Complete laparoscopic excision of endometriosis in teenagers: is postoperative hormonal suppression necessary?

Patrick Yeung, Jr., M.D.,[a] *Ken Sinervo, M.D.,*[b] *Wendy Winer, R.N.,*[b] *and Robert B. Albee, Jr., M.D.*[b]

[a] Department of Obstetrics & Gynecology, Duke University, Durham, North Carolina; and [b] Center for Endometriosis Care, Atlanta, Georgia

Objective: To determine long-term outcomes after complete laparoscopic excision done at a tertiary referral center in a teenager population, who were not specifically advised to take postoperative hormonal suppression.
Design: Prospective observational case series (Canadian Task Force II-3).
Setting: A tertiary referral center that specializes in the laparoscopic treatment of endometriosis.
Patient(s): Teenagers with symptoms suspicious for endometriosis who consented and were prospectively recruited to participate in the study.
Intervention(s): All patients underwent diagnostic laparoscopy and complete excision of all areas of abnormal peritoneum with typical and atypical endometriosis. Patients were not specifically advised to take postoperative hormonal suppression.
Main Outcome Measure(s): Rate of recurrent (or persistent) endometriosis.
Result(s): Twenty teenagers underwent complete laparoscopic excision of all areas of abnormal peritoneum with typical and atypical endometriosis. Seventeen patients had endometriosis confirmed by histology at initial surgery. Follow-up was up to 66 months (average 23.1 months). There was a statistically significant improvement in most pain symptoms, including bowel-related symptoms, during this time period. The rate of repeat surgery was 8 of 17 patients (47.1%), but the rate of endometriosis (diagnosed visually or histologically) found at surgery was zero. Only one-third of patients took postoperative hormonal suppression for any length of time.
Conclusion(s): Complete laparoscopic excision of endometriosis in teenagers—including areas of typical and atypical endometriosis—has the potential to eradicate disease. These results do not depend on postoperative hormonal suppression. These data have important implications in the overall care of teenagers, regarding pain management, but also potentially for fertility. Further large comparative trials are needed to verify these results. (Fertil Steril® 2011;95:1909–12. ©2011 by American Society for Reproductive Medicine.)

Key Words: Adolescent, teenager, endometriosis, laser, excision, hormonal suppression, progressive

Endometriosis was first described in teenagers (women less than 20 years old) as early as the 1940s (1). Since that time several studies have reported that endometriosis is one of the most common diagnosis in teenagers with chronic pelvic pain, ranging from 19%–47% (2–5). Furthermore, the incidence of endometriosis in teenagers with chronic pelvic pain, who fail medical therapy, is much higher and is estimated to be 70% (6–8). An almost universal symptom of endometriosis in teenagers is pelvic pain, both cyclic and noncyclic (6, 9). Other common symptoms include dyspareunia (29%) and gastrointestinal complaints (34%–46%) (6, 7).

Endometriosis has many different appearances that can make the diagnosis challenging and may necessitate histologic confirmation (10, 11). "Subtle" or "atypical" appearance has been described as "red" or "white" lesions, or "clear" vesicles (12, 13). Endometriosis in teenagers has been found to be more atypical in appearance (12, 14). Some believe that with enhanced magnification available with modern-day laparoscopy, virtually all endometriosis can be identified (15).

In their Committee Opinion of 2005, the American College of Obstetricians & Gynecologists recommends a step-wise approach to treatment of endometriosis in adolescents (16) (Fig. 1). In this approach, a combination of hormone therapy and nonsteriodal anti-inflammatory drugs is recommended as first-line treatment. If this fails, or if empiric therapy is declined, then diagnostic and therapeutic laparoscopy should be offered. Most published reviews recommend that postoperative hormonal suppression be offered to adolescents to treat symptoms of endometriosis, and to prevent assumed progression of the disease (14, 16, 17).

There are few studies evaluating the outcomes after only laparoscopic excision of endometriosis in teenagers. In the study by Stavroulis et al. (18), laparoscopic "radical excision" was used to treat 11 teenagers (including one laparoscopic full thickness disc resection), followed by hormonal suppression in the form of an intrauterine system or oral contraceptives (OC). An excellent response (completely pain free or greatly improved) was seen in 73%, with a median follow-up of 4 months. Recently, Roman (19) reported on outcomes after laparoscopic excision of 29 adolescents. The rate of postoperative hormonal suppression is not stated. There were statistically significant reductions in rates of dysmenorrhea and dyspareunia with a mean follow-up of 2.6 years.

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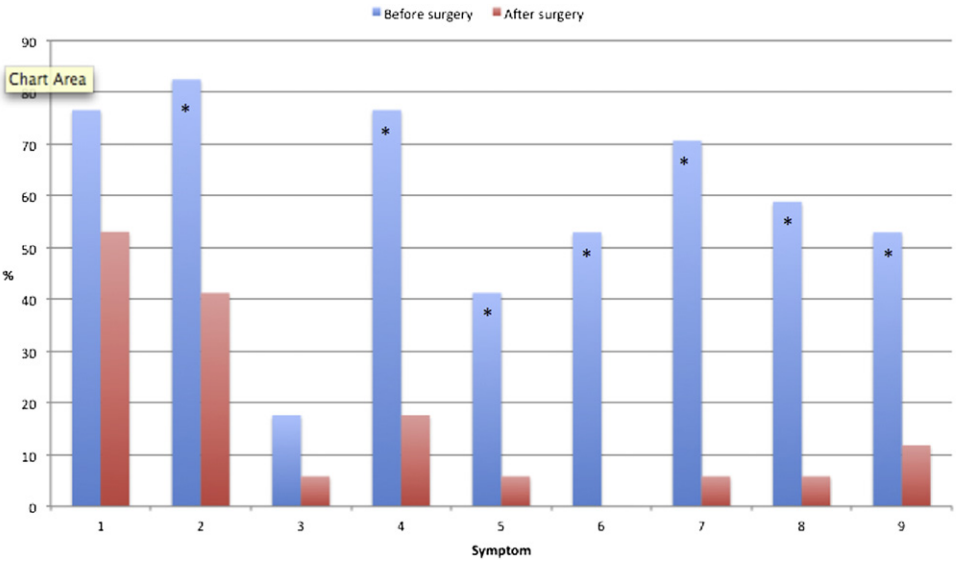
Reprint requests: Patrick Yeung Jr., M.D., Duke University, 3116 N. Duke Street, Durham, NC 27704 (E-mail: yeungpjr.md@gmail.com).

FIGURE 1

Symptoms before and after complete excision in teenagers. 1 = pelvic pain; 2 = dysmenorrhea; 3 = dyspareunia; 4 = dyschezia; 5 = constipation; 6 = tender examination; 7 = painful exercise; 8 = intestinal cramping; 9 = bladder pain. *$P<0.05$.



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Our approach to the treatment of endometriosis, including in teenagers, is complete laparoscopic excision of all visible lesions. The purpose of this prospective study is to determine the long-term outcomes after complete laparoscopic excision of endometriosis in teenagers, who were not specifically advised to take postoperative hormonal suppression.

MATERIALS AND METHODS

From February 1999 to December 2007, consecutive patients at the Center for Endometriosis Care (CEC) in Atlanta, Georgia, were recruited to be in a prospective study of outcomes (Canadian Task Force II-3) after complete laparoscopic excision. All patients had documentation of informed consent to have their information used for study purposes signed by themselves and/or their legal guardians prospectively, before undergoing treatment and follow-up. The study was based on a deidentified database of this information, and thus was deemed to be Institutional Review Board exempt. Also, the investigators did not change their usual practice of complete excision when treating the study patients.

The subjects completed a preoperative questionnaire that included demographic data, information on previous medical and surgical treatment, and findings, symptom, and quality of life (QOL) data. The symptom data and QOL information were each ranked on a 5-level qualitative scale ranging from (in increasing order) "does not apply" to "crippling" and from "awful" to "terrific," respectively.

All diagnostic laparoscopies and laparoscopic excision surgeries were performed by only two surgeons at a single tertiary care referral center, the CEC in Atlanta. Both surgeons are published (13) and well experienced in identifying typical and atypical endometriosis, and both were consistent in their methods for laparoscopic excision. Diagnostic laparoscopy was performed systematically to examine the entire pelvis and upper abdomen using "near contact" laparoscopy (where the camera tip is brought close to the tissue being examined to allow for adequate magnification and illumination of all peritoneal surfaces). The criteria of Redwine (12) were used to identify all areas of abnormal peritoneum, including atypical (or "non-black") red or white lesions and clear papules. A Coherent 5000L carbon dioxide laser (on ultrapulse setting; Lumenis Inc., Santa Clara, CA was used to circumscribe any lesion suspicious for endometriosis, and the lesions were excised using blunt and sharp dissection to normal tissue. In all cases, the surgeons determined that to the best of their ability, complete excision of all areas of abnormal peritoneum (typical or atypical) had been achieved. The pathology criteria for the diagnosis of endometriosis included the presence of "endometrial glands and stroma."

Operative data was collected on where the areas of abnormal peritoneum were identified, and areas where histologic confirmation of endometriosis was achieved. Hormonal suppression was not specifically advised postoperatively, which is customary for this practice if it is deemed that complete excision of all abnormal peritoneum is achieved. Of course, patients could have chosen to take it for either suppressive or contraceptive purposes.

All patients were sent follow-up questionnaires at 1- to 2-year intervals until the end of 2008 to gather information similar to that from the preoperative questionnaire. Patients were asked about their use of hormonal suppression after surgery (again although not specifically advised to do so), their symptoms and QOL, whether or not they had repeat surgery, and the procedures and findings if they did have repeat surgery. Operative records and pathology results were reviewed for all patients who had repeat surgery.

The χ^2 tests were used to compare symptoms in patients who had endometriosis versus the symptoms when patients did not have endometriosis, and to determine whether the presence of certain symptoms were predictive of endometriosis. Pearson correlations were done to determine whether any of the symptoms were predictive of the stage (or point score) of endometriosis. Paired Student's *t*-tests were used to compare symptoms at follow-up with those symptoms before surgery. A score χ^2 (type 3 statistic of a generalizing estimating equations model) test was used to compare the QOL after surgery to the QOL before surgery. This test was used to accommodate missing QOL scores after surgery, and to account for the before and after scores as being nonindependent values.

RESULTS

During the study period 20 teenagers (range, 12–19 years) with symptoms suspicious for endometriosis underwent diagnostic and operative laparoscopy. The 17 patients with histologically confirmed endometriosis are the subjects of this study. Fourteen of these

TABLE 1

Percent of teenagers with symptoms before and after complete excision.

Symptom	Before surgery (%)	After surgery (%)
Pelvic pain	76.5	53
Dysmenorrhea	82.4	41.2
Dyspareunia	17.6	5.8
Dyschezia	76.5	17.6
Constipation	41.2	5.8
Tender exam	52.9	0
Painful exercise	70.6	5.8
Intestinal cramping	58.8	5.8
Bladder pain	52.9	11.8

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patients (82.4%) had been on preoperative hormonal suppression at the time of the index surgery at the CEC. Thirteen patients (76.5%) had previous laparoscopic surgery (range, 1 to 3 laparoscopies) for pain. Seven (41.2%) of these had endometriosis diagnosed visually and treated by ablation or fulguration.

On the preoperative questionnaire, in patients who had histologically confirmed endometriosis the three most common symptoms were chronic pelvic pain described by 13 of 17 (76.5%), dysmenorrhea described by 14 of 17 (82.4%), and dyschezia described by 13 of 17 (76.5%) as "moderate" or more. Other symptoms experienced by more than half of the patients with endometriosis at baseline to be "moderate" or more were: painful bladder (9/17 or 52.9%), pain with exercise (12/17 or 70.6%), and intestinal cramping (10/17 or 58.8%; see Table 1). The QOL was described by 11 of 17 patients (64.7%) as being "awful" or "poor." None of these symptoms was found to be predictive of the stage (or point score) of endometriosis by Pearson correlation.

The revised American Society for Reproductive Medicine (ASRM) staging (20) of histologically confirmed endometriosis was stage 1 (5/17 or 29.4%) or 2 (11/17 or 64.7%), or 3 (1/17 or 5.9%). The revised ASRM range was 4 to 18 points, with an average of 7.1 points and a mode of 6 points. The most common areas where endometriosis was found were in the left uterosacral (10/17 or 58.8%) and right uterosacral ligament (9/17 or 52.9%). There was a single postoperative bladder infection, but otherwise, no complications from surgery or in the postoperative period.

In the teenagers who had endometriosis excised, 6 of 17 patients (35.3%) did take combination OCs for 10–22 months, and 1 of 17 patients (5.9%) took a GnRH agonist (leuprolide acetate) for 6 months. There were statistically significant decreases in symptoms by paired Student's *t*-test in the following symptoms: dysmenorrhea, dyschezia, constipation, tender examination, painful exercise, intestinal cramping, and bladder pain. Of note, there were decreases in chronic pelvic pain and dyspareunia, although these decreases were not statistically significant (Fig. 1). Regarding QOL scores, whereas 12 of 16 patients (75%) reported a score of "awful" or "poor" before surgery, only 2 of 7 patients (28.6%) reported a score of "poor" after surgery. When comparing these QOL scores after surgery to before using a (score χ^2 statistic), there was a statistically significant difference improvement, with a P value of .04 ($P<.05$).

The length of follow-up was up to 66 months, with an average of 23.1 months. During this period 8 of 17 patients (47.1%) had a subsequent laparoscopy for persistent recurrent pain. Half of the patients were found to have pelvic adhesions, although these were all filmy. Two patients had appendectomies for abnormal appendices, and one patient had a cystoscopy with hydrodistention, in addition to diagnostic laparoscopy, to evaluate for interstitial cystitis. Of note, although half of reoperated patients had excision of abnormal peritoneum, none of the patients had endometriosis diagnosed visually or histologically. The majority (6/8 or 75%) of patients had their repeat surgery at the CEC.

DISCUSSION

The results of this study are consistent with other studies (6, 8) in showing that chronic pelvic pain (13/17 or 76.5%) and dysmenorrhea (14/17 or 82.4%) are common symptoms of teenagers who have endometriosis. Interestingly in this study, bowel-related symptoms are also prevalent in teenagers who have endometriosis including dyschezia (13/17 or 76.5%) and intestinal cramping (10/17 or 58.8%). It is also important to note that, although 7 of 15 (46.7%) had previous endometriosis diagnosed and treated by laparoscopic ablation or fulguration, and that 16 of 20 (80%) of the patients had been on hormonal suppression preoperatively, 17 of 20 of these teenagers (85%) had endometriosis confirmed by histology. Taken together, these data suggest that neither history of treatment by hormonal suppression nor history of laparoscopic ablation of endometriosis rule out the presence of endometriosis. Rather, clinical symptoms—namely chronic pelvic pain and dysmenorrheal—especially if persistent with treatment by hormonal suppression, correlate highly with the presence of endometriosis, regardless of history of surgical ablation. However, although symptoms may correlate well with the presence of endometriosis, symptoms do not correlate to the stage or extent of disease.

Our study did not show a statistically significant decrease in chronic pelvic pain after laparoscopic excision, or in dyspareunia, although there was a trend in improvement of these symptoms. However, there were statistically significant decreases after laparoscopic excision of endometriosis in the following symptoms: dysmenorrhea, dyschezia, constipation, tender examination, painful exercise, intestinal cramping, and bladder pain. Of note, improvement of these symptoms occurred with an average follow-up of almost 2 years (23.1 months), although only 6 of 17 patients (35.3%) took postoperative hormonal suppression of their own initiative for any length of time, and only 1 of 17 patients (5.9%) took postoperative GnRH agonists for 6 months.

This study also showed a statistically significant improvement in QOL scores based on a comparison using a type 3 score χ^2 statistic test based on a generalizing estimating equation model. This model was chosen to compare QOL scores before and after a procedure or intervention in the same patient. However, there is a potential inherent bias in the lack of QOL scores in the data after surgery.

In this series of teenagers, only stage 1–2 endometriosis (by revised ASRM classification) was found, although other studies (8, 14, 19) have shown that stage 1–4 endometriosis can be found in adolescents. This result cannot be well explained, especially because the CEC is a tertiary referral center for the laparoscopic treatment of endometriosis. The rate of repeat surgery for pain was high (8/17 or 47.1%) with the length of follow-up of up to 66 months (average, 23.1 months). However, it is noteworthy that the rate of recurrent or persistent endometriosis (diagnosed visually or histologically) was zero, and that these results occurred when only about one-third of the teenagers took hormonal suppression for any length of time postoperatively.

It has been proposed that endometriosis is a "progressive" disease (21). However, when evaluating the literature on this topic, it is important to understand that the concept of progression is used in different ways. There are studies that provide evidence of an increase in disease scores by revised ASRM classification (of between one-third and two-thirds of patients) (22–25) and other studies that indicate that peritoneal endometriosis evolve from atypical lesions to more typical lesions over time (12, 26). However, as demonstrated most clearly in a study by Koninckx et al. (26), an increase in depth or volume of implants does not implicate an increase in area of disease, therefore progression of endometriosis does not necessarily mean continuous spreading of disease. In fact, endometriosis may be considered static in terms of geographic location. This understanding is important to explain the very low rates of endometriosis after surgical excision.

[Please refer to supplemental text in on-line version regarding discussion of excision in comparison to ablation of endometriosis.]

It is important to note that pain is only one aspect of endometriosis as a disease, therefore the potential benefits of removing of endometriosis cannot be fully described in terms of effects on pain alone. Eradication of disease may prevent progression of disease, including endometriomas and distortion of anatomy, which may have profound effects on present or future fertility. Larger, long-term studies are needed to test this hypothesis.

National recommendations strongly encourage the early diagnosis and treatment of endometriosis in the adolescent population (16) due to the assumed progressive nature of endometriosis. The goals of treatment are the management of pain, prevention of disease progression, and the maintenance of fertility. Data from this series suggest that endometriosis is not a progressive disease after excision and that postoperative hormonal suppression is unnecessary for disease eradication. It is important to note, however, that the absence of endometriosis at repeat surgery only pertains to complete laparoscopic excision, as judged by an experienced surgeon, and includes the excision of all areas of abnormal peritoneum both typical and atypical (especially in the teenager population). This result needs to be systematically studied in larger comparative trials. Furthermore, it has been suggested "diagnostic laparoscopy in adolescents should be undertaken only by gynecologists skilled in advanced laparoscopic surgical techniques" (27).

In conclusion, complete laparoscopic excision of endometriosis is a safe procedure even in teenagers, achieving favorable results on symptom improvement postoperatively for up to 66 months (average, 23.1 months). Also, although the rate of repeat surgery was high for pain in this population, our results suggest that complete excision of endometriosis, including areas of typical and atypical disease, has the potential to completely eradicate disease. These results do not depend on postoperative hormonal suppression. These data have important implications in the overall care of teenagers, regarding pain management, but also potentially for fertility. Additional large comparative trials are needed to verify these results.

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SUPPLEMENTAL MATERIAL

The rate of recurrent or persistent endometriosis after complete laparoscopic excision of endometriosis in this series is much less than published rates (40%–60% in 1–2 years) of recurrence (or persistence) of endometriosis after ablation (1, 2), even if a postoperative hormonal regimen is used (3). Rather, the complete absence of endometriosis found at repeat surgery in the present study is consistent with the low rates of endometriosis found at sequential reoperation in other studies after surgical excision (between 19% and 34%), which did not change with time (4, 5). This suggests that complete excision is superior to ablation, at least with regard removal of disease, and has the potential for complete eradication of endometriosis.

A recent randomized controlled trial by Healey et al. (6) found that there was not a statistically significant difference in overall visual analogues scores for pain at 12 months when comparing excision versus ablation of endometriosis. However, the investigators themselves state that although their study was unable to prove a difference in overall pain reduction, "… that is not the same as proving that the two treatments are equal." A larger trial may be needed to detect more subtle differences in pain, or components of pain. The study by Healey et al. found trends toward a decrease in rectal pain and dyschezia, similar to our data.

The laparoscopic management of endometriosis has been shown to improve fertility in Stage 1–2 endometriosis (7), and if excision is superior to ablation in removing disease, excision should have greater benefits than ablation on fertility.

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