

OUTCOME OF REAL TIME SELF-VISUALIZATION OF RIGID CYSTOSCOPY PROCEDURE ON PROCEDURAL PAIN IN MALE PATIENTS

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ABSTRACT

Cystoscopy is a minimally invasive procedure that allows the surgeon to share the findings with the patient and colleagues either in real-time or as a captured image. The purpose of this study is to evaluate the level of pain in patients undergoing the procedure and to evaluate the utility of real-time self-visualization in pain experienced by the patient. A total of 169 male patients, who underwent rigid cystoscopy, were taken and divided into two groups using simple random sampling method. Patients in the case group were allowed to view their cystoscopy procedure in the monitor simultaneously with the surgeon performing the procedure whereas the control group were not allowed to view the procedure in the monitor. At the end of the procedure, another observer in the operation theater asked the patients regarding the pain experienced by them via VAS numeric scale. The results were compared between two groups. The visualization of procedure in the monitor during the procedure had experienced significant relief in pain by the patients (95% CI, p-value <0.001). Patients undergoing cystoscopy and double J (DJ) removal procedure had average pain 1.45 times higher than those undergoing only cystoscopy. Furthermore, visualization was equally helpful in alleviating pain in both, cystoscopy only (95% CI, p-value <0.005) and cystoscopy with DJ removal (Fischer's exact, p=0.003) groups. Real-time visualization was associated with lesser pain scores in cystoscopy and related procedures.

KEYWORDS

Cystoscopy, double J stent, visualization, VAS

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INTRODUCTION

Cystoscopy is a very common minimally invasive procedure where modern video endoscope is introduced through the urethra. The purpose can be diagnostic such as inspection of lower urinary tract,¹ taking a biopsy as well as therapeutic such as removal of the double J (DJ) stent. The benefit is it allows the surgeon to share the findings with the patient and colleagues either in real time or as a captured image.¹

Patients frequently experience pain² and discomfort during the procedure due to which it becomes challenging for the surgeon to properly complete the procedure.³ Various attempts have been made in the past to make cystoscopy less painful. Over the past few years, evidences have been found that patients benefit from watching their cystoscopy in real time.⁴⁻⁶ Plenty of literature can be found on flexible cystoscopy but there is a paucity of data on rigid cystoscopy. So the aim of this study was to evaluate self-reported pain levels associated with the rigid cystoscopy and whether men tolerate office-based cystoscopy better when simultaneously viewing their procedure or not.

MATERIALS AND METHODS

This was an observational comparative study conducted at the Nepal Medical College and Teaching Hospital from May 2022 to June 2023. After approval by the institutional review committee (IRC), sampling was started. Procedure was explained and written informed consent was taken from all the patients.

Inclusion criteria:

- All patients undergoing cystoscopy for either diagnostic purpose or for DJ removal

Exclusion criteria:

1. Patients requiring general or spinal anesthesia i.e. analgesia other than 2% lignocaine jelly.
2. Patient who needs urethral dilation, catheterization and urethrotomy during the procedure.
3. Patient who doesn't respond or understand the command.
4. Patient who has visual impairment.
5. Age of patient below 18 years as in our hospital under 18 are seen by pediatric surgery.
6. All patients from the study group who did not want to visualize the procedure on the screen and patients from the control group

who wanted to visualize the procedure on the screen.

However, cystoscopy was performed in all patients, irrespective of the inclusion or exclusion into either groups.

All the patients were taken to the operating room after a negative urine culture report. Prior to entry into the operating room, patients were briefed about the VAS pain scoring system and the briefing was repeated just prior to insertion of the lignocaine jelly. In the operating room, consecutive patients were randomly assorted into two groups, first being the cases group in which the patients were allowed to watch the procedure in the monitor being performed by the urologist and second being the control group in which the patients were not allowed to view the monitor by using a screen to block the monitor towards patient's side.

As a part of procedure being performed in these cases, the patients were asked to empty their bladder before the procedure and positioned in dorsal lithotomy position on the operation theatre table. Instrument involved were a 22F rigid cystoscopy sheath (Storz), a 30-degree and a 7-degree rod lens, a digital camera, and a color video monitor. Preparation included lignocaine jelly 2% applied into the urethra via a 10 ml disposable syringe. Clamp was applied for holding the jelly inside the urethra for 5 minutes for adequate anesthesia. Procedure was then performed and at the end of the procedure, operation theatre (OT) assistant, usually a resident, asked the patient regarding the pain experienced by them in a VAS numeric scale.

All data were obtained in hard copy and entered into Microsoft Excel and IPS-SPSS version 16.0. Continuous variable were expressed as frequencies, mean +/- standard deviations. Categorical data were analyzed using Chi-square test. All data were represented with figures and tables.

Terminology used in this study:^{7,8}

No pain: VAS score 0

Mild pain: VAS score 1 to 3

Moderate pain: VAS score 4 to 6

Severe pain: VAS score 7 to 9

Very severe pain: VAS score of 10

RESULTS

General Data: A total of 169 male patients (age 18 to 88) underwent rigid cystoscopy. The mean age was 50.35 years. Visualization of procedure

Table 1: Overview of patient data

Total patients	Average age (years)	Cystoscopy/ cystoscopy with DJ removal	Allowed to view/not allowed	Mild pain/moderate to severe pain
169	50.35 (19 to 88)	100/69	83/86	58/111

Table 2: Distribution between procedure and visual monitoring

Procedure performed	Visualization of the monitor		Total
	Yes	No	
Cystoscopy	61	39	100
Cystoscopy and DJ Removal	22	47	69
Total	83	86	169

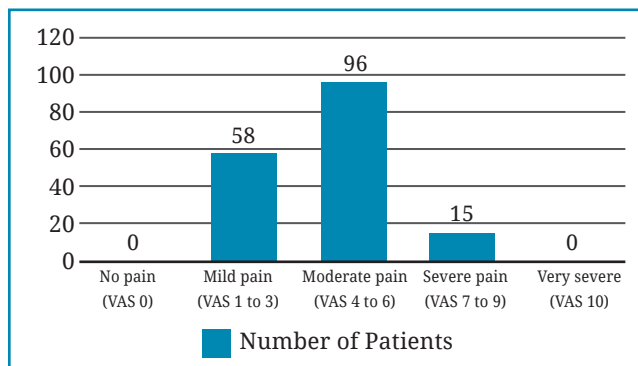


Fig. 1: Number of patients in VAS scale

Table 3: Number of patients in VAS scale

Score	n	%
0	0	0.0
1	1	0.6
2	17	10.1
3	40	23.7
4	47	27.8
5	29	17.2
6	20	11.8
7	6	3.6
8	8	4.7
9	1	0.6
10	0	0.0
Total	169	100.0%

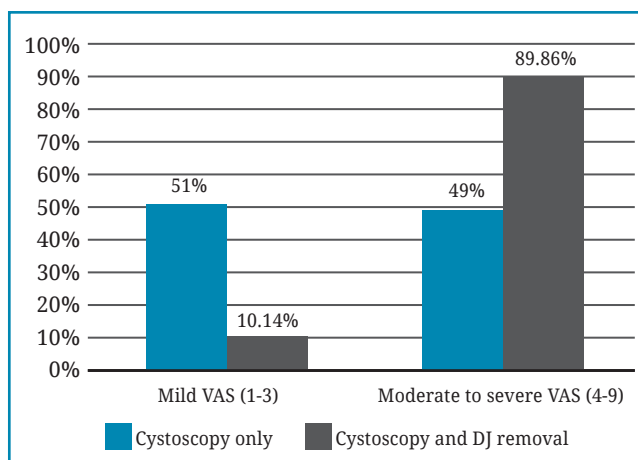


Fig. 2: Distribution of patients comparing pain and procedure

was allowed in 83 (49.1%) patients and 86 (50.9%) were not allowed. Among them, 100 (59.2%) had undergone cystoscopy with BEP (n=60) being the main indication and remaining 69 (40.8%) had undergone cystoscopy with DJ removal. Mild pain during either procedure was experienced by 58 patients (34.3%) and remaining 111 patients (65.7%) had pain of greater score in VAS. There were no patients with no pain or very severe pain. The general patient data is summarized in table 1, patient distribution in table 2, VAS score in table 3 and grading by VAS in Fig. 1.

Procedure related pain: Among the patients who underwent only cystoscopy, majority of the patients (51.0%, n=51) experienced moderate to severe pain, while remaining (49.0%, n=49) experienced mild pain with mean

pain score of 3.61. Similarly among patients who underwent cystoscopy with DJ removal, moderate to severe pain was experienced by most of the patients (89.9%, n=62) compared to few patients (10.1%, n=7) experiencing mild pain with mean pain score of 5.25. The mean pain score of DJ removal group is 1.45 times higher than cystoscopy only group. So it can be inferred that patients who underwent cystoscopy with DJ removal had experienced significantly higher pain compared to patients undergoing only cystoscopy (Chi-square test, 95.0% CI, p-value <0.001).

Visualization of procedure in the monitor and pain: In the group of patients who were allowed to view the monitor during the procedure, mild pain was experienced by 44 patients (53.0%) and moderate to severe pain was experienced

Table 4: Association between surgical procedure and pain score

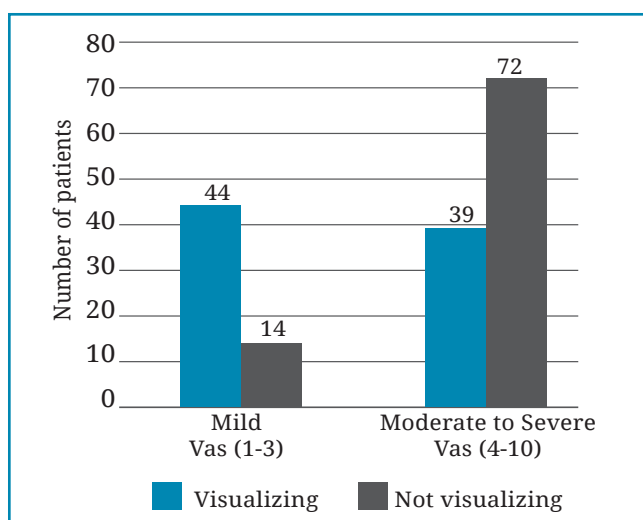
Procedure	Pain category		Average pain score	Significance
	Mild	Moderate to severe		
Cystoscopy	51 (51.0%)	49 (49.0%)	3.6	p < 0.001
Cystoscopy and DJ	7 (10.1%)	62 (89.9%)	5.2	

Table 5: Association between visual monitoring and pain score

Visual monitoring	Pain category		Association
	Mild	Moderate to severe	
Yes	44 (53.0%)	39 (47.0%)	P < 0.001
No	14 (16.3%)	72 (83.7%)	

Table 6: Association between procedure, VAS and visual monitoring

Procedure	Visual monitoring	Pain grade in VAS		Total	Significance
		Mild pain	Moderate to severe pain		
Cystoscopy	Yes	38	23	61	P < 0.005
	No	13	26	39	
Cystoscopy with DJ removal	Yes	6	16	22	P = 0.003
	No	1	46	47	
Total		58	111	169	

**Fig. 3: Visual monitoring and pain score**

by 39 patients (47.0%). In contrast, patients who were not allowed to view the monitor during the procedure predominantly (n=72, 83.7%) experienced moderate to severe pain and only 14 patients (16.3%) experienced mild pain. This shows that visualization of procedure in the monitor during the procedure had significant relief in pain experienced by the patients during cystoscopy (Chi-Square test, 95.0% CI, p-value <0.001).

Association between type of procedure, visualization and pain: In our study, the association between procedure, visualization and pain is shown in Table 6. It can be seen that among patients who underwent only cystoscopy, visualization of the procedure was associated with lower pain. (Chi-square test, 95.0% CI, p-value <0.005). Similarly, among the patients who underwent cystoscopy and DJ removal, patients had experienced greater pain when they were not allowed to view the procedure as shown by p-value of 0.003 in a Fischer's exact test.

DISCUSSION

There are two types of cystoscopes available. They are rigid cystoscope and flexible cystoscopes. Rigid cystoscopes were the first instrument used, followed by flexible devices, which were introduced by Tsuchida and Sugawara in 1973.⁹ Owing to the minimal patient discomfort, flexible cystoscopes have largely replaced rigid cystoscopes.⁶ However, rigid cystoscopy is still indispensable ascribed to its better visual performance, lower costs and easier operation compared to flexible.⁹

We used the VAS score in this study as VAS has been validated as a dependable tool

for assessment^{10,11} and it is well known that cystoscopies can be painful. Numerous trials with different techniques to alleviate patient's pain during cystoscopy have been conducted, especially for male patients and yet the results are inconsistent and conflicting. The proposed non-pharmacological methods include increasing irrigation pressure, delaying instillation time of topical anesthetics in the urethra,^{12,13} listening to music,¹⁴⁻¹⁶ hand-holding, urinating during cystoscopy, distraction bag squeeze,¹⁷ virtual reality,¹⁸ inhalation of nitrous oxide gas during the procedure,¹⁹ application of midazolam²⁰ or transcutaneous electrical nerve stimulation.²¹

Concept of real-time visualization is not a recent discovery with Keshari *et al*²² performing a study in 2003. Their study found that visualization was not beneficial in alleviating pain. Clements *et al*²³ published a beneficial effect of observing the procedure with regards to pain. This result was supported by the findings of Patel *et al*⁴ in 2007, Zhang *et al*⁶ in 2011 and opposed by Cornel *et al*²⁴ in 2008 and Patel *et al*.²⁵ All of them had enrolled patients for diagnostic indications and excluded manipulations such as DJ stent removal whereas in current study we have included patients undergoing DJ-removal as well. Only Patel *et al*²⁵ had used rigid cystoscope like ours but their study population were females only.

Soomro *et al*⁵ had reported that real-time visualization is effective in lowering pain. They had included diagnostic as well as removal of DJ-stents in their study. However, their study had not compared the outcomes of diagnostic cystoscopy with DJ-stent group. In our study we have compared the VAS scores of diagnostic cystoscopy with DJ-stent and found that DJ-stent removal is more painful than cystoscopy alone. Similarly they had used supine position for the procedure while we use lithotomy position.

We routinely use lidocaine gel as a lubricating agent and both our study groups had received it prior to the insertion of the cystoscope. On contrary to popular belief, a meta-analysis had reported that lidocaine gel 2% had no outcome on pain and should be considered more of a lubricating substance. The most painful part of the procedure is when the scope passes the external urethral sphincter at the level of the pelvic floor.^{3,26} Increasing hydrostatic pressure by bag squeeze method during this part of procedure may alleviate the pain.¹⁰ We routinely use this method during our cystoscopy procedure and as such both groups were not exempted from using this method.

This study can have a few limitations. Firstly, the urologist was not blinded from the study procedure. Secondly we had fewer patients who were allowed to view the monitor when DJ removal was undertaken. This may act as a confounding factor when interpreting that DJ removal was more painful. Thirdly, the global acceptance of flexible cystoscopy means our results are applicable mostly to resource poor countries and centers with only rigid cystoscopes. Finally, paucity of data on rigid cystoscopy means that a larger scale study is required.

In conclusion cystoscopy is a routinely performed procedure by all of the urologist which can be painful. Cystoscopy with instrumentation such as DJ removal is more painful than cystoscopy alone. Real-time visualization of the procedure is a feasible, easy and practical method to alleviate the pain felt during cystoscopy as well as instrumentation. So, we recommend urologists to consider real time visualization during every cystoscopy and related procedures.

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