

## **Short-term clinical effects of 68 cases of transcervical resection of adhesions.**

**Yan He<sup>1#</sup>, Fei Ji<sup>1#</sup>, Xiaoshan Zhou<sup>2</sup>, Cailing Ma<sup>1\*</sup>, Yan Ding<sup>1</sup>**

<sup>1</sup>Department of Gynaecology, First Affiliated Hospital of Xinjiang Medical University, Urumqi, PR China

<sup>2</sup>Image center, the First Affiliated Hospital of Xinjiang Medical University, Urumqi, PR China

<sup>#</sup>These authors contributed equally to this study

### **Abstract**

**This study aims to investigate the short-term efficacy and safety of Transcervical Resection of Adhesions (TCRA). The data of 68 patients with Intrauterine Adhesion (IUA) treated by TCRA from October 2011 to September 2013 in our hospital were analysed. The intrauterine contraceptive ring was placed after resection, and oestrogen replacement therapy was performed after surgery. After three-month treatment, the uterine recovery and menstrual improvement were examined by the hysteroscopy. The intrauterine adhesions were related to the numbers of intrauterine operations, while the menstrual abnormalities were associated with the intrauterine adhesions. Intraoperative complications occurred in 8 patients. After TCRA, the menstrual abnormalities were improved, and the total efficiency was 91.30%; the improvement rates of amenorrhea, menstrual reduction and menstrual disorder were 86.95%, 94.44% and 100%, respectively. The results of post-TCRA 3 month hysteroscopy revealed that re-adhesion occurred in one case. TCRA is minimally invasive, safe and effective, and could significantly improve menstruation.**

**Keywords:** Hysteroscopy, Intrauterine adhesion, Oestrogen replacement therapy.

*Accepted on October 27, 2016*

### **Introduction**

Intrauterine (IUA) refers to the mutual adhesions of intrauterine muscle wall and (or) cervical canal after the endometrial basal layer was injured by various factors [1]. It would affect menstruation and reproductive functions of childbearing-age women. The endometrial mechanical and inflammatory damages might result in IUA [2], and the intrauterine structural changes would lead to the reduction of pregnancy rate, infertility and miscarriage during pregnancy [3]. The main risk factors of IUA were curettage and pregnancy termination [4]. Furthermore, the occurrence rate of IUA after hysteroscopic resection of uterine fibroids was about 10%. The transmural uterine fibroids resection and uterine arterial embolization might also cause IUA [5]. The main tissues focused on the diagnosis, treatment, prevention and recurrence of IUA [6]. It was reported that the transplantation of oral mucosal epithelial cells could protect the possible IUA after procreation and uterine surgeries, but this could not be implemented in clinical practice [7]. Hysteroscopic adhesiolysis showed good effects towards postoperative IUA than the uterine artery embolization [8], suggesting the possible long-term impacts of uterine blood supply conditions towards IUA when IUA formed. Transcervical Resection of Adhesions (TCRA) targetedly separated or incised IUA under direct vision, so that the patients could restore normal menstruation, and obtain improved pregnancy and childbirth.

Therefore, TCRA has been considered as the standard method in treating IUA [6] and the comprehensive treatment could prevent the recurrence of IUA [9]. This article retrospectively analysed the clinical data, short-term effects and postoperative 3 month follow-up results of 68 TCRA cases performed in our hospital.

### **Materials and Methods**

#### ***General information***

From October 2011 to September 2013, 68 patients were performed TCRA in the First Affiliated Hospital of Xinjiang Medical University (excluded the endometrial tuberculosis-caused IUA). The patients aged 20 to 46 years old, with the mean age as 31.8 years old. Treatment reasons: 41 cases of amenorrhea or the menstrual blood volume was reduced (60.29%), 5 cases of menstrual disorder (abnormal uterine bleeding) (7.35%), 12 cases of infertility (17.64%), 6 cases of abdominal pain (8.82%) and 4 cases of habitual abortion (5.88%). The disease histories included various uterine and cervical surgeries, including complete curettage of uterine cavity (caused by abortion, medical abortion failure, spontaneous abortion, induced abortion, hydatidiform mole, placental adhesion, and placenta remnants and so on), caesarean section, uterine abnormal bleeding-caused diagnostic curettage, cervical erosion laser surgery, and cervical

myomectomy. Among whom 21 patients were performed uterine operation once, 21 patients were performed twice, 26 patients were performed  $\geq 3$  times 26 cases, and the one patient was performed up to 9 times, 1 patient was combined with the history of cervical surgery. Before hospitalization, amenorrhea caused by ovary, pituitary and hypothalamic lesions were excluded by examinations, and all patients were performed preoperative hysteroscopy. Although 3D ultrasound had high diagnostic value towards intrauterine lesions, sometimes it even equalled to hysteroscopy [10], hysteroscopy was still considered as the gold standard towards the diagnosis of IUA [11]. This study was a prospective study and conducted in accordance with the Declaration of Helsinki. This study was conducted with approval from the Ethics Committee of Xinjiang Medical University. The patients had their own table records, preoperative and postoperative, surgical records, etc. Written informed consent was obtained from all participants before and after the operation.

### ***Diagnostic criteria of IUA***

According to the classification criteria of IUA by American Fertility Society, the cases in this study were divided into mild degree, moderate degree and severe degree according to the degrees of IUA classification. Mild degree: IUA was involved in  $<1/4$  of uterine area, the uterine bottom and the fallopian tube openings were normal; moderate degree: IUA was involved in  $1/4$  to  $3/4$  of uterine area; severe degree: IUA was involved in  $>3/4$  of uterine area, and accompanied with thick muscle fiber bands, the uterine upper section was obstructed. In this paper, the 68 patients had 13 cases of mild degree, 35 cases of moderate degree and 20 cases of severe degree.

### ***Surgical method***

The conventional cleansing enema was performed the night before surgery, and patients were administrated Carprost sublingually, or placed inside cervix or anus to fully expand and soften cervix 2 h before surgery. After intravenously anesthetized, the hysteroscopic surgery used 24 Fr and 27 Fr rotating passive continuous-perfusion uterine resectoscope (Olympus, Japan), the whole procedure was monitored by ultrasound (Aloka-210 RT2600 Real-time linear array ultrasound and RT3000 sector-scanning ultrasound, Japan), with probe frequency as 3.5 MHZ. the cervix was dilated with conventional cervical dilator to No. 10 size, the uterine-distension pressure was set as 100 mmHg, and the flow rate was set as 260 ~ 300 ml/min. the uterine position, size, uterine wall thickness, uterine suture position and broken-lost situations were investigated by ultrasound. According to patient's IUA situations, the needle electrode was firstly used to divide IUA, gradually opened uterine cavity and exposed bilateral uterine horns, then used ring electrode to resect atrial adhered tissues for the pathological examination. The patient consolidated with endometrial polyps and uterine septum was performed endometrial polypectomy and mediastinal resection simultaneously. After surgery, the uterine shape returned normal, and the bilateral uterine horns appeared clearly. After

surgery, T-IUD was conventionally implanted, as well as the oestrogen supplementation (estradiol valerate: progynova 1 mg, twice/day) for three months. All patients were performed the infection prevention for 2 to 3 days. Dilated the uterus and placed a mirror under ultrasound guidance, and removed the adhered tissues along the uterine horizontal axis, during which period the electric cutting-formed hyper-echogenic light band should be kept centered, meanwhile, the changes of uterine wall thickness and the positions of cutting mirror were monitored, and whether there existed the aqueous dark area and its changes around the uterus were observed, for example if the aqueous dark area expanded rapidly in a short period, it might suggest the existence of uterine perforation.

### ***Efficacy-evaluation criteria and follow-up***

The patients were routinely followed up postoperatively per month to understand the situations of menstruation and abdominal pain, and re-performed hysteroscopy 3 months later. Assessment criteria: 1) Effective: patient with amenorrhea resumed menstruation for 3 consecutive months, patient with reduced menstrual flow increased for 3 consecutive months, patient with menstrual disorder restored normal menstrual cycle for 3 consecutive months, uterine morphology of patient with infertility recovered; abdominal pain disappeared. 2) Otherwise it was judged as invalid. Successful separation criteria of IUA: the entire uterine cavity restored normal size and shape, the uterine bottom exposed, the bilateral tubal openings were clearly visible [12]; three months after surgery, hysteroscopy was re-performed and removed IUD, and there should be no IUA, the endometrial development should be good, and IUD should be in normal position.

### ***Statistical analysis***

SPSS17.0 software was used for data analysis. Measurement data were expressed as  $\bar{x} \pm s$  and were analysed by using one-way ANOVA among groups. Count data expressed as percentages or proportions were compared using the chi-square test, with the testing level as 0.05.

## **Results**

### ***Relationships of IUA degree and surgery history***

The 68 patients all had the history of uterine and cervical surgery (1 case had the history of cervical surgery), accounting for 100%. The IUA degrees were related to the numbers of surgeries, and the intergroup difference was statistically significant ( $P < 0.05$ , Table 1).

### ***Relationships of menstrual abnormalities and IUA degree***

Among the 68 patients, 46 patients visited the hospital with the main complaints as amenorrhea, menstrual reduction and menstrual disorder. The 23 cases of amenorrhea were mainly moderate and severe IUA cases, the 18 cases of menstrual reduction and the 5 cases of menstrual disorder were mainly

mild and moderate IUA cases. The IUA degrees were closely related to menstrual disorders, and the intergroup difference was statistically significant ( $P < 0.05$ , Table 2).

**Monitoring and complications during IUA surgery**

8 patients out of the 68 patients appeared complications, among who 3 cases were bleeding problem under hysteroscopy, which was improved after strengthened uterine contractions; 2 cases were uterine perforation, which were both caused by the combination of severe IUA and cervical canal adhesion; ultrasound revealed the rapid emergence of aqueous dark area around the uterus, then the surgery was stopped, oxytocin and haemostatic agents were applied postoperatively, while none was performed laparotomy. Patients were generally in good conditions, and the postoperative vital signs were good. 3 patients appeared false passage intra-operatively, who were all severe IUA, exhibited amenorrhea for more than a year before surgery, and had difficulties in intraoperative dilatation, the combination of hysteroscopy and ultrasound revealed the false passage, which was then successfully performed progressive dilatation under hysteroscopic guidance. 1 case exhibited re-IUA after surgery, and underwent secondary surgery and followed up. No postoperative infection occurred.

**Follow up**

One patient with severe IUA exhibited IUD incarceration, and was found mild adhesions of bilateral uterine corners after taken off IUD under ultrasound monitoring. The rest IUAs were all improved. The hysteroscopy revealed the uterine shapes, the uterine bottom was exposed, the bilateral tubal openings were clearly visible, and a small amount of endometrium could be seen. Abdominal pains were improved to various degrees. Menstrual improvements: effective: 42 cases (91.30%); invalid: 4 cases (2.17%), the patients with infertility and habitual abortion were being followed up (Table 3).

**Table 1.** Relationships of IUA degree and surgery history.

IUA degree	Times of uterine surgery			Sum (n)
	1	2	≥3	
Mild	5	3	5	13
Moderate	12	12	11	35
Severe	4	6	10	20
Sum	21	21	26	68

**Table 2.** Relationships of menstruation and IUA degree.

IUA degree	Amenorrhea	Menstrual reduction	abnormal uterine bleeding	Sum
Mild	0	4	2	6

Moderate	11	13	3	27
Severe	12	1	0	13
Sum	23	18	5	46

**Table 3.** 46 follow-up results.

Clinical symptoms	Effective	Invalid
Amenorrhea	20	3
Menstrual reduction	17	1
Menstrual disorder	5	0
Sum	42	4

**Discussion**

**Etiology and prevention of IUA**

Under normal circumstances, the anterior and posterior uterine walls were close to each other, but because the endometrium was integral, even endometrial exfoliation in menstruation would not cause adhesions, because only the functional layer of endometrium exfoliated. Any trauma-caused loss and damage of endometrial basal layer could lead to the mutual adhesion of uterine walls. It was reported in literature that more than 90% IUA was caused by uterine curettage. The 68 patients in this study all had the histories of various uterine and cervical surgeries. The patients with moderate and severe IUA exhibited more serious damages in the endometrial basal layer, the regenerative capacities of endometrium and glands were low, the endometrial receptivity was poor [13], and the postoperative prognosis was poor. After treatment, the pregnancy rate of IUA patients was significantly lower than normal women by about 51%. In recent years, due to the increasing of artificial abortion and medical abortion, the incidence of IUA was also increased; it should be prevented bases on IUA causes. Firstly, contraception should be stressed, so that abortion or medical abortion-induced uterine operations could be reduced; secondly, the uterine operations should avoid excessive rudeness, as well as excessive suction-curettage-caused iatrogenic injuries, meanwhile, the operations should be strictly aseptic and applied prophylactic antibiotics postoperatively.

**Efficacies and safety of hysteroscopic electrocision**

The efficacies of hysteroscopic electrocision were closely related to the IUA degrees. Generally, the patients with postoperative significant improvements or restored to normal menstrual period might reach about 95%, the intraoperative initial treatment of IUA, followed by blunt dissection, played certain effects in maintaining the normal uterine shape [14]. Among 46 patients with abnormal menstruation in this study, 42 cases were effective (91.30%), and 4 cases were invalid (2.17%), consistent with the literature. Thus, hysteroscopic electrocision could effectively improve menstruation and restore uterine shape. The patients with moderate and severe

IUA lost their normal uterine shapes, therefore there might exist high risks when performing hysteroscopy. Uterine perforation was the most common complication of hysteroscopy; especially electrocision would be more likely to cause uterine perforation and damages of adjacent organs. It was reported that the energy-surgery might cause more complications such as damages and perforation of organs, Robinson et al. [15] reported the incidence rate as 4.5%, Cheng reported it as 3.7%, and this study found 2 cases of perforation (2.9%). Hyponatremia was another severe complication of hysteroscopy; therefore the perioperative prevention and identification should be emphasized [16]. Before hysteroscopic resection, full cervical preparation should be performed, and Carprost could be placed inside cervix, or posterior fornix of rectum or vagina before surgery. The surgery should be operated in accordance with the specific circumstances of uterine cavity, and the separation should be performed under direct vision, comprehensively explored the small gaps among IUA, among which there often might flow small blood blocks or tissue debris, and this could help to distinguish normal tissues and adhered bands; the direction and depth of separation should be noticed, meanwhile, the positions of bilateral uterine horns should be paid attention. The intraoperative ultrasound could increase the safety of surgery, on one hand, it could ensure the equal thickness of all uterine walls, thus effectively treating the uterine horn adhesions and reducing the chance of uterine perforation and therefore caused organ damages, on the other hand, ultrasound-monitoring could avoid excessive perfusion fluid to enter the abdominal cavity, reducing hyponatremia caused by uterine-distention medium entering the circulation, and it could also promote the hysteroscopic doctor to timely terminate the surgery when the uterine morphology returned to normal. The 68 patients of this study were performed hysteroscopy under ultrasound monitoring, and no hyponatremia caused by uterine-distention medium entering the blood circulation occurred. This showed that the safety of hysteroscopy depended not only on the surgeon's techniques, but also on the close intraoperative monitoring.

### **Prevention of postoperative re-adhesion**

The prevention of postoperative re-adhesion was still the problem of clinical treatment. The postoperative re-adhesion was a major factor that would impact the efficacies, and the intractable problem in clinical treatment. The traditional way was to immediately indwell metal ring after hysteroscopy for at least three months to prevent re-adhesion, the recovery rate of menstruation by this method was 83% [17]. It was reported that the uterine balloon or IUD could effectively prevent the recurrence of IUA [18]. The 68 patients of this study were place a metal ring, as well as administrated the oestrogen progynova to promote the repairing of endometrium, the oestrogen therapy was applied for three months, and the recovery rate of menstruation was 91.30%, higher than the traditional methods. Meanwhile, the patients with moderate to severe IUA were implanted sodium hyaluronate into uterus, which contacted anterior and posterior uterine walls and

bilateral uterine horns to prevent the occurrence of re-IUA. The oestrogen treatment could promote the endometrial repairing and proliferation. Some study demonstrated that after separating IUA, the injection of medical anti-adhesion agents into uterine cavity could act as a biological barrier, reducing the formation of hematoma, and exhibiting good biocompatibility [19].

Based on the above, TCRA was a safe effective way to recover menstruation and reproductive functions, and ultrasound monitoring added its safety. After separated IUA, implantation of metal ring and oestrogen therapy would be feasible and effective to promote the endometrial repairing.

### **Conflicts of Interest**

All of the authors declare that they have no conflicts of interest regarding this paper.

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**\*Correspondence to**

Cailing Ma

Department of Gynaecology

First Affiliated Hospital of Xinjiang Medical University

PR China