Introduction

As in other fields of surgery, laparoscopy has been introduced in oncologic gastric surgery aiming to reduce the surgical trauma and allow a faster recovery of patients. In 1994 Kitano (1) first reported a laparoscopic gastric resection for early gastric cancer (EGC) and in 2001 Goh et al. (2) first published a laparoscopic assisted gastrectomy with a D2 lymphadenectomy for advanced gastric cancer (AGC).

Nowadays guidelines of the Japanese Gastric Cancer Association consider the laparoscopic approach an adequate treatment in general clinical practice only in stage I cancer in which a distal gastrectomy is indicated. Cases of AGC or those in whom a total gastrectomy is indicated, should be treated by a laparoscopic approach only in clinical trials and at high volume centers (3). Similar positions have been taken also in the West by the European Society of Medical Oncology, European Society of Surgical Oncology and European Society of Radiotherapy and Oncology and in Italy by the Italian Research Group for Gastric Cancer (4,5).

Materials and methods

A Medline search for gastric neoplasms, lymph node excision, lymphadenectomy and laparoscopy was made. Case reports and small case-series were excluded.

Feasibility of an adequate D2 lymphadenectomy

One of the reasons for this limited area of application of laparoscopy is the concern about the feasibility of an adequate D2 lymphadenectomy. In fact by a technical point of view this is a very difficult and challenging procedure.
artery branches. The risk of not easily manageable bleeding, the narrow space and anatomical variability of the splenic dissection because of the deep location of the splenic hilum, by Hyung stations No. 10. The first report of this maneuver was made needed, is the spleen preserving lymphadenectomy of the particularly challenging maneuver by laparoscopy, when the first dissecting initially the stations No. 11p, 11d and then No. 10, the second dissecting station No. 10 first and subsequently the 11d and 11p (12). In order to preoperatively quantify the difficulty of this dissection Li et al. produced a “difficulty score” based on male gender, BMI ≥25, presence of splenic lobar arteries ≥3 and with a distributed-type and divided patients in three category of difficulty: low, intermediate and high. They found that most of patients were in the intermediate group (71.6%) but only 43.6% of them had a long lasting operation time. Only 13.9% of patients were in high difficulty group but 90.9% of them required a long operating time. They concluded that less skilled surgeons should face only low difficulty spleen preserving lymphadenectomy (13).

**Spleen preserving lymphadenectomy**

A particularly challenging maneuver by laparoscopy, when needed, is the spleen preserving lymphadenectomy of the stations No. 10. The first report of this maneuver was made by Hyung et al. in 2008 (11). This is an extremely difficult dissection because of the deep location of the splenic hilum, the narrow space and anatomical variability of the splenic artery branches. The risk of not easily manageable bleeding, of injuries to pancreas or spleen or adrenal gland is high and probably this is the reason why this procedure is not so diffuse, especially in Western countries. In fact a learning curve of about 40 cases has been proposed for this specific maneuver (12). Nevertheless it is technically feasible by laparoscopy and it is becoming more accepted by an increasing number of experts. Basically two approach are used: the first dissecting initially the stations No. 11p, 11d and then No. 10, the second dissecting station No. 10 first and subsequently the 11d and 11p (12).

**General considerations**

The minimally invasive approach to D2 lymphadenectomy seems to be associated to a comparable incidence of specific complications as chyle leak, pancreatitis and pancreatic fistula as evidenced in a case-control study on 266 gastric cancer patients submitted to laparoscopic or open distal gastrectomy + D2 lymphadenectomy (14) and some recent meta-analysis on AGC and total gastrectomy in more than 2,000 patients (15,16).

Almost all reports from literature evidence how the laparoscopic approach to gastric cancer is associated with a longer operative time of about 60–90 minutes respect traditional open surgery and often is a statistically significant difference (14,16,17). Probably one of the main reasons is that the laparoscopic lymphadenectomy is a complex and time-consuming procedure, even if some authors now reports comparable operating time, suggesting that with practice our performances can be improved (18).

On the other hand, laparoscopy allows to halve the intraoperative blood loss and to reduce the need for blood transfusions as observed by many authors (17,18).

**Conclusions**

The laparoscopic D2 lymphadenectomy represents a challenging procedure for surgeons and dissection of some stations represents a really difficult step. Nevertheless
available data, even if not always with high level of evidence, suggest that is a feasible procedure at least as effective as with open approach. A learning curve of 40 cases is suggested by many authors (19,20) but it’s an hard goal to reach, particularly for surgeons from countries where gastric cancer has not an high incidence. Even for this reason laparoscopic surgery for gastric cancer should be centralized in high volume centers in order to maximize results.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

References


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