Experimental
&
Clinical Article

Reproductive Medicine; *Endocrinology and Infertility*

Does Pelvic Organ Prolapse Relate with Expulsion of Intrauterine Devices?

Mehmet ÇINAR[1], Rıfat Taner AKSOY[1], Aytekin TOKMAK[1], Selçuk ERKILINÇ[1], Ali İrfan GÜZEL[1], Özlem GÜN ERYILMAZ[1], Yasemin TAŞÇI[1]

Ankara, Turkey

ABSTRACT

OBJECTIVE: We designed this study to demonstrate the risk factors of intrauterine devices (IUD) expulsion.

STUDY DESIGN: Eighty patients (age range; 28-36) applied IUD evaluated in terms of their IUD expulsions. Risk factors recorded were; age, gravidity, parity, BMI, previous expulsion of intrauterine devices, delivery type, length of the endometrial cavity POP-Q scores and sonographic correct IUD location. Statistically analysis was performed by Mann Whitney U test, Logarithmic transformation and Logistic regression analysis.

RESULTS: There were no statistically significant differences between groups in terms of ages, gravidity, parity, BMI, previous expulsion of intrauterine devices, delivery type, length of the endometrial cavity and the measure of Ap, Bp, C, D, TVL distances of POP-Q scores ($p>0.05$). The measure of Aa, Ba, Gh, Pb distances were statistically significantly lower in IUD expulsion group ($p<0.05$).

CONCLUSION: As interestingly; we found that POP-Q assessment should be a promising marker in predicting IUD expulsion. To the best of our knowledge, this is the first study with a such result, therefore POP-Q evaluation should be a useful parameter for future IUD expulsion.

Keywords: Contraception, Intrauterine devices expulsion, POP-Q scores

Gynecol Obstet Reprod Med 2016;22(2):80-83 DOI: 10.21613/GORM.2016.79

Introduction

In spite of advances in contraceptive methods, undesired pregnancies still an important global public health issue. In the 21st century, women have gained access to many contraceptive options. Intrauterine devices (IUDs) are the most widely used contraceptive method, especially in developing countries, because it is a substantially effective, long-acting, intimate, safe, coitus independent and precipitately reversible method of contraception with low side effects. Among the contraceptive methods intrauterine methods are the most cost-effective methods (1). Risk factors for expulsion include age less than 20 years, nulliparity, dysmenorrhoea, menorrhagia, and immediate post abortion and postpartum placement but there are comparatively few report about the risk factors for IUD expulsion (2,3).

[1] *Zekai Tahir Burak Hospital Department of Gynecology, Ankara*

Address of Correspondence: *Mehmet Çınar*
Zekai Tahir Burak Women Health Education and Research Hospital, Ankara, Turkey
drmcinar@gmail.com

Submitted for Publication: *17. 04. 2016*
Accepted for Publication: *27. 04. 2016*

Pelvic floor muscles, uterosacral ligaments and endopelvic fascia represent the anatomical support of female pelvic organs. A complex damage mechanism at the basis of pelvic floor caused to a series of structural alterations of the connective tissue. The changes in pelvic anatomical structures caused to change the position of uterus in pelvis and pelvic organ prolapse (POP). The etiology of POP is multifactorial. Literature confirms that the main cause is childbirth, however this needs to be considered in light of acquired and congenital risk factors. Various research groups have analyzed a range of risk factors for POP including childbirth, birth trauma, menopause, body mass index (BMI) and chronic obstructive pulmonary disease (COPD). The clinical description of pelvic floor anatomy is determined during the physical examination of the external genital organs and vaginal canal. Prolapse of genitalia quantified on clinical examination by using the prolapsed quantification system of the pelvic organ prolapse quantification (POP-Q) which published in 1996 (4). POP-Q classification system demonstrates prolapse of the anterior and posterior vaginal wall and of the uterine cervix or, after hysterectomy, of the vaginal vault, according to the hymen. Clinical stages of POP-Q is respectively stage 0 (normal) and stage 1, 2, 3 and 4. Stage 1 is related to the anterior and posterior compartment descent and it is possible to be part of the normal range (5,6).

In this study, we aimed to investigate if the changes of uterine structural position have an impact on the displacement of intrauterine devices.

Material and Method

This prospective study was designed at Dr. Zekai Tahir Burak Women's Health Education and Research Hospital, from January 2014 to April 2014. The study was approved by the Ethics Committee of local ethics committee of the institution. All of the participants gave informed consent to the study. This is a tertiary research and education hospital in middle of Turkey and most of the health services are free of charge and supported by the central government of Turkey.

A total of eighty patients whose maternal ages between 26-38 years were enrolled the study. The risk factors evaluated were; age, gravidity, parity, BMI, previous expulsion of intrauterine devices, delivery type, length of the endometrial cavity, POP-Q scores and sonographic correct IUD location. Each patient enrolled gave a written informed consent to participate. Patients with malformed uterus, prior surgery involving the uterine cervix (loop electrosurgical excision procedure or cone biopsy), uterine fibroids, adenomyosis, uterine septum, intrauterine adhesion or other pathological lesions which caused to distortion of uterine cavity were excluded from study. Patients with abnormal amount of menstrual flow and dysmenorrhea were also excluded. Before applying the intrauterine device all patients were examined in dorsal lithotomic position using a forceful valsalva maneuver. POP-Q exam was performed as described by Bump et al (4). All examinations were performed by the same examiner (M.Ç.). To determine anterior compartment defects the distance from Aa and Ba points to hymen were measured and noted. The Ap and Bp points to hymen distance were measured for to determine posterior compartment defects and noted. The transvaginal, cervix to hymen and posterior fornix to hymen distances, genital hiatus and perineal body were measured and noted. Then sterile speculum was inserted. After fixing the cervix an IUD (Pregna Copper T 380A; Pregna International, Chakan, India) was placed in the fundus of the uterus by the same examiner (M.Ç.). Translabial 2D-ultrasound was performed to all patients and the distance between the top of the vertical arm of the IUD and the junction between the endometrium and the uterine cavity was measured. Vaginal probe was tilted 90° and the uterus was scanned in the transverse plane from cervix to fundus using a 6.5 MHz multifrequency transvaginal probe (Voluson 730 expert, GE Kretz Ultrasound, Zipf, Austria). Patients with ≥10 mm distance were also excluded. Four weeks later all of the patients called to second examination. Translabial 2D-ultrasound was performed to all patients and the distance between the top of the vertical arm of the IUD and the junction between the endometrium and the uterine cavity was measured again by the same examiner. To ensure adequate contraception mentioned distance of iud-fundus defined as less than 10 mm (7). For this, we divided patients to two group and Group 1 defined as whose distance between the top of the vertical arm of the IUD and the junction between the endometrium and the uterine cavity is less than 10mm and Group 2 large than 10mm. Groups were compared in terms of their POP-Q scores.

Statistics

Mean and standard deviation (SD) were calculated for continuous variables. The normality of the variables was analyzed by Kolmogorov-Smirnov test. Mann Whitney U test, the chi-square (χ^2) test and Student's t-test were used to evaluate associations between categorical and continuous variables. The receiver operator characteristic (ROC) curve analysis was used to evaluate the predictive role of POP-Q scores. Logistic regression analysis was performed to find the risk variables for IUD expulsion by including all related variables to the model. Odds ratios were calculated by logistic regression method. All variables were included in the backward stepwise procedure. Two-sided p values were considered statistically significant at $p<0,05$. Statistical analyses were carried out by using the statistical packages for SPSS 15.0 for Windows (SPSS Inc., Chicago, IL, USA).

Results

Table 1 depicted the demographic and clinical characteristics of the patients. The mean age of the patients in group1 was 31.63 ± 4.2 years and in group 2 32.55 ± 2.98years (p=0.186). There were no statistically significant differences between groups in terms of ages, gravidity, parity, BMI, previous expulsion of iud rates, previous delivery type, length of the endometrial cavity and the mesure of Ap, Bp, C, D, TVL distances of POP-Q scores ($p>0,05$). The mesure of Aa, Ba, Gh, Pb distances were statistically significantly lower in IUD expulsion group (group 2) ($p<0.05$).

According to the ROC curve analysis (Figure 1) Aa, Ba distances was found to be a discriminative parameter in patients with IUD expulsion. The area under curve (AUC), cut of values and sensitivity and specificity are shown in table 2. The best best Aa, Ba distances cut-off value for distinguishing the groups were -2.5 cm and -1.5 cm with 88.1% sensitivity, 62.1% specificity and 88,9% sensitivity, 55.0% specificity; respectively.

Table 3 summarizes the outcomes of the logistic regression model. According to the model, Aa and Ba measurements were found to be significant risk factors for IUD expulsion ($p<0.001$). The odds ratios (95% CI) were 6.39 (1.25–26.58), 3.42 (1.61-9.01), respectively.

Table 1: Compression of demographic characteristics between patients with and without intrauterine devices expulsion groups

Variables		Group 1 (n=44) (mean±SD	Group 2 (n=36) (mean±SD)	p value
Age (years)		31.63 ± 4.2	32.55 ± 2.98	0.186
Gravidity		3.11 ± 0.74	2.88 ± 0.57	0.492
Parity		2.36 ± 0.48	2.19 ± 0.56	0.119
BMI		26.5 ± 2.19	27.4 ± 3.44	0.285
Previous Delivery Type n (%)	Cesarean	12 (%28)	10 (%27)	0.322
	Vaginal	32 (%72)	26(%73)	
Previous expulsion of iud n (%)		5 (%11.3)	4 (%11.3)	0.113
Length of the endometrial cavity		3.94± 0.73	3.66± 0.82	0.125
Aa		-2.53 ± 0.76	-0.84 ± 0.60	<0.001
Ba		-2.41 ± 0.81	-0.64 ± 0.68	<0.001
Ap		-2.46 ± 0.50	-1.92 ± 1.25	0.200
Bp		-2.73 ± 0.45	-2.12 ± 1.23	0.081
C		7.63 ± 0.61	7.52 ± 0.65	0.763
D		9.01 ± 0.51	8.72 ± 0.45	0.112
Gh		2.11 ± 0.32	2.47 ± 0.50	<0.001
Pb		3.09 ± 0.42	3.94 ± 1.01	<0.001
Tvl		8.2 ± 0.49	8.9 ± 0.60	0.231

p<0.05 is statistically significant.

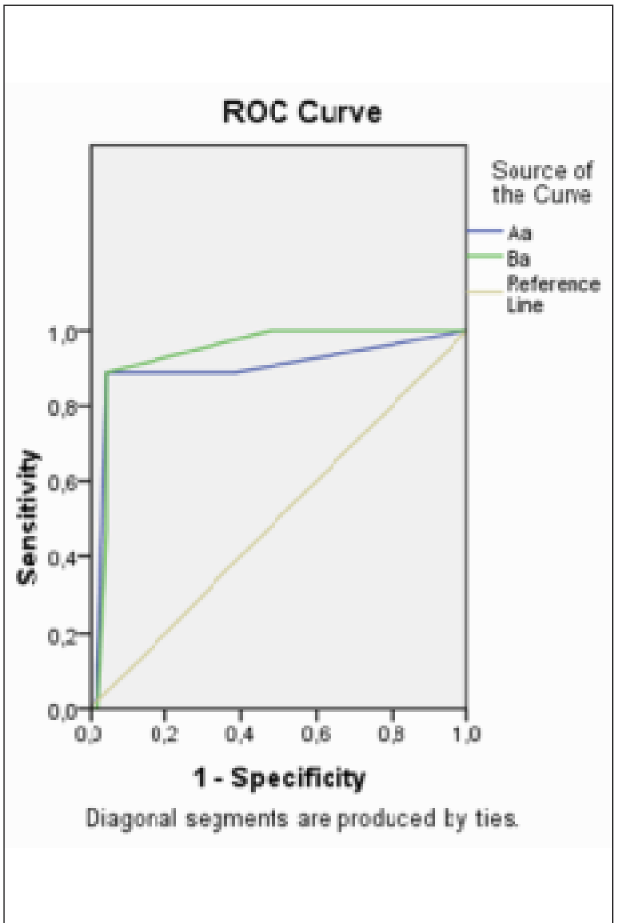

Figure 1: ROC for the Aa and Ba distances revealing its diagnostic potential for patients with Intrauterine devices *expulsion*

Table 2: The area under curve (AUC) cut of values and sensitivity and specificity for Aa and Ba distances in patients

	AUC	SE	95 % CI	Cut of value	Sensitivity (%)-specificity (%)
Aa distence	0.894	0.043	0.810-.979	-2.5	88.1-62.1
Ba distence	0.936	0.031	0.875-.997	-1.5	88.9-55.0

p<0.05 is statistically significant

Table 3: Risk factors for Intrauterine devices *expulsion*

	β	S.E.	Wald	Odds ratio	95% CI	p
Aa Distance	1.85	0.727	6.50	6.39	1.53-26.58	<.001
Ba distance	1.03	0.59	3.05	3.42	1.61-9.01	<.001

p<0.05 is statistically significant

Discussion

In this prospective case control study we evaluated POP-Q scores in patients with IUD who use it as a contraceptive method and divided patients into two groups whether IUD expulsion. To the best of our knowledge this is the first study whether the POP-Q scores is a predictive factor of IUD expulsion.

For this, we assign the patients ages, gravidity, parity, BMI, previous iud expulsion history, previous delivery type, length of uterine cavity, POP-Q scores and sonographic correct IUD location. The measure of Aa, Ba, Gh, Pb,distances were statistically significantly high in IUD expulsion group (group 2) (p<0,05).

ROC curve analysis showed that as the parameters of POP-Q score Aa and Ba distances were -2,5 cm and -1.5 cm with 88.1% sensitivity, 62.1% specificity and 88,9% sensitivity, 55.0% specificity, respectively, for detecting expulsion of IUD. In linear regression analysis, we found that lower Aa and Ba distances mostly attributable to expulsion of IUD (β coefficient: 1.85 - 1.03, $p<0.001$).

Many women find the IUD to be very convenient; because it requires little attention once it is inserted and has a high ability for protecting to undesired pregnancies. There are some limitations of this method such as abnormal uterine bleeding and expulsion of device. Maddeen et al reported %10.7 expulsion rates among patients with using copper t IUD. They suggested in their study that age, nulliparity, immediate postplacental insertion, and heavy menses were associated with expulsion (8). All these risk factors associated with strength of ligaments which holding the uterus in place. For instance, Grimes Et al. showed in their study that after postplacental insertion, IUD expulsion rates appear higher than interval insertion. This results support a relation between strength of ligaments which holding the uterus in place and IUD expulsion rates (9).

The degradation of pelvic anatomy that keeps the uterus in place provokes to alteration in the three-dimensional position of the uterus and this caused to change the effect of gravity on the uterine cavity. Due to the forces keep the uterus structural position changes, uterus three-dimensional reconstruction leads to a new array of uterus. Change of not only the axis of the forces that hold the uterus in place but also the gravidity effect to the endometrium axis lead to displaced the intrauterine devices to different locations. POP-Q system was a good current method to evaluate the pelvic organ prolapsed (10). The Aa and Ba distances evaluate anterior vaginal wall prolapse. In the midline of the anterior vaginal wall, 3 cm proximal to the external urethral meatus determined as Aa point and the most distal position of any part of the upper anterior vaginal wall from the vaginal cuff or anterior vaginal fornix to point Aa determined as Ba (4). Changing the distribution of forces holding the uterus in place can affect the position of uterus (6). In our study, we found an association between anterior vaginal wall prolapse and increased IUD expulsion rates. So we suggest that women with anterior vaginal wall prolapse have increased IUD expulsion risk. For this reason, patients should be follow up more closely.

In conclusion, we think that POP-Q assessment should be a promising marker in predicting IUD expulsion. Further randomized controlled studies with more participants are needed to evaluate the accurate effects of POP-Q assessment on patients using IUD for contraception.

References

1. Winner B, Peipert JF, Zhao Q, Buckel C, Madden T, Allsworth JE, et al. Effectiveness of long-acting reversible contraception. NEJ M 2012;366(21):1998-2007. Epub 2012/05/25.
2. Zhang J, Feldblum PJ, Chi IC, Farr MG. Risk factors for copper T IUD expulsion: an epidemiologic analysis. Contraception 1992;46(5):427-33. Epub 1992/11/01.
3. Aoun J, Dines VA, Stovall DW, Mete M, Nelson CB, Gomez-Lobo V. Effects of age, parity, and device type on complications and discontinuation of intrauterine devices. Obstetrics and gynecology 2014;123(3):585-92. Epub 2014/02/07.
4. Bump RC, Mattiasson A, Bo K, Brubaker LP, DeLancey JO, Klarskov P, et al. The standardization of terminology of female pelvic organ prolapse and pelvic floor dysfunction. Am J obstet and gynecol 1996;175(1):10-7. Epub 1996/07/01.
5. Swift S, Woodman P, O'Boyle A, Kahn M, Valley M, Bland D, et al. Pelvic Organ Support Study (POSST): the distribution, clinical definition, and epidemiologic condition of pelvic organ support defects. Am J obstet and gynecol 2005;192(3):795-806. Epub 2005/03/05.
6. Badi SS, Foarfa MC, Rica N, Grosu F, Stanescu C. Etiopathogenic, therapeutic and histopathological aspects upon the anterior vaginal wall prolapse. Romanian j morphology and embryology 2015;56(2 Suppl):765-70. Epub 2015/10/03.
7. Merki-Feld GS, Schwarz D, Imthurn B, Keller PJ. Partial and complete expulsion of the Multiload 375 IUD and the levonorgestrel-releasing IUD after correct insertion. Eur j obstet gynecol reprod biology 2008;137(1):92-6. Epub 2007/03/14.
8. Madden T, McNicholas C, Zhao Q, Secura GM, Eisenberg DL, Peipert JF. Association of age and parity with intrauterine device expulsion. Obstetrics and gynecology 2014;124(4):718-26. Epub 2014/09/10.
9. Grimes DA, Lopez LM, Schulz KF, Stanwood NL. Immediate postabortal insertion of intrauterine devices. The Cochrane database of systematic reviews 2010(6): CD001777. Epub 2010/06/18.
10. Gürbüz A. Karateke A. Kabaca C. Gedikbaşı Ali. A clinical study concerning sacrocolpopexy with prolene mesh and combinated operations in cases with vaginal vault eversion. Gynecol Obstet Reprod Med 2002;8(3):223-5.