

LAPAROSCOPIC TREATMENT OF OVARIAN ENDOMETRIOMAS: CYSTECTOMY VERSUS FENESTRATION AND COAGULATION

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ABSTRACT

Objective: to evaluate different laparoscopic surgical techniques (Cystectomy-Coagulation- combination of both techniques) in the management of ovarian endometriomata.

Setting: Cytogenetic and Endoscopy Unit of Zagazig university hospital.

Patients: Sixty infertile women with chronic pelvic pain and a suspected sonographic diagnosis of ovarian endometriomas (3-8) cm.

Interventions: Complete cystectomy was done in 20 patients (group A), partial cystectomy and electro-coagulation of the remaining adherent cyst wall in 19 patients (group B) and electro-coagulation of the whole adherent cyst wall in 21 patients (group C). Operative time, recurrence of chronic pelvic pain, recurrence of endometriomata, ovarian function and pregnancy rate were reported during follow up period of 1 year.

Results: The mean operative time was 14.25, 13.16 and 13 min. for group A, B and C respectively. Significant improvement of chronic pelvic pain was reported in all groups. However, recurrence of chronic pelvic pain was significantly higher in group C (33.3%) compared to group A (5%) and B (10.5%). The recurrence rate of endometrioma was significantly higher in group C (28.6%) than the other groups (5% for group A and 5.3 % for group B) during the follow up period. There was significantly higher spontaneous pregnancy rate in group B (31.6%) than group A (10%) and group C (4.8%) after one year of follow up. A significant elevation in day-2 FSH level at 3-, 6- and 12-month follow-up periods was reported in all groups. However, in group B, the rise in FSH level was significantly lower than the two other groups ($P < 0.01$).

Conclusion: Partial cystectomy and coagulation of adherent cyst wall (GP B) is better in terms of ovarian function and pregnancy rates than complete cystectomy (GP A) and electrocoagulation of the whole cyst wall (GP C). However, complete cystectomy (GP A) was better in terms of endometrioma recurrence than the other 2 methods (GP B and GP C).

Key words: endometrioma, cystectomy, coagulation, fenestration

INTRODUCTION

Endometrioma is one of the most commonly encountered diagnoses in ovarian surgery and may be present in up to 17-44% of patients with endometriosis. Ovarian endometriomas are usually associated with the symptoms of dysmenorrhea, chronic pelvic pain, dyspareunia, and infertility⁽¹⁾.

Previous studies have demonstrated that endometriomas can negatively affect the rate of spontaneous ovulation⁽²⁾, as well as follicular number and activity in the adjacent ovarian tissues⁽³⁾.

Medical treatment (hormonal) may result in reduction of endometrioma size up to 57%. However, it is not effective in large endometriomas. Furthermore, it suppresses ovulation during treatment periods in patients in whom infertility is a major concern. Also, endometriomas regrow after stopping of medical treatment⁽⁴⁾.

Surgical treatment in the form of cystectomy or fenestration and coagulation of the cyst wall has been suggested. This helps to confirm the diagnosis of endometrioma histologically and improve ovarian response to ovulation stimulating drugs. However, ovarian reserve has been reported to be negatively affected by cystectomy procedure due to unavoidable concomitant removal of normal ovarian tissue⁽⁵⁾.

Fenestration of endometrioma and coagulation of cyst wall is another surgical treatment option. This is a relatively easier procedure compared to stripping of frequently adherent cyst wall. Unfortunately, the probability of incomplete coagulation of endometrioma cyst wall and the possibility of thermal destruction of ovarian cortex make this technique also falls short of ideal⁽⁶⁾.

A combination of both techniques has been suggested. This includes stripping of non adherent cyst wall areas (thus avoiding removal of adherent normal ovarian cortex) and coagulation of adherent cyst wall areas (thus avoiding excessive coagulation of cyst wall with the risk of thermal damage of adjacent ovarian tissue)⁽⁷⁾.

In this study, we have evaluated these laparoscopic surgical techniques (complete cystectomy, fenestration and bipolar coagulation of the whole cyst wall and partial cystectomy and coagulation of the remaining adherent cyst wall) regarding safety and effectiveness in treatment of ovarian endometrioma.

PATIENTS AND METHODS

This study was conducted in the Cytogenetic and Endoscopy Unit - Zagazig university hospital during the period of January 2008 to December 2009.

The participants were given oral and written information, and signed a consent form. All follow-up visits and data collection were performed within the unit.

It included sixty infertile patients with age ranges from 21 to 35 years. All patients had preoperative ultrasound diagnosis of suspected unilateral ovarian endometrioma.

Patients with severely distorted pelvic anatomy and those with non endometriotic ovarian cysts "histopathologically" were excluded from the study. All patients were submitted to a detailed general and gynaecologic history, complete physical examination, urine pregnancy test, blood chemistries, trans-vaginal ultrasonography and day 2 FSH (as a test of ovarian reserve).

Following initial evaluation of the pelvis and abdominal cavity, ovaries with endometrioma were mobilized and freed of adhesions if present.

Patient assignment to one of the 3 groups was done intraoperatively according to cyst adherence to the stroma.

At first, removal of cyst wall was tried either by grasping its base with laparoscopic forceps peeling it from the ovarian stroma, or by creation of a cleavage plane between cyst wall and ovarian cortex. If the base of the cyst is adherent to ovarian stroma or a cleavage plane can't be developed between cyst wall and ovarian stroma, we proceed with electrosurgical coagulation of the cyst wall. Finally a combination of both techniques was adopted if the cyst wall could, only, be partially stripped with coagulation of the remaining adherent areas of the cyst wall. At the end of surgery, haemostasis was secured by bipolar electrocautery and all retrieved tissues were sent for histopathological examination.

Operative time (from incision of cyst wall till securing haemostasis), intra-operative and postoperative complications were recorded.

During one-year follow up period the following were recorded:

- 1- Degree of pelvic pain "dysmenorrhea and non menstrual pelvic pain using visual analogue scale (V.A.S) ⁽⁸⁾ at 3,6 and 12 month.
- 2- Recurrence of endometrioma using TVS at 3, 6, 12 month.
- 3- Ovarian function by day 2 FSH at 3,6,12 months.
- 4- Pregnancy rate "diagnosed by urinary pregnancy test and ultrasound.

Statistical analysis:

Data were presented as mean \pm SD. Statistical significance was determined by paired sample "t" test for differences within the same group. Differences between groups were determined by a one-way ANOVA (f) and Chi-Square (χ^2). $P < 0.05$ was considered statistically significant. SPSS version 11.5 program for Windows (SPSS Inc. Chicago, IL, USA) was used.

RESULTS

Complete cystectomy was succeeded in 20 patients (group A). Partial cystectomy and coagulation of the remaining adherent cyst wall was done in 19 patients (group B). Fenestration and bipolar coagulation of the whole adherent cyst wall was done in 21 patients (group C).

Basic characteristics of studied groups are shown table (1). No significant differences were reported among the studied groups regarding age, BMI, size of endometrioma, duration of infertility, frequency of pelvic pain or basal day-2 serum FSH.

No significant difference was reported in operative time among the studied groups, table (2).

No intra-operative or early postoperative complications were reported

Significant improvement of chronic pelvic pain (dysmenorrhea and non-menstrual pelvic pain) has been reported in all groups during follow up period. However, the recurrence of pelvic pain was significantly higher in group C compared to group A and B at 12 month follow up period, table (3).

No significant differences in recurrence rate of endometrioma have been reported, among studied groups, during the first 6 months following surgery. However, at 12-month follow up, the recurrence rate was significantly higher in group C than the other two groups A and B ($p < 0.05$), table (4).

Spontaneous pregnancy rate at 3, 6, 12-months postoperatively is demonstrated in table (5). There was significantly higher spontaneous pregnancy rate in group B (31.6%) compared with group A (10%) and C (4.8%) at the end of 12-month follow up period.

Postoperative day-2 FSH levels, as a test for ovarian reserve, are shown in table (6). There was significant elevation in FSH level at 3-, 6- and 12-month follow-up periods in all groups. In group B, rise in FSH level was significantly lower in comparison with groups A and C. patients who conceived during the study period were excluded from ovarian reserve testing

Table (1): Basic characteristics of studied groups

	Group A Total cystectomy (n = 20)	Group B (partial cystectomy) (n = 19)	Group C (fenestration and bipolar coagulation) (n = 21)	P
Age (years)				
Mean ± SD	27.2 ± 3.6	28.5 ± 3.3	27.7 ± 4.1	0.63
Range	22-35	21-35	22-35	
BMI (kg/m²)				
Mean ± SD	24.2 ± 3.3	24.37 ± 3.2	24.2 ± 2	0.9
Range	20-30	20-30	20-29	
Endometriotic cyst size (cm)				
Mean ± SD	5.63 ± 1.19	6.13 ± 1.07	5.88 ± 1.06	0.367
Range	3-8	3-8	3-8	
Duration of infertility				
Mean ± SD	3.52 ± 0.78	3.42 ± 0.88	3.66 ± 0.88	0.66
Range	2-6	2.5-6	2-6.5	
Pelvic pain dysmenorrhea and non-menstrual pelvic pain	12 (60%)	12 (63.2%)	14 (66.7%)	0.906*
Day 2 serum FSH	5.19 ± 0.8	4.66 ± 1.05	4.63 ± 1.01	0.24

P values determined by analysis of variance (f) except * by χ^2
 The level of significance p <0.05

Table (2): partial operative time

operative time (minutes)	Group A Total cystectomy (n = 20)	Group B (partial cystectomy) (n = 19)	Group C (fenestration and bipolar coagulation) (n = 21)	P
Mean ± SD	14.25 ± 3.2	13.16 ± 3.5	13 ± 3.4	0.36
Range	9-25	8-24	8-23	

The level of significance: p <0.05.
 P values determined by f value

Table (3): Degree pelvic pain (dysmenorrhea and non menstrual pelvic pain) at 12-month follow up after surgery

	Group A Total cystectomy (n = 20)		Group B (partial cystectomy) (n = 19)		Group C (fenestration and bipolar coagulation) (n = 21)		p
	No	%	No	%	No	%	
Before surgery	12/20	60	12/19	63.2	14/21	66.7	0.906
One year after surgery	1/20	5	2/19	10.5	7/21	33.3	0.036
P	0.000		0.001		0.03		

The level of significance $p < 0.05$

P values determined by χ^2

Table (4): Recurrence rate of endometrioma at 3-, 6- and 12-month follow-up periods

	After 3 months		6 months		12 months		p
	No	%	No	%	No	%	
Group A Total cystectomy (n = 20)	0	0	0	0	1	5	0.36
Group B (partial cystectomy) (n = 19)	0	0	1	5.3	1	5.3	0.6
Group C (fenestration and bipolar coagulation) (n = 21)	0	0	3	14.3	6	28.6	0.04
Overall	0	0	4	6.7	8	13.3	0.014
p	1		0.178		0.039		

The level of significance $p < 0.05$

P values determined by χ^2

Table (5): spontaneous pregnancy rate at 3-, 6- and 12-month follow-up periods

	After 3 months		6 months		12 months		p
	No	%	No	%	No	%	
Group A Total cystectomy (n = 20)	0	0	1	5	2	10	0.35
Group B (partial cystectomy) (n = 19)	1	5.3	3	15.8	6	31.6	0.1
Group C (fenestration and bipolar coagulation) (n = 21)	0	0	1	4.8	1	4.8	0.6
Overall	1	1.7	5	8.3	9	15	0.03
p	0.33		0.36		0.045		

The level of significance $p < 0.05$

P values determined by χ^2

Table (6): ovarian reserve measured by day 2 FSH

	Group A Total cystectomy (n = 20)	Group B (partial cystectomy) (n = 19)	Group C (fenestration and bipolar coagulation) (n = 21)	F	p
Preoperative(0)	5.19 ± 0.8	4.66 ± 1.05	4.63 ± 1.01	1.49	0.24 (NS)
3 months	6.9 ± 0.8 ⁺	6.2 ± 1.1*	7.6 ± 1.4 ⁺	7.23	0.0015*
6 months	6.7 ± 0.8 ⁺	6 ± 1*	7.5 ± 1.3 ⁺	9.19	0.001**
12 months	6.7 ± 0.8 ⁺	6.1 ± 1*	7.4 ± 1.3 ⁺	6.9	0.0019*
12m vs. (0) T	29.9	11.7	6.8		
P	<0.001	<0.001	<0.001		

The level of significance p <0.05

* Significant compared with A or C.

⁺P < 0.05 when compared with 0

DISCUSSION

Two techniques are currently proposed for laparoscopic surgical treatment of ovarian endometrioma, either cystectomy consisting of removal of endometrioma wall or ablative surgery that involves opening the endometrioma and destroying its wall by laser vaporization or bipolar coagulation.

A third approach combines these two techniques. But, as each technique has its advantages and disadvantages. We still in need to determine which technique would be more effective and safe in management of endometrioma. Moreover, few articles have been published comparing cyst excision versus drainage and coagulation ⁽⁹⁾.

In our sixty infertile women, we have tried 1st to excise the cyst wall of the endometrioma according to our cystectomy technique. This was successful in 20 patients (group A). But, if the plane of cleavage was not clear and the wall of endometrioma appeared to be adherent, we had proceeded with electro-coagulation of the endometrioma cyst wall. This was done in 21 patients (group C). Finally a combination of both techniques was adopted if the cyst wall could, only, partially stripped with coagulation of the remaining adherent areas of the cyst wall (group B).

The mean operative time, as shown in table (2) was 14.25, 13.16 and 13 minutes for groups A, B and C consequently. No significant difference was observed among studied groups. We did not spend much time trying to separate adherent cyst wall and

proceeded directly to electro-coagulation of all or partially non-separable cyst walls.

In accordance with our study, Hart et al., 2008 ⁽¹⁰⁾ reported no significant difference between excisional and ablative surgery as regard operative time. The same result was also reported by Muzii et al., 2005 ⁽¹¹⁾.

Noticeably, as shown in table 3, significant improvement of chronic pelvic pain (menstrual and non-menstrual) was reported in this study following all modalities of laparoscopic surgical treatment during 12 month follow up period.

Recurrence of pelvic pain was significantly higher following ablative technique (group C) compared to the other 2 methods of cystectomy (partial or total) at 12 months follow up period.

A significant reduction in the recurrence rate of endometrioma in cystectomy groups (total and partial) compared with fenestration and coagulation (group C) has been reported in our study. Furthermore, the interval for recurrence of the endometrioma was significantly shorter in fenestration and coagulation (group C) compared to the other 2 cystectomy groups (A and B).

A mean value of maximal penetration of endometriotic tissue into the cyst capsule of 0.6± 0.4 mm was reported. According to these findings, superficial vaporization of the inner lining of endometrioma up to 0.2mm with bipolar coagulation of the cyst wall could result in most cases in persistence of endometriotic tissue and consequently a higher rate of recurrence with respect to cystectomy ⁽⁴⁾.

Overall, the most important advantage, spontaneous pregnancy rate, was significantly higher (31.6%) in partial cystectomy group (group B) after a year of follow up than the other 2 groups (10% for group A and 4.8% for group C).

Excision of endometrioma could actually improve fertility as it allows complete removal of potentially noxious endometriotic tissue. Partial cystectomy technique avoids difficult stripping with possible excision of follicle containing ovarian tissue. It also, avoids excessive tearing of ovarian tissue with excessive use of electro-cautery for hemostasis.

Our results coincide with the results of Hart et al., 2008⁽¹⁰⁾. This meta-analysis, which analyzed three randomized controlled trials, concluded that there is good evidence that excisional surgery for endometriomas provides a more favorable outcome than drainage and ablation with regard to the recurrence of pain symptoms, recurrence of endometrioma and spontaneous pregnancy rate in women who are previously sub fertile. However, in women who may subsequently undergo fertility treatment insufficient evidence exists to determine the favored surgical approach.

As a test of ovarian reserve following surgery, day 2 FSH was done at 3, 6 and 12 months postoperatively. Significant elevation has been reported during the follow up periods in all groups. This may be explained by avoiding difficult stripping of adherent areas with possible excision of follicle containing ovarian tissue and avoidance of excessive cauterization of the entire cyst wall.

This result coincides with the study done by Hwu et al., 2011 who reported that both ovarian endometrioma and surgical treatment are associated with a significant reduction on ovarian reserve⁽¹²⁾.

Moreover, in Coccia et al., 2011 study, it was shown that in women previously submitted to surgery for endometrioma, the mean age at menopause is significantly lower compared with a reference population and this young age appears to be even lower in patients who underwent surgery for bilateral endometriomas⁽¹³⁾.

However, the rise of FSH in group B was significantly lower than the other groups. Thus, partial cystectomy with coagulation of adherent cyst wall offers better results in terms of ovarian reserve. This may be explained by avoiding difficult stripping of adherent areas and avoidance of excessive cauterization of the entire cyst wall.

These results also coincide with Li et al., 2009 who reported that electrocoagulation is associated with statistically significant reduction in ovarian reserve

(measured by day 2 FSH, antral follicle count, mean ovarian diameter and ovarian stromal blood flow velocity) which is partly a consequence of the damage to the ovarian vascular system⁽⁶⁾.

This agrees with the study of Donnez et al., 2010 who reported a statistical significant difference when the excision group was compared with the ablation group (in favor of excision). He adopted stripping away most of the cyst and then ablating the remaining adherent cyst wall at the hilus, a procedure that seems to be associated with decreased ovarian trauma, as demonstrated by post operative antral follicle count⁽⁷⁾.

These results disagree with Var et al., 2011 who evaluated the effect of cystectomy versus coagulation in bilateral endometriomas on ovarian reserve measured by AFC and ovarian volume. He reported that the decreases in AFC and ovarian volume were found in both coagulation and cystectomy, but the decrease was statistically significantly more frequent in cystectomized ovaries than in coagulated ovaries⁽¹⁴⁾.

SUMMARY AND CONCLUSION

Cystectomy is better than coagulation regarding prevention of recurrence of endometrioma and pelvic pain while partial stripping and coagulation of the remaining adherent cyst wall is better in terms of ovarian reserve and pregnancy rate.

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