A Randomized Control Trial Comparing Combined Glandular Lidocaine Injection and Intraurethral Lidocaine Gel with Intraurethral Lidocaine Gel Alone in Cystoscopy and Urethral Dilatation

Shahram Gooran,[1] Pejman Pourfakhr,[2] Shirin Bahrami,[1] Alimohammad Fakhr Yasseri,[1*] Amir Javid,[1] Negar Behtash,[1] Gholamreza Pourmand[1]

Purpose: Cystoscopy is one of the most common urologic procedures. The aim of this study is to investigate the combined effect of intraurethral lidocaine gel and intraglandular injection of lidocaine 2% on pain during and after cystoscopy.

Materials & Methods: In this double-blind, parallel group randomized clinical trial, 156 patients referred for double J removal, urethral dilatation, or cystoscopy were enrolled. The patients were divided into two groups, A and B. All patients received 20 cc of intraurethral lidocaine gel 2%. In group A (N = 75), lidocaine 2% was also injected into the glans penis. The patients in group B (N = 81) only received the intraurethral lidocaine gel. Cystoscopy was performed 10 minutes later. The primary outcome of interest was measured in terms of pain score (visual analogue scale) during and 5 minutes after cystoscopy.

Results: Immediate pain score after the procedure was 3.4 ± 3 and 4.6 ± 3 in groups A and B, respectively (P = .011).

Conclusion: Based on the findings of the present study, lidocaine injection into the glans penis significantly reduced pain perception.

Keywords: pain perception; cystoscopy; local anaesthesia.

INTRODUCTION

Cystoscopy is one of the most common urologic procedures[(1)]. Cystourethroscopy is a urological procedure to view the urethra and bladder[(2)]. When lidocaine is injected into the glans penis, it spreads easily around the urethra and paralyses the sensory nerves around the urethra and anaesthetizes the urethra. Outpatient cystoscopy under intracorporal anaesthesia has several advantages over the same procedure under general or spinal anaesthesia in the operating room: The risks of general or spinal anaesthesia, headache, and nausea, are avoided; the urologist can perform this surgical procedure in his office and the total cost is reduced markedly[(3)].

In 2005, Chen and his colleagues performed a randomized, double-blind trial in Taiwan on the analgesic effect of lidocaine gel during cystoscopy. They showed that intraurethral lidocaine gel injection is a cost-effective analgesic method, which dramatically reduces the need for analgesic use after cystoscopy[(4)]. Chang et al. performed a study in China in the same year on the effect of intracorpus spongiosum lidocaine injection before certain urological procedures, including the endoscopic removal of stone and internal urethrotomy. They concluded that this anaesthetic could significantly decrease pain in 90% of the patients[(3)].

Several clinical trials have been conducted to find the most suitable way of making this procedure more tolerable. Using local anaesthesia before cystoscopy has many benefits over the use of general or spinal anaesthesia[(3-6)].

Although intracorpus spongiosum lidocaine injection has been used in a few studies around the world for certain endoscopic procedures, it has not been used in cystoscopy[(3)]. By applying this method of anaesthesia, cystoscopy can be done in the urologist's office and is less expensive than conducting one in an operating room. This randomized trial compared the combined effect of intracorpus spongiosum lidocaine injection plus intraurethral lidocaine gel with the effect of intraurethral gel injection alone on pain perception during cystoscopy and urethral dilatation.

MATERIALS AND METHODS

Study population

Male patients referred for double J stent removal, urethral dilatation or cystoscopy between March 2014 and March 2015 entered the study. The exclusion criteria were the presence of meatal ulcers, acute prostatitis, and prolonged cystoscopy for more than 20 minutes. Each patient provided written informed consent and the study was performed in accordance with rules of the 1989 Declaration of Helsinki. The patients' enrolment algorithm has been illustrated in **Figure 1**.

A course of antibiotics was used before the intervention

[1]Urology Research Center, Sina Hospital, Tehran University of Medical Sciences, Hassan-Abad Sq., Tehran, Iran

[2]Department of Anesthesiology, School of Medicine, Tehran University of Medical Sciences, Tehran, Iran

*Correspondence: Sina Hospital, Tehran, Iran.

Tel:0098 9122451541. E-mail:yasseri_2006@yahoo.com.

Received May 2016 & Accepted May 2017

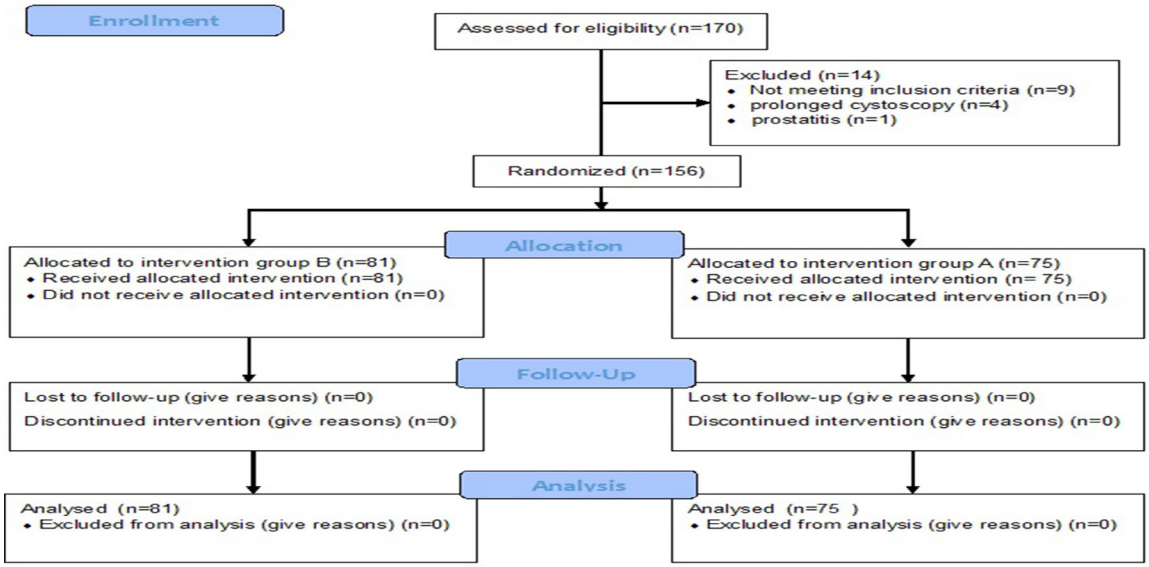

Figure 1. Patients' enrollment algorithm

in the case of a positive urine culture. In patients with negative urine culture, a single dose of 80 mg gentamycin was administered intramuscularly, 15 minutes before the procedure. The patients were observed for an hour after the procedure and they were warned about major complications.

Study design

This study was a double-blind, randomized clinical trial performed in Sina Hospital, Tehran, Iran. One hundred and fifty-six patients were randomly categorized in two groups, A and B. We explained the visual analogue scale (VAS) (a ten numbers scale and 6 faces scale) before the procedure to the patients. The other variables included age, demographic data, blood pressure, and pulse rate before and after the procedure. The patients were divided into groups A (lidocaine 2% injection+intraurethral lidocaine gel group) and B (intraurethral lidocaine gel alone group).

Surgical technique

Each cystoscopy was performed with a rigid cystoscope with 22 Fr sheet and 30 degree lens and urethral dilatation was done with metal dilatators. All procedures were performed by a single urologist. After the patients' preparation and draping, all the patients received 20 cc of intraurethral lidocaine gel 2%. In group A, lidocaine 2% was also injected into the glans penis with a 5 ml syringe and 31 gauge needle. The injection was pushed in 2 or 10 o' clock of glans. The injection site was two millimetres from the meatus and two millimetres from the glans edge. The cystoscopy was performed ten minutes later. The pain experienced was assessed using the visual analogue scale immediately after the procedure (termed during the procedure for the purpose of this study) and five minutes later.

Outcome assessment

The primary outcome was the pain score (VAS) during and after five minutes. The secondary outcomes included blood pressure and pulse rate changes. After the collection of data, they were analysed with the software SPSS version 21, using descriptive and analytical analyses. The qualitative data were presented by mean ± SD and they were compared by the Kolmogorov-Smirnov test. The values of $P < .05$ were considered statistically significant.

RESULTS

In this interventional study, 156 patients undergoing cystoscopy or urethral dilatation were evaluated. Overall, 75 patients (48.1%) received a combination of lidocaine injection 2% and intraurethral lidocaine gel (group A) and 81 patients (51.9%) received intraurethral lidocaine gel alone (group B). The procedure type was cystoscopy in 120 (76.9%) and urethral dilatation in 36 (23.1%) patients. The cause of cystoscopy was diagnostic in 45 (28.8%), double J stent removal in 97 (62.2%), double J stent removal of transplanted kidney in 10 (6.4%) and was associated with urethral dilatation in 2 (1.3%) patients. The mean age of the patients was 49.9 ± 17.5 years. The average age was 49.7 ± 17.3 in group A and in 50.3±17.9 in group B ($P = .83$). The mean cystoscopy duration was 5.4±4.1 minutes. The cystoscopy duration did not differ significantly in the two groups (5.12 ± 4.12 minutes in group A versus 5.6±4.1 minutes in group B, $P = .52$). The mean pain score (VAS) was 4.1±3.1 and 1.4±1.7 immediately and 5 minutes after the procedure, respectively.

The pain scores (number scale) during the procedure were 3.4 ± 3 in group A and 4.6 ± 3 in group B ($P = .011$). The pain scores (face scale) during the procedure were 2.3 ± 1.7 in group A and 3.1 ± 2.0 in group B ($P =. 008$). On the other hand, five minutes after the procedure no significant difference was found between the two groups in terms of the pain score. Also, no significant differences were observed in pre- and post-procedural blood pressure and heart rate or in blood pressure between the two methods (**Table 1**).

Then, this comparison was done for cystoscopy and the urethral dilatation procedure separately. The pain scores during the procedure (number scale) were 3.9 ± 3.2 and 4.8 ± 3.1 in groups A and B, respectively ($P = .061$). Although the pain was more in group B, this

Table 1. Comparison of pain, blood pressure and pulse rate between groups A and B.

Variables	GroupA (mean ± SD)	GroupB (mean ± SD)	*P* value
Pain during procedure(number scale)	3.47 ± 3.03	4.64 ± 3.06	0.011
Pain during procedure (face scale)	2.26 ± 1.73	3.15 ± 1.97	0.008
Pain 5 minutes after procedure (number scale)	1.23 ± 1.51	1.65 ± 1.91	0.230
Pain 5 minutes after procedure (face scale)	1.01 ± 1.17	1.36 ± 1.70	0.518
BP change, mmHg	0.4 ± 1.40	0.65 ± 1.49	0.271
BP before procedure, mmHg	13.96 ± 2.02	14.52 ± 2.30	0.324
BP after procedure, mmHg	14.38 ± 2.05	15.09 ± 2.23	0.094
PR before procedure	79.60 ± 12.430	78.29 ± 13.55	0.439
PR after procedure	79.54 ± 9.99	83.52 ± 15.07	0.402

Abbrebviations: Group A,lidocaine 2% injection plus intraurethral lidocaine gel group; group B,intraurethral lidocaine gel alone group; SD,standard deviation; BP,blood pressure; PR,pulse rate

difference in pain between the two groups was not statistically significant (**Table 2**).

DISCUSSION

This study shows that compared to intraurethral lidocaine gel alone, local anaesthesia with direct injection of lidocaine into the glans penis significantly reduces pain perception immediately after cystoscopy or urethral dilation (**Figure 1**). However, no significant difference in pain perception was found between the two groups five minutes after the injection. Also, no significant differences were observed in pre- and post-procedural blood pressure and heart rate.

In 1997, a double-blind study was conducted by Fisher et al. comparing the effects of lidocaine gel and lubricant gel on pain during rigid cystoscopy. They injected 300 ml of gel in the tract and cystoscopy began 20 minutes later. They showed that the injection of lidocaine gel was ineffective for reducing pain in women, but it significantly reduced the pain in men[1]. In France, Thompson and colleagues conducted a study 1999 on the temperature of the gel, showing that cold lidocaine gel leads to more effective analgesia in patients during cystoscopy[2]. In 2001, Derry Hurst suggested the use of 600 ml intravesical lidocaine gel for reducing the pain during cystoscopy[3].

In 2005, Chen and his colleagues performed a randomized, double-blind trial in Taiwan on the analgesic effect of lidocaine gel during cystoscopy. They showed that lidocaine gel is a cost-effective analgesic method that dramatically reduces the need for analgesic use and hospitalization after cystoscopy[4]. Shan et al., in China, performed a study in the same year on the effect of intracorpus spongiosum lidocaine injection before certain urological procedures including the endoscopic removal of stone and internal urethrotomy. They concluded that this anaesthetic could significantly decrease pain in 90% of the patients[5].

In 2006, Shide and Turfan evaluated the effect of lidocaine gel on analgesia during endoscopic procedures in a retrospective study. He concluded that the best result is obtained when 20 to 30 ml of gel is injected into the urethra. It is better to inject slowly (at least 10 seconds) to cause less pain[6]. A meta-analysis in 2009 showed the effect of lidocaine gel on reducing moderate to severe pain during flexible cystoscopy[7].

Table 2. Comparison of pain between groups A and B in cystoscopy and urethral dilatation subgroups.

Subgroups		GroupA (mean±SD)	GroupB (mean±SD)	*P* value
cystoscopy	Pain during procedure(number scale)	3.85 ± 3.20	4.85 ± 3.151	0.061
	Pain during procedure (face scale)	2.49 ± 1.82	3.27 ± 2.09	0.060
	Pain 5 minutes after procedure (number scale)	1.43 ± 1.61	1.86 ± 1.968	0.314
	Pain 5 minutes after procedure (face scale)	1.20 ± 1.23	1.52 ± 1.75	0.689
Urethral dilatation	Pain during procedure(number scale)	2.28 ± 2.10	3.94 ± 2.73	0.074
	Pain during procedure (face scale)	1.53 ± 1.17	2.78 ± 1.51	0.022
	Pain 5 minutes after procedure (number scale)	0.61 ± 0.979	1.00 ± 1.60	0.606
	Pain 5 minutes after procedure (face scale)	0.41± 0.71	0.89 ± 1.49	0.568

Abbrebviations: Group A,lidocaine 2% injection plus intraurethral lidocaine gel group; group B,intraurethral lidocaine gel alone group; SD,standard deviation

Ather et al. performed a nonrandomized study in 2009. They used intracorpus spongiosum lidocaine and sedation before optical urethrotomy and compared it with general or spinal anaesthesia. Sixteen out of 32 patients received 2 to 3 ml of 1% lidocaine into the glans penis. In this group, 15 patients (94%) had no discomfort or pain. The anaesthetic effect lasted for an hour and it was satisfactory, without any complications. The visual analogue pain score was not different in the two groups. They concluded that urethrotomy using an intracorpus spongiosum lidocaine with sedation is as effective and safe as regional or general anaesthesia. This method is also cost-effective due to a shorter operative time[5].

This study has some limitations. First, this is a single-centre study without a large sample size. Second, the patients in this study were observed for one hour and no one showed a major complication except some injection-related effects

On the other hand, based on the literature review, this study is the first clinical double-blind study to evaluate the role of intracorpus spongiosum anaesthesia in urologic procedures. Another advantage of this study is the randomization and integration of the other factors related to pain. Intracorpus spongiosum anaesthesia can be used easily in the office without any reported complication.

It is recommended that future studies are carried out with larger sample sizes. Higher doses of lidocaine are also recommended. This method can also be used in other endoscopic procedures such as urethral stone removal and internal urethrotomy.

CONCLUSIONS

Based on the findings of the present study, the injection of lidocaine 2% into the glans penis significantly reduces pain perception immediately after cystoscopy or urethral dilatation compared to the use of intraurethral lidocaine gel alone. So, this method could be used as an effective way of pain control during cystoscopy reducing the need of anaesthesia.

ACKNOWLEDGEMENT

This study was approved in Urology Research Center of Sina Hospital. The authors would like to thank Dr. Ayat ahmadi for statistical analysis, Mr Akbari and Miss Pajoohan for their helps in procedures.

CONFLICT OF INTEREST

The authors report no conflict of interest.

REFERENCES

1. Goldfischer ER, Cromie WJ, Karrison TG, Naszkiewicz L, Gerber GS. Randomized, prospective, double-blind study of the effects on pain perception of lidocaine jelly versus plain lubricant during outpatient rigid cystoscopy. J Urol. 1997;157:90-4.
2. Thompson TJ, Thompson N, O'Brien A, Young MR, McCleane G. To determine whether the temperature of 2% lignocaine gel affects the initial discomfort which may be associated with its instillation into the male urethra. BJU Int. 1999;84:1035-7.
3. Dryhurst DJ, Fowler CG. Flexible cystodiathermy can be rendered painless by using 2% lignocaine solution to provide intravesical anaesthesia. BJU Int. 2001;88:437-8.
4. Chen YT, Hsiao PJ, Wong WY, Wang CC, Yang SS, Hsieh CH. Randomized double-blind comparison of lidocaine gel and plain lubricating gel in relieving pain during flexible cystoscopy. J Endourol. 2005;19:163-6.
5. Ather MH, Zehri AA, Soomro K, Nazir I. The safety and efficacy of optical urethrotomy using a spongiosum block with sedation: a comparative nonrandomized study. J Urol. 2009;181:2134-8.
6. Schede J, Thuroff JW. Effects of intraurethral injection of anaesthetic gel for transurethral instrumentation. BJU Int. 2006;97:1165-7.
7. Aaronson DS, Walsh TJ, Smith JF, Davies BJ, Hsieh MH, Konety BR. Meta-analysis: does lidocaine gel before flexible cystoscopy provide pain relief? BJU Int. 2009;104:506-9; discussion 9-10.