Outcomes of Hysteroscopic Adhesiolysis in Ain Shams University Maternity Hospital – a retrospective analysis

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Abstract: Objective: The aim of the current work is to study the outcomes of hysteroscopic adhesiolysis at Early Cancer Detection Unit at Ain Shams University Maternity Hospital over a 12-year period between 1999 and 2011.**Patients and Methods:** The current study is a retrospective analysis of outcomes of hysteroscopic adhesiolysis procedures performed at the Early Cancer Detection Unit at Ain Shams University Maternity Hospital over a 12-year period between 1999 and 2011. Data were retrieved from patients' case records available at the Early Cancer Detection Unit. Operative procedure details and notes were obtained from patients' case records. Patients were contacted directly, through mail and/or phone calls to complete follow-up data, procedure outcomes as well as missing data. **Results:** A total of 363 women, who underwent hysteroscopic adhesiolysis during the period between 1999 and 2011, were included in the analysis. Of the included 130 women, 88 (24.24%) had presented with primary infertility, 181 (49.85%) had presented with secondary infertility, 39 (10.74%) had presented with recurrent miscarriage, while 55 (15.16%) had presented with amenorrhea. Laparoscopic assistance was employed in 27 (7.44%) cases, including 11 cases of perforation and 6 cases of suspected perforation or false passage and 9 cases of extensive grade IV adhesions. The procedure passed uncomplicated in 351 (96.69%) cases. Cervical lacerations occurred in 1 (0.28%) case. Uterine perforation occurred in 11 (3.03%) cases. All underwent concomitant laparoscopy and no bowel or other injuries were found. Of the included 363 women, 130 (35.81%) were accessible for follow-up. Of the accessible 130 women, 4 (3.08%) had hysteroscopic adhesiolysis performed for amenorrhea. Of the 4 women who had presented with amenorrhea, 3 (75%) had it resolved. Of the accessible 130 women, 126 (96.02%) had hysteroscopic adhesiolysis performed for infertility; of them 40 (31.75%) women got pregnant, while 86 (68.25%) remained infertile. Of the 40 women who got pregnant, 30 had term delivery, 6 had preterm delivery, while 4 had first trimester spontaneous abortion. **Conclusion:** Hysteroscopic adhesiolysis in cases of IUAs for restoring normal menstrual flow in women with amenorrhea and for improving pregnancy rates in women with infertility or recurrent miscarriage is an effective and relatively safe treatment of such conditions.

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Key Words: Operative hysteroscopy – hysteroscopic adhesiolysis – Asherman's syndrome – intrauterine adhesions – intrauterine synechiae

1. Introduction

The prevalence of IUAs varies geographically. The discrepancies could be explained by several factors including the degree of awareness of the clinicians, the number of therapeutic and criminal abortions in different areas, whether sharp, blunt or suction evacuation is used for puerperal and postabortive evacuation, the incidence of genital tuberculosis and puerperal infection in different countries and the criteria used for diagnosis of IUAs [1]. Asherman's syndrome or intrauterine adhesions (IUAs) complicates chronic and acute endomyometritis, vigorous endometrial curettage and uterine surgery (e.g. Cesarean section or myomectomy) [2-3]. Davies *et al.* reported a case of IUAs following uterine artery embolization [4]. Roman *et al.* reported a case of IUAs following bilateral uterine artery ligation due to severe postpartum hemorrhage [5]. The gravid uterus, in particular, is vulnerable to development of Asherman's syndrome owing to the postabortive or postpartum low estrogen status. Estrogen is essential for regeneration of the endometrial lining. Trauma of the endometrium in such conditions with low estrogen is associated with the risk of development of IUAs [2]. IUAs are associated with infertility, recurrent miscarriage and hypo- or amenorrhea [6]. The treatment of IUAs improved dramatically with the emergence of hysteroscopic approach [7]. A number of case series examined the use of different hysteroscopic methods and combination of hysteroscopic adhesiolysis with laparoscopic guidance and control [7-8]. Methods described included the use of hysteroscopy and forceps for blunt dissection [9], sharp dissection with hysteroscopic scissors [10], a combination of both [7] or the use of unipolar or bipolar electrosurgery [6,8]. Postoperative insertion of a mould, to prevent reformation of adhesions, is usually a routine practice. Traditional options included insertion of IUCD or inflated Foley's catheter [11]. Recent alternative options include amnion graft [12], Seprafilm bioresorbable membrane [13] and modified hyaluronic acid and [14]. Postoperative hormonal treatment to help endometrium

regenerate is also a common practice. Consensus about the regimen, dose and duration of treatment was not made yet, however. Options include either cyclic estrogen and progestin or estrogen alone [8, 15-16]. The aim of the current work was to retrospectively revise the outcomes of a 12-year experience of hysteroscopic adhesiolysis at the Early Cancer Detection Unit at Ain Shams University Maternity Hospital.

2. Patients and Methods

The current study is a retrospective analysis of outcomes of hysteroscopic adhesiolysis procedures performed at the Early Cancer Detection Unit at Ain Shams University Maternity Hospital over a 12-year period between 1999 and 2011. Data were retrieved from patients' case records available at the Early Cancer Detection Unit. Operative procedure details and notes were obtained from patients' case records. Patients were contacted directly, through mail and/or phone calls to complete follow-up data, procedure outcomes as well as missing data.

Grading of intrauterine synechiae:

Intrauterine synechiae were classified though a modification of the classification of European Society of Gynecological Endoscopy (ESGE) [17]:

- Grade I: mild filmy adhesions, easily ruptured by hysteroscope alone – cornual area is normal.
- Grade II: singular dense adhesion connecting separate areas of the uterine cavity – visualization of both ostiae possible.
- Grade III: multiple dense adhesions connecting separate areas of the uterine cavity – unilateral occlusion of ostial areas.
- Grade IV: extensive dense adhesions with (partial) occlusion of the uterine cavity – both ostial areas (partially) occluded.

Procedure of hysteroscopic adhesiolysis:

INSTRUMENTATION:

- Hamou endomat infusion [model 26 33 10 20] at an infusion rate of 300 ml/min, pressure of 120 mm Hg and suction 0.2.
- Fibroptic light: Xenon nova [model 20 13 15 20] (Karl Storz®, Tuttlingen, Germany).
- Hysteroscope: rigid telescope, 30°, Hamou II hysteroscopy [model 25157 BT] Karl (Karl Storz®, Tuttlingen, Germany), with a Hopkins II lens system. The sheath had an outer diameter of 5 mm, with an operative channel for instruments [model 26 163 V] with 2.9 mm rodlens.
- Camera: Karl Storz® endoscope, telecom DXpal [model 20 23 20 20].
- Semi-flexible instruments: scissors, grasping forceps, unipolar and bipolar electrode.
- Monitor: TVCR Goldstar [model No. KKV-9050, 50/60 Hz, AC, 100-270 V] to display the videotape and hysteroscopic procedure events.
- Collin's speculum, tenaculum and uterine sound were ready to be used when needed.
- The surgeons were one of the three authors entitled above with supervision of all details of the technique.

HYSTEROSCOPY PROCEDURE:

The patient was placed in a dorsal lithotomy position. The thighs were positioned at 90° angle to the pelvis and perineum was positioned just past the edge of the table to create enough space for the surgeon to manipulate the hysteroscope. Vulva, perineum and vagina were prepared with a non-irritating Povidone iodine solution (Bedatine® antiseptic solution). The hysteroscope was introduced into the cervical canal either via *conventional technique* (where vaginal speculum was inserted and the anterior lip of the cervix was grasped by a single-toothed vulsellum) or via *vaginoscopic technique* (where no speculum was inserted, the tip of the hysteroscope was positioned on vaginal introitus, labia were gently separated by fingers of the other hand, vagina was distended with saline, the hysteroscope was driven to the posterior fornix to visualize the portio and slowly withdrawn backwards to identify the external cervical os, then the hysteroscope is gently introduced through the cervical canal to the internal os). Saline was the standard distension medium used. Glycine was used as distension medium in cases where unipolar electrosurgery was needed, while saline was used when bipolar electrosurgery was used. Once uterine cavity was entered, it was symmetrically explored by rotating the fore-oblique scope in order to identify any abnormalities in the uterine walls and to visualize both tubal ostiae.

HYSTEROSCOPIC ADHESIOLYSIS PROCEDURE:

A trial of insertion of the hysteroscope first with the distension medium (whether carbon dioxide, saline or glycine) may allow its tip to bluntly break down the intrauterine adhesions. In some cases, this blunt dissection with the tip of hysteroscope was sufficient. The resectoscope is then introduced, and, by using the knife, needle, loop electrode, incision of the fibrous adhesions was performed. In cases of total or near-total obliteration of the cavity, preliminary creation of a pouch above the level of the isthmus was performed by advancing the edge of the hysteroscopy gradually and firmly, then the resectoscope was introduced and dissection of the adhesions and enlarging the cavity was attempted. In cases of peri-ostial adhesions, scissors alternating with crocodile forceps, along with the tip of a ureteric catheter were used for tubal cannulation. In some cases, the rigid optical scissors were used. In such cases, repeated irrigation with saline was needed as bleeding was more excessive than encountered with the resectoscope. Cases of dense adhesions required multiple sessions before adequate cavity was reformed. After reforming an adequate cavity, a Copper T 380A IUCD was left in some patients who had mild adhesions with adequate

hemostasis, in an attempt to prevent reformation of the adhesions. This IUCD was left for a period of 1-3 months. In patients who had extensive adhesions with wide area of dissection, an inflated Foley's catheter (10-15 ml sterile water or saline) was left to both produce a tamponade effect and minimize reformation of adhesions. The Foley's catheter was removed 3-7 days postoperatively. Amnion graft was left inside the reformed cavity in some other cases. The amnion graft was prepared from a fresh-delivered placenta in women with no risk of intrauterine infection who underwent elective Cesarean section, and had negative screening for transmissible blood-borne diseases (e.g. hepatitis B, hepatitis C and human immunodeficiency viruses). The amnio-chorion was gently separated from the placenta and repeatedly washed with saline until cleared from blood and debris, and then kept in a mixture of 500 ml saline and 6 million IU of penicillin G. Concomitant laparoscopy was done in cases of dense adhesions, when a false passage or perforation was suspected or did occur. Patients received postoperative analgesia, prophylactic antibiotics and cyclic estrogen and progestin for 3 months.

3. Results

A total of 363 women, who underwent hysteroscopic adhesiolysis during the period between 1999 and 2011, were included in the analysis. The mean age of included women was 30.7 ± 5.6 years (range: 18 – 45 years). The median parity was 0 (range: 0 – 7; interquartile range: 0 – 0). The median no. of previous miscarriages was 2 (range: 0 – 12; interquartile range: 2 – 3). The mean duration of illness was 8.2 ± 5.1 months (range: 1 – 30 months). Of the included 130 women, 88 (24.24%) had presented with primary infertility, 181 (49.85%) had presented with secondary infertility, 39 (10.74%) had presented with recurrent miscarriage, while 55 (15.16%) had presented with amenorrhea. Conventional hysteroscopy was performed in 171 (47.11%) women, while vaginoscopic technique was used in 192 (52.89%) women. The procedure was performed without anesthesia in 125 (34.44%) women, general anesthesia was needed in 227 (62.53%), and paracervical block in 11 (3.03%) women. The procedure was performed without electrosurgery in 199 (54.82%) women, and was performed using unipolar electrosurgical current in 94 (25.9%) women, and bipolar current in 70 (19.28%) women. The knife electrode was used in 151 (41.6%) women, loop electrode in 2 (0.55%) women, while needle electrode in 11 (3.03%) women. Carbon dioxide was used as a distension medium in 43 (11.85%) cases, glycine in 114 (31.04%) cases and saline in 206 (56.75%) cases. Intrauterine adhesions (IUAs) were of grade I in 79 (21.76%) cases, of grade II in 167 (46.01%) cases, of grade III in 103 (28.37%) cases and of grade IV in 14 (3.86%) cases. Laparoscopic assistance was employed in 27 (7.44%) cases, including 11 cases of perforation and 6 cases of suspected perforation or false passage and 9 cases of extensive grade IV adhesions. The procedure passed uncomplicated in 351 (96.69%) cases. Cervical lacerations occurred in 1 (0.28%) case. Uterine perforation occurred in 11 (3.03%) cases. All underwent concomitant laparoscopy and no bowel or other injuries were found. The mean operative time was 24.6 ± 11.4 min (range: 20 – 60 min)

Table-1: Characteristics of Women who underwent Hysteroscopic Adheisolysis:

Age (Years)	
Range:	18 – 45
Mean ± SD:	30.7 ± 5.6
No. of Previous Miscarriages	
Range:	0 – 12
Median (IQR):	2 (2 – 3)
Presenting Complaint [No. (%)]	
Primary Infertility	88 (24.24%)
Secondary Infertility	181 (49.86%)
Recurrent miscarriage	39 (10.74%)
Amenorrhea	55 (15.16%)
Hysteroscopy Technique [No. (%)]	
Conventional:	171 (47.11%)
Vaginoscopic:	192 (52.89%)
Need for Anesthesia [No. (%)]	
No:	125 (34.44%)
General:	227 (62.53%)
Paracervical block:	11 (3.03%)
Type of Electricity [No. (%)]	
No Electricity:	199 (54.82%)
Unipolar:	94 (25.90%)
Bipolar:	70 (19.28%)
Electrode [No. (%)]	
No Electrode:	199 (54.82%)
Knife:	151 (41.60%)
Loop:	2 (0.55%)
Needle:	11 (3.03%)
Distension Medium [No. (%)]	
CO_2:	43 (11.85%)
Glycine:	114 (31.40%)
Saline:	206 (56.75%)
Grade of IUAs [No. (%)]	
Grade I:	79 (21.76%)
Grade II:	167 (46.01%)
Grade III:	103 (28.37%)
Grade IV:	14 (3.86%)
Laparoscopic Assistance [No. (%)]:	27 (7.44%)
Operative Time (min)	
Range:	20 – 60
Mean ± SD:	24.6 ± 11.4
Complications [No. (%)]	
Perforation:	11 (3.03%)
Cervical lacerations:	1 (0.28%)

Of the included 363 women, 130 (35.81%) were accessible for follow-up; of them 121 cases responded to phone calls while 9 responded to mail. The remaining 233 (64.19%) women were inaccessible

either due to lack of channel of contact or lack of response to mail or phone calls.

Of the accessible 130 women, 4 (3.08%) had hysteroscopic adhesiolysis performed for amenorrhea. Of the 4 women who had presented with amenorrhea, 3 (75%) had it resolved. Of the accessible 130 women, 126 (96.02%) had hysteroscopic adhesiolysis performed for infertility; of them 40 (31.75%) women got pregnant, while 86 (68.25%) remained infertile. Of the 40 women who got pregnant, 30 had term delivery, 6 had preterm delivery, while 4 had first trimester spontaneous abortion (Table-2).

Table-2: Follow-up of Women who underwent Hysteroscopic Adheisolysis:

Follow-up of Women [No. (%)]	
Accessible	130/363 (35.81%)
Inaccessible	233/363 (64.19%)
Lack of channel of contact	102/233 (43.78%)
Lack of response to mail	21/233 (9.02%)
Lack of response to phone calls:	110/233 (45.2%)
Accessible Women [No. (%)]	
Amenorrhea:	4/130 (3.08%)
Resolved:	3/4 (75%)
Not resolved:	1/4 (25%)
Infertility:	126/130 (96.92%)
Remained infertile	86/126 (68.25%)
Got pregnant:	40/126 (31.75%)
Term delivery	30/40 (75%)
Preterm delivery	6/40 (15%)
Abortion	4/40 (10%)

Of the 126 accessible women, who had presented with infertility, 26 (20.63%) had IUAs of grade I, 58 (46.03%) of grade II, 36 (28.57%) of grade III and 6 (4.67%) of grade IV. The rates of pregnancy among these women were 12/26 (46.15%), 23/58 (39.66%), 3/36 (8.33%) and 2/6 (33.33%), respectively (Table-3).

Table-3: Relationship between Grade of IUAs and Pregnancy Rate

Grade of IUAs	Women who Had IUAs (n=126)	Women who Got Pregnant (n=40)
Grade I	26 (20.63%)	12/26 (46.15%)
Grade II	58 (46.03%)	23/58 (39.66%)
Grade III	36 (28.57%)	3/36 (8.33%)
Grade IV	6 (4.76%)	2/6 (33.33%)

Table-4: Summary of Outcomes of Relevant Studies on Hysteroscopic Adhesiolysis for Treatment of Infertility:

Study	No. of Patients	Patients who got Pregnant	Term Deliveries	Preterm Deliveries	Abortion	Complications
Valle and Sciarra, 1998 [10]	81 (all grades)	48 (59.2%)	31 (65%)	0	17 (35%)	5/187 (2.7%) Perforation
Pabuccu *et al.*, 1997 [19]	16 (all grades)	10 (62%)	6 (60%)	0	4 (40%)	1/40 (2.5%) Perforation
Feng *et al.*, 1999 [20]	186 (grades not mentioned)	156 (83.9%)	145 (92.9%)	0	11 (7.1%)	4/365 (1%) Perforation
Capella-Allouc *et al.*, 1999 [8]	28 (severe grades)	12 (42.8%)	9 (75%)	3 (25%)	0	4/55 (7.1%) Perforation
Preutthipan and Linasmita, 2000 [24]	45 (all grades)	16 (35.6%)	16 (100%)	0	0	Not mentioned
Fernandez *et al.*, 2006 [22]	50 (severe grades)	18 (35%)	12 (67%)	0	6 (33%)	7/136 (5%) Perforation
Thomson *et al.*, 2007 [21]	17 (all grades)	9 (53%)	4 (44%)	1 (12%)	4 (44%)	0
Robinson *et al.*, 2008 [23]	15 (all grades)	10 (66%)	7 (70%)	0	3 (30%)	0
Yu *et al.* ,2008 [3]	18 (all grades)	39 (45.9%)	30 (77%)	0	9 (23%)	1/104 (0.9%) Perforation
The current study	127 (all grades)	40 (31.5%)	30 (75%)	6 (15%)	4 (10%)	12/363 (3.3%) 11 Perforation 1 Cervical lacerations

4. Discussion

In spite of the relatively small proportion of accessible women for follow-up and lack of second-look hysteroscopy reports, the results of the current retrospective analysis are promising. Table-4 summarizes the outcomes of the relevant studies on hysteroscopic adhesiolysis in comparison to the current study. The rates of uterine perforation complicating the procedure were highest in the study conducted by Capella-Allouc *et al.* [8]. In this study, they used unipolar electrosurgery and general or epidural anesthesia in most of the included cases. It's our practice to limit the use of general anesthesia to selected cases with extensive adhesions or when patient cannot tolerate the procedure without anesthesia. Dissection through adhesions was often tolerable by the majority of cases of IUAs. Pain is usually a useful tool in guarding against uterine perforation. It's also our practice to use blunt and sharp dissection using the scissors in the majority of cases with IUAs. Thermal energy may, itself, damage the residual healthy endometrium [18]. Therefore, judicious use of electrosurgery is a must when used in hysteroscopic adhesiolysis.

It seems that restoration of normal menstrual flow in women with IUAs was strongly associated with higher pregnancy rates. Studies that reported relatively high pregnancy rates, also reported high rates of restoration of normal menstrual flow. Pabuccu *et al.* reported restoration of normal menstrual flow in 85% of women and a pregnancy rate of 62% , of them 60% delivered at term [19]. Feng *et al.* reported restoration of normal menstrual flow in 83% of cases and a pregnancy rate of 83.9%, of them 92.9% delivered at term [20]. The latter study had the highest ever reported pregnancy rate among all published studies. The grade of IUAs in included women were not mentioned, however.

The pregnancy rate seems not to be only related to the grade of IUAs. In the current study, pregnancy rate declined steadily with severity of adhesions in grades I, II and III, but rose sharply in IUAs of grade IV (46.15%, 39.66%, 8.33%, 33.33%, respectively). Similarly, Thomson et al. reported pregnancy rates of 66%, 43% and 57% in IUAs of grades I, II and III, respectively [21]. Fernandez et al. reported a pregnancy rate of 36% in IUAs of grades III and IV [22]. Robinson et al. reported a pregnancy rate of 70% among women with initial diagnosis of severe IUAs. Among the women who had an initial diagnosis of mild IUAs, the pregnancy rate was 60% [23]. It seems that the underlying cause of these IUAs and postoperative hormonal treatment may be more important in determining the prognosis of hysteroscopic adhesiolysis than the initial grade of IUAs.

In conclusion, hysteroscopic adhesiolysis in cases of IUAs for restoring normal menstrual flow in women with amenorrhea and for improving pregnancy rates in women with infertility or recurrent miscarriage seems to be an effective and relatively safe treatment of such conditions. Clinical trials, with close follow-up of cases and outcomes and precise determination of the underlying pathology along with performing second look hysteroscopy to assess the effectiveness of adhesiolysis, along with documentation of the postoperative mould used (whether IUCD, inflated Foley's catheter or amnion graft) and relation of all these factors to the reproductive outcome, are needed to truly validate and assess such promising intervention.

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