

Short-Term Morbidity and Long-Term Recurrence Rate of Ovarian Dermoid Cysts Treated by Laparoscopy Versus Laparotomy

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Abstract

Objective: To compare the short-term morbidity and the long-term recurrence rate of ovarian dermoid cysts in women treated conservatively by laparoscopy with the outcomes in women treated by laparotomy.

Methods: This retrospective multicentre cohort study compared the outcomes of removal of dermoid cysts by laparoscopy with removal by laparotomy. All specimens were confirmed histologically as dermoid cysts. We reviewed all medical records and identified all surgical interventions for dermoid cysts over a 10-year period (1993–2003) in two academic centres in Quebec City.

Of the 299 women treated for ovarian dermoid cysts, 167 were treated by laparotomy and 132 were treated by laparoscopy. To compare short-term morbidity, we excluded those who had undergone oophorectomy or any concomitant surgery, and we consequently reviewed the records of 98 patients in the laparotomy group and 100 patients in the laparoscopy group. To compare long-term recurrence rates we excluded only those patients who had had oophorectomy. In total, 245 women with available follow-up were identified as having ovarian cystectomy (95 in the laparoscopy group and 150 in the laparotomy group). Two-tailed Fisher exact test was used for analysis of categorical variables, and Student *t* test or Wilcoxon rank test were used for analysis of continuous variables comparing the two groups. Life table analysis using the Kaplan-Meier method was performed to assess the risk of long-term recurrence.

Results: The mean diameter of the cyst in women who had a laparotomy was significantly larger than in women who had laparoscopy (8.27 cm vs. 5.94 cm), and significantly more women in the laparotomy group had bilateral cysts (16% vs. 5% in the laparoscopy group). In women who had laparoscopy, operating time was greater ($P = 0.0363$), but blood loss was less ($P < 0.0001$) and duration of hospital stay ($P < 0.0001$) was shorter. Spillage of the cyst's contents occurred in 18% of cases in the laparoscopy group and in 1% in the laparotomy group. Conversions of laparoscopy to laparotomy occurred in 11% of cases, mainly because of cyst size. Postoperative complication rates were similar in the two groups. Reintervention rate was 4.2% in the laparoscopy group and 0% in the laparotomy group ($P = 0.0217$). Using life table analysis, the probability of recurrence

at two years was 7.6% (95% confidence intervals 2.9, 19.2) in the laparoscopy group and 0% in the laparotomy group.

Conclusion: Ovarian cystectomy performed by laparoscopy is associated with a higher incidence of intra-abdominal spillage than laparotomy, but this is not associated with any increase in morbidity. Laparoscopic treatment results in a shorter hospital stay and less intraoperative blood loss than laparotomy, but it is associated with a significantly higher risk of recurrence.

Résumé

Objectif : Comparer la morbidité à court terme et le taux de récurrence à long terme des kystes dermoïdes ovariens chez les femmes traitées de façon conservatrice par laparoscopie aux issues que connaissent les femmes traitées par laparotomie.

Méthodes : Cette étude de cohorte multicentrique rétrospective a comparé les issues de l'excision de kystes dermoïdes par laparoscopie à celles de l'excision par laparotomie. La nature « kyste dermoïde » de tous les prélèvements a été confirmée par histologie. Nous avons examiné tous les dossiers médicaux et relevé toutes les interventions chirurgicales visant des kystes dermoïdes sur une période de dix ans (1993–2003), au sein de deux centres universitaires de la ville de Québec.

Des 299 femmes ayant bénéficié d'un traitement visant des kystes dermoïdes ovariens, 167 avaient été traitées par laparotomie et 132, par laparoscopie. Afin d'effectuer une comparaison en fonction de la morbidité à court terme, nous avons exclu les patientes qui avaient subi une ovariectomie ou toute autre chirurgie concomitante; par la suite, nous avons examiné les dossiers de 98 patientes du groupe « laparotomie » et de 100 patientes du groupe « laparoscopie ». Afin d'effectuer une comparaison en fonction des taux de récurrence à long terme, nous n'avons exclu que les patientes qui avaient subi une ovariectomie. En tout, 245 femmes pour lesquelles un suivi était disponible ont été identifiées comme ayant subi une kystectomie ovarienne (95 du groupe « laparoscopie » et 150 du groupe « laparotomie »). Le test exact de Fisher bilatéral a été utilisé aux fins de l'analyse des variables nominales; pour l'analyse des variables continues comparant les deux groupes, nous avons eu recours au test de Student ou au test de Wilcoxon. Une analyse de table de survie faisant appel à la méthode Kaplan-Meier a été effectuée afin d'évaluer le risque de récurrence à long terme.

Résultats : Le diamètre moyen du kyste était considérablement plus important chez les femmes qui avaient subi une laparotomie que chez les femmes qui avaient subi une laparoscopie (8,27 cm, par comparaison avec 5,94 cm); de plus, un nombre considérablement plus élevé de femmes du groupe « laparotomie » présentaient des

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kystes bilatéraux (16 %, par comparaison avec 5 % dans le groupe « laparoscopie »). Chez les femmes qui avaient subi une laparoscopie, la durée opératoire était supérieure ($P = 0,0363$), mais la perte sanguine ($P < 0,0001$) et la durée de l'hospitalisation ($P < 0,0001$) étaient moindres. Un déversement du contenu du kyste est survenu dans 18 % des cas au sein du groupe « laparoscopie » et dans 1 % des cas au sein du groupe « laparotomie ». Une conversion laparoscopie-laparotomie est survenue dans 11 % des cas, principalement en raison de la taille du kyste. Les taux de complication postopératoire étaient semblables dans les deux groupes. Le taux de réintervention était de 4,2 % dans le groupe « laparoscopie » et de 0 % dans le groupe « laparotomie » ($P = 0,0217$). Au moyen d'une analyse de table de survie, nous avons déterminé que la probabilité de récurrence à deux ans était de 7,6 % (intervalle de confiance à 95 %, 2,9-19,2) dans le groupe « laparoscopie » et de 0 % dans le groupe « laparotomie ».

Conclusion : La kystectomie ovarienne effectuée par laparoscopie est associée à une plus grande incidence de déversement intra-abdominal que la kystectomie ovarienne effectuée par laparotomie; toutefois, cela n'est associé à aucune hausse de la morbidité. Bien que le traitement par laparoscopie entraîne une hospitalisation moins prolongée et une perte sanguine peropératoire moins abondante que le traitement par laparotomie, il est associé à un risque de récurrence considérablement plus élevé.

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INTRODUCTION

Benign cystic ovarian teratomas (dermoid cysts) are the most frequently occurring ovarian neoplasms, representing 95% of germ cell tumours and 25% to 40% of all ovarian tumours.¹ Most affected women are of reproductive age, so conservative surgical excision or cystectomy is warranted. Excision is indicated to determine the nature of suspected teratomas seen on ultrasound as persistent, heterogeneous, sometimes bilateral masses, or because of pelvic pain with or without signs of rupture or torsion.² In the past 15 years, laparoscopy has progressively gained popularity as a valid alternative to the usual surgical approach by laparotomy.^{3,4} Because laparoscopy has recognized advantages over laparotomy, such as reduced adhesion formation, less postoperative pain, shorter hospital stay, and quicker recovery, this approach is appealing.^{5,6}

However, the laparoscopic approach raises concerns. Firstly, intraoperative rupture of a dermoid cyst, allowing the contents to spill over bowel and peritoneal surfaces, may lead to postoperative complications such as peritonitis and adhesion formation.^{7,8} Intraoperative rupture during laparoscopic management of dermoid cysts appears to occur quite often (in up to 88% of cases) but very few complications have occurred because of this.⁹ Extensive peritoneal washings at the time of surgery to remove any spillage may account for this low complication rate.^{10–12} Secondly, recurrence may be more frequent after cystectomy performed by laparoscopy than by laparotomy. However, most published studies include less than 100

cases and have insufficient follow-up to assess recurrences adequately.^{9,13–18}

The objective of this retrospective study was to assess the short-term morbidity in women undergoing removal of dermoid cysts by laparoscopy or laparotomy, including the frequency and consequences of intraoperative rupture, and to compare the long-term recurrence rates after each approach.

MATERIALS AND METHODS

We reviewed the hospital charts of all women who underwent surgery for dermoid cysts in either Centre de recherche, Université Laval (CHUL) or Hôpital St-François D'Assise (university-affiliated hospitals in Quebec City) between April 1993 and March 2003. The study protocol was approved by the CHUL research ethics board. A total of 24 gynaecologists performed surgery during this 10-year period; three had had additional training in laparoscopic surgery. Inclusion in the study required a histologic diagnosis of benign teratoma on the pathology report. Women who had undergone oophorectomy or concomitant surgery were excluded from the short-term comparison, but only women who had undergone oophorectomy were excluded from the analysis of long-term recurrence rates. Recurrence was defined as a surgical reintervention for a dermoid cyst confirmed by histology. The statistical analysis compared two groups: women who had laparoscopic treatment and women who had laparotomy, with or without diagnostic laparoscopy. Two-tailed Fisher exact test was used for analysis of categorical variables and Student *t* test or Wilcoxon rank test were used for analysis of continuous variables comparing the two treatments. We used life table analysis with the Kaplan-Meier method for analysis of recurrence in the laparoscopy group.

RESULTS

The hospital charts of 299 women who had surgery for benign ovarian teratoma were reviewed. Of the total, 167 had laparotomy with or without diagnostic laparoscopy and 132 had laparoscopic treatment. In order to assess short-term morbidity, we excluded women who had concomitant surgery including oophorectomy; we therefore analyzed data from 98 women who had laparotomy and 100 women who had laparoscopy. The patients' characteristics are shown in Table 1. These were similar in both groups, except both bilaterality and the occurrence of larger cysts were significantly greater in the laparotomy group.

Short-Term Morbidity

Operating time was significantly longer in the laparoscopy group, despite the occasional conversion from laparoscopy

Table 1. Patient Characteristics

Variables (mean ± standard deviation or %)	Laparotomy (n = 98)	Laparoscopy (n = 100)	P
Age	29.0 ± 11.9	30.9 ± 11.8	0.2543
Weight (kg)	64.3 ± 18.7	60.9 ± 13.7	0.1508
BMI (kg/m ²)	24.9 ± 5.6	24.0 ± 5.5	0.4547
Previous laparotomy	28.6%	31.0%	0.7572
Smoking (cigarettes/day)	6.1 ± 10.5	5.7 ± 8.9	0.8523
Cyst size (cm)	8.27 ± 3.95	5.94 ± 2.26	< 0.0001
Bilaterality	16.3%	5.0%	0.0111

Table 2. Operative Morbidity

Variables (mean ± standard deviation)	Laparotomy (n = 98)	Laparoscopy (n = 100)	P
Operative time (min.)	89.9 ± 31.7	102.0 ± 47.3	0.0363
Blood loss (mL)	85.9 ± 101.1	20.1 ± 70.2	0.0001
Hospital stay (days)	3.6 ± 1.8	1.4 ± 1.4	0.0001

Table 3. Postoperative Morbidity

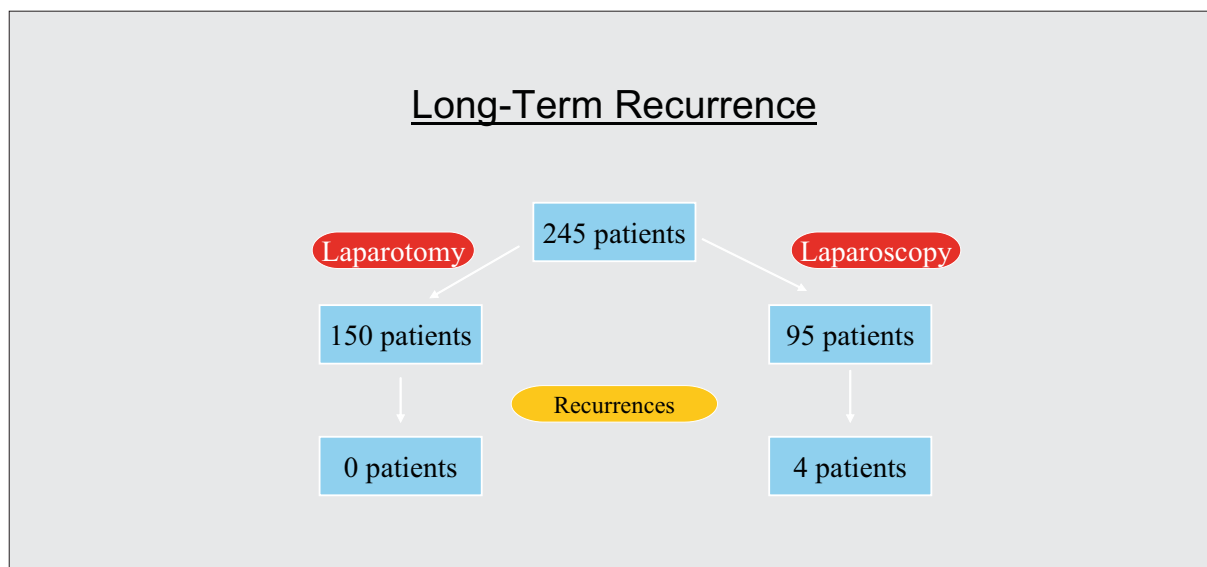
Complications	Laparotomy (n = 98)	Laparoscopy (n = 100)	P
None	90.8%	96.0%	
Infection	2.0%	0%	
Anemia	2.0%	0%	
Ileus	2.0%	1.0%	
Other	3.1%	3.0%	
Overall			0.4233

to laparotomy, more frequent occurrence of bilateral cysts in the laparotomy group (16% vs. 5%), and larger mean size of the cyst at laparotomy. Cyst diameter varied in the laparoscopy group from 2 to 18 cm (mean 5.9 cm), whereas in the laparotomy group it varied from 2 to 23 cm (mean 8.3 cm). Of the cysts treated by laparoscopy, 90% were less than 10 cm in diameter, whereas 30% of cysts in the laparotomy group were more than 10 cm in diameter. In women undergoing laparoscopic removal of cysts more than 10 cm in diameter, the procedure was converted to laparotomy in 30% of cases. Blood loss was significantly less and hospital stays significantly shorter in the laparoscopy group, as shown in Table 2. Despite the fact that intraoperative spillage occurred in 18% of the laparoscopy group and in only 1% of the laparotomy group ($P < 0.001$), there was no difference between the groups in the rate of postoperative ileus. However, there was an 11% rate of

conversion from laparoscopy to laparotomy, mostly because of cyst size (92% of cases). Overall postoperative complications were similar in both groups (Table 3). The only major complication, a ureteral injury requiring additional surgery, occurred in the laparotomy group.

Long-Term Recurrence Rate

In order to assess long-term follow-up we excluded from analysis those women who had oophorectomy only or who had no documented follow-up. This resulted in 54 of the 299 women (18%) being excluded. We were able to analyze results for 245 women, 150 of whom had undergone laparotomy and 95 of whom had laparoscopic treatment (Figure). Follow-up varied from one month to 10 years, but the average long-term follow-up was similar in both groups (25.2 months in the laparotomy group and 29.8 months in the laparoscopy group, $P = 0.2193$).



A recurrence of ovarian teratoma after conservative surgery was recorded if repeat surgery was performed with a confirmed histopathologic diagnosis of teratoma. There were four recurrences in the laparoscopy group (4.21%) and none in the laparotomy group; this difference was significant (Fisher exact test, $P = 0.0217$). Using life table analysis for a minimum follow-up of 24 months, we found the probability of recurrence of a dermoid cyst in the laparoscopy group was 7.6% (95% confidence intervals 2.9, 19.2). One surgeon had two patients with recurrences out of 14 cases (14%). Recurrences occurred between four and 24 months after surgery and were all on the same side as the initial surgery. Cyst diameter at the initial surgery for these four women was 2 cm, 4 cm, 6 cm, and 8 cm.

DISCUSSION

This retrospective study has the largest sample size published to date in a comparative study of conservative management of ovarian teratoma by laparoscopy and laparotomy. The follow-up period of more than two years allows a reliable analysis of the recurrence rate after the two procedures.

We have confirmed that intraoperative spillage of the contents of a dermoid cyst does not affect postoperative morbidity. No postoperative peritonitis was observed in either group, a finding that is in keeping with the published information.^{8,19} This is most likely due to abundant peritoneal lavage performed at the time of surgery in response to the spillage. In the laparoscopy group, it is possible that intentional puncture and drainage of the cyst was part of the surgeon's technique; we included this in the "spillage" group,

even if there was no contamination of the pelvic cavity. This may account for the relatively high proportion of spillage in the laparoscopy group (18%), although this figure is in keeping with those in other reports.⁹ The rate of conversion from laparoscopy to laparotomy (11%) was mainly due to technical difficulties related to the size of the cyst. In the great majority of these cases (92%), the cyst diameter was greater than 10 cm. In reviewing operative reports, conversion to laparotomy also resulted from concern about uncontrolled spillage of cyst contents into the upper abdomen, concern about possible malignancy, and limited surgical visibility.

The significantly higher long-term surgical recurrence rate at follow-up after laparoscopic cystectomy is surprising, and this raises concern about the surgical technique used and the potential difficulty of completely peeling off the cyst wall. The relatively short time between initial surgery and recurrence, less than 24 months in all cases, and the fact that these cysts may grow slowly and without clinical symptoms together suggest that apparent recurrence may result from incomplete removal rather than a true new occurrence of a teratoma. As these cysts originate from germ cells, they initially grow from deep within the ovary, unlike epithelial cysts such as endometriomas, which develop adjacent to the ovarian cortex. Therefore, in order to remove the cyst completely, care should be taken to remove the entire cyst wall down to the ovarian hilum; in our opinion, simply cauterizing the deeper area without removing the cyst wall is likely to increase the risk of persistence or recurrence. Another possible cause of apparent recurrence is a second dermoid cyst in the same ovary being missed during laparoscopic

surgery. We were unable to find any published evidence in the fields of ultrasonography or magnetic resonance imaging to support this possibility. In this study, recurrences occurred when the initial cyst diameter was between 2 cm and 8 cm; therefore, small or large cyst size did not seem to predict recurrence.

CONCLUSION

Laparoscopic excision of ovarian dermoid cysts is associated with a shorter hospital stay than excision performed by laparotomy, despite a greater occurrence of intraoperative spillage of cyst contents. The occurrence of spillage of contents therefore is not associated with additional morbidity. Laparoscopic surgery is also associated with significantly less intraoperative blood loss. In this long-term retrospective study there was a higher probability of recurrence when ovarian cystectomy was performed by laparoscopy (7.6% at 24 months after surgery) than after laparotomy. The surgical technique used at laparoscopy may influence this risk.

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