

A Study of Fertility Outcome and Recurrence between Laparoscopic Enucleation by Stripping and Fulgration of Endometriotic Cyst Wall

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Abstract

Objectives: The objective of this study is to determine the most effective technique for treating an ovarian endometrioma between the laparoscopic enucleation of endometrioma by stripping of the cyst wall and drainage and fulgration of the cyst wall.

Methods: We retrospectively studied 52 infertile women who underwent endometriotic cyst enucleation by stripping of the cyst wall (Group 1) or drainage and fulgration of the cyst wall (Group 2) in AV Hospital during January 2010 and December 2011. They were studied for 18 months after their laparoscopic surgery to determine the effectiveness of the surgery for fertility outcome and recurrence of the cyst.

Results: The overall pregnancy rate for the two groups under study was 46% (24/52). While 63% (21/33) of Group 1 conceived either spontaneously or through Artificial Reproductive Technique (ART), only 15% (3/19) of Group 2 conceived spontaneously. Further, the pregnancy rate for the stage IV patients was relatively low 7% (4/52) compared to the stage III patients 38.46% (20/52). Additionally, 21% (4/19) of the patients of Group 2 had recurrence of pregnancy as compared to 6% (2/33) of the patients of Group 1.

Conclusions: Laparoscopic enucleation by stripping method of the endometrioma results in higher rate of pregnancy either spontaneously or by ART. Further, this method also results in reduced risk of recurrence of the endometrioma and reduced rate of further surgery.

Keywords: Endometriotic cyst, Endometrioma, Enucleation, Fulgration

1.Introduction

Infertility is a significant medical problem that affects many couples in the present world. According to Meuleman *et al*[1] for a significant percentage of them (47%) the underlying cause is endometriosis, wherein endometrial tissue (glandular epithelium and stroma) is found outside the normal uterine cavity. Further, Chapron *et al*[2] noted that 17-44% of the patients with endometriosis-related infertility had ovarian endometriotic cysts.

According to Yasbeck *et al*[3] endometrioma is a pseudocyst, wherein the removal of the cyst wall may involve removal of the normal ovarian tissue, with possible adverse implications for the future fertility. Regardless of its symptoms, surgery is the most prevalent method of treatment because the medical treatment alone is found to be inadequate. Several approaches to endometriomas are adopted to resolve the problem, some of which are aspiration, cystectomy, fenestration, ablation of the

cyst wall etc. But presently there is no consensus on which approach is the most effective in terms of ovarian reserve. One of the frustrating aspects of treating endometrioma with laparoscopic excision is its recurrence after the surgery.

This study considers two methods of laparoscopic surgeries to resolve endometriomas and their effectiveness in pregnancy rate after the surgery. The two techniques are:

- a) Enucleation by cyst wall stripping and
- b) Drainage of the cyst with fulgration of endometriotic cyst wall.

Further, the study extends to the effectiveness of the surgery towards recurrence of endometriomas after the surgery.

2. Materials and Method

Infertile patients who underwent laparoscopic surgeries during January 2010 and

December 2011 in AV Hospital, Bangalore for endometriomas ≥ 3 cms were included in the study. They were kept under observation for up to 18 months after the surgery through telephonic communication or their subsequent visit to the hospital to gather the surgery outcomes.

The inclusion criteria for the study were:

1. Patients with age between 20 and 39 years
2. Infertile even after attempts to become pregnant for at least 12 months through unprotected intercourse
3. Regular 21 to 35 days cycle
4. BMI between 18- 30 kg/m²
5. No History of previous abdominal surgeries
6. Minimum of 3 cm endometriotic cyst, diagnosed by Sonography prior to procedure and confirmed during laparoscopy
7. Diagnosis of endometriosis based on surgical and histological criteria
8. No other infertility factors with confirmed bilateral tubal patency on hysterosalpingography.

The exclusion criteria for the study were:

1. Patients who already underwent surgery for endometriosis
2. Patients who received estrogen suppressing drugs such as oral contraceptives, Danazol, or decaptyl in the previous 6 months.

Patients were randomly selected to undergo laparoscopic surgery using one of the two methods of study: enucleation by stripping of the cyst wall (Group 1) or drainage and fulgration of the inner lining of the cyst wall with bipolar coagulation (Group 2). Laparoscopic surgeries were performed under general anaesthesia.

Operative laparoscopic surgeries were performed by video control through sub-umbilical primary port and two or three lower abdominal secondary ports. Surgical instruments included 5 mm scissors, graspers (both blunt and toothed), 5mm suction and irrigation and bipolar cautery forceps. Irrigation was performed after the procedure with ringer lactate. Complete hemostasis was achieved with bipolar coagulation. All procedures included lysis of the adhesions to mobilize the ovaries and where ever the other ovary or the pelvic peritoneum had superficial active endometriosis, they were cauterized.

In Group 1 patients, the inner lining of the cyst was stripped from the normal ovarian tissue by using two atraumatic graspers and by pulled them slowly in opposite directions. The specimen was removed from the abdominal cavity using an endobag. The fluid from the peritoneal washing and the cyst wall after stripping were sent for histopathology.

In Group 2 patients, drainage of the cyst followed by fulgration of the inner lining of the cyst wall was done. Multiple biopsies were taken for histopathological confirmation. No sutures were used and the ovaries were left open.

The stage of disease was determined by the revised American Fertility Society (rAFS) classification of the ASRM 1997.

The patients were kept under observation for about 18 months either through telephonically or during their subsequent visit to the hospital at 3, 6, 9, 12 and 18 months after their surgeries. The occurrence of an intra-uterine pregnancy during that period was noted either spontaneously or by Artificial Reproductive technique (ART).

The age, BMI, duration of infertility (primary or secondary infertility), laparoscopic findings, etc. of the patients were noted for all the patients for the both type of surgeries. These observations were compared between the pregnant and non-pregnant patients of both the Groups. The recurrence of endometriomas was also noted for all the patients of both the Groups and compared within that period.

The results were statistically analysed and $p < 0.05$ were considered significant.

3. Results

During our study period of Jan 2010 and December 2011 in A V Hospital, a total of 67 patients were diagnosed to have infertility with either unilateral or bilateral endometriomas. These were further confirmed after laparoscopic operation. Out of the above patients, 15 patients were excluded from the study. The reasons for exclusion were

1. Other infertility factor, such as male factor
2. Conversion to laparotomy due to dense adhesion
3. Uterine synechie or
4. Went out of observation

Out of 67 patients, 52 patients were considered for the study. Among them 33 patients underwent laparoscopic surgery of enucleation by cyst wall stripping (Group1) and 19 patients underwent drainage and fulgration of the cyst wall (Group 2).

Table 1 shows various observations of the patients under Group 1 and Group 2. Some of the observations are, age, primary or secondary infertility, stages of the disease, size of the cyst etc. From the table, it is clear that the differences of these parameters for both the Groups were very small and therefore statistically insignificant. Therefore, these parameters did not influence the statistical outcome of the pregnancy after surgery as well as recurrence of the endometriomas for both the Groups.

Table 1: Patients Profile of Group 1 and Group 2 patients

Particulars	Group 1 (n = 33)	Group 2 (n = 19)	P value
Age mean +/- SD	27.18±5.43	28.95±4.74	0.54 (NS)
Patients with Primary Infertility (%)	11 (33%)	9 (46%)	0.83 (NS)
Patients with secondary infertility (%)	22 (67%)	10 (54%)	0.48 (NS)
Patients with rAFS stage III	19	6	0.13 (NS)
IV	14	13	0.13 (NS)
Patients with Bilateral endometrioma (%)	7 (21%)	9 (47%)	0.10 (NS)
Patients with Unilateral endometrioma (%)	26 (79%)	10 (53%)	0.10 (NS)
Mean diameter of the cyst			
Small (3-4 cm)	3.52	3.57	0.70 (NS)
Large (> 4 cm)	5.84	6.57	0.30 (NS)

Note: rAFS Revised American Fertility Society Score

Table 2 shows the pregnancy outcome of the patients of both the Groups. Out of 33 patients of Group 1, 21 became pregnant (63%) either spontaneously or through ART, whereas out of 19 patients in Group 2, only 3 (15%) became pregnant during the observation period. For the purpose of the analysis $p < 0.05$ were considered significant.

From the Table it is clear that the patients with Stage III disease have better chances of conception when the endometrioma is removed by enucleation by cyst wall stripping instead of by fulgration and fenestration. Over all pregnancy rate for the stage IV patients was relatively low 7% (4/52) compared to the stage III patients 38.46% (20/52).

Further, patients with unilateral endometrioma have higher chances of pregnancy when the endometrioma is removed by enucleation instead of by fulgration and fenestration. Since there was no pregnancy of Group 2 patients with bilateral endometrioma, no conclusions could be made related to pregnancy outcome for this category of patients.

Table 2: Pregnancy Outcome of Group 1 and Group 2 Patients

		Group 1 N=33	Group 2 N=19	P value
Pregnant Patients		21	3	0.0008 (S)
Non Pregnant Patients		12	16	0.0008(S)
Stage III	Pregnant	17	3	0.018 (S)
	Nonpregnant	2	8	0.015 (S)
Stage IV	Pregnant	4	0	NA
	Nonpregnant	10	13	0.008 (S)
Unilateral	Pregnant	18	3	0.388(NS)
	Nonpregnant	8	7	0.334 (NS)
Bilateral	Pregnant	3	0	NA
	Nonpregnant	4	9	0.047 (S)

The above results indicate that the treatment with complete enucleation by stripping of the cyst wall is better than the fulgration method for a more favourable pregnancy outcome.

Table 3 shows the recurrence of endometrioma of Group 1 and Group 2 patients

within 18 months period after the surgery. It was observed that 2 patients out of 33 patients in Group 1 (6%) had recurrence of endometrioma, whereas it is 4 patients out of 19 patients in Group 2 (21%).

Table 3: Recurrence of the Endometrioma of Group 1 and Group 2 Patients

Particulars	Group 1 (n=33)	Group 2 (n=19)
Recurrence	2	4
Percentage	6%	21.05%
P Value	0.103(NS)	

4. Discussions

The treatment and management of infertility patients with ovarian endometrioma is currently inconclusive. Nakagawa *et al*[4] state that the presence of endometriosis is thought to reduce fecundity, therefore cystectomy is commonly performed for endometriomas more than 3 cm in diameter before ART treatment.

Different laparoscopic techniques are used as treatment for ovarian endometriomas such as cyst wall laser vaporization[5], drainage and bipolar coagulation of the cyst wall and stripping of the endometrioma wall[6][7].

Nakagawa *et al*[4] expressed major concern about the loss of follicles associated with the stripping procedure. But in both the randomized control studies of Beretta *et al*[6], Alborzi *et al*[7] and Hye *et al*[8] the spontaneous pregnancy was significantly greater in the excision group 66.7% vs 23.5%, 59.3% vs 23.3% and 38.9% vs 11.1% (Table 4). In our present study the difference of pregnancy rate between enucleation by stripping method and the fulgration method was 63.6% vs 15.8%.

Table 4: Pregnancy rate following the laparoscopic management of the endometrioma

Author	Year	Sample Size	Intervention	Pregnancy Rate (%)
Beretta <i>et al</i> [6]	1998	64	Cyst stripping Electrocoagulation	66.7 23.5
Alborzi <i>et al</i> [7]	2004	62	Cyst stripping Electrocoagulation	59.3 23.3
Hye <i>et al</i> [8]	2013	43	Cyst Stripping Electrocoagulation	38.9 11.1
Nakagawa <i>et al</i> [4]	2007	33	Cyst stripping	60.9
Busacca <i>et al</i> [9]	1999	57	Cyst stripping	57.5
Abbott <i>et al</i> [5]	2003	54	Cyst stripping	59.0
Present study	2015	52	Cyst stripping Electrocoagulation	63.6 15.8

From the above Table 4, it shows that the results of the current study are consistent with the results reported by other authors.

Regarding the recurrence of ovarian endometrioma after laparoscopic excision, several reports are available. Koga *et al*[10] reported 30.4% recurrence among the patients who had undergone

laparoscopic cyst excision. Five variables (previous medical treatment of endometriosis, the size of the largest cyst at laparoscopy, co-existence of deep endometriosis, revised ASRM score and post-operative pregnancy) were selected for logistic regression analysis.

Chapron *et al*[2] reported 34.1% recurrence after post-operative pregnancy. Sesti *et al*[11] did randomized study and found that hormonal suppression treatment or dietary therapy after laparoscopic cystectomy has no significant effect on the recurrence rate of the ovarian endometriosis when compared with surgical plus placebo. In comparison, this study found the 11.5% (6/52) recurrence of endometriomas after surgery. It also shows that 21% (4/19) of the patients of Group 2 had recurrence of pregnancy as compared to 6% (2/33) of the patients of Group 1.

5. Conclusions

In our study, 52 infertile women who have undergone laparoscopic surgery of endometrioma by stripping of the cyst wall (Group 1) and drainage and fulguration of the cyst wall (Group 2) were analyzed for their pregnancy rate and recurrence. Through 18 months of post-operative observation, it was found that 63% of Group 1 patients conceived either spontaneously or through Artificial Reproductive Technique (ART) and only 15% of Group 2 conceived spontaneously. Further, the pregnancy rate for the stage IV patients was relatively low 7% compared to the stage III patients 38.5%. Additionally, 21% of the patients of Group 2 had recurrence of pregnancy as compared to 6% of the patients of Group 1. Therefore, it can be concluded that laparoscopic enucleation by stripping method of the endometrioma results in higher rate of pregnancy either spontaneously or by ART and also results in reduced rate of recurrence of the endometrioma.

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