

WHAT HAPPENS AFTER TUBAL STERILIZATION: A JORDANIAN EXPERIENCE

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ABSTRACT

Objective: To study the menstrual and hormonal changes in Jordanian women who underwent tubal sterilization, and compare these with international studies.

Methods: A systematic review of international literature identified around 190 articles related to tubal sterilization using the pub med site from year 1972 to 2004. In our study we reviewed the files of 300 cases that underwent tubal sterilization in Prince Rashid Ben Al-Hassan Hospital in the period between 1990 and 2000 and another control group of 440 cases with no history of tubal ligation matching same age and parity. Two hundred and twenty patients filled a questionnaire and completed the study. We compared the incidence of hysterectomy, changes in menstrual cycle pattern, hormonal and endometrial tissue biopsy results. Patients were followed up in the clinic for a period for one year to 12 years. We compared our results to those published in the literature.

Results: Out of the 220 patients who participated in the study 14 patients who underwent sterilization had hysterectomy later giving incidence 6.3%. Of these 120 patients had previously used oral contraceptives or an intrauterine contraceptive device prior to tubal ligation. Women, who had used oral contraceptives before, showed worsening in dysmenorrhea and dysfunctional uterine bleeding as well as an increased amount of blood loss as compared to those who had not used this method. Patients who used intrauterine contraceptive devices showed improvement in these symptoms. No significant hormonal or endometrial tissue changes after sterilization were recorded in our study.

Conclusion: Tubal sterilization is not associated with an increased risk of menstrual dysfunction, dysmenorrhea, or increased premenstrual distress in women who underwent the procedure after the age of 30 years. There may be some increased risk for younger women, although they do not appear to have significant hormonal or endometrial tissue changes after tubal ligation.

Key words: Tubal sterilization, Menstrual cycle, Contraception.

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Introduction

Tubal sterilization is the most popular method of contraception in the world⁽¹⁾. As these women age and need gynecologic care, they will have menstrual complaints that many will ascribe to their sterilization. The occurrence of abnormal bleeding after tubal sterilization was described in 1972 by Muldoon⁽²⁾. He reported that 43% needed further treatment, 18.7% required a hysterectomy and 6.3% required some other major gynecologic surgery such as repair for genital tract prolapse. Studies such as these prompted many

physicians to recommend that women undergo hysterectomy instead of tubal sterilization. In addition, at that time, tubal ligation was a major undertaking, requiring a laparotomy and a lengthy hospitalization. With the introduction of laparoscopy, tubal sterilization became much easier. One or two small incisions replaced the large laparotomy scar. Women were in and out of the hospital in hours instead of days. As the number of women undergoing sterilization increased, reports started to appear concerning the possible long-term effects of the procedure, including menstrual

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symptoms, hormonal and other physical characteristics, and the risk of hysterectomy after an essentially minor elective procedure. The mechanism for the occurrence of post-tubal sterilization syndrome has long been a matter of conjecture. It has been hypothesized that the destruction of the fallopian tube and, in many procedures, the concomitant destruction of portion of the mesosalpinx, alters the blood supply to the ovary. Theoretically, this would reduce the gonadotropin signal to the ovary, with resultant impairment of follicular growth and corpus luteum function. Ovarian hormone levels would be affected and a variety of menstrual disorders would ensue. Some of these would be manifested by minor changes, but major changes might be significant enough to warrant major therapeutic interventions, including surgery. In our study we tried to detect any menstrual cycle changes or hormonal and endometrial tissue changes after tubal ligation and compared this to that published in the literature. The psychological aspect was not included in this study although it is very important in our community.

Methods

A systematic review of international literature using the pub med site, we identified about 190 articles, related to menstrual and hormonal changes after tubal sterilization. Data were extracted to be compared with data of our study. The study was conducted at Prince Rashid Ben Al-Hassan Hospital (PRHH) in Jordan. The records of 300 women who underwent tubal sterilization and another 440 women with no history of tubal ligation (used as control group) were reviewed during the period 1990 to 2000. Patients were followed up in the outpatient clinic till August 2003, and were asked to fill a questionnaire regarding new complaints, which developed following tubal ligation. Sixty patients were excluded due to lack of follow up or missing records, 20 patients refused to fill the questionnaire. Two hundred twenty patients participated in our study; midluteal serum progesterone was also requested during the follow up.

Data was compared between the two groups regarding changes in menstrual cycle pattern (frequency, duration, volume of blood loss, dysmenorrhea), incidence of hysterectomy and hormonal changes after tubal sterilization.

Results

As shown in Table I, in PRHH 14 patients who underwent sterilization have had to undergo hysterectomy giving an incidence (6.3%) compared to (5.9%) in patients with no prior history of sterilization. five of them had tubal ligation at age below 30 years, four of them had organic lesions like (benign endometrial polyp, adenomyosis, simple cystic

glandular hyperplasia) as revealed by histopathology. Ten patients did not show any pathological findings, three of these patients underwent modified vaginal hysterectomy and eleven underwent abdominal hysterectomy. Sixty-six cases did previously use oral contraceptive pills and 54 used intrauterine contraceptive device (IUCD) prior to tubal ligation, compared to 100 cases with no prior use of contraception. As shown in Table II patients who used oral contraceptives prior to sterilization did show worsening in dysmenorrhea and dysfunctional uterine bleeding as well as increase in the amount of vaginal bleeding. However patients who used IUCDs showed improvement in dysmenorrhea and decreased in the amount of vaginal bleeding, some of them retained regularity. Furthermore women who did not use oral contraceptives prior to tubal sterilization showed no tendency towards worsening of these symptoms. The majority of our patients had endometrial sampling for dysfunctional uterine bleeding and we requested serum progesterone level at the day 21 of the cycle for 80% of them; we did not detect any major pathology or change in the endometrium as well as the progesterone level.

Discussion

Hysterectomy was perceived as an indicator of menstrual dysfunction or gynecologic problems after sterilization, a perspective that has been set by Muldoon⁽²⁾. In uncontrolled studies 1.6% to 5.4% of women who underwent sterilization subsequently underwent hysterectomy⁽³⁻⁷⁾. None of these figures approached the 18.7% found by Muldoon (Table III). Furthermore, two of these studies reported that most or all of the hysterectomies were performed for organic disease that often had existed before the sterilization^(4,8).

In studies that included a control group, there appeared to be an increased risk of hysterectomy in women who had undergone sterilization when compared with control subjects^(5,6,9,10). Of even greater interest, is that three studies indicated women who had undergone sterilization at a younger age were at significantly greater risk for hysterectomy than women who had undergone sterilization later in life. The risk was significantly elevated for women who had undergone hysterectomy before the age of 29 years in two studies and before the age of 24 years in another^(6,11,12).

In PRHH it was noticed that the risk of hysterectomy was higher among women who had undergone sterilization than in the general population. In earlier studies, much of this could be explained by the fact that sterilization procedures had been performed for medical reasons and preexisting gynecologic disorders contributed to the hysterectomy rate. Regardless of whether sterilization produced the problems that led to hysterectomy in more recent studies, it apparently

produced an increased demand for surgery. Once childbearing no longer is desired, the presence of the uterus is much less important to many women and menstrual disorders are not tolerated as willingly.

Numerous investigators have evaluated menstrual symptoms after tubal sterilization. Several have not controlled for oral contraceptive pills (OCs) use or menstrual pattern before sterilization (Table IV). This is particularly relevant for the millions of women who used OCs, many of whom did so to ensure menstrual regularity and decrease menstrual bleeding and pain. As these women elected to undergo sterilization, they discontinued the use of OCs and began to experience heavier, more irregular, and more painful menstrual periods, which would have occurred regardless of whether the sterilization had been performed. In 1976, Chamberlain⁽¹³⁾ was the first to report the effect of prior contraceptive practices on menstrual symptoms after tubal sterilization. He reported that one third of patients after laparoscopic tubal sterilization had longer and heavier period but those women who were using oral contraception before operation had the worst symptoms, while there was no significant difference between laparoscopy and laparotomy in terms of increased in heavy bleeding or number of days of bleeding.

In PRHH and most other studies⁽¹⁵⁻²⁰⁾ also found no significant changes in menstrual symptoms after controlling for contraceptive use before sterilization (Table V). Some studies found significant changes associated with some sterilization techniques, but not with sterilization in general. For example, increased pain or menstrual irregularity has been observed in subgroups of women undergoing sterilization by unipolar or bipolar cautery^(17,19,21), but no statistically significant menstrual changes have been in the group as a whole. More than 2 years after sterilization, the women who previously had had normal cycles had a significantly increased risk of abnormal menstrual cycle length and menstrual irregularity. One serious consideration is the potentially increased risk of menstrual disorders among women who undergo sterilization at a young age. One study by Shy⁽²²⁾ found such an increase.

In our attempt in PRHH to define the cause of menstrual changes, as well as many investigators have evaluated various objective parameters during the menstrual cycle. These include hormonal analyses, endometrial biopsy, and changes in menstrual cycle pattern. One of the earliest attempts to measure menstrual changes objectively was made by Kasonde and Bonnar in 1976 (Table VI). By extracting menstrual blood from tampons and sanitary napkins, they measured blood loss by the Halberg method for three consecutive cycles before tubal sterilization and for six

consecutive cycles afterwards. These authors concluded that tubal occlusion did not increase menstrual bleeding in the first year after surgery. At least three studies⁽²³⁻²⁶⁾ have reported results of endometrial biopsy in women who have undergone sterilization and in control subject who have not. One showed retardation of the endometrium consistent with a luteal phase defect⁽²⁴⁾. Another demonstrated normal endometrium, despite evidence of retardation shortly after sterilization⁽²⁵⁾. The third study showed no endometrial abnormalities⁽²⁶⁾.

Since that time, many authors have reported levels of serum progesterone and other ovarian and pituitary hormones (Table IIV) many of the studies were performed in women who requested reversal of sterilization or women who had significant menstrual abnormalities. Their findings were compared with those of women who were partners of infertile men, women who had infertility, or some other control group.

In several of these studies⁽²⁷⁻³¹⁾ evidence of decreased midluteal phase estradiol (E2), progesterone (P), or leutinizing hormone (LH) was found. In those studies in which the women served as their own controls and had preoperative hormone levels assessed, in PRHH no significant or persistent changes in hormone levels were demonstrated as found by Rivera⁽³²⁾ and Carmonna⁽³³⁾. This is important because these women served as their own controls, obviating the concern for confounding factors other than ageing. The length of follow-up varied from three months to several years.

Conclusion

Tubal sterilization is not associated with an increased risk of menstrual dysfunction, dysmenorrhea, or increased premenstrual distress in women who underwent the procedure after the age of 30 years. There may be some increased risk for younger women, although they do not appear to have significant hormonal or endometrial tissue changes after the procedure. The only consistency in the articles reviewed is their inconsistency, there appears to be no clear-cut evidence of the existence of post-tubal sterilization syndrome. There is evidence that the individuals at highest risk of developing symptoms after tubal sterilization are in their 20s who have history of menstrual dysfunction before their tubal sterilization which may not be the same at our community.

The important lesson is not that women should avoid tubal sterilization because of the small possibility of increased problems. Rather, they should be aware of all the risks, as well as considerable benefits that are associated with this procedure. Tubal sterilization remains one of the best permanent methods of family planning with minimal side effects.

Table I. Comparison between tubal sterilization group and control group with no prior history of tubal sterilization

	Tubal ligation group 220	Control group 440
Incidence of hysterectomy	6.3% (14 cases)	5.9% (26 cases)
Midluteal serum progesterone		
Less than 1 ng/ml	3.8%	4.1%
From 1-10 ng/ml	26%	27.1%
More than 10 ng/ml	70.2%	68.8%
Endometrial tissue results		
Proliferative	45%	48%
Secretory	31%	30%
Other	24%	22%

Table II. The effect of prior use of contraceptives on menstrual cycle changes developed after tubal sterilization.

	No prior use (100 cases)	Prior use of combined pills (66 cases)	Prior use of intrauterine device (54 cases)
Dysmenorrhea			
Increase	20% (20)	62.1% (41)	11.2% (06)
Decrease	24% (24)	15.1% (10)	64.8% (35)
Unchanged	56% (56)	22.7% (15)	24.0% (13)
Amount of menstrual blood loss			
Increase			
Decrease	18% (18)	10.6% (07)	03.7% (02)
Unchanged	19% (19)	68.2% (45)	74.0% (40)
Unchanged	63% (63)	21.2% (14)	22.3% (12)
Regularity of cycle			
More regular	23% (23)	12.1% (08)	74.4% (38)
Less regular	22% (22)	59.0% (39)	09.2% (05)
Unchanged	55% (55)	28.9% (19)	20.4% (11)

Table III. Outcome of hysterectomy after tubal sterilization

Author	Year of study	No. of tubal sterilization cases	No. of control subjects	Follow up (month)	Hysterectomy outcome after tubal sterilization
Muldoon ⁽²⁾	1972	374	0	120 to 180	18.7% had hysterectomy.
Cooper ⁽⁵⁾	1983	588	365.000	6 to 72	3.4% after sterilization, 2.2% after control group.
Kendrik ⁽⁴⁾	1985	4.002	0	1 to 15	64 (1.6%) had hysterectomy, some of them had preexisting organic disease.
Cohen ⁽⁶⁾	1987	4.374	6,835	24 to 96	Women more than 30 years age had no increased risk; 1.6 times more in women aged 25 to 29 years.
Koetswang ⁽⁷⁾	1990	499	0	48 to 144	5.4% had hysterectomy, none for menstrual disorders.
Rulin ⁽⁹⁾	1993	500	466	36 to 54	4.55% in tubal sterilization; 2.17% in control group.
PRHH*	2000	220	440	12 to 120	6.3% (14) cases had hysterectomy; 5.9% in control group.

Table IV. Change in menstrual symptoms after tubal sterilization not controlled for prior contraceptive use.

Author	Year	No. of tubal sterilization cases	No. of control	Follow up (months)	Findings after sterilization
Neil ⁽¹⁴⁾	1975	454	143	10 to 28	Increased menstrual pain and bleeding for unipolar cautery, but not for laparotomy.
Poma ⁽¹⁵⁾	1980	514	514	24 to 84	22% of women with tubal sterilization and 31% of controls were rehospitalized for complications.
Alder ⁽¹⁶⁾	1980	–	–	Unknown	Increased menstrual blood loss was reported.
Shy ⁽²²⁾	1992	7,253	25,448	12 to 180	Increased risk of hospitalization for menstrual disorders.
PRHH*	2000	220	Self	12 to 120	No significant increase in menstrual blood loss or dysmenorrhea reported.

*PRHH: Prince Rashid Ben Al-Hassan Hospital

Table V. Change in menstrual symptoms after tubal sterilization controlled for prior contraceptive use.

Author	Year	Finding after tubal sterilization
Chamberlain ⁽¹³⁾	1976	Prior coc users had significantly longer and heavier periods, No significant difference between laparoscopy and laparotomy in amount or duration of periods.
Reidel ⁽¹⁷⁾	1981	Significantly fewer menstrual complaints for endocoagulation than for unipolar cautery.
DeStefano ⁽¹⁹⁾	1983	Significantly decreased duration of menstrual bleeding and increased in pain only after unipolar cautery.
Rulin ⁽²⁰⁾	1985	No significant menstrual changes noted
Shain ⁽²³⁾	1989	Significant menstrual changes and more pain for bipolar cautery or pomeroy procedure, but not for falope ring procedure.
Rulin ⁽⁹⁾	1993	No significant menstrual changes noted.
PRHH*	2000	Decreased bleeding and pain in IUCD users, increased cycle irregularity and pain in oral contraceptive users.

Table VI. Nonhormonal objective measure for menstrual changes

Author	Year	No. of tubal Sterilization	No. of control	Follow-up (months)	Measures	Finding after sterilization
Kasonde ⁽²⁴⁾	1976	25	Self	Pre, 6, and 12	Volume of menstrual blood	No change in menstrual blood loss before and within 1 year of tubal sterilization
Donnez ⁽²⁵⁾	1981	58	65	6	Endometrial biopsy 5 to 10 d before next cycle	Retarded endometrial biopsy samples in cautery and Pomeroy groups but not in clip and control groups
El-Mahgoup ⁽²⁶⁾	1984	109	–	2 to 108	Midluteal phase endometrial biopsy	No abnormalities noted in endometrial biopsy samples 24 to 58 m after, but retarded within 24 m of sterilization
Hague ⁽²⁷⁾	1987	72	32	Unknown	Luteal phase endometrial biopsy	No luteal phase defect in women with tubal sterilization or control subjects
PRHH*	2000	220	Self	12 to 120	amount and duration of menstrual blood	No significant increase in the amount or duration of menstrual blood loss

Table VII. Hormonal measures in women after tubal sterilization

Author	Year	No. of tubal sterilization	No. of control	Follow-up (months)	Measures	Finding after sterilization
Hargrove ⁽²⁸⁾	1981	29	11	12 to 44	Midluteal P, E2, PRL	Significantly lower midluteal P and higher E2
Radwansk ⁽²⁹⁾	1982	23	28	–	LH, FSH, P, E2 every 2 d for one cycle	Significantly lower midluteal Phase P
Cattanach ⁽³⁰⁾	1988	112	55	24	24-h urine for estrogen and pregnanediol	Significantly lower midluteal phase urinary estrogen
Rivera ⁽³²⁾	1989	65	26	Pre, 1, 3, 6, and 12	Luteal P on menstrual d 15,20 and 25	No significant change in P
Rojansky ⁽³²⁾	1991	25	43	24 to 260	Midfollicular and late luteal phase E2, P, PRL, TSH and T4	No significant changes except lower midfollicular phase E2
PRHH*	2000	220	440	12 to 120	Midluteal P	No significant changes

*PRHH: Prince Rashid Ben Al-Hassan Hospital

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