Original Article

Adolescent endometriosis in the Waikato region of New Zealand – A comparative cohort study with a mean follow-up time of 2.6 years

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Study objective: To describe our experience with laparoscopic excision of endometriosis on an adolescent population and to compare it with a non-adolescent population treated during the same period.
Design: Comparative cohort study of patients with endometriosis treated consecutively between July 2003 and January 2009 with a follow-up between six months and six years.
Setting: Braemar Hospital, Hamilton, New Zealand.
Results: We treated 20 adolescents. Ninety-five per cent (19/20) of adolescents were using pain relief other than Paracetamol, in contrast to only 59% (84/143) of non-adolescents. Thirty per cent (6/20) of adolescents had a first-degree relative with endometriosis, in contrast to 8% (11/143) of non-adolescents. Endometriosis was found to be stage I in 40% (8/20) of patients, stage II in 45% (9/20) of patients, stage III in 5% (1/20) of patients and stage IV in 10% (2/20) of patients. The main type of endometriotic lesion in the adolescent was an atypical red vascular lesion, which was present in 60% (12/20) of adolescents; but it was present in only 20% (29/143) of non-adolescents. There were no intra-operative complications. Minor postoperative complications included one case of urinary tract infection and one case of port infection. The operative complications that developed when treating the non-adolescent group are presented for comparison. Pain scores recorded at follow-up revealed a significant reduction in dysmenorrhoea and pelvic pain and there was a positive effect on the quality of life of adolescents as measured by the EQ-5D questionnaire tool.
Conclusion: Adolescents with endometriosis use significantly more pain relief than non-adolescents to control symptoms. They have a higher rate of a first degree relative with the disease and they present with more atypical endometriotic lesions when compared with an adult population with endometriosis. All the stages of disease are present in the adolescent, including stages III and IV. The laparoscopic excision of endometriosis has a positive effect on the relief of pain symptoms and on the improvement in quality of life in the adolescent.

Key words: adolescent, endometriosis, laparoscopy, New Zealand, quality of life.

Introduction

Endometriosis in adolescents may offer a particular challenge for the differential diagnosis and timing of surgery. However, early diagnosis is essential to decrease pain and hopefully prevent disease progression and preserve future fertility.[1] Given an increased awareness of endometriosis, this disease is being diagnosed more frequently[2] in the adolescent and some concerns have been raised about surgical intervention and its effect on quality of life. However, there are still scarce data on the effect of the surgical treatment of endometriosis in the adolescent. The aim of this study was to present our experience with the laparoscopic surgical excision of endometriosis in an adolescent population and to correlate these findings with those of an adult population treated surgically during the same period.

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Received 26 October 2009; accepted 11 January 2010.

Methods

The Clinical Committee of Braemar Hospital supported this study. All the patients were counselled preoperatively. Surgical risks were discussed at length. An information sheet, which included an explanation of the disease, a description of the surgical procedure and advice regarding potential surgical complications, was provided. The patients or their parents gave written informed consent for surgery.

Between July 2003 and January 2009, 269 consecutive patients underwent operative laparoscopy at Braemar Hospital with the presumptive diagnosis of endometriosis. Of these, 72% (194/269) of patients had histologically confirmed endometriosis. A total of 163 patients had completed data sets for up to six-year follow-up. Thirty patients were lost to follow-up and one patient declined to participate.

Of the total of 163 patients, 20 were adolescents (<20 years old). Their data were compared with data from

all non-adolescent patients (143) with endometriosis treated surgically during the same period.

The preoperative evaluation included a medical history and a gynaecological examination. The preoperative investigations involved ultrasonography and in cases of a pelvic mass, magnetic resonance imaging and double-contrast Barium Enema.

Patients completed a visual analogue scale for six compo nents of endometriosis-related symptoms: dysmenorrhoea, dyspareunia, pelvic pain not related to menstruation, dyschezia, constipation or diarrhoea associated with menstruation and dysuria associated with menstruation. The EuroQol Group's EQ-5D[3] questionnaire was used for evaluation of quality of life. This questionnaire defines 'health' on five dimensions: mobility, ability to undertake self-care, ability to participate in usual activities, experience of pain or discomfort, and anxiety or depression. The 5Q-5D questionnaires also include a visual analogue scale with 'best imaginable health state' (a score of 100) at the top and 'worst imaginable health state' (a score of 0) at the bottom.

Bowel preparation using PICOPREP powder (Pharmatel Pty Ltd, Hornsby, NSW, Australia) was performed routinely in every case and the patient had low residue diet the day before surgery.

All surgical procedures were performed by the author under general anaesthesia with endotracheal intubation.

At the time of surgery, operative findings were recorded; the findings were documented by digital photography using a Sony DCR-PC350E (Sony Minato, Tokyo, Japan) digital video camera recorder. Photos of the surgical procedure were included in the operative report. The stage of disease (revised American Fertility Society classification system[4]) was also recorded.

Laparoscopic electrosurgical excision of endometriosis was performed in all cases, using the scissors or needle as the primary excisional tool. Intra-operative complications were noted as well as other surgical procedures performed at the index surgery. The number of specimens and their location were recorded, as was the histological confirmation of endometriosis.

All patients were seen at the office two to four weeks after laparoscopic surgery and early postoperative complications up to then were documented.

Long-term follow-up was performed by EQ-5D questionnaire tool and the review of the patients' medical records. The questionnaire was posted to all the patients, regardless of the initial date of surgery.

Statistical analysis

Statistical analysis of change in pain scores, quality of life index and visual analogue scale was performed using nonparametric Wilcoxon signed rank sum test. Fisher's exact test was used to test for difference between the adolescent and the non-adolescent groups as regards family history, use of pain relief and the presence of red vascular lesion. Difference in stages of endometriosis between the two groups was explored using the Cochran-Armitage trend test. Analysis was undertaken using STATA (Version 11.0; STATA Corporation, College Station, TX, USA).

Results

A total of 29 adolescents underwent consecutive laparoscopic surgery with the preoperative diagnosis of endometriosis, 72.41% (21/29) of patients had histologically confirmed endometriosis following excision of their disease and 95.24% (20/21) of patients who had completed data for preoperative questionnaire, intra-operative findings and photo documentation were included in this study.

The mean follow-up time was 2.6 years (1.77–3.43). There was no statistically significant difference (*P*-value: 0.59), with the mean follow-up for the adult population (143 patients) that had a mean follow-up time of 2.8 years (2.54–3.062).

Ninety per cent (18/20) of patients were referred by their General Practitioners and 10% (2/20) of patients were referred by other Gynaecologists. One patient had a diagnostic laparoscopy performed before referral.

The average age of the patient was 17.4 years (CI: 16.71–18.09). The youngest patient was 14 years old at the time of surgery. The chief complaint at the initial consultation was dysmenorrhoea in 80% (16/20) and non-menstrual pelvic pain in 20% (4/20), compared with dysmenorrhoea in 55% (78/143) and non-menstrual pelvic pain in 28% (40/143) of non-adolescents.

Sixty per cent (12/20) of patients were sexually active and 60% of the sexually active adolescents were using the combined oral contraceptive pill at the time of the first consultation.

Ninety-five per cent (19/20) of adolescents were using pain relief other than Paracetamol, in contrast to 59% (84/143) of non-adolescents (*P*-value: 0.0067). Thirty per cent (6/20) of adolescents had a first-degree relative with endometriosis, in contrast to 7.6% (11/143) of non-adolescents (*P*-value: 0.0083).

Surgical procedure

All patients underwent laparoscopic electrosurgical excision of endometriosis performed using a diathermy needle or scissors. All the procedures were completed laparoscopically. The mean length of surgery was 86 min (SD: 19 and CI: 78–94).

Other surgical procedures performed with the index surgery were cystoscopy in 15% (3/20) patients, laparoscopic ovarian cystectomy in 10% (2/20) of patients and laparoscopic appendectomy in one patient. This is in contrast with the higher number of surgical procedures performed in the non-adolescent population as presented in Table 1.

A total number of 69 biopsy specimens were taken and 68% (47/69) of specimens were positive for endometriosis.

Surgical findings

At the time of surgery, endometriosis was found to be stage I in 40% (8/20) of patients, stage II in 45% (9/20), stage III

Table 1 Comparison between the study group (adolescents) and the non-adolescent group

	Adolescents (20)	Non-adolescents (143)	Statistical significance
Duration of follow-up (years)	2.6 ± 1.9	2.8 ± 1.6	No SD (t-test, $P = 0.59$)
Use of pain relief	18 (90%)	85 (59%)	$P = 0.0067$ (Fisher exact test)
Family history (First degree relative)	6 (30%)	11 (7.6%)	$P = 0.0083$ (Fisher exact test)
Presence of red vascular lesions	15 (75%)	37 (26%)	$P < 0.0001$ (Fisher exact test)
Fusion anomaly of Mullerian duct	0 (0%)	5 (3.5%)	
Endometriosis stage (RAFS classification)			
I	8 (40%)	41 (29%)	No SD (Chi-square trend test)
II	9 (45%)	57 (40%)	
III	1 (5%)	22 (15%)	
IV	2 (10%)	23 (25%)	
Previous surgery for endometriosis	1 Diagnostic laparoscopy 0 Operative laparoscopies	1 Diagnostic laparoscopy 33 Operative laparoscopies (23%)	
Mean length operative time	86 min (78–94)	105 min (88–122)	
Laparotomies	0 (0%)	6 (4.2%)	
Other surgical procedures performed	3 Cystoscopies (15%) 2 Lap ovarian cystectomies 10%) 1 Lap appendectomy (5%)	45 Cystoscopies (31.5%) 22 Lap ovarian cystectomies (15.4%) 12 Lap appendectomies (8.4%) 15 Lap hysterectomies (10.5%) 6 Lap oophorectomies (4.2%) 6 Sigmoidoscopies (4.2%) 5 Lap adhesiolysis (3.5%) 2 Bowel resections (1.4%) 1 Bladder resection (0.7%) 1 Lap myomectomy (0.7%)	
Intra-operative complications	1 Urinary tract infection 1 Port site infection	2 Urinary tract infections 1 Port site infection 1 Bowel perforation 1 Severe pelvic pain 1 Temporary numbness of the perineum	
Further laparoscopies	2 (10%)	30 (21%)	No SD (Fisher test)

in 5% (1/20) of patients and stage IV in 10% (2/20) of patients.[4] There was no statistically significant difference with the stage of endometriosis found in the adult population. The pelvic sidewalls were involved by disease in 60% (12/20) of patients, the cul de sac peritoneum was involved in 45% (9/20), the uterosacral ligaments in 25% (5/20), the ovaries in 10% (2/20), the anterior cul de sac peritoneum or round ligaments in 5% (1/20), the rectum in 15% (3/20), the recto-vaginal septum or vagina in 5% (1/20).

The main types of endometriotic lesions were atypical red vascular lesions, which were present in 60% (12/20) of adolescents with endometriosis compared with red vascular lesions in only 20% (29/143) of non-adolescents.

Surgical outcomes

There were no intra-operative complications. Minor postoperative complications included one case of urinary tract infection and one case of port site infection that resolved with the administration of oral antibiotics. The operative complications that developed when treating the non-adolescent group are presented in Table 1 for comparison.

Effect of the treatment at a mean follow-up time of 2.6 years

The surgical excision of endometriosis had a positive effect on dysmenorrhoea and pelvic pain symptoms (*P*-value: 0.0055 and 0.05 respectively) (see Fig. 1).

The Fig. 2 shows significant positive effect of the surgical excision on the quality of life of adolescents as demonstrated by the EQ-5D[3] questionnaire covering five dimensions of self-reported health (EQ-5D index) and as demonstrated by the EQ-5D visual analogue scale (see Fig. 3). The same positive effect is shown for the non-adolescent population.

Further laparoscopic procedures

Ten per cent (2/20) of patients underwent a second laparoscopy because of pelvic pain, within two years of the index surgery. The first patient was found to have no

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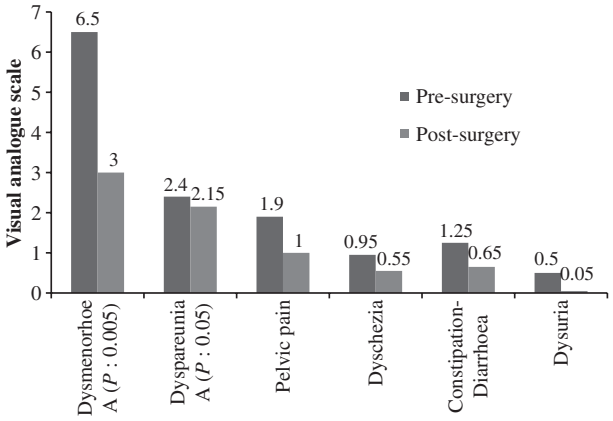

Figure 1 The effect of the surgical treatment on symptoms on an adolescent population as assessed by visual analogue scale from 0 to 10.

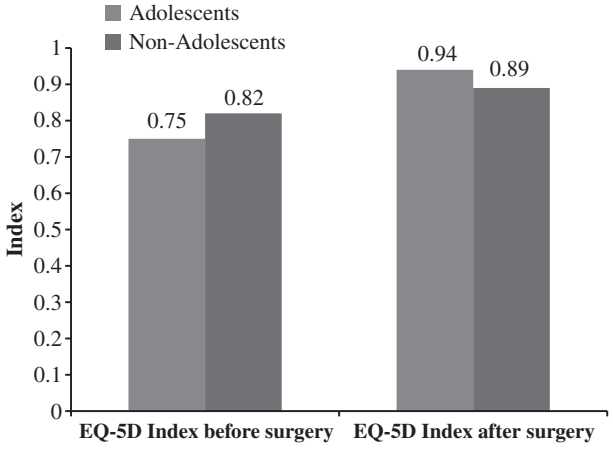

Figure 2 Comparison of the quality of life (EQ-5D index) before and after surgery between adolescents and non-adolescents.

recurrent endometriosis, but an appendicitis and she underwent a laparoscopic appendectomy and the second patient was found to have a normal pelvis with no recurrent endometriosis. Twenty-one per cent (30/143) of the adult population underwent further laparoscopies for recurring symptoms (*P*-value: 0.37).

Discussion

Although we should suspect endometriosis in an adolescent with dysmenorrhoea (80% patients), we should keep in mind that pelvic pain not related to periods could also be a presentation symptom in the adolescent in 20% cases. The very high rate of first-degree relatives with endometriosis, on the other hand, is an important factor to take into account when deciding about the need to perform laparoscopy on an adolescent with dysmenorrhoea. The relationship between the awareness of the disease in the family and the early

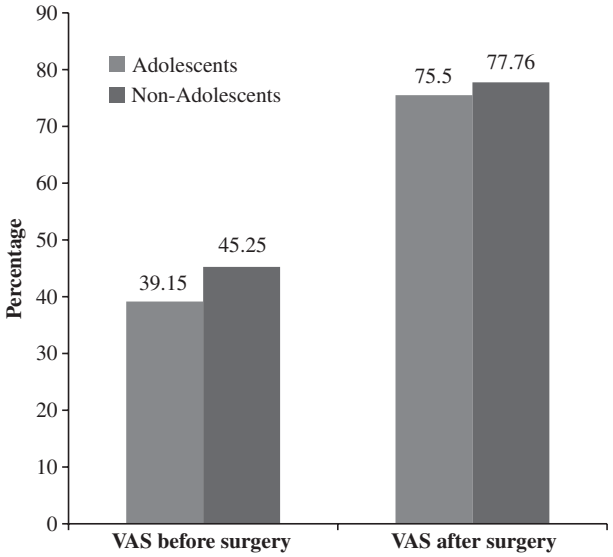

Figure 3 Comparison of the quality of life (EQ-5D Visual Analogue Scale) before and after surgery between adolescents and non-adolescents.

referral to the General Practitioner at the time of the symptoms presentation is a point that deserves further study.

Adolescents with endometriosis in the Waikato region of New Zealand use significantly more pain relief than non-adolescents to control pain symptoms. It remains unclear if this is because of a lower tolerance of pain.

We report the presence of more red vascular atypical endometriotic lesions (65%) in adolescents when compared with these lesions found in adults (20% of red vascular lesions). This is consistent with other reports[8] and it emphasises the importance of looking for atypical endometriotic lesions at laparoscopic examination when dealing with adolescents.

All stages of disease may be present in the adolescent. This has been reported in the literature.[9,10] We found that the rate of stage III and stage IV approximates well to the rate of severe disease in the adult. Furthermore, it has been reported that the younger the women at onset of symptoms, the longer the period for diagnosis to be made.[11] Therefore, it may not be wise to withhold treatment on an adolescent believing that she can only have mild disease or that she has not been symptomatic for too long.

The operative complication rate reported in the study group of adolescents is very low when compared with the non-adolescent population. The complexity of surgery in the control population may have contributed to the difference in the results, as the control group presented with a greater number of previous surgical procedures performed before seen by our group and also they underwent further major surgical procedures at the time of the index surgery. The number of patients in the study population is low to reach a significant conclusion in this regard.

The EuroQol Group's EQ-5D[3] questionnaire that covers five dimensions of self-reported health (EQ-5D index) and

has the EQ-5D visual analogue scale has been applied to a New Zealand population before and it was found to be a valid and reliable tool, especially useful in chronic conditions.[5–7] We report in this study that laparoscopic surgical excision of endometriosis on the adolescent population of the Waikato Region of New Zealand has a positive effect on the quality of life as demonstrated by the above index and also by the above visual analogue scale.

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