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ORIGINAL ARTICLE

SICE national survey: current state on the adoption of laparoscopic approach to the treatment of colorectal disease in Italy

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Abstract

The real diffusion of laparoscopy for the treatment of colorectal diseases in Italy is largely unknown. The main purpose of the present study is to investigate among surgeons dedicated to minimally invasive surgery, the volume of laparoscopic colorectal procedures, the type of operation performed in comparison to traditional approach, the indication for surgery (benign and malignant) and to evaluate the different types of technologies used. A structured questionnaire was developed in collaboration with an international market research institute and the survey was published online; invitation to participate to the survey was issued among the members of the Italian Society of Endoscopic Surgery (SICE). 211 surgeons working in 57 surgical departments in Italy fulfilled and answered the online survey. A total of 6357 colorectal procedures were recorded during the year 2015 of which 4104 (64.1%) were performed using a minimally invasive approach. Colon and rectal cancer were the most common indications for laparoscopic approach (83.1%). Left colectomy was the operation most commonly performed (41.8%), while rectal resection accounted for 23.5% of the cases. Overall conversion rate was 5.9% (242/4104). Full HD standard technology was available and routinely used in all the responders' centers. The proportion of colorectal resections that are carried out laparoscopically in dedicated centers has now reached valuable levels with a low conversion rate.

Keywords Survey · Colorectal cancer · Surgery · Laparoscopy · 3D technology · Colorectal disease

Introduction

The minimally invasive approach for colorectal diseases was first described in 1991. After initial concerns due to port site recurrences and uncertain oncologic outcomes, which were overcome by the results of several RCT trials [1–4], the laparoscopic approach has progressively gained popularity and it is now offered by a large number of surgeons in Italy as the procedure of choice in the treatment of different surgical conditions. Despite the well-known advantages, the progress in translating the scientific evidence into daily clinical practice is slow [3]. Moreover, data on adoption rates, regional variations, and factors determining whether laparoscopic colorectal surgery is being incorporated into routine clinical practice are not currently available in Italy. A recent report from AGENAS (Agenzia Nazionale Servizi Sanitari), the nationwide database in 2015, shows an incidence of laparoscopic procedures for colorectal diseases ranging from 32.1% for colon and 40.4% for rectal disease, respectively [5]. This wide range was mainly related to Tertiary vs regional Hospital as well as to geographic distribution. The Italian Society of Endoscopic Surgery (SICE)

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promoted a survey through members and accredited laparoscopic centers (hospitals) to investigate surgeons' personal and professional characteristics, type of operation performed, volume of laparoscopic colorectal procedures in comparison to traditional approach, and the application of a mini-invasive approach in both benign and neoplastic colorectal diseases as well as to evaluate the different types of technologies utilized.

Materials and methods

The survey was designed by the executive board of SICE. The questionnaire included twelve questions and three demographic inquiries on the numbers and types of colonic and rectal resections carried out in Italy in 2015, with a special focus on open versus laparoscopic operations (see Online Appendix 1). Colonic and rectal resections were divided into right colectomy, left colectomy, sigmoid resection, total colectomy, proctocolectony, rectal resection, and "others." Only elective operations were considered. A web-based online software developed in collaboration with Delphi International, an Italian market research institute, was used to develop the questionnaire. The questionnaire was mailed to all SICE members. Delphi carried out the data collection, processing, and analysis for the present study. A reminder e-mail was sent to all the members to optimize the response rate. Non-responders were encouraged to reply by a number of follow-up e-mails. Moreover, potential responders were also contacted by telephone interview for participation in the study. The data returned were input into the database by DELPHI. After the online survey, we started with telephone querying in all missing clinics.

Statistical analysis

Descriptive data were reported as mean, median, range, standard deviation (SD), number of patients and percentage as appropriate. For continuous variables, differences between groups were tested with Student's *t* test for normally distributed data (based on the Kolmogorov–Smirnov test) or the Mann–Whitney *U* test for non-normally distributed data. The Pearson's Chi-square test or Fisher's exact test was used for proportions, as appropriate. A two-sided significance level of 0.05 was considered statistically significant. The SPSSTM software package, version 18 for Windows (SPSS Inc., Chicago IL, USA), was used for all the statistical analyses.

Results

One-hundred and eighty-four complete surveys were received. Fifty-five reminder e-mails were sent. Taking into account that in 2015, 303 surgeons were active SICE members, the final response rate was 60% (184/303). The responders are currently working in 57 surgical departments. In the case of two or more SICE staff surgeons working in the same group, the chairman of the Department supervised the compilation of the questionnaire in order to avoid duplicate and to assure the each surgeon reports only its own laparoscopic cases. Eighty-seven (50/57) percent of the responding centers were Tertiary National Health Care hospitals, whereas 13% (7/57) were academic centers.

Figure 1 shows the geographic distribution among the different Italian regions. Fourteen out of twenty regions were represented in the survey with various centers involved, being Veneto and Emilia Romagna the most representative regions reporting data (11 and 10 centers, respectively), while a poor response was obtained from the southern regions with only 12 responding centers and four regions giving no response. With respect to centers/volume for the year 2015, 54,7% of the centers reported more than 50 colorectal resections/year, a volume ranging between 25 and 50 cases in 29.8% (17/57), while only 9 (15.7%) centers performed less than 25 cases. Among the responding centers, all have at least an experience of 7 years in offering laparoscopic approach to colorectal disease with figures ranging from 7 to 22 years (mean 15.9 years; median 15 years). Overall, 6357 colorectal procedures were performed during the year 2015, of which 4104 were operated using a mini-invasive approach accounting for 64.6% of cases. In details, a mininvasive approach was used for colon diseases in 67.7% of cases (3299/4869) and in 54.1% (805/1488) for rectal diseases.

Fig. 1 Geographic distribution of the responding centers among the different Italian regions

Table 1 Operations performed for an using a mini-invasive approach during year 2015

Type of operation	Neoplastic disease (%)	Benign disease (%)
Right colectomy	1235 (36.2)	21 (3)
Left colectomy	1165 (34.1)	553 (79.6)
Segmental colectomy	208 (6)	65 (9.3)
Total colectomy		30 (4.3)
Proctocolectomy		3 (0.4)
Rectal resection	802 (23.5)	–
Other		22 (3.1)
Overall	3410 (83.1)	694 (16.9)

Values in parentheses are percentages

Table 2 Conversion rate according to the nature of the disease and type of operation performed

Colon resection	Neoplastic disease (%)	Benign disease (%)
Right colectomy	15/1235 (1.2)	5/21(23.8)*
Left Colectomy	103/1165 (8.8)	16/553 (1.5)
Total Colectomy	–	0/30 (0)
Segmental colectomy	0/208 (0)	1/65 (1.5)
Other	–	0/22 (0)
Overall	**118/2608 (4.5)**	**22/691 (3.1)**
Rectal resection		
PME	19/207 (9.1)	–
TME	83/595 (13.9)	–
Proctocolectomy		0/3 (0)
Overall	**102/802 (12.7)**	**0/3 (0)**

Values in parentheses are percentages

*In 5/21 patient indication was recurrent Crohn's disease

No difference was observed among responders in the rate of benign/malignant diseases among the patients treated and laparoscopic resection of colorectal cancer was considered an appropriate indication by all responding surgeons. Indeed malignant tumors were the most common indication for laparoscopic approach (83.1% of the cases), while benign colorectal disease accounted for 16.9% of cases ($p = 0.02$).

Among benign diseases, diverticular disease was the most common reported indication (92.2%), followed by inflammatory bowel disease (5.5%) and rectal prolapse (2.3%). Laparoscopic left colectomy was the most commonly performed procedure overall, whereas it was laparoscopic right colectomy for malignant disease (Table 1).

Conversion rate and 30-day mortality rate were 5.9 and 0.8%, respectively. Table 2 shows the conversion rate according to the type of operation and the nature of the disease.

Standard full HD systems were available and routinely used in all the responders' centers associated with fluorescence technology in 9.1% of the centers. Stereoscopic 3D systems were available in 16 centers (28.8%) and its use accounted for 46 percent of the cases in the centers in which this technology was available. In only 8 (14%) responding centers, a robotic approach was used to treat selected cases of colorectal diseases.

Discussion

The worldwide diffusion of a minimally invasive approach for the treatment of colorectal malignancies was initially hampered by several concerns regarding oncological outcomes and the risk of port site metastases [1]. Nevertheless, in the early 2000s, the results of large RCT trials have demonstrated the safety and oncological adequacy of the laparoscopic approach showing equivalent oncological outcomes and short-term outcome benefits when compared to the open approach [3, 4, 6]. Despite the increasing evidence in favor of laparoscopic colorectal resections, there has been a relatively slow adoption of the mini-invasive approach worldwide with contrasting results [6–8]. In particular, data from a survey referring to the surgical activity in the United Kingdom for the year 2009 revealed that only 25% of the procedures were performed using this technique [9]. Similarly, data from the Austrian National Hospital Morbidity Database (NHMD) for the year 2013 revealed that only 26.1% of the colorectal procedures were performed laparoscopically [10]. Interestingly, data from the above-mentioned paper indicated the presence of colorectal cancer as the main reason for preferring an open approach in more than 40% of the responders, a lack of appropriate training being the second one.

Although this was an online survey with optional participation, a satisfactory response rate was obtained, yielding a relatively large sample size considering that the survey was only directed to the members of the SICE. Nevertheless, it should be considered that although SICE is not the only body representing laparoscopic surgeons in Italy, it is the most representative. In fact data from AGENAS (5), which included all the surgical procedures performed by all Italian hospitals, for the year 2015 reported 34231 colon and rectal resections, of which 11614 were performed using a mini-invasive approach. On the basis of these data, the present survey includes 36% of the whole amount of colorectal resection performed in Italy during the year 2015. The data are underestimated, considering that the response rate to the survey was 60%.

In the present survey, the proportion of colon and rectal operations performed using a mini-invasive approach in Italy during the year 2015 was 67.7% and 54.1%, respectively. These data favorably compare with data from AGENAS which shows a penetrance of laparoscopic colonic and rectal resection during the same period of time of 32.6 and

40.4%, respectively. These findings can be explained by the fact that centers responding to the survey are mainly focused on laparoscopic surgery (SICE members) and the vast majority (70.2%) reported an experience of more than 10 years in this field. This finding also explains the relatively low reported conversion rate, which is an expression of completion of the surgeons' learning curve and volume, that favorably compares with conversion rates reported in a recent meta-analysis on this subject and with those reported by leading centers in the field of laparoscopic colorectal surgery [11–14]. A higher penetration for colon resection was observed in the present survey which differs from AGENAS, in which a higher penetration was reported for rectal resection. These findings could be potentially explained to the fact that AGENAS data do not include benign disease that in the present survey for colon resection accounted for 14.1% of the cases. Moreover, rectal endoscopic trans-anal resections were not included in the present survey.

In the present series, among participating centers, a minimally invasive approach was reserved to inflammatory bowel disease in only 5.5% of the cases and it was also associated with higher conversion rates. This could be explained by the fact that most of the conversions occurred in case of recurrent diseases [15, 16]. Nevertheless, our results show a low propensity to approach these complex diseases by laparoscopic surgery by Italian surgeon outside of referral centers.

The present survey also allowed to investigate the different technologies available and used by the different surgeons. Interestingly, we found that almost 30% of the responding centers have 3D technology, but this was not routinely used since it was used for only 46% of the cases, leaving the use of standard full HD technology for the remaining cases. Although 3D technology has been recently indicated as a possible advantage for the surgeon in terms of perception of personal security and efficacy, especially for procedures with greater complexity [17], the relative low use of the 3D technology reported by our survey might lie in the visual discomfort and fatigue initially experienced by surgeons, which is still experienced by more than 10% of the surgeons as emerged on a recent RCT trial on this subject [18].

One of the limitations of this survey is represented by the low percentage of responders among the academic centers. University-hospital affiliation and formal minimally invasive training appear to be significant independent predictors for offering a laparoscopic approach as emerged in a recent survey form Canada [19]. On the other hand, including only Academic settings could represent a possible bias, not being representative of a nationwide scenario when a survey is considered. The data should be considered in the view of Italian Hospital organization where colorectal units are present only in a few hospitals and the majority of colorectal surgery volumes are performed in general surgery units.

Another limit of this survey is represented by the lack of data from 4 Italian regions. This is likely related to the low penetration of minimally invasive colorectal surgery in these regions leading to no response to our survey. On the other hand, this is an important stimulus to create future educational programs of the SICE to increase the diffusion of the minimally invasive approach in those regions.

Conclusions

Among the Italian centers that have specific interest and experience in minimally invasive surgery (SICE members), the uptake of laparoscopic approach for different colorectal resections in 2015 is relatively high, especially in case of malignant diseases, with relatively low conversion and mortality rates. There are significant differences among different regions, especially between the north and the south of Italy probably due to the lack of specific training. Among centers that routinely perform laparoscopic colorectal surgery, standard full HD video systems are preferred while the use of stereoscopic technology is limited even when it is available. The penetration of the emerging technologies among all the responding centers gives interesting figures as baseline for future survey.

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Compliance with ethical standards

Conflict of interest The authors declare that they have no competing interests.

Research involving human participants and/or animals The study protocol has been approved by the institute's committee on human research.

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