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Health related quality of life after surgery for colonic diverticular disease

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Abstract

Diverticular disease (DD) of the colon is very common in developed countries and is ranked the fifth most important gastrointestinal disease worldwide. The management of acute diverticulitis without perforation and peritonitis is still debated. Health related quality of life (HRQL), subjectively perceived by patients, is becoming a major issue in the evaluation of any therapeutic intervention, mainly in patients with chronic disease. To date only a few published studies can be found on Medline examining HRQL in patients with DD. The aim of this study was to review the impact of surgery for DD on HRQL. All Medline articles regarding HRQL after surgery for colonic DD, particularly those comparing different surgical approaches, were reviewed. DD has a negative impact on HRQL with lower scores in bowel function and systemic symptoms. Both surgery-related complications and disease activity have a significant impact on patients' HRQL. While no significant differences in HRQL

between different operations for DD in non-randomized studies were revealed, the only prospective double-blind randomized study that compared laparoscopic and open colectomy found that patients undergoing laparoscopic colectomy had significantly reduced major postoperative complication rates and subsequently had better HRQL scores. Formal assessment of HRQL could be a good instrument in the selection of appropriate patients for elective surgery as well as in the assessment of surgical outcome.

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Key words: Colonic diverticular disease; Health related quality of life; Laparoscopy

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INTRODUCTION

Diverticular disease (DD) of the colon is very common in developed countries and is ranked the fifth most important gastrointestinal disease worldwide. It is probably even more common in the Western world with a prevalence of approximately 33% in persons over 60 years^[1-3] placing a substantial burden on inpatient and outpatient resources^[2]. In

fact, 10%-25% of these patients will suffer an acute attack with a further 30% developing complicated DD^[3,4]. The frequency of perforation associated with DD is increasing, indeed it reached a prevalence of almost 4 cases per 100 000 in 2000^[4]. Colonic resection is standard practice in cases of perforation and peritonitis in DD and primary anastomosis with defunctioning stoma seems to be the optimal surgical strategy for fit patients, while Hartmann's procedure is recommended in high risk patients^[5].

The management of acute diverticulitis without perforation and peritonitis is still debated. In these cases, medical therapy is usually successful^[11,6], but up to 25% of these patients may end up requiring an urgent operation^[7], and more than half of these procedures involve a colectomy^[8-10]. Elective colectomy is, thus, often recommended to avoid the risks and high mortality rate connected with emergency surgery usually associated with recurrent diverticulitis. The timing of elective surgery is, nevertheless, controversial with most advisory bodies recommending surgery after the second episode^[2,11]. Many surgeons advise prophylactic colon resection after a single hospitalization in younger patients because the disease is considered more virulent in these subjects^[11-15].

The evolution of laparoscopic colorectal surgery in the past decade has brought immediate short-term benefits to patients, including earlier postoperative pain relief and return of bowel function, shorter hospital stay, and better cosmesis. There is some evidence in the recent literature that immediate postoperative health related quality of life (HRQL) is better after certain laparoscopic procedures than after open surgery^[16].

In the case of acute complications such as perforation with peritonitis in an emergency setting, the surgical approach can be in one stage or multiple stages and quality of life assessment is increasingly being recognized as an integral factor in surgical decision-making regarding disease management choices^[17].

However, the results of one of our previous studies did not show any long-term advantage in terms of quality of life, symptoms recurrence and risk of surgery in submitting patients to colonic resection for DD without perforation and peritonitis^[18]. The decision to electively operate on patients after their recovery from an acute episode of diverticulitis is still debated.

Although the use of objective outcome measures after surgical procedures is an important means of defining a patient's degree of health, the patient's subjective perceptions and expectations need to be factored into that objective assessment to determine the patient's actual quality of life, particularly in the treatment of benign disease such as DD. Moreover, HRQL measures have been shown to be useful in predicting health care expenditures. With the development of well-validated reliable and sensitive non-disease specific (generic) questionnaires such as the Short Form survey 36 (SF-36) or disease specific questionnaires like the gastrointestinal quality of life (GIQLI)^[19-20], there is a HRQL measuring tool that can be applied to post-

operative quality of life research not only to define the long-term outcome in elective operations, but may also be useful in comparing different surgical approaches and techniques. The aim of this study was to review the impact of surgery for DD on HRQL.

A text word literature review was performed using the PubMed and Medline databases. Although this was not a systematic review, the search terms used were as follows: DD, acute diverticulitis, surgery, elective OR emergency resection OR surgery AND HRQL. The reference lists of identified articles were searched for further relevant publications. Aided by a clinical librarian, the databases were consulted from January 1965 to April 2010. Two researchers (Angriman I and Ruffolo C) independently selected the studies, particularly those comparing different surgical approaches. Whenever there was discordance regarding study inclusion the two researchers negotiated an agreement.

DD HAS AN IMPACT ON QUALITY OF LIFE

In the majority of patients, colonic diverticula (diverticulosis) are asymptomatic^[27]; nevertheless, an estimated 20% of affected individuals develop symptoms in their lifetime, such as abdominal pain and/or discomfort, bloating and disturbance of bowel habits. This clinical condition is termed DD^[28] and may be symptomatic uncomplicated, recurrent symptomatic, or complicated. DD treatment is aimed at relieving symptoms and preventing major complications. HRQL, subjectively perceived by patients, is becoming a major issue in the evaluation of any therapeutic intervention, mainly in patients with chronic disease where the aim of therapy is to keep patients either symptom-free or to reduce the discomfort caused by the disease. To date only a few published studies can be found on Medline examining HRQL in patients with DD.

Bolster *et al.*^[29] suggested that DD does affect a person's HRQL. In their study they used a disease specific questionnaire which had been validated for patients with inflammatory bowel disease and consisted of 32 questions which assessed four aspects of patients' lives: gastrointestinal symptoms, systemic symptoms, emotional function and social function. Patients with DD had mean scores well below the optimal scores of the questionnaire in all four categories, and compared with a control group of healthy volunteers, patients with DD had statistically significant lower scores in all categories. The authors concluded that DD has a negative impact on HRQL.

Similar results were observed by Comparato *et al.*^[30] in 58 patients affected by uncomplicated symptomatic DD. They used the SF-36 questionnaire and clinical evaluation was registered by means of global symptomatic score at baseline and after 6 mo. They concluded that DD has a negative impact on HRQL compared with the normal population and medical therapy improves HRQL if symptoms are relieved.

QUALITY OF LIFE AFTER SURGERY FOR DD

Surgical resection for DD, outside of the emergency setting, is primarily intended to obviate future hospitalization and/or emergency surgery for the patient, even though the risk of any single individual suffering a subsequent acute exacerbation is unpredictable. In contrast, symptomatic DD itself causes considerable ongoing disruption in terms of lifestyle and general “well-being”. However, little formal weight is currently given to quality of life consideration *per se*. This is probably because it remains unclear whether surgery can restore the missing HRQL, but outcome may instead represent the most compelling reason to offer surgery to an individual.

Several studies observed a significant improvement in quality of life and social function following elective sigmoid resection in the majority of patients.

Most of those studies compared the HRQL before and after surgery. Forgiione *et al.*^[16] performed a prospective analysis of 46 patients undergoing elective, laparoscopic sigmoidectomy for prior acute diverticulitis demonstrated by CT scans over an 18-mo period. Preoperative measures of HRQL were assessed by the GIQLI questionnaire administered at baseline and then again regularly throughout the first postoperative year. Mean preoperative GIQLI score was 99.5 and postoperative scores were significantly higher at each postoperative time point. The mean GIQLI score 12 mo after operation was 111.5 ($P < 0.05$). Postoperative augmentation of GIQLI was correlated most with improvements in the symptoms domain and was inversely correlated with the preoperative score. The authors concluded that the development of a more disease-specific questionnaire for patients being considered for elective surgery after prior diverticulitis may allow even greater discrimination in preoperative selection.

Roblick *et al.*^[31] observed a significantly higher HRQL after surgery in patients suffering from DD and only slightly below a validated normal population. In this study, a total of 45 patients who underwent surgery for diverticulitis at stage I - II a (Hinchey classification) were included. HRQL was measured using the SF-36 questionnaire and the follow-up period was at least 2 years.

In one of our previous studies^[18], to evaluate the impact of colonic resection for DD on the natural history and long-term quality of life in these patients, HRQL of DD patients undergoing surgery was compared to those on medical treatment. The study was particularly focused on the long-term clinical outcome of non-complicated diverticulitis. HRQL was also assessed in 69 healthy subjects [39 males and 30 females with a mean age of 43 (22-85) years] without gastroenteric symptoms enlisted from hospital employees and their relatives.

For HRQL assessment, the Cleveland Global Quality of Life (CGQL) score^[32], which consists of three items (current quality of life, current quality of health, and current energy level), each on a scale of 0 to 10 (0, worst; 10, best), was used. The CGQL was created to assess HRQL

in patients affected by ulcerative colitis after restorative proctocolectomy and was then used in HRQL analysis of patients with Crohn's disease^[33,34]. No significant differences were observed in the rate and in the timing of readmission and surgical procedures for DD in the two groups. The CGQL total score as well as the two items on current quality of life and current energy level responses were similar in the two groups of patients and in the group of healthy subjects. Only the scoring on the current quality of health was significantly worse in patients who had undergone colonic resection. Similarly, in the Hinchey 1 subgroup, no significant differences in CGQL score, current quality of health, current quality of life and current energy level were observed in patients who had been operated on and those who had been treated conservatively. Those results indicated that there are no long-term advantages to colonic resection for DD if the goal of the surgical treatment is to improve HRQL, and these data seemed to be supported by the analysis of the small group of Hinchey stage 1 patients.

QUALITY OF LIFE AFTER OPEN AND LAPAROSCOPIC SIGMOID COLECTOMY

Long-term outcome and HRQL were evaluated in patients undergoing laparoscopic colectomy (LC) *vs* open colectomy (OC) for benign colorectal diseases, based on standardized, validated measures, in a retrospective study^[35]. All consecutive patients who underwent elective LC for uncomplicated diverticulitis in an 8-year time period were evaluated and compared to controls treated with conventional OC in the same period. HRQL was assessed by the SF-36 Physical and Mental Component Summary Scale (PCS; MCS) and by the SF-36 Health Survey. None of the 8 SF-36 Health Survey domains or the PCS and the MCS showed significant differences in HRQL between LC patients and OC patients. The occurrence of postoperative incisional hernias and bowel obstructions, which represented the only surgery-associated long-term complications, was comparable in both groups, as was the patients' HRQL. The two limitations of this study were the small patient cohort and the short follow-up (6-9 mo postoperatively with no long-term available). The lack of statistical difference between LC and OC patients in SF-36 scores related to the development of long-term complications may have been due to these limitations. Surgery-related complications were the only events that had a significant impact on the patients' HRQL, reflecting lower SF-36 scores in certain areas. The laparoscopic colorectal surgery itself had no significant influence on the patients' HRQL in the follow-up of these patients. The authors observed that better immediate postoperative HRQL after laparoscopic procedures may have been related to treatment of the disease *per se* and to favourable parameters such as faster convalescence, shorter hospital stay, and better cosmesis. On the other hand, long-term HRQL seemed to be influenced by chronic sequelae of the surgical procedures. Interestingly, more favourable cosmesis

itself had no impact on either the patients' overall HRQL or the emotional and social domains of the SF-36.

Another comparison of long-term HRQL between patients undergoing LC and OC was performed by Seitz *et al.*^[36] using the GIQLI questionnaire. Fifty-four patients who underwent sigmoid colectomy for recurrent diverticulitis were included. Patients who underwent LC seemed to feel better after surgery compared with those undergoing OC; however, this trend did not reach statistical significance. Patients' satisfaction regarding the cosmetic result was significantly higher in those undergoing LC than patients treated with OC. All patients had a similar GIQLI postoperatively, independent of the type of surgery. Eypasch's GIQLI did not identify clear differences between LC and OC. The limitation of this study was that only the *status quo* was determined and a comparison before and after surgery was not performed. The missing difference between LC and OC may be secondary to the higher rate of persistent symptoms in the LC group compared with the OC group, which was determined by simply asking the patients whether they felt that the disease had recurred. Thus, the authors commented that possible long-term advantages after LC with regard to HRQL may have been lost owing to this difference in "subjective recurrence".

Recently, a prospective, multicentre, double-blind, randomized controlled trial was designed to compare the impact of LC and OC on postoperative complication rates in patients with symptomatic diverticulitis^[37]. Quality of life was assessed using the SF-36 questionnaire measured preoperatively and 6 wk after surgery. One hundred and four consecutive patients who underwent elective surgery for symptomatic diverticulitis of the sigmoid colon were randomized in 5 centres. Fifty-two LC patients were compared to 52 OC patients for gender, age, body mass index, American Society of Anesthesiology classification, prevalence of comorbidities, previous abdominal surgery, preoperative workup, and indication for surgery. SF-36 data showed no preoperative intergroup differences. Postoperative SF-36 data were significantly better in LC patients for role limitations due to physical and emotional problems, social functioning, and pain level. The main finding of this randomized controlled trial was that LC patients had significantly reduced major postoperative complication rates as compared with OC patients for symptomatic diverticulitis. Subjectively, patients who underwent LC scored significantly better than OC patients on the Visual Analogue Scale (VAS) for quality of life-pain score and SF-36 questionnaire. Several items in the latter showed improved role limitations due to physical health, role limitations due to emotional problems, social functioning, and pain.

A multicentre study compared HRQL in patients affected by DD submitted to LC *vs* those who underwent OC during long term follow up, using the Padova Inflammatory Bowel Disease Quality of Life (PIBDQL) score, CGQL score, VAS, Body Image Questionnaires (BIQ) and cosmetic score (CS), ad hoc DD symptom score (DDSS) and Bristol Stool Form Scale^[38]. Sixty consecutive patients

were included: 20 underwent LC, 15 OC and 25 had only medical therapy. The PIBDQL^[35,39,40] was validated for use in patients with DD. Preliminary results showed that the PIBDQL scores were significantly worse in all patients with DD than those obtained from healthy subjects and correlated with the symptoms score. The CGQL was similar in patients who had LC compared to healthy subjects. BIQ scores correlated inversely with the presence of a stoma. The intestinal symptoms item was worse in patients who had LC than in those who had OC. On multivariate regression, the DDSS score was the only independent predictor of the PIBDQL score. No significant difference was observed in VAS for quality of life among the three groups of patients and in total CS in the two groups submitted to surgery. Only the scar score item was significantly better in patients who underwent LC compared to that in patients who had OC. Similarly, no significant difference was observed in the BIQ items and total score in the two groups submitted to surgery. The authors concluded that disease activity is the only independent predictor of the disease-specific quality of life.

QUALITY OF LIFE AFTER STAGED RESECTION FOR COMPLICATED DD

Constantinides *et al.*^[17] assessed long-term differences in HRQL using the SF-36 questionnaire between single and staged resections, in complicated DD. The authors divided the study population into two groups: one group consisting of patients who underwent primary colonic resection and anastomosis and the other group who underwent staged resections followed by restoration of intestinal continuity (HP). Three subgroups were created for each of the single staged and staged resection groups on the basis of when HRQL was assessed (1 group less than 3 years after primary surgery, 1 group 3-6 years after primary surgery and 1 group more than 6 years after primary surgery). One hundred and fifty-eight patients who underwent single staged resections and 30 patients who underwent staged resections with restoration of intestinal continuity were included. Significant differences were observed between the two groups in patients suffering from major comorbidities. No statistically significant differences were found in any of the eight domains between the single and staged resection groups. No significant differences were found between the two surgical methods across any of the eight SF-36 domains, for any of the time periods. The PF and RP domains were both subject to a significant decrease in mean score with advancing age. The BP domain had a progressive, but not statistically significant, decrease in score with advancing age.

Patients with no postoperative complications had significantly higher scores in the PF domain, the RP domain and the BP domain. According to these authors, in the setting of complicated DD, long-term HRQL tends to be similar between surgical interventions but remains significantly lower in selected domains when compared to the general population norms.

The main limitations of this study were that: (1) the two groups were inhomogeneous in terms of patient comorbidities and therefore, the effect of comorbidity on HRQL as a confounder could not be eliminated; and (2) no patient had a residual stoma and as a result, the study did not assess the impact of a colostomy on quality of life. Furthermore, HRQL was not assessed in the preoperative state.

CONCLUSION

The conclusions that can be drawn from these different studies are that DD has a negative impact on HRQL with lower scores in bowel function and systemic symptoms. Currently, the criteria for selection of DD patients for elective surgery remain debatable. Formal assessment of HRQL could be a good instrument in the selection of appropriate patients for elective surgery as well as in the assessment of surgical outcome. Both surgery-related complications and disease activity have a significant impact on patients' HRQL. While no significant differences in HRQL between different operations for DD in the non-randomized studies were revealed, the only prospective double-blind randomized study that compared LC and OC found that patients undergoing LC had significantly reduced major postoperative complication rates and subsequently had better HRQL scores.

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