Original Research

Does uterine position affect pain intensity during outpatient diagnostic hysteroscopy?

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Summary

Objective: To assess the impact of uterine position on pain intensity during outpatient diagnostic hysteroscopy. *Materials and Methods:* Retrospective data from 312 diagnostic hysteroscopy patients were evaluated. Pain was measured using a 10-cm visual analog scale (VAS). Analyses were performed to determine associations between uterine position [anteverted-anteflexed (AA), anteverted-retroflexed (AR), retroverted-anteflexed (RA), retroverted-retroflexed (RR)], and pain intensity during the procedure (VAS > 3 *vs.* VAS ≤ 3). Patient characteristics and clinical variables were evaluated using univariate and multivariate analysis. *Results:* Logistic regression analysis revealed no association between uterine position and pain intensity during outpatient diagnostic hysteroscopy [AA uterus, adjusted odds ratio (AOR) = 0.82, confidence interval (CI): 0.39–1.72; AR uterus, AOR = 0.65, CI: 0.25–1.71; RA uterus, AOR = 1.37, CI: 0.38–4.84; RR uterus, AOR = 0.84, CI: 0.22–3.17]. *Conclusion:* The present data suggest that uterine position does not affect pain intensity during diagnostic hysteroscopy.

Key words: Uterine position; Hysteroscopy; Pain; Version angle; Flexion angle.

Introduction

Outpatient diagnostic hysteroscopy is used to evaluate the endometrial cavity and is one of the most frequent types of gynecological examination [1]. The procedure is usually performed in the diagnostic work-up of patients with abnormal uterine bleeding, in whom a focal lesion is suspected [1]. In most cases, the availability of narrow instruments (≤ 3.5 mm) makes this feasible, and the success rate is 81–99% [2-4]. Despite the low failure rate, a major limitation of the procedure is the associated pain [5].

To better know which patient characteristics could affect pain perception, previous authors analyzed associations between selected clinical variables and pain intensity during outpatient diagnostic hysteroscopy. These studies found associations with different variables of interest, such as the nature of the distension medium, postmenopausal status, and procedure time [6-8].

No previous author investigated the effect of both the version and the flexion angles on pain perception in diagnostic hysteroscopy. Uterine position is of interest, since some studies have found associations between uterine version/flexion and pain intensity in some gynecological conditions such as dysmenorrhea, dyspareunia, and chronic pelvic pain [9-12].

Since hysteroscopy provides the passage of a hysteroscope into the cervical canal and uterine cavity (with their version and flexion angles), the investigation of perceived pain in relation to uterine position may be a novel topic to study. In this regard, the aim of the present study was to assess the impact of uterine position on pain intensity during outpatient diagnostic hysteroscopy.

Materials and Methods

A retrospective observational study was performed including women who underwent outpatient diagnostic hysteroscopy at the Cesare Magati Hospital, Scandiano, or the University Hospital of Modena (Modena, Italy) between January 2016 and August 2017. As the present study was merely observational and included only analysis of data from routine measurements, it did not require submission to the Ethics Committee. All patients provided written informed consent for the use of their data for research purposes.

The patients were in their early follicular phase with no previous history of hysteroscopic examination, a current successful hysteroscopy, and had a documented pre-hysteroscopic transvaginal ultrasound. The study exclusion criteria were chronic pelvic pain, dysmenorrhea, endometriosis, pathologies with a potential impact on pain perception (e.g., fibromyalgia), oncological disease (including endometrial cancer detected at hysteroscopy), and previous cervical conizaion. All hysteroscopies were performed by expert gynecologists in the hysteroscopic field.

Prior to the commencement of the procedure, the patient was asked to empty her bladder. All examinations were performed without anesthesia and using vaginoscopy. A saline solution was used as the distension medium, and a maximum pressure of 90 mmHg was applied. A 3.4-mm diagnostic single-flow sheath with a viewing angle of 30° was used.

The following types of data were retrieved from the medical records of each patient: personal medical history, pre-hystero-
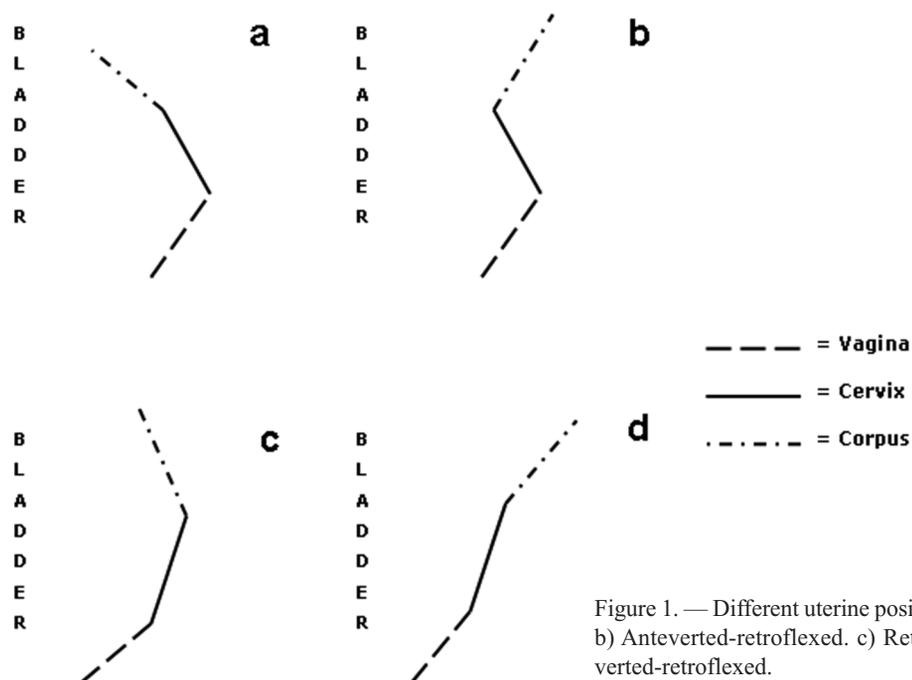
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Figure 1. — Different uterine positions. a) Anteverted-anteflexed. b) Anteverted-retroflexed. c) Retroverted-anteflexed. d) Retroverted-retroflexed.

scopic transvaginal ultrasound findings, hysteroscopic appearance, as documented by the gynecologist during the procedure, expectations of pain prior to the procedure, pain perception during the procedure, endometrial biopsy findings, and procedure time.

Usually, during diagnostic hysteroscopy, pain was assessed by the gynecologist at two time-points: (i) prior to the procedure, and (ii) immediately after the procedure and prior to the removal of any biopsy material. The patient was asked to quantify expected and perceived pain on a visual analog scale (VAS) ranging from 0 cm (no pain) to 10 cm (the strongest pain imaginable).

Patient characteristics of interest were: age, menopausal status, history of vaginal deliveries, history of cesarean section, body mass index [weight (kg)/height^2 (m^2)], current use of an oral contraceptive (OC) or hormonal replacement therapy (HRT), the presence of intracavitary lesions (polyps, myomas, or synechiae), the presence of extracavitary lesions (subserosal or intramural myomas, adenomyosis), VAS prior to and during the procedure, and procedure time.

Uterine position was determined using pre-procedure transvaginal ultrasound images and standard radiological guidelines [13]. The four uterine positions comprised anteverted-anteflexed (AA), anteverted-retroflexed (AR), retroverted-anteflexed (RA), and retroverted-retroflexed (RR). Here, the following definitions were used: (i) anteversion, cervix directed towards the bladder in relation to the vaginal axis, (ii) retroversion, cervix directed away from the bladder, (iii) anteflexion, uterine body directed towards the bladder in relation to the cervical axis, and (iv) retroflexion, uterine body directed away from the bladder (Figure 1).

The cohort was divided into two subgroups on the basis of pain intensity during the procedure (VAS score ≤ 3 vs. > 3) using cut-off values described in previous studies [14-16]. Inter-group comparisons of the variables of interest were performed in univariate analysis. To verify whether a given uterine position was associated with significant pain during hysteroscopy (dependent variable), each uterine position was evaluated as an independent variable in a multivariate analysis and adjusted for explanatory variables showing a p value ≤ 0.25 in the univariate analysis [17].

For continuous variables, the presence of a normal or non-normal distribution was determined using the Kolmogorov-Smirnov test. Categorical variables were evaluated using Chi-square analysis. The Mann-Whitney test was used to identify significant differences between two independent continuous variables. Finally, multivariate logistic regression analysis was performed

All statistical analyses were performed using MedCalc Statistical Software version 17.2. Statistical significance was set at $p < 0.05$.

Results

The data of 312 consecutive patients were analyzed retrospectively. Characteristics of the cohort are shown in Table 1. Univariate analysis revealed significant differences between the two subgroups. The VAS > 3 subgroup was associated with (i) older age (years) [median (interquartile range), 50 (46–57.5) vs. 48 (42.5–54.5), $p = 0.04$], (ii) postmenopausal status [81 (53.3 %) vs. 52 (32.8 %), $p = 0.0002$], (iii) a longer procedure time [> 60 seconds, 109 (71.7 %) vs. 34 (21.9 %), $p < 0.0001$], and (iv) a history of cesarean section [35 (23.3 %) vs. 20 (12.5 %), $p = 0.015$]. Conversely, the VAS ≤ 3 subgroup was associated with (i) current use of HRT or OC [23 (14.1 %) vs. 10 (6.7 %), $p = 0.025$] and (ii) history of vaginal delivery [115 (71.9 %) vs. 91 (60.0 %), $p = 0.025$] (Table 2).

Logistic regression analysis revealed no association between uterine position and pain intensity during outpatient diagnostic hysteroscopy: (i) AA uterus, adjusted odds ratio (AOR) = 0.82, confidence interval (CI): 0.39–1.72, $p = 0.61$, (ii) AR uterus, AOR = 0.65, CI: 0.25–1.71, $p = 0.39$, (iii) RA uterus, AOR = 1.37, CI: 0.38–4.84, $p = 0.62$, and (iv)

Table 1. — *Patient characteristics.*

Variables	Study participants (n=312) n (%)
Age (years)	
Median (interquartile range)	49.5 (44–55)
Postmenopausal status	133 (42.7)
Previous cesarean section	55 (17.7)
Current use of HRT or OC	33 (10.5)
Body mass index (kg/m^2)	
Median (interquartile range)	24.9 (21.5–28.9)
Procedure time (seconds)	
≤ 60	168 (54.0)
> 60	144 (46.0)
Previous vaginal delivery	206 (66.1)
Intrauterine lesions	128 (41.1)
Extrauterine lesions	76 (24.2)
Expected pain score	
Median (interquartile range)	5 (2–6.5)
Perceived pain score > 3	152 (48.3)
Uterine position	
Anteverted–anteflexed	184 (58.9)
Anteverted–retroflexed	60 (19.2)
Retroverted–anteflexed	32 (10.2)
Retroverted–retroflexed	36 (11.7)

HRT: hormone replacement therapy; OC: oral contraceptives.

RR uterus, AOR = 0.84, CI: 0.22–3.17, *p* = 0.80 (Table 3). Based on the results of the univariate analysis, all evaluations in the multivariate analysis were adjusted for the following variables: age, postmenopausal status, history of cesarean section, history of vaginal delivery, procedure time, and current use of HRT or OC.

Discussion

The present multivariate analysis revealed no association between uterine position and significant pain during outpatient diagnostic hysteroscopy. A total of 48% of patients reported a pain intensity of VAS > 3 during the procedure, which is similar to the rate reported by previous authors (43%) [7]. These data confirm that hysteroscopy is a procedure which causes a certain discomfort.

In most cases, diagnostic hysteroscopy is performed as an outpatient procedure and without anesthesia [5]. However, despite a high success rate, hysteroscopy is considered a painful examination [5]. Several studies demon- strated that a longer procedure time, the presence of cervical synechiae, and the use of normal saline solution as a distension medium were associated with a VAS score of > 3, while a history of vaginal deliveries was a protective factor in terms of intense pain [6-8]. More contentious associations have been reported for a history of cesarean section and postmenopausal status [18-20]. In a further study, Celik *et al.* demonstrated that bladder distension improved both the feasibility of hysteroscopy and pain scores [21].

A further clinical variable related to pain in several gynecological disorders is uterine position. There have been some studies showing associations between pain intensity and some uterine positions. For example, uterine retroversion was associated with dyspareunia and dysmenorrhea, while different version angles of the uterus were associated with chronic pelvic pain, dyspareunia, and dysmenorrheal [10-12]. Furthermore, in an investigation of women with pain syndromes, Ott *et al.* showed that laparoscopic ventrosuspension ameliorated discomfort in patients with a retroverted and retroflected uterus [22]. Finally, Cagnacci *et al.* demonstrated that menstrual pain was associated with uterine flexion, as measured using ultrasound images [23]. The present topic has never been specifically studied in the hysteroscopic field.

In previous studies investigating the pain perception during outpatient diagnostic hysteroscopy, only some authors included the impact of the version angle among their independent variables. Mazzon *et al.* found that the angle of the cervical canal (version angle) did not predict intense pain, while van Dongen *et al.* demonstrated that uterine anteversion was a protective factor in terms of pain intensity [8, 9]. In the latter case, no hypothesis was proposed to explain that outcome [9]. The present results are consistent with those of Mazzon *et al.*, and suggest that the version/flexion angle combination is not associated with pain intensity during outpatient diagnostic hysteroscopy.

Although it does not fall within the scope of this study, two hypotheses can be formulated to explain the mechanisms underlying these outcomes. First, during the passage of the hysteroscope, the diverse uterine angles may change into an almost uniform straight line (close to 180°), thus minimizing the deviation of the instrument during its passage through the uterine canal (cervix and uterine body), regardless of the uterine position. To test this hypothesis, a prospective study is warranted to evaluate a possible change in uterine angle during hysteroscopy. Second, if no change in version/flexion angle occurs during hysteroscopy, it is likely that any direction traced by the hysteroscope in the uterine canal may have no impact on variables associated with more pronounced pain, such as procedure time.

Although the present study generated no significant findings, the results may have a potential implication in terms of clinical practice. In the experience of the present authors, patients with particular uterine positions, in particular a retroverted or retroflected uterus, are generally reluctant to undergo any gynecological examination, including outpatient diagnostic hysteroscopy, due to the potential discomfort. In this regard, data that confirm that uterine position is not a source of pain are of direct relevance to routine clinical practice, and may reduce pre-procedure anxiety in patients referred for hysteroscopy.

The present investigation had two main limitations. First, the retrospective nature of the study. Second, no specific measurements were made of the version and flexion angles. These limitations should be addressed in a future prospec-

Table 2. — *Univariate analysis of independent variables in women with significant and non-significant pain at hysteroscopy.*

Independent variables	Dependent variable: pain score on VAS		
	Pain ≤ 3 n (160)	Pain > 3 n (152)	*p* value
Age (years)			
Median (interquartile range)	48 (42.5–54.5)	50 (46.0–57.5)	0.04
Post-menopausal status			
n (%)	52 (32.8)	81 (53.3)	0.0002
Previous cesarean section			
n (%)	20 (12.5)	35 (23.3)	0.015
Current use of HRT or OC			
n (%)	23 (14.1)	10 (6.7)	0.025
Body mass index (kg/m^2)			
Median (interquartile range)	24.5 (21.83–28.98)	25.0 (21.49–28.8)	0.69
Procedure time (seconds)			< 0.0001
≤ 60	125 (78.1)	43 (28.3)	
> 60	35 (21.9)	109 (71.7)	
Previous vaginal delivery			
n (%)	115 (71.9)	91 (60.0)	0.025
Intrauterine lesions			
n (%)	63 (39.1)	65 (43.3)	0.54
Extrauterine lesions			
n (%)	35 (21.8)	41 (26.6)	0.29
Expected pain score			
Median (interquartile range)	5 (2–6)	5 (2–7)	0.64

VAS: visual analogue scale; HRT: hormone replacement therapy; OC: oral contraceptives.

Table 3. — Logistic regression analysis showing associations between uterine positions and significant pain at hysteroscopy.

Independent variable	Dependent variable: pain score on VAS > 3		
	AOR	95% CI	*p* value[a]
Uterine position			
Anteverted – anteflexed	0.82	0.39 to 1.72	0.61
Uterine position			
Retroverted – anteflexed	1.37	0.38 to 4.84	0.62
Uterine position			
Retroverted – retroflexed	0.84	0.22 to 3.17	0.80
Uterine position			
Anteverted – retroflexed	0.65	0.25 to 1.71	0.39

[a]*Adjusted for: age, post-menopausal status, previous cesarean section, procedure time, previous vaginal delivery, current use of hormone replacement therapy or oral contraceptives. VAS: visual analogue scale; AOR: adjusted odds ratio; CI: confidence intervals.*

tive study. However, a strength of the study was the application of stringent inclusion and exclusion criteria. Although these limited the sample size, they maximized data accuracy. A further strength of the study was that the analyses generated novel preliminary data.

Conclusion

The results of the present retrospective observational study suggest that uterine position does not predict pain intensity during outpatient diagnostic hysteroscopy.

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