlson Comorbidity Index > 6 and with previous abdominal surgery. The 30 items are shown in supplementary table 1. The questionnaire, once completed, was emailed from each participant to authors who analyzed the results obtained.

Aims of the study

The primary end-point was to identify the percentage of minimally invasive procedures performed in each setting: EGC, AGC, obesity, elderly age, Charlson Comorbidity Index > 6 and previous abdominal surgery. The secondary end-point was to evaluate the impact of volume activity and specific clinical setting on percentage of minimally invasive surgery.

Statistical analysis

Statistical analysis was performed using the SPSS 27 system (SPSS Inc., Chicago, IL, USA). Categorical data were expressed as frequency distributions and/or percentages. The chi-square test was applied to compare qualitative variables. The denominator of the percentages of respondents was the total number of respondents who completed the survey. All the results were presented as two-tailed values with statistical significance if $p < 0.05$.

Results

Over a 5-month period, responses were collected from 46 participants out of 100 upper GI surgeons.

Demographics (Q1)

Most of the respondents (47.8% – 22 out of 46 surgeons) worked in hospitals performing 25–50 gastrectomies per year, whereas 32.6% (15 out of 46 surgeons) worked in hospitals performing < 25 gastrectomies yearly and 19.6% (9 out of 46 surgeons) in hospitals performing 50–100 gastrectomies per year.

Gastrectomy cases for early gastric cancer (Q2 to Q4)

The total number of gastrectomy cases for early gastric cancer performed per year was <25 in 97.8% of respondents (45 out of 46 responders). In details 95.7% of respondents (44 out of 46 surgeons) and 2.2% (1 out of 46 surgeons) performed <25 and 0 total gastrectomies for early gastric cancer yearly, respectively, while 95.7% of respondents (44 out of 46 surgeons) and 2.2% (1 out of 46 surgeons) performed <25 and 50–100 partial gastrectomies for early gastric cancer yearly, respectively. One center did not answer questions 2 to 4.

Gastrectomy cases for advanced gastric cancer (Q5 to Q7)

The total number of gastrectomy cases for advanced gastric cancer performed per year was <25 for 26 out of 46 centers (56.5%), between 25 and 50 for 17 out of 46 centers (37%) and between 50 and 100 for 3 out of 46 centers (6.5%). In details 80.4% of respondents (37 out of 46 surgeons), 17.4% (8 out of 46 surgeons) and 2.2% (1 out of 46 surgeons) performed <25, 25–50 and 50–100 total gastrectomies for advanced gastric cancer per year, respectively, while 67.4% of respondents (31 out of 46 surgeons), 30.4% (14 out of 46 surgeons) and 2.2% (1 out of 46 surgeons) performed <25, 25–50 and 50–100 partial gastrectomies for advanced gastric cancer yearly, respectively.

Minimally invasive gastrectomies (Q8 to Q26)

The percentage of minimally invasive gastrectomies performed per year was between 25 and 50% for most of respondents (30.4%-14 out of 46 surgeons), whereas it was <5% in 21.7% of cases (10 out of 46 surgeons), <25% in 15.2% of cases (7 out of 46 surgeons), between 50 and

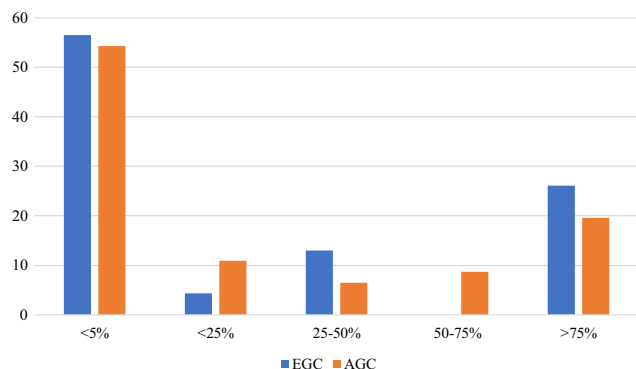


Fig. 1 Minimally invasive total gastrectomies for early and advanced gastric cancer. *EGC* early gastric cancer, *AGC* advanced gastric cancer

75% in 8.7% of cases (4 out of 46 surgeons) and >75% in 23.9% of cases (11 out of 46 surgeons). The details of minimally invasive total and partial approach both for early and advanced gastric cancer are shown in Figs. 1 and 2. The minimally invasive approach for early and advanced gastric cancer involved both robotic and laparoscopic surgery, the details are shown in Figs. 3 and 4.

It is important to underline that percentage of surgeons choosing a minimally invasive approach to treat early and advanced gastric cancer was similar as shown in Figs. 1 and 2.

Minimally invasive surgery in detailed clinical settings (Q27 to Q30)

The percentage of minimally invasive gastrectomy cases in obese patients, elderly patients, patients with Charlson Comorbidity Index >6 and in patients with previous abdominal surgery performed per year are shown in Fig. 5.

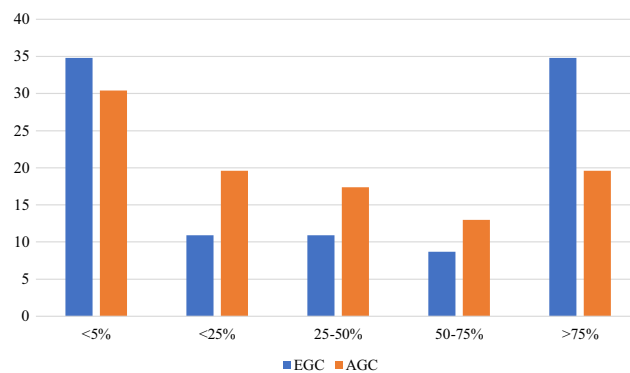


Fig. 2 Minimally invasive partial gastrectomies for early and advanced gastric cancer. *EGC* early gastric cancer, *AGC* advanced gastric cancer

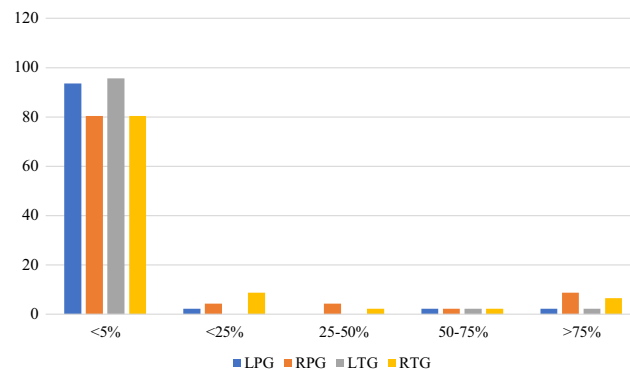


Fig. 3 Laparoscopic and robotic approach for early gastric cancer. *LPG* laparoscopic partial gastrectomy, *RPG* robotic partial gastrectomy, *LTG* laparoscopic total gastrectomy, *RTG* robotic total gastrectomy

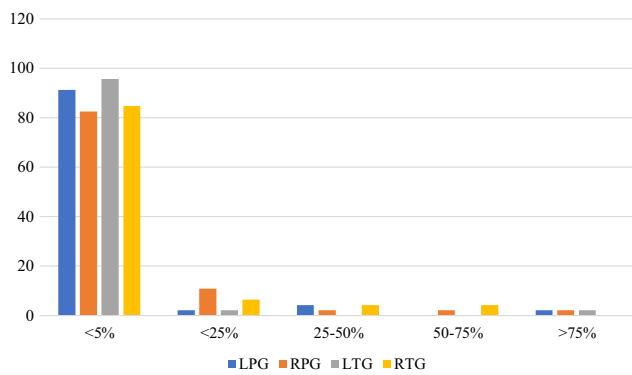


Fig. 4 Laparoscopic and robotic approach for advanced gastric cancer. *LPG* laparoscopic partial gastrectomy, *RPG* robotic partial gastrectomy, *LTG* laparoscopic total gastrectomy, *RTG* robotic total gastrectomy

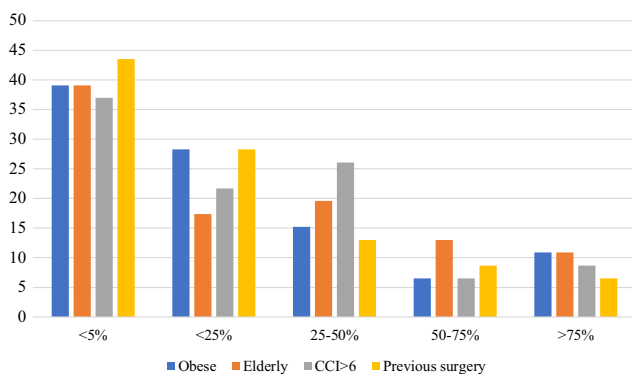


Fig. 5 The use of minimally invasive surgery in obese patients, elderly patients, patients with Charlson Comorbidity Index > 6 and in patients with previous abdominal surgery. *CCI* Charlson Comorbidity Index

Correlation between minimally invasive surgery and specific clinical setting

Evaluating the correlation between minimally invasive surgery in obese patients, elderly patients, patients with Charlson Comorbidity Index > 6, patients with previous abdominal surgery and volumes activity we did not obtain statistically significant results (obese patients: $p = 0.9$, elderly patients: $p = 0.4$, patients with Charlson Comorbidity Index > 6: $p = 0.07$ and patients with previous abdominal surgery: $p = 0.5$).

Correlation between minimally invasive surgery and volumes activity

Analyzing data from the centers involved, we obtained that the percentage of minimally invasive total and

partial gastrectomies in advanced cases augmented with the increase of surgical procedures performed per year ($p = 0.02$ and $p = 0.04$, respectively) (Table 1). On the contrary, in early cases we did not find a rise of the percentage of minimally invasive total and partial gastrectomies with the increase of volumes activity ($p = 0.6$ and $p = 0.8$).

Discussion

This study evaluated current national trends in surgical treatment for gastric cancer, by conducting a survey which was sent to experts upper gastrointestinal surgeons among the Italian Research Group for Gastric Cancer (GIRCG). The results showed that minimally invasive surgery was adopted for the treatment of both early and advanced gastric cancer and that the penetrance of minimally invasive approach correlated with volumes activity.

In 2012, the Board of the Italian Society of Surgery (SIC) decided to dedicate the 2013 annual Consensus Conference to gastric cancer and the Italian Research Group for Gastric Cancer (GIRCG) was invited to organize and conduct this Consensus Conference [9]. The experts stated that minimally invasive surgery should be performed only for EGC respecting the parameters of correct oncological radicality. Minimally invasive approach in advanced tumours has been considered to be further evaluated [11]. Up to now, no further guidelines were available.

However, in the last decade minimally invasive surgery has been increasingly used also for AGC, mainly in eastern experiences. Many experiences suggested that minimally invasive surgery provided oncologically radicality with an improvement of recovery after surgery [12]. So the question if clinical practice overcome the recommendation in this clinical setting.

Certainly minimally invasive approach should be selected for EGC as demonstrated by current literature [13–22]. At difference, few reports on the treatment for AGC were available. The first laparoscopic total gastrectomy (LTG) for cancer was reported in 1999 by Azagra et al. [23]. Since then, large retrospective studies have demonstrated safety of minimally invasive approach for AGC, reporting less estimated blood loss, reduced use of analgesic injection, shorter hospital stay, decreased early and late complications in LG compared to OG but no statistically significant differences have been obtained in mortality, complication rate, or 5-years disease free survival between the two groups. Extremely relevant could be the observation that patients who underwent LG had a higher likelihood of going on to receive adjuvant systemic chemotherapy when indicated due to shorter recovery from their operation as shown by Kelly et al. [31]. Recently, two randomized controlled trials (RCTs) have revealed the surgical safety of laparoscopic

Table 1 Correlation between minimally invasive surgery and volumes activity

	MIS					P
	<5%	<25%	25–50%	50–75%	>75%	
VA	Minimally invasive total gastrectomies for AGC					0.02
<25	45.6%	6.5%	6.5%	2.1%	19.6%	
25–50	9%	4.3%	0%	4.3%	0%	
50–100	0%	0%	0%	2.1%	0%	
	Minimally invasive partial gastrectomies for AGC					0.04
<25	24%	15%	15%	2.1%	11%	
25–50	4.3%	4.3%	2.1%	11%	9%	
50–100	2.1%	0%	0%	0%	0%	
	Minimally invasive total gastrectomies for EGC					0.6
<25	6.5%	0%	0%	0%	0%	
25–50	52.2%	4.3%	13%	0%	24%	
50–100	0%	0%	0%	0%	0%	
	Minimally invasive partial gastrectomy for EGC					0.8
<25	4.3%	0%	0%	0%	0%	
25–50	30.4%	11%	11%	9%	32.6%	
50–100	2.1%	0%	0%	0%	0%	

MIS minimally invasive surgery, VA volume activity, AGC advanced gastric cancer, EGC early gastric cancer

distal gastrectomy with D2 lymphadenectomy for AGC [32, 33]. Similar results were obtained by other RCTS [34–36]. Lee H-J et al. observed that early morbidity rate was significantly lower after LG in patients with AGC [35]. Hyung et al. [36] showing that LG with D2 lymphadenectomy was comparable to open surgery in terms of relapse-free survival for patients with locally AGC claimed that this approach could be a potential standard treatment option for locally AGD. In addition, Shi Y. et al. evaluating long-term oncologic feasibility of LG with D2 lymphadenectomy in patients with locally AGC demonstrated that this approach can provide comparable long-term survival without an increase in recurrence and metastasis [34].

Giving a snapshot of current surgical propensity of each Italian upper gastrointestinal surgeon in performing minimally invasive techniques for the treatment of gastric cancer, we can state that surgeons are not used to properly respect the guidelines developed by GIRCG in 2013.

On the basis of surgical and clinical benefits clinical practice overcome current recommendation. Minimally invasive approach has been selected not only for early but also for advanced gastric cancer following the example of Eastern surgeons.

The percentage of surgeons choosing a minimally invasive approach to treat early and advanced gastric cancer was similar.

The majority of surgeons involved in our survey (67.4%) worked in a high-volume hospital (defined as ≥ 20 gastrectomies annually according to the literature [37]), and it is important to highlight that the percentage of minimally

invasive total and partial gastrectomies in advanced cases augmented with the increase of surgical procedures performed per year ($p=0.02$ and $p=0.04$, respectively).

In addition, we analyzed the use of minimally invasive surgery to treat gastric cancer in obese patients, elderly patients, patients with Charlson Comorbidity Index > 6 and in patients with previous abdominal surgery and all these clinical settings do not impact on the choice to select a minimally invasive approach.

Conclusions

It is reasonable to assume that there is a widening of indications given by the current national guideline. The propensity of expert Italian upper gastrointestinal surgeons was performing minimally invasive techniques not only for early but also for advanced gastric cancer.

Expert upper GI surgeons performed minimally invasive surgery both for early and advanced cases and volume activity correlated with the propensity of surgeons to select a minimally invasive approach.

Although high-quality randomized controlled studies remain to be required in the West to evaluate the results and compare them with those of the studies carried out in the East, the evidences accumulated by our results including expert upper GI Surgeons from the Italian Research Group for Gastric Cancer witness that clinical practice overcome current recommendations. A call to evaluate again the indications on the basis of current literature was needed.

Supplementary Information The online version contains supplementary material available at <https://doi.org/10.1007/s13304-022-01438-8>.

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Data availability The corresponding author is responsible for the safe-keeping of all data, available at request.

Declarations

Conflict of interest The authors declare that they have no conflict of interest.

Ethical approval No institutional review board approval was required.

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