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Original Article

Randomised trial on pain reduction in hysterosalpingography - a modified technique without vulsellum forceps

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Abstract

Background: Pain is the most common side effect of hysterosalpingography (HSG) and partly arises from vulsellum placement on the cervix and cervical traction.

Objective: To study the effect of conducting HSG without grasping the cervix with vulsellum forceps on the time taken to complete the procedure, pain experienced by the participants and diagnostic quality of HSG images produced.

Materials and Methods: A randomized controlled trial of 64 consenting adult women referred to the Radiodiagnostic department for HSG from July to December 2020 was carried out. The women were consecutively selected and randomly distributed into two groups: Group 1 - no cervical grasp and Group 2 – with cervical grasp with vulsellum forceps. HSG was done using a fluoroscopy machine, following the standard hospital protocol with speculum, Leech Wilkinson cannula and Urografin 76%. Procedure time, procedure pain using the visual analog scale and diagnostic quality of images were assessed. Data analysis was done using Microsoft Excel and SPSS software version 22.

Results: The overall mean duration of the procedure was 12.59 minutes. There was no significant difference in the procedure duration between both groups. The overall mean pain scores immediately and 15 minutes after the procedure were 4.83 and 2.23 respectively. Significant differences in pain scores were seen in the immediate post procedure 3.94 (group 1) versus 5.72 (group 2) and 15 minutes post procedure 1.75 (group 1) versus 2.72 (group 2). After adjusting for confounders, the pain score was noted to be significantly related to the HSG technique with vulsellum use associated with the higher immediate post HSG pain score. No significant difference was seen in the diagnostic image quality between group I and II.

Conclusion: The elimination of vulsellum forceps during hysterosalpingography was associated with reduced pain in the immediate and 15 minutes after the procedure, without significantly increasing the procedure duration. It had no deleterious effect on the image quality.

Keywords: HSG, Technique, Pain, Cervical grasp, Vulsellum, Procedure duration.

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Introduction

Hysterosalpingography (HSG) is a radiologic modality used in investigating female factor infertility [1]. It involves the instillation of contrast or dye through the cervix to outline the uterine cavity and establish tubal patency [1]. It is often associated with pain, in some cases warranting sedation and pain medication.

Pain is the most common side effect of HSG and arises from tenaculum placement on the cervix, cervical traction, instillation of dye through a cannula and tubal spillage of dye [2]. A study by Atalabi et al on x-ray hysterosalpingography showed that cervical traction with the introduction of cannula was the most painful part of the procedure with median pain of 6 on a 0-10 visual acuity scale [3].

Grasping of the cervix using a tenaculum/vulsellum forceps is usually done for adequate stabilization of the cannula [3]; however, this can result in more pain and distress and a negative experience if not placed adequately. Some studies have shown that gentle slow placement reduces the pain, but does not eliminate the pain completely [4,5]. These studies were conducted for intrauterine device insertion. Variations for grasping the cervix have not been considered for HSG.

A study by Unlu et al on comparison of four different pain relief methods during hysterosalpingography was able to eliminate pain from tenaculum placement using oral naproxen tablets, injections and topical creams [6]. These drugs are not without their own side effects.

The aim of the study was to ascertain whether conducting HSG without grasping the cervix with vulsellum forceps was feasible and to document the effect on time taken to complete the procedure, pain experienced by the participants and morphology of HSG images *vis* a *vis* the outlined uterine cavities and tubes.

Materials and methods

This was a prospective study and a randomized controlled trial of consenting adult women who were referred to the hospital for HSG on account of infertility. Approval for the study was obtained from the Health Research Ethics Committee of Lagos University Teaching Hospital (ADM/DCST/HREC/APP/2511). All patients who presented at the center between 15 July and 14 December 2020 were included into the study. Sixty four (64) consecutive women who were referred for the procedure were randomly distributed into 2 groups, namely group 1 no cervical grasp and group 2 with cervical grasp.

Odd numbers were pre-assigned as group 1 and even numbers were pre-assigned as group 2. Each participant was asked to pick an envelope containing a number. The envelope is opened by the patient and the number was handed over to the radiologist.

Informed oral and written consent was obtained from the participants prior to the commencement of the study. A proforma to obtain sociodemographic, clinical and gynaecological history was administered to the patient. Women with known stenotic cervical os, acute cervicitis, intense anxiety, a history of any allergy to radio-opaque dye, any recent history of acute pelvic inflammatory disease, any abnormal vaginal discharge (known to exacerbate and flare up following HSG), any other cause of chronic pelvic pain, a positive β-human chorionic gonadotropin test, or were <18 years of age and participants with patulous cervix were excluded from the study.

Sample size determination was done using the formula for equivalence design of randomized control trial as detailed below [7]:

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Prevalence of women with moderate to severe pain during tenaculum placement: 78.7% p = 0.79 [3].

Minimum acceptable margin $\delta_0 = 0.21$

$$N = 2 \times \left(\frac{z_{1-\frac{\alpha}{2}} + z_{1-\beta}}{\delta_0} \right)^2 \times p \times (1-p)$$

$$N = 2 \, x \left[\frac{1.96 + 0.68}{0.19} \right] x \, 0.79 \, x \, 0.21 \; = 52.7.$$

Twenty percent (20%) attrition was added, giving a total of 64 participants

Technique of Hysterosalpingography at the centre

A fluoroscopy machine Apelem VBS and a bucky table were used in the procedure. Participants were booked during the proliferative phase (day 8 – 12) of the menstrual cycle, when the endometrium was thinnest.[1] They were advised to abstain from sexual intercourse from the start of their period till after the procedure.

On the day of the procedure, an intravenous line was secured prior to the procedure, for the purpose of resuscitation in case of contrast reaction. Hospital gowns were provided to the patients to wear after removing their clothes and underwear.

Scout films (antero-posterior [AP] of the pelvis) were obtained to ascertain good radiographic factor settings and also to detect any premorbid condition.

The patients were placed in the lithotomy position, with the thighs flexed and abducted, the feet resting in stirrups, and the buttocks extending slightly beyond the edge of the examining table for the ease of examination.

The perineum and vagina were cleaned with an antiseptic using a sponge holding forceps and sterile gauze. The vagina and perineal area were cleansed before speculum insertion.

The patients' external genitalia were inspected. Under an aseptic condition and bright illumination, the labia were parted and a disposable plastic Cusco's speculum lubricated with xylocaine gel was inserted into the vagina with the blades held obliquely and pressure exerted toward the posterior vaginal wall to avoid the more sensitive anterior wall and urethra. The blades were rotated into a horizontal position, and opened after full insertion, then maneuvered so that the cervix came into full view. The speculum was secured with the blades open by tightening the thumbscrew.

For group 1, the vulsellum forceps were not utilized. For group 2, the anterior lip of the cervix was grasped with a vulsellum forceps. Participants were blinded to the group they fell in.

An appropriate size Leech Wilkinson's cannula was selected and inserted into the distal end of the cervical canal, after prefilling with contrast medium to eliminate air bubbles. While maintaining a tight seal between the cervical canal and the cannula, a water-soluble contrast medium, Urografin 76% (20 mL contains sodium amidotrizoate 200 g and meglumineamidotrizoate 1320 g, with iodine concentration of 370 mg/mL, diluted with water for injection in ratio 1:1, to prevent peritoneal irritation) was instilled slowly into the uterine cavity and the fallopian tubes under fluoroscopic guidance. About 7-20 mL of contrast medium was instilled with higher volume in grossly dilated uterine cavities. The contrast medium was instilled in a slow and steady fashion while watching its progress under fluoroscopy.

Before film exposure, the position of the marker was ascertained. Early radiograph of the uterine cavity when it first fills with contrast medium was obtained because further instillation of contrast medium can sometimes obscure intracavitary pathology. Continuous contrast medium instillation and intermittent fluoroscopy

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screening was done, and the film exposed when the tubes filled and spilled into the peritoneal cavity. Patients were turned to right or left oblique position to delineate the fallopian tubes better if necessary.

Pelvic radiographs were obtained in AP supine and right and left oblique positions during the instillation of the contrast medium. Delayed radiographs were obtained 30 minutes after completion of the procedure, as necessary, to assess the degree of loculation of contrast medium in the peritoneal cavity.

Measures

A. Procedure duration in each patient was determined.
Timing commenced after insertion of speculum and ended just before the removal of the speculum.

B. Procedure pain.
In both groups, the pain of the procedure was scored immediately after and 15 minutes after the HSG completed and instruments were removed.
Patients were asked to rate their pain during HSG using a 0 to 10 visual analogue scale (VAS), (0 = no pain, 10 = worst possible pain). VAS scores were measured and recorded in real time by the same radiologist.

C. Diagnostic quality of images:

1. Poor (uterine cavity, tubes and cervical canal not clearly depicted)
2. Average (uterine cavity and tubes clearly depicted, excluding the cervical canal)
3. Good (uterine cavity, cervical canal and tubes clearly depicted)

Image analysis

One radiologist performed all the procedures while the films were reviewed by performing radiologist with two other experienced radiologists reviewing the HSG images with consensus.

Data analysis

The data was entered using Microsoft Excel and analyzed using the SPSS software, Chicago, IL, USA for Windows version 22 program. Chi-square test was used for comparison between categorical variables and Student T-test for comparison between continuous variables in both groups. The different pain scores were tested for normality by Shapiro-Wilk test. A multivariate stepwise linear regression model was conducted to assess if the use of vulsellum forceps was associated with increased pain. A P value <0.05 was regarded as a significant value.

Results

Demographic and clinical characteristics

A total of 64 consenting women who presented for hysterosalpingography procedure at the radiology department/diagnostic centre were included in the study, randomized into two groups; group 1 without cervical grasp (32 women) and group 2 (32 women) with cervical grasp (Table 1).

The mean ages were 35.63 years and 35.94 years for groups 1 and 2 respectively with no significant difference in age between the comparison groups (p-value > 0.05).

The overall mean duration of the procedure was 12.59 minutes. Group I had a higher mean of 13.2 minutes, which was, however, not statistically significant.

The mean pain scores immediately and 15 minutes after the procedure were also lower in group 1(3.94; 1.75) compared with group 2 (5.72, 2.72).

The overall mean pain reduction score was also lower in group 1 than in group 2 (2.19 versus 2.59). This was, however, not statistically significant.

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Table 1. *Demographic and clinical characteristics of the study population.*

Clinical characteristics	No vulsellum			Vulsellum			Total			p-value
	N	Range	Mean ± SD	N	Range	Mean ± SD	N	Range	Mean ± SD	
Age(years)	32	28-43	35.63 ± 3.97	32	28-43	35.94 ± 3.37	64	28-43	35.78 ± 3.66	0.736
Number of days post-menses	31*	8-12	10.35 ± 1.11	31*	9-12	10.71 ± 0.86	62	8-12	10.53 ± 1.00	0.115
Parity	32	0-4	1.00 ± 1.16	32	0-4	1.22 ± 1.26	64	0-4	1.11 ± 1.21	0.934
Duration of HSG(minutes)	32	5-45	13.22 ± 7.53	32	5-20	11.97 ± 3.33	64	5-45	12.59 ± 5.81	0.394
Pain score immediate post-HSG	32	0-8	3.94 ± 1.98	32	4-9	5.72 ± 1.37	64	0-9	4.83 ± 1.92	<0.001
Pain score 15minutes post-HSG	32	0-8	1.75 ± 1.81	32	1-8	2.72 ± 1.80	64	0-8	2.23 ± 1.86	0.036
Pain score reduction from 0 – 15 minutes	32	-3-7	2.19 ± 2.05	32	-2-7	3.00 ± 1.85	64	-3 -7	2.59 ± 1.98	0.101

**Two women had amenorrhoea, one in each group*

Thirty (30; 46.8%) participants were sent on account of primary infertility and twenty-nine (29, 45.3%) on account of secondary infertility. Twenty-eight (28; 43.8%) patients had a history of previous HSG and only 4(6.3%) had done sonohysterosalpingography (Table 2).

Table 2. *Clinical characteristics of participants in each group.*

Clinical characteristics		Group 1: No vulsellum (n = 32) Frequency (% of total)	Group 2: Vulsellum (n = 32) Frequency (% of total)	p-value
Indication	Primary infertility	15 (23.4)	15 (23.4)	0.346
	Secondary Infertility	13 (20.3)	16 (25)	
	Amenorrhoea	1 (1.6)	1 (1.6)	
	Uterine Fibroids	3 (4.7)	0 (0)	
History of previous pregnancy	No	16 (25)	14 (21.9)	0.616
	Yes	16 (25)	18 (28.1)	
History of miscarriage/ abortion	No	17 (26.6)	16 (25)	0.802
	Yes	15 (23.4)	16 (25)	
Past history of Pelvic Inflammatory Disease	No	15 (23.4)	15 (23.4)	1.000
	Yes	17 (26.6)	17 (26.6)	
History of Lower Abdominal Pain	No	22 (34.4)	24 (37.5)	0.578
	Yes	10 (15.6)	8 (12.5)	
History of Lower Abdominal Pain	No	10(15.6)	15 (23.4)	0.200
	Yes	22 (34.4)	17 (26.6)	
Previous Pelvic USS study	No	3 (4.7)	4 (6.2)	0.689
	Yes	29 (45.3)	28 (43.8)	
Previous Sono-HSG Study	No	31 (48.4)	29 (45.3)	0.302
	Yes	1 (1.6)	3 (4.7)	
Previous HSG Study	No	20 (31.2)	16 (25)	0.313
	Yes	12 (18.8)	16 (25)	
History of Previous Surgery	No	25 (39.1)	23 (35.9)	0.564
	Yes	7 (10.9)	9 (14.1)	

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Association between technique of HSG and pain score immediately after and 15 minutes after procedure

In view of the non-normality of the distribution of pain score immediately after the procedure, with respect to the HSG technique (p<0.001; Shapiro-Wilk test), the independent-samples Mann-Whitney U non-parametric test was employed, which demonstrated a significant association (p< 0.001) between the pain score immediately after procedure and the technique of HSG. The performance of HSG without vulsellum is associated with a reduced pain score immediately after the procedure. There was also significant association between the technique of HSG and the pain score 15 minutes after the procedure (P= 0.007) (Table 3).

Table 3. *Association between technique of HSG and pain score immediately after and 15 minutes after procedure.*

		Pain score immediately after HSG		
Technique of HSG	**n**	**Mean rank**	**Standardised test statistic**	**p-value**
No vulsellum	32	23.56	3.936	<0.001
Vulsellum	32	41.44		
		Pain score 15 minutes after HSG		
Technique of HSG	**n**	**Mean rank**	**Standardised test statistic**	**p-value**
No vulsellum	32	26.41	2.699	0.007
Vulsellum	32	38.59		

Association between the technique of HSG and reduction in the pain score from 0 – 15 minutes after HSG

Using the non-parametric Mann-Whitney U test because of the non-normality in the distribution of the reduction in pain score from 0 – 15 minutes after HSG (Shapiro-Wilk test), there is no significant association (p = 0.907) between the technique of HSG and the pain score reduction (Table 4).

Table 4. *Association between technique of HSG and reduction in pain score from 0 – 15 minutes after HSG.*

	Pain score reduction from 0 to 15 minutes after HSG			
Technique of HSG	**n**	**Mean rank**	**Standardised test statistic**	**p-value**
No vulsellum	32	28.69	1.671	0.095
Vulsellum	32	36.31		

Association between technique of HSG and procedure duration

Using the non-parametric Mann-Whitney U test because of the non-normal distribution of the procedure duration (p<0.001; Shapiro-Wilk test), we found no significant association (P= 0.907) between the technique of HSG and the procedure duration (Table 5).

Table 5. *Association between technique of HSG and procedure duration.*

	Procedure duration			
Technique of HSG	**n**	**Mean rank**	**Standardised test statistic**	**p-value**
No vulsellum	32	32.23	0.117	0.907
Vulsellum	32	32.77		

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Relationship between the pain score immediately after the procedure and demographic/clinical characteristics/HSG technique

Multiple linear regression was performed to model the relationship between pain score immediately after the procedure and demographic/clinical characteristics/HSG technique, while adjusting for the presence of confounders. The result showed that the pain score immediately after the procedure, adjusted for other possible confounders, is significantly related to HSG technique; the use of vulsellum is associated with a higher immediate post-HSG pain score. The other parameters do not, however, show a significant relationship with the immediate post-HSG pain score (Table 6).

Table 6. *Relationship between pain score immediately after procedure and demographic/clinical characteristics/HSG technique.*

Model	Standardized Coefficients	t	p-value	95.0% Confidence Interval	
	Beta			Lower Bound	Upper Bound
(Constant)		-0.362	0.719	-6.214	4.316
Age	0.143	1.057	0.295	-0.067	0.217
Duration of HSG	0.035	0.246	0.807	-0.082	0.105
Technique of HSG	0.463	3.911	<0.001	0.857	2.665
Ever pregnant	-0.065	-0.211	0.834	-2.588	2.096
History of abortion	-0.101	-0.309	0.759	-2.871	2.105
Past history of PID	-0.077	-0.542	0.590	-1.381	0.794
Any lower abdominal pain	-0.138	-0.921	0.361	-1.850	0.686
Any history of fibroid	-0.010	-0.081	0.936	-1.034	0.954
Any previous HSG	0.122	0.895	0.375	-0.581	1.516
Any pelvic surgery	0.020	0.151	0.881	-1.087	1.264
Reason for test	0.144	0.838	0.406	-0.505	1.228

The relationship between the pain score 15 minutes after the procedure and the demographic/clinical characteristics/HSG technique

Multiple linear regression was again performed to model the relationship between the 15-minute post-procedure pain score and the demographic/clinical characteristics/HSG technique, while adjusting for the presence of confounders. The result showed that the 15-minute post-procedure pain score, adjusted for other possible cofounders, is significantly related to the HSG technique, and the past history of pelvic inflammatory disease (PID). Hence, the use of vulsellum is associated with higher 15-minute post-procedure pain score. Similarly, the past history of PID was associated with the higher 15-minute post-procedure pain score. The other parameters do not, however, show a significant relationship with the 15-minute post-HSG pain score (Table 7).

Table 7. *Relationship between pain score 15 minutes after procedure and demographic/clinical characteristics/HSG technique.*

Model	Standardized Coefficients	t	p-value	95.0% Confidence Interval	
	Beta			Lower Bound	Upper Bound
(Constant)		0.579	0.565	-3.528	6.389
Age	-0.087	-0.666	0.509	-0.178	0.090
Duration of HSG	0.067	0.492	0.625	-0.066	0.109
Technique of HSG	0.235	2.047	0.046	0.017	1.719
Ever pregnant	-0.088	-0.296	0.769	-2.531	1.881
History of abortion	-0.339	-1.073	0.288	-3.595	1.091
Past history of PID	0.301	2.176	0.034	0.086	2.134
Any lower abdominal pain	-0.154	-1.059	0.295	-1.824	0.565
Any history of fibroid	-0.247	-2.000	0.051	-1.869	0.003
Any previous HSG	0.258	1.947	0.057	-0.030	1.945
Any pelvic surgery	0.046	0.352	0.726	-0.913	1.302
Reason for test	0.253	1.523	0.134	-0.197	1.435

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Diagnostic quality of images

Diagnostic quality of images was good in both the vulsellum and non-vulsellum groups while no case was poor in either group. Hence, there is no significant difference (P = 1.000) in the diagnostic image quality between the vulsellum and no-vulsellum groups (Table 8, Figures 1,2).

Table 8. *Association between technique of HSG and diagnostic quality of the images.*

Technique of HSG	Diagnostic quality of the images			Total	p-value
	Poor	Average	Good		
No vulsellum	0	2	30	32	
Vulsellum	0	1	31	32	1.000
Total	0	3	61	64	

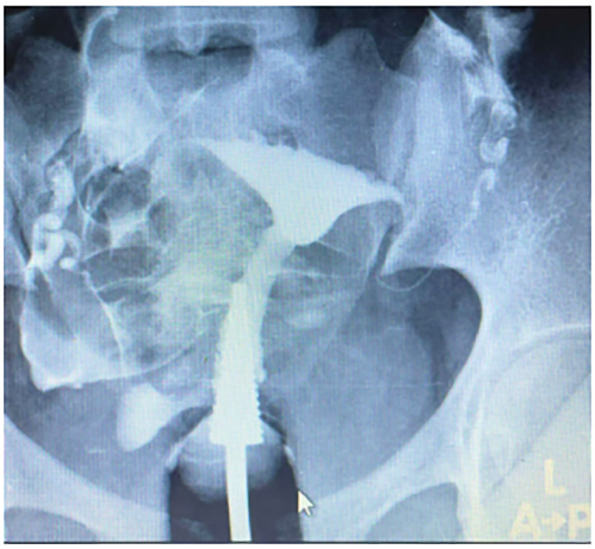

Figure 1. *HSG image without vulsellum: This demonstrates the uterine cavity and tubes with bilateral free peritoneal contrast spillage. Diagnostic image quality was 3 -good.*

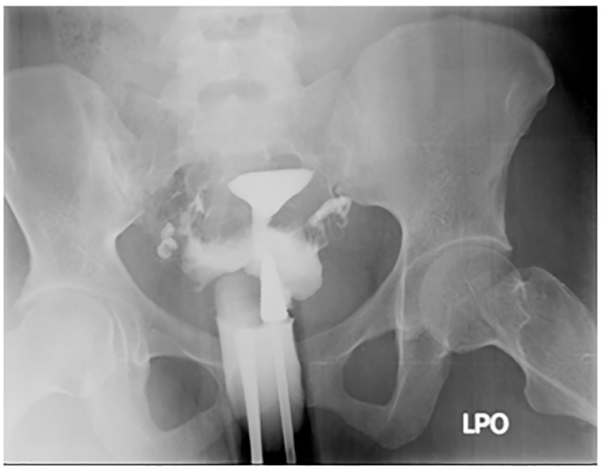

Figure 2. *HSG image with vulsellum shows the uterine cavity and tubes with bilateral free peritoneal contrast spillage. Diagnostic image quality was 3 - good.*

Discussion

Several studies have been done to assess ways of pain alleviation during hysterosalpingography. Pain is experienced at various stages in the procedure; The main factors producing pain are cervical traction and fast instillation of contrast into the uterine cavity causing uterine contraction [3]; hence, slow instillation of the dye is recommended to obviate this. An individual radiologist is also one of the factors associated with pain during and after HSG. This study aimed to assess the possibility of pain reduction through the elimination of usage of vulsellum during the procedure.

The mean age of participants who presented for the hysterosalpingography procedure in this study on account of infertility is similar to those of other studies [8,9,10]. Mean ages in recent studies range from 32-36 years.

The majority of the participants (92%) had infertility as indication for hysterosalpingography. Less than half (45%) were on account of secondary infertility. This did not correlate with that of the study by Onwuchekwa et al, in which they documented that 81.6% of their 250 study participants was on account of secondary infertility [8]. Toufig et al noted that the indication depended on the

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age group being researched. They noted that in the 15-25 year age group, the sole indication was primary infertility, while in the 26-45 year age group, secondary infertility dominated [11]. The difference noted may be due to the smaller sample size in this study.

About 43-48% of the participants had a previous history of hysterosalpingography and abortions/miscarriages, the percentage is higher than seen in Toufig et al likely because they only recorded those who had complications such as infections or pathologies such as blocked tubes in their history taking [12].

Sonohysterosalpingography, also called hysterosonography is the technique implemented under ultrasound guidance which involves the introduction of a catheter into the endometrial cavity and instillation of sterile saline to outline the uterine cavity. This provides detail of the endometrial lining. It is a procedure often done prior to assisted conception [12]. Only 6.3% of the participants had done sonohysterosalpingography, which suggests preference for HSG over the former, most likely because of the limitation of sonohysterosalpingography in assessing the tubes [13].

The procedure duration of HSG varies per location or institution. [13] It has been recorded as taking 10 to 45 minutes [14-16], which includes the time for the patient to lie on the couch and take the first film till the patient is off the couch. Another study that discussed timing during HSG only discussed the intervals between the first HSG image and distal tubal filling, and interval between distal tubal filling and the last HSG image. The intervals ranged from 8.4 secs to 80 secs [17]. The procedure duration in this study ranged from 12 to 21 minutes, excluding the time for patient preparation.

There was no significant difference in duration in the non-vulsellum group, compared with the vulsellum group. To our knowledge, no study has shown the time between post speculum insertion and pre speculum removal, neither have they shown timing of vulsellum placement.

Many side effects of HSG have been described such as nausea, vomiting, infection, bleeding and pain. Pain is the most common side effect of HSG and one which causes fear and anxiety among women, with a negative impact on patient cooperation [18]. According to Unlu et al, most of the women found the procedure acutely painful at the point of placement of the tenaculum, cervical traction, dye instillation and tubal spillage [7]. Grasping the cervix with a tenaculum or vulsellum may release prostaglandins which can initiate uterine cramps resulting in pain [19]. Liberty et al also stated in their study that cervical instrument insertion was the most painful step of the procedure [20]. This was also noted in this study as using the visual analog scale, vulsellum placement was associated with a higher immediate post-HSG pain score, compared with non-vulsellum placement. A similar finding was described by Atalabi et al [3]. It was discovered in Unlu et al's study on comparison of four different pain relief methods during HSG that local application of lidocaine cream in addition to 500mg NSAID nonsteroidal anti-inflammatory drug (Naproxen®) helped to reduce the pain [7]. Yet, another study hypothesized the use of non-opioid analgesia as the most preferred prophylactic method; however, a Cochrane review reported that beneficial effect of the analgesia could not be ascertained, compared with the placebo up to 30 minutes after the procedure [21]. Intracervical and paracervical blocks have also been researched by some, this enabled patients to tolerate pain during tenaculum placement and subsequent traction [9,19,22]. These blocks are done by submucosal injection of 2% lidocaine at 12'0'clock, 4'o'clock and 8'o'clock positions, lateral and posterior to the uterocervical junctions. This is not without side effects of injecting the wrong sites and having lidocaine in the blood stream [19,22].

Other ways of eliminating pain involve the use of balloon catheters [23]. Balloon catheters have been seen to cause less pain compared with metal cannulas; however, this does not eliminate the pain from tenaculum placement [24]. We believe for some patients, even with balloon catheters, tenaculum or vulsellum placement can be completely eliminated.

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The overall mean score for 15 minutes post procedure pain was reduced compared with the immediate post procedure. Also noted is a reduction in the pain score for those in the non-vulsellum group compared with the vulsellum group. According to Ayida et al, pain perception gradually decreases, ending 30 minutes after the procedure in a high percentage of patients with mild to moderate pain during the procedure [25].

Other techniques have also eliminated the use of vulsellum or tenaculum [26]. One of such is the use of a cervical vacuum cup. The cup stays on the cervix through a vacuum and contrast is then instilled into the uterine cavity. While this eliminates the pain from tenaculum placement, when compared with the balloon catheter, the procedure was harder to perform and took longer time. The balloon catheter was also better tolerated.

For patients with patulous cervix, larger catheters or 8F paediatric Foley catheters can be utilized instead of the 5F catheters [27].

The type of procedure did not affect the image quality. Both the vulsellum and non-vulsellum groups gave good quality images.

Limitation:
The study was institution-based.

Conclusion

The elimination of vulsellum forceps during hysterosalpingography was associated with reduced pain in the immediate and 15 minutes after the procedure, without significantly increasing the procedure duration. It had no deleterious effect on the image quality.

Multicentre studies are advised to confirm our findings with a larger sample size.

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