

Surgical management of deep infiltrating endometriosis of the rectum: pleading for a symptom-guided approach[†]

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ABSTRACT: Two surgical approaches are usually employed in the treatment of deep infiltrating endometriosis of the rectum (DIER): colorectal resection removing the rectal segment affected by the disease, and nodule excision either without opening the rectum (shaving) or by removing the nodule along with the surrounding rectal wall (full thickness or disc excision). Although the present available data are from retrospective series reported by surgeons who generally perform only one technique, there is no evidence to support the risk of recurrences as a valid argument in favour of colorectal resection over rectal nodule excision. The advantage of a lower morbidity associated with nodule excision is not necessarily at the cost of an increased rate of pain recurrences, especially in women benefiting from post-operative medical treatment. The symptom-guided surgical approach in DIER primarily focuses on the relief of digestive symptoms and pelvic pains, rather than on mandatory 'carcinologic' resection of lesions. In addition, the risk of new post-operative unpleasant symptoms as a result of a compulsory and systematic excision of all endometriotic foci may be avoided. In a majority of cases, pelvic anatomy and digestive function can be restored by shaving or disc excision, as well as by colorectal resection; thus digestive complaints can be resolved even when the rectum is conserved. The most accurate evaluation of the results of DIER surgery should be provided by post-operative evolution in digestive function. Even though quality of life is improved for the majority of patients managed by colorectal resection, the question is whether or not a greater health improvement can be achieved by performing nodule excision, which avoids various post-operative and functional digestive complications. In addition, continuous medical treatment leads to a decrease in endometriotic nodules and prevents post-operative pain recurrences. Instead of choosing between medical and surgical management in the treatment of DIER, it is most likely that the two therapies should be associated.

Key words: rectal endometriosis / deep infiltrating endometriosis / colorectal resection / nodule excision / digestive function

Deep infiltrating endometriosis of the rectum (DIER) is a chronic disease with a high potential for aggressiveness, leading to a severe impairment of women's health by progressive pelvic pain, deep dyspareunia and by generating various digestive complaints such as diarrhoea, constipation, tenesmus, dyschezia, painful defecation or occlusion. Women presenting with DIER usually experience a major impairment

of both their professional and social lives and seek effective treatment and not just expectative care.

The term 'deep infiltrating endometriosis of the rectum' designates the involvement of at least the muscular layer of the rectal wall, while endometriotic implants when exclusively involving the digestive serosa could be considered superficial peritoneal lesions (Chapron *et al.*,

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2003). More than 80% of digestive localizations concern the rectum and the distal sigmoid colon, and are represented by fibrotic nodules also infiltrating the vagina, the uterine isthmus, the uterosacral ligaments or the adnexas. As regards histology, deep endometriotic nodules differ from peritoneal and ovarian implants, in that they contain a high proportion of fibro-conjunctive tissue (41%) and smooth muscular fibres (35%) when compared with that of endometrial epithelium and stroma (24%) (Bazot *et al.*, 2007).

Surgery and medical treatment: arguments for their systematic association

Many physicians choose between medical and surgical management in the treatment of DIER; however, we will present arguments for why we believe that the two therapies should be associated. In cases of macroscopic lesions that can generally be completely removed, surgical management is clearly curative, leading a majority of authors to suggest that surgical treatment should be considered in the management of symptomatic DIER.

Although able to reduce pelvic pain significantly, continuous hormonal treatment does not lead to the complete disappearance of deep endometriotic nodules, but rather to a slight decrease in volume. It has been demonstrated that therapeutic amenorrhoea over a period of several months might lead to a decrease in endometriotic nodule volume by up to 30% (Fedele *et al.*, 2000, 2001). This observation is consistent with data concerning the histological composition of deep nodules shown to consist of only 20–30% of endometrial epithelium, while >60% is fibrosis and smooth muscular fibres insensitive to hormone action (Bazot *et al.*, 2007). However, a slight decrease in volume associated with the suppression of cyclic intra-nodular micro haemorrhages might be enough to relieve pain significantly for as long as the treatment is administered (Angioni *et al.*, 2006). When efficient control of pain and digestive symptoms is obtained by continuous medical therapy only, surgical management of DIER could be either postponed for the long term or definitively avoided.

On the other hand, there are numerous arguments for the use of medical treatment in the prevention of recurrences in women undergoing complete excision of macroscopic endometriotic lesions. While the aetiology of endometriosis is still unknown, it is likely that the biological mechanisms responsible for endometriotic implants are not influenced by surgery, and that new lesions may form as soon as the day after the surgical procedure. This hypothesis provides an explanation as to why the risk of pain recurrences may average 20–40% at only 3–5 years after the surgery (Vercellini *et al.*, 2009). It has been shown that continuous post-operative hormonal treatment might prevent pain recurrences after surgical removal of deep infiltrating nodules (Donnez and Squifflet, 2010). As new endometriotic nodules do not develop in menopausal or pregnant women free of cyclic ovarian activity, it is probable that post-operative amenorrhoea may prevent the occurrence of new rectal lesions arising from microscopic rectal implants left in place.

From the literature, it is difficult, if not impossible, to distinguish between ‘disease recurrences’ and ‘progression of residual disease’. The term ‘residual disease’ designates macroscopic incomplete

excision of deep endometriotic nodules, whereas ‘disease recurrence’ signifies that complete removal of the disease has previously been performed. However, in the particular case of deep infiltrating endometriosis occurring in young women with a desire for pregnancy, the term ‘complete removal’ is relative: although complete macroscopic resection can usually be attained on the digestive tract by performing colorectal resection, it becomes much more challenging on the uterine torus and vagina which cannot be limitlessly tailored. It is therefore likely that in the various case series of women managed for DIER, residual disease progressions are considered along with disease recurrences. As suggested above, post-operative medical treatment could be a useful tool in the prevention of both unfavourable events.

Surgical management of DIER: two different approaches

Despite a myriad of research papers already published, there is as yet no definitive answer to the question ‘Which surgical procedure should be recommended for women presenting with colorectal endometriosis?’ Studies show that two surgical approaches are usually employed: colorectal resection removing the rectal segment affected by the disease, and nodule excision. This latter approach may be performed without opening the rectum (shaving) or by removing the nodule along with the surrounding rectal wall (full thickness or disc excision). Owing to the paucity of comparative studies (Roman *et al.*, 2010a; Fanfani *et al.*, 2010), it should be emphasized that the present available data are provided by retrospective series reported by surgeons who generally perform only one technique (Darai *et al.*, 2010; Donnez and Squifflet, 2010; Dousset *et al.*, 2010). Consequently, recommendations made about the surgical management of DIER are based on little evidence and tend to reflect the personal convictions and experience of those experts editing the guidelines.

Furthermore, the conclusions provided by case series may be weakened by susceptibility to various errors, particularly when a study is retrospectively conducted. Few series mention the number of patients lost to follow-up or specify the reasons for this loss, while it is clear that non-respondent women are often those who present with complications or who are dissatisfied by post-operative outcomes (Roman *et al.*, 2010b). In series where patients are managed by one surgical procedure, it can be unclear whether only patients having benefited from this procedure are included, or whether only this procedure was routinely performed by the surgeon (De Cicco *et al.*, 2010). Lastly, the placebo effect of surgery, which has been previously demonstrated in other localizations of endometriosis (Fauconnier and Chapron, 2005), might also flaw the results, particularly in series with a short follow-up or where data are recorded by the surgeon himself.

Colorectal segmental resection is performed by a majority of surgeons worldwide, in a large majority of women presenting with symptomatic DIER. Their choice is supported by retrospective case series studies that report a significant improvement in pain and quality of life following colorectal resection (Chopin *et al.*, 2005; Dubernard *et al.*, 2006; Dousset *et al.*, 2010). Those surgeons performing systematic colorectal resection strongly believe that the radical removal of digestive endometriotic foci is the most effective way to avoid the risk of recurrences, in the same way as radical surgery does in colorectal

cancer. Their choice is supported by studies showing that disc excision does not usually lead to the removal of microscopic endometriotic lesions spread around the main rectal nodule (Kavallaris et al., 2003; Remorgida et al., 2005). As active glandular epithelium and stroma are responsible for a deeper infiltration of rectal layers than that of rectal nodule fibrosis and smooth fibres (Roman et al., 2009), they also believe that shaving is incompatible with the aims of carcinologic resection of DIER.

Conversely, rectal nodule excision remains the first choice for several experienced surgeons (Donnez et al., 1997; Donnez and Squifflet, 2004; Slack et al., 2007; Donnez and Squifflet, 2010; Roman et al., 2010b). As far back as in 1995, Donnez et al. (1995, 1997) recommended curtailing rather than encouraging aggressive rectal surgery in rectovaginal endometriosis with rectal involvement. The main arguments supporting this choice are an increase in the rate of post-operative complications following colorectal resection (Slack et al., 2007; Donnez and Squifflet, 2010; Roman et al., 2010b), and a higher rate of unpleasant digestive and urinary functional outcomes following a partial removal of the rectum (Ret Davalos et al., 2007; Roman et al., 2010a). As microscopic foci could also be left on the digestive wall, above and below the limits of the colorectal resection (Roman et al., 2007; Anaf et al., 2009), this provides an explanation as to why cyclic digestive symptoms may still be present in up to 70% of women undergoing this technique (Benbara et al., 2008), and adds to the awareness that microscopically complete resection of endometriotic foci remains an aim rather than a reality.

Is the risk of recurrences a valid argument in the choice of colorectal resection?

To date, there is no evidence to support the risk of recurrences as a valid argument in favour of colorectal resection over rectal nodule excision. This question is even more challenging in cases of women who accept continuous post-operative hormonal treatment or benefit from bilateral adnexectomy. To our knowledge, there are only two studies that compare the rate of recurrences and the surgical technique employed. Fanfani et al. (2010) reported a rate of recurrences of respectively 14 and 12% after disc excision and colorectal resection, with a median follow-up of 3 years. However, in this study, cases ($n = 48$) and controls ($n = 88$) were not entirely comparable, due to disc excision being performed in women with a nodule size inferior to 3 cm, while colorectal resection was performed in women with larger lesions.

The second study was recently published by our team, and has a distinguishing feature in that the choice of surgical procedure was not determined by the characteristics of the nodule but by our convictions at the time of surgery. Hence, prior to November 2007, colorectal resection was our first choice, while since that date rectal nodule excision has been systematically attempted (Roman et al., 2010a). In a series including 41 women managed for DIER (25 and 16 women having undergone, respectively, colorectal resection and nodule excision) with a follow-up ranging from 13 to 53 months, we did not observe any significant difference between recurrences of pelvic pain depending on the type of rectal surgery and no nodule recurrences were recorded in either group. Two years after surgical treatment,

the probability of being free of dysmenorrhoea, dyspareunia and non-cyclic pain in women managed by colorectal resection and nodule excision was respectively 80% [95% confidence interval (CI) 55–92%], 65% (42–81%), 43% (23–62%) and 62% (34–81%), 81% (52–94%), 69% (40–86%). Despite some pain recurrence, the post-operative 10-point visual analogue pain score was much improved when compared with that recorded pre-operatively.

As shaving and disc excision appear to allow a less complete excision of microscopic implants, it is likely that these implants could be responsible for cyclic pain or digestive complaints. However, as cyclic symptoms may be controlled by post-operative hormonal treatment, e.g. the contraceptive pill or progestin, they should not lend support to an argument for a more aggressive and potentially morbid surgical approach. In our opinion, no randomized trial would ever demonstrate for women with continuous post-operative medical treatment that those managed by colorectal resection have better prognostic outcomes than those having undergone nodule excision. In a previous randomized trial that failed to demonstrate the usefulness of post-operative medical therapy, the hormonal treatment was only administered for a few months, while outcomes were checked 1–2 years later (Yap et al., 2004).

In a recent retrospective study of 500 women managed for deep infiltrating rectovaginal endometriosis, and including 204 women who presented with rectal nodules managed exclusively by shaving, Donnez and Squifflet (2010) reported excellent outcomes and a low rate of recurrences along with a low rate of post-operative complications such as urinary retention, rectovaginal fistula or post-operative rectal stenosis. It should be noted that the rate of recurrences was very low among women who had received continuous post-operative progestin (1%) and in women who had interrupted the medical treatment and then rapidly conceived (2%), when compared with women who had abandoned the treatment but had not become pregnant (20%). These data suggest that the advantage of a lower morbidity associated with nodule excision might not be at the cost of an increase in rate of pain recurrences.

Principles of the symptom-guided approach

In order to reduce the post-operative morbidity rate in young women managed for endometriosis, Vercellini et al. (2009) recently proposed 'a more pragmatic approach [...] focused more on the woman's needs than on the extension of the ectopic foci' and to centre treatment 'on resolution of complaints, independently of a priori excision of lesions'. This approach becomes possible where treatment is associated with surgery and administered long term 'for years and not only for months'.

In our opinion, this statement reflects surgical wisdom, and particularly applies to DIER even more than for other localizations of the disease. It means that the surgical approach in DIER should primarily focus on the relief of digestive symptoms (diarrhoea, constipation, tenesmus, dyschezia and defecation pain) and pelvic pains (dysmenorrhoea, dyspareunia and non-cyclic pain), rather than on mandatory 'carcinologic' resection of lesions. In addition, the risk of new post-operative unpleasant symptoms as a result of a compulsory and systematic excision of all endometriotic foci should be avoided. As the

potential risk of recurrences must be taken into account, extended associated post-operative medical therapies should be systematically proposed to women who do not intend to conceive.

Since November 2007, we have adopted a symptom-guided surgical approach, and abandoned systematic colorectal segmental resection in women presenting deep endometriosis with infiltration of at least the muscular layer of the rectal wall (Roman *et al.*, 2010a,b). We began by proposing nodule excision to women who accepted post-operative therapeutic amenorrhoea up to menopause, and to those whose digestive symptoms only manifested during menses. We, therefore, ceased carrying out colorectal resection in older women benefiting from associated bilateral adnexectomy. Secondly, we proposed rectal nodule excision to nulliparas. In our opinion, the desire to conceive is no longer an argument in favour of a radical resection of endometriotic foci as long as the length of time without hormonal treatment is limited to a few months (Donnez and Squifflet, 2010). This can be achieved provided a complete fertility assessment is performed immediately after stopping post-operative treatment. Spontaneous pregnancy is attempted only when fertility is not impaired; otherwise, reproductive assistance is proposed.

Shaving of rectal nodules: a surgical technique suitable in a majority of cases

Patients' digestive complaints may be explained by three major consequences of the development of rectal endometriotic nodules: (i) cyclic micro haemorrhages and inflammation into the rectal wall (Fig. 1), (ii) forward fixation of the rectum to the uterine cervix or vaginal fornix (Fig. 2) or (iii) rectal stenosis (Fig. 3).

Cyclic inflammation of the rectal wall explains why a majority of patients present digestive complaints (diarrhoea, constipation, dyschezia, tenesmus and defecation pain) especially or exclusively during menstruation. It is probable that the inflammation acts as an irritant factor leading to an increase in the daily number of bowel movements (usually described as a 'diarrhoea'), in defecation pain and in a feeling

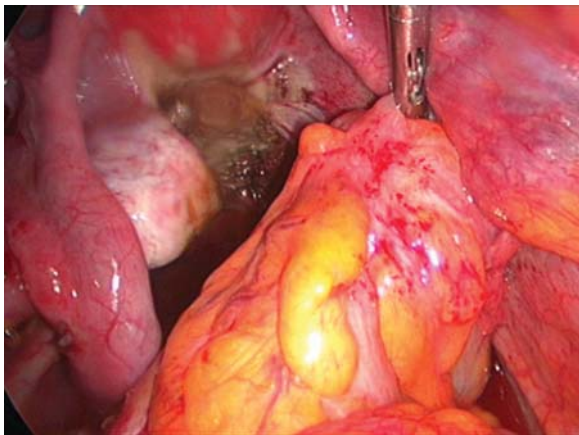


Figure 1 Micro haemorrhages arising in endometriotic implants surrounding the digestive nodule.

of never emptying the rectum. These symptoms may also be encountered in women presenting with peritoneal implants on the Douglas pouch and rectal serosa. These symptoms are significantly or even completely relieved by medical therapy administered during the weeks preceding surgery.

Rectal fixation on the uterine cervix or the vaginal fornix is due to the backward development of types II and III deep rectovaginal nodules (Squifflet *et al.*, 2002), and may lead to abnormal angulations of the digestive tract (Fig. 2), disturbing stool progression and resulting in defecation pain or constipation. Rectum angulation is less identifiable on MRI examination when the patient is placed in decubitus, but it becomes obvious when the uterus is intra-operatively anteverged to facilitate the approach to the Douglas pouch (Fig. 2).

Rectal stenosis is usually due to nodule protrusion into the rectum and may be revealed as an indentation by barium enema or computed tomography with virtual colonoscopy (Fig. 3). It is important to note that revealing intrarectal protrusion does not mean that the nodule has developed through the full thickness of the rectal wall, but rather that it has pushed inside the rectal layers along with the infiltration of rectal musculosa.

The aim of the symptom-guided approach is to relieve painful digestive complaints by altering the above-mentioned consequences of deep infiltrating endometriosis on the rectum. We believe that both techniques of nodule excision, i.e. shaving and disc full thickness excision, are suitable for this goal.

As previously mentioned, microscopic endometriotic implants usually surround macroscopic rectal nodules. Furthermore, in a majority of cases, macroscopic intestinal lesions are multiple (Dousset *et al.*, 2010), suggesting a tendency for the disease to spread through the abdominal cavity. This provides an explanation for histological examination of extremities of the digestive tract removed by colorectal resection that can reveal endometriotic implants, located far from the macroscopic limits of the nodule (Roman *et al.*, 2007; Anaf *et al.*, 2009), and for cyclic digestive symptoms post-operatively still present in up to 70% of women undergoing colorectal resection (Benbara *et al.*, 2008). On the other hand, disc excision and shaving may result in leaving active endometriotic

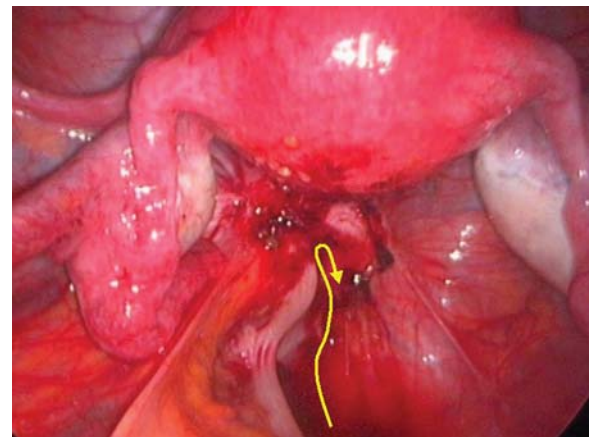


Figure 2 Rectal fixation on the uterine cervix or the vaginal fornix leading to abnormal angulation of the digestive tract, disturbing stool progression and resulting in defecation pain or constipation.

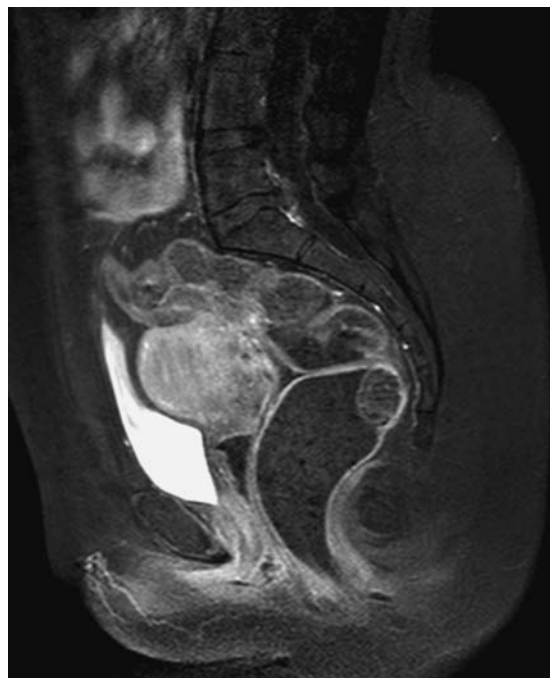


Figure 3 Rectal stenosis due to circumferential endometriotic nodule (MRI examination, T1 sequence).

lesions outside the deepest limit of the excision of fibrous rectal nodules (Remorgida et al., 2005; Roman et al., 2009). The clinical implications of leaving microscopic foci of endometriosis on the digestive tract remain unknown (Fanfani et al., 2010), but it is likely that they are symptomatic when micro haemorrhages and the inflammatory phenomenon occur in the rectal wall on a cyclical basis. However, as continuous hormonal therapy, with either progestins or contraceptive pills, could be a simple and adequate tool in controlling micro haemorrhages, we believe that shaving and disc excision are as efficient as colorectal resection in preventing pain due to the cyclic inflammatory process when associated with prolonged post-operative amenorrhoea.

Rendering the rectum free from its anterior fixation is accomplished by both nodule excision and colorectal resection because both procedures involve the separation of the rectum from the uterine cervix and posterior vagina, the excision of deep endometriosis nodules after complete dissection from the posterior part of the cervix and the removal of the posterior vaginal fornix affected by endometriosis (Donnez and Squifflet, 2010; Dousset et al., 2010).

We believe that the degree of rectal stenosis is of importance when deciding between conservative and radical rectal surgery and should be pre-operatively checked. The threshold for the degree of stenosis tolerated without painful symptoms is yet to be assessed, but it is likely that moderate rectal stenosis is often asymptomatic and does not require a systematic removal of the rectal segment involved. Figure 4 presents the results of a 45-year-old woman who underwent shaving and bilateral adnexectomy and whose digestive complaints were completely relieved, in spite of moderate stenosis corresponding to a residual indentation of the anterior rectal wall. Conversely, the

complete relief of digestive symptoms by pre-operative hormonal therapy leads us to believe that micro haemorrhages and inflammatory processes are responsible for digestive complaints rather than rectal narrowness, and presents a strong argument for conservative rectal surgery.

All these considerations suggest that in a majority of cases, pelvic anatomy and digestive function can be restored by shaving or disc excision as well as by colorectal resection, and that digestive complaints can be resolved even though the rectum is conserved.

What are the most appropriate criteria in evaluating the success of surgical management of DIER?

Most series evaluating the surgical management of DIER focus on the improvement in dysmenorrhoea, dyspareunia, non-cyclic pain and quality of life. However, the above-mentioned outcomes may not be the most accurate in characterizing the success of rectal nodule surgery, due to uncertainty concerning a direct relationship with the relief of these symptoms. Post-operative dysmenorrhoea is usually related to small implants spreading over the pelvic peritoneum, to associated adenomyosis and sometimes to pelvic adhesions (Fauconnier and Chapron, 2005). Post-operative deep dyspareunia depends on the completeness of the excision of foci located on the posterior vaginal wall, uterosacral ligaments and Douglas pouch, whose thorough removal might be limited by the sparing of vegetative bladder nerves. Chronic non-cyclic pelvic pain also depends on associated functional bowel and bladder diseases, adhesions and psychological factors. Finally, an improvement in quality of life remains subjective and strongly depends on pre-operative impairment of sexual intercourse and a woman's health, in general (Benbara et al., 2008). Even though improvement in quality of life is doubtless a fact for a large majority of patients, the question is whether or not a greater level of health improvement can be achieved by performing shaving, which avoids various post-operative and functional digestive complications, instead of colorectal resection.

In our opinion, the most accurate evaluation of the results of surgery in DIER is provided by post-operative evolution in digestive function. Women suffering from this disease experience dyschezia in 67% (Dousset et al., 2010) to 80% (Benbara et al., 2008) of cases; however, this symptom may also be related to rectovaginal and uterosacral localizations without rectal effect (Seracchioli et al., 2008). Pre-operative defecation pain is recorded in up to 100% (Roman et al., 2010a), abnormal bowel movements in 72% (Benbara et al., 2008) and painful constipation in 61% (Dousset et al., 2010) of cases. Rectal bleeding is more frequent (18–36%, Benbara et al., 2008; Dousset et al., 2010) than mucosal involvement (<10%, Benbara et al., 2008; Roman et al., 2008; De Cicco et al., 2010).

It is important to note that for a majority of patients, in series reported by tertiary referral centres, performing colorectal resection does not lead to complete relief of digestive complaints. In a series of 50 patients followed up for 42 ± 32 months (range 10–154 months), a majority of digestive symptoms, such as abnormal bowel movements (70% post-operatively versus 78% pre-operatively) and constipation (59 versus 62%), were only slightly improved (Benbara et al., 2008). Conversely, other symptoms were post-operatively

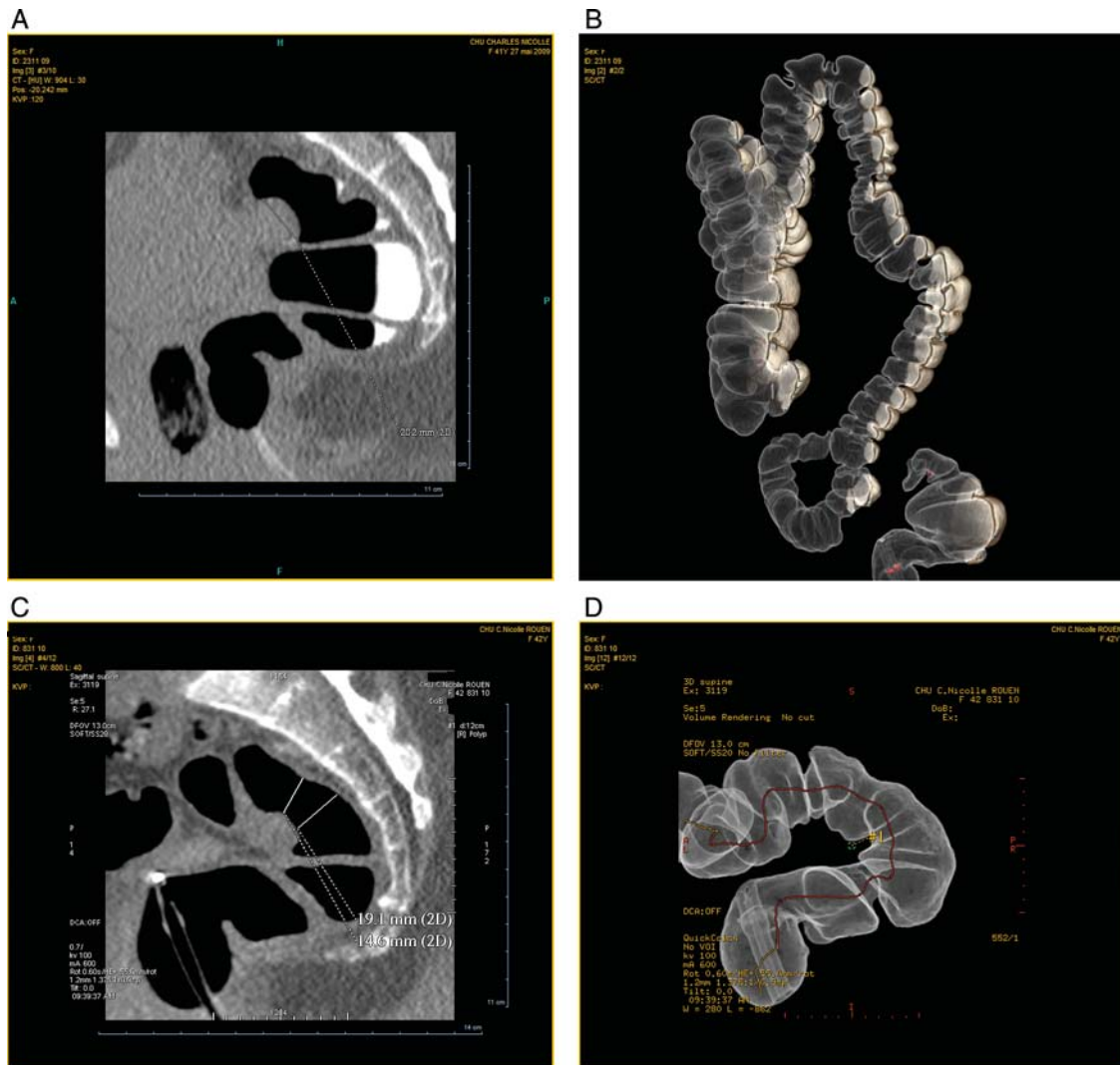


Figure 4 Computed tomography and virtual colonoscopy performed prior to (A and B) and after (C and D) shaving of the rectal nodule carried out in a 45-year-old woman. Post-operative examination reveals a persistent indentation on the anterior rectal wall; however, the increase in rectal diameter allowed complete and definitive relief of digestive symptoms.

impaired, such as tenesmus (49 versus 42%). As a large majority of patients were followed up over a period of >1 year, it is likely that the definitive rates of post-operative functional outcomes were not far from those reported in the study. In another series including 52 patients managed by colorectal resection, constipation was unchanged and impaired following surgery in 45% of women, bowel movement cramping in 18%, defecation pain in 22%, tenesmus in 59% and diarrhoea in 14% (Dubernard *et al.*, 2006). We recently reported that women managed by colorectal resection and followed up for 28 ± 13 months (range 15–53 months) experienced post-operative severe *de novo* constipation (1 stool/more than 5 days) in 12% of cases, while conversely 52% of women usually present ≥ 3 bowel movements/day (Roman *et al.*, 2010a). Neither of these post-operative symptoms could be attributed to rectal nodule recurrences, but rather to the surgical procedure employed.

Such functional results could be considered unsatisfactory, especially in women also experiencing post-operative complications;

however, a large majority of patients feel a real post-operative improvement in quality of life (Dubernard *et al.*, 2006; Daraï *et al.*, 2010). Furthermore, when asked if they would recommend the surgery to a friend, 88–91% of women who had undergone colorectal resection answered 'yes' (Benbara *et al.*, 2008; Roman *et al.*, 2010a).

Surgeons performing colorectal resection believe that a significant improvement in quality of life constitutes a sufficient argument to recommend the radical 'carcinologic' approach as the best treatment for DIER (Dubernard *et al.*, 2006; Benbara *et al.*, 2008; Dousset *et al.*, 2010). However, for numerous women, as we suggested above, improvement in quality of life may not be related to an improvement in digestive symptoms, but rather an improvement in sexual intercourse or gynaecological pain. As these latter symptoms usually depend on the care taken to remove deep infiltrating lesions on uterosacral ligaments and the vagina, they are similarly relieved by both colorectal resection and shaving. We thus observed that women

managed by shaving also answer 'yes' when asked if they would recommend the surgery to a friend (Roman et al., 2010a).

Furthermore, other functional outcomes of the surgery in DIER, such as faecal incontinence and outlet obstruction, have been poorly investigated. Removal of the rectum, together with possible contractile activity occurring within the colonic neo-reservoir, can contribute to faecal urgency and incontinence (Guillemot et al., 1991). This has been shown in patients undergoing colectomy for rectal cancer even with respected anal sphincters, resulting in a rate of 10–30% of faecal incontinence according to the type of technique (J-pouch or straight coloanal anastomosis) and 5–10% for outlet obstruction (Machado et al., 2003; Heriot et al., 2006). In our series, the rate of faecal urgency and incontinence was 4% in young women managed by colorectal resection for DIER (Roman et al., 2010a). Surprisingly, none of these complications was observed in a series of 100 patients with low rectal resection, where patients were treated with straight coloanal anastomosis (Dousset et al., 2010). The authors attributed this discrepancy to the young age of the patients, the lack of co-morbidities and the absence of associated radiotherapy. However, their results could be compared with those of series of patients managed for rectal cancer by surgery alone. In a series including patients with a mid (66%) or low (33%) rectal tumour and a follow up of 35 ± 16 months, gas, liquid and solid stool incontinence averaged respectively 40, 25 and 10%, and 20% of patients were routinely using pads (Gervaz et al., 2001). In addition, the rate of patients with clustering and urgency were respectively 30 and 21%. Of interest is whether this huge difference in functional outcomes can be attributed exclusively to the increase in the age of patients managed for rectal cancer when compared with those presenting with DIER. The maintenance of faecal continence is complex and results from an interplay between the rectum, the anal sphincters, the pelvic floor muscles and the nerves innervating these structures. Faecal incontinence is usually multifactorial, involving the impairment of several of these mechanisms resulting from muscle injury (after childbirth or anorectal surgery) (Sultan et al., 1993), atrophy (Noguti et al., 2008) or after damage to central or peripheral innervations of the sphincter (Sultan et al., 1994). Further studies are required to investigate the long-term functional outcomes of rectum resection for endometriosis, since results and experience of colorectal surgery for rectal cancer suggest that a significant subset of patients might develop faecal incontinence or urgency in the long run.

Conclusions

The choice of the best surgical approach in the management of DIER is the subject of a debate that is far from being closed. To draw definitive conclusions, comparative studies with a long-term follow-up and a focus on both gynaecological and digestive outcomes are indispensable. Non-comparative series are also welcome, provided that their results are accurately presented and allow comparison with those of other teams. In this paper, we have presented arguments in support of our view that nodule excision is a less morbid surgical procedure suitable for a majority of women and that colorectal resection should be reserved for a small number of patients presenting with major digestive stenosis or with nodules whose features render excision technically impossible. In all cases, associated medical treatment should be administered to improve pain relief and to reduce the risk

of recurrences. As we have stated previously, women should also be aware of the advantages and complications associated with each surgical technique and be given the opportunity of making an informed choice.

Authors' roles

H.R., M.V. and J.J.T. developed the original design. H.R., G.G. and G.S. wrote the first draft of the report. L.M., A.M.L. and F.M. critically revised the manuscript for important intellectual content. All authors contributed to the writing of the final manuscript and approved it for publication.

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