

Original Article

Slow Instillation of Cooled Lignocaine Gel: Does it Reduce Urethral Discomfort During Cystoscopy?

Robin Bahadur Basnet¹, Arvind Kumar Shah¹, Chitaranjan Shah¹

¹Department of Urology, National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal

ABSTRACT

Introduction: Intraurethral instillation of 2% lignocaine hydrochloride is associated with discomfort and stinging sensation, especially to male patients. This study was aimed to determine whether slow instillation and cooled gel reduces this discomfort.

Materials and Methods: A prospective randomized study was done comparing initial and procedural discomfort between 2% lignocaine instilled at room temperature and cooled to 4° C; and that instilled over 2 seconds and 10 seconds. Hundred and sixty male patients were divided into two groups of eighty each for the two studies.

Results: Significant reduction in initial discomfort was observed with 10ml of 2% lignocaine hydrochloride cooled to 4° C and also when instilled over 10 seconds. Although procedural discomfort was also lesser in these two sets, it was not statistically significant.

Conclusions: Discomfort, the most common complaint of male patients during rigid cystoscopy, can be reduced by slow instillation of lignocaine hydrochloride gel and also if the gel is cooled to 4° C.

Key words: Cystoscopy; Intraurethral; Lignocaine Hydrochloride

Correspondence:

Robin Bahadur Basnet, (General Surgery), MCh (Urology)
Associate Professor, Department of Urology
National Academy of Medical Sciences, Bir Hospital, Kathmandu, Nepal
ORCID ID: 0000-0001-9899-3095
Email: robinbasnet@gmail.com

Submitted: 25th April 2019

Accepted: 4th June 2019

Published: 20th June 2019

Source of Support: None
Conflict of Interest: None

Citation: Basnet RB, Shah AK, Shah CR. Slow instillation of cooled lignocaine gel: Does it reduce the urethral discomfort during cystoscopy? Nep Med J 2019;2(1):164-6. DOI 10.3126/nmj.v2i1.23703



INTRODUCTION

Large number of urological procedures and outpatient based rigid cystoscopy for lower urinary tract symptoms, follow up of urological malignancies, and removal of double J stent are performed using topical analgesia. Cocaine was reported as the first topical anesthetic agent for cystoscopy in 1884.^{1,2} Although intraurethral 2% lignocaine hydrochloride gel is usually adequate for most office procedures; some patients, especially males, complain of some extent of discomfort and a stinging sensation.³ In females, because of the short female urethra, the efficacy of intraurethral anesthesia by numerous means of topical application is limited and difficult to standardize.³

The objectives of this study were to determine whether slow instillation of gel reduces the initial discomfort; and procedural outcome of cooled lignocaine hydrochloride compared to that at room temperature.

Slow instillation of cooled lignocaine gel during cystoscopy

MATERIALS AND METHODS

A prospective randomized study was done in Department of Urology at National Academy of Medical Sciences, Bir Hospital between April 2018 and August 2018. Consecutive 160 male patients undergoing rigid cystoscopy for different indications were included in the study. Patients with urethral pathology and those concurrently using analgesics for any cause were excluded. Informed consents were obtained from all patients. All cystoscopies were performed under oral antibiotic coverage with 500mg Ciprofloxacin given 15 minutes prior to procedure.

Computer generated randomization (www.randomizer.org) was done to divide the first 80 patients into two groups, i.e. set 1 comprising of

40 patients where 10 ml of 2% lignocaine hydrochloride gel, cooled overnight in refrigerator at 4°C was instilled and set 2 comprising of 40 patients where 10 ml of 2% lignocaine hydrochloride gel at room temperature was instilled in the urethra. Instillation period was 10 seconds for both sets of patients. Similarly for the next 80 patients, set 3 comprised 40 randomized patients, whom the lignocaine hydrochloride at room temperature was instilled in the urethra over a period of 10 seconds. Set 4 comprised 40 patients where lignocaine hydrochloride at room temperature was instilled in the urethra over a period of 2 seconds.

Penis was compressed with a gauze loop for 5 minutes for the drug to take effect in all patients. During this period, patients were assessed using nongraphical visual analogue scale for discomfort felt during the instillation of gel. Zero on the scale meant no discomfort at all and 10 meant severe discomfort and stinging sensation. Rigid cystoscopy using 19 Fr. Karl Storz sheath and 30 degree rod lens was performed in all patients. At the end of the procedure, patients were again assessed using the same nongraphical visual analogue scale for discomfort felt during cystoscopy.

The student's t-test was used for analysis of results and expressed as mean \pm standard deviation (SD). A p value of <0.05 was considered statistically significant.

RESULTS

A total number of 160 consecutive male patients undergoing rigid cystoscopy for various indications were included in the study. As shown in table 1, the first two sets were comparable by age (44.34 vs.46.21 years). Initial discomfort was significantly lower in patients where cooled lignocaine was used (p value <0.05). Although procedural discomfort was lesser in patients where cooled lignocaine was used, it was statistically not significant (p value >0.05).

Table 1: Comparison of initial and procedural discomfort between lignocaine instilled at room temperature and cooled lignocaine

Variable	Lignocaine gel at Room Temperature	Lignocaine gel, cooled (4° C)	p value
Age (mean)	44.34	46.21	0.6944
Initial discomfort	6.2 \pm 2.1	4.4 \pm 3.2	0.0039
Procedural discomfort	4.6 \pm 3.2	3.9 \pm 1.8	0.2315

In the second part of the study, set 3 and set 4 were analyzed. The two sets were statistically comparable by age (41.69 vs. 44.34 years). Significant initial discomfort was perceived by patients who received the topical anesthetic over 2 seconds (p value 0.001). Although procedural discomfort was more in patients where lignocaine was instilled in 2 seconds, it was statistically not significant (p value >0.05).

Table 2: Comparison of initial and procedural discomfort between lignocaine instilled in 2 seconds vs. 10 seconds

Variable	Lignocaine Instillation (2 sec)	Lignocaine Instillation (10 sec)	p value
Age (mean)	41.69	44.34	0.5779
Initial discomfort	8.1 \pm 1.1	5.4 \pm 3.2	0.001
Procedural discomfort	5.6 \pm 2.2	4.9 \pm 1.8	0.1234

DISCUSSION

Outpatient cystoscopy is one of the most common procedure performed in urology practice and it is usually well tolerated.⁴ Two percent lignocaine hydrochloride have been used as an intraurethral local anesthetic in urology practice since 1949.⁵ It has a medium potency and a medium duration of action. Lignocaine hydrochloride is a lipid-soluble amide base capable of entering the hydrophobic components of neuronal cell membranes and preventing the transmembrane flow of sodium ions necessary for the initiation and propagation of nerve signal action potentials.⁶ Studies have been done on different aspects of intraurethral instillation of lignocaine for men undergoing cystoscopy including concentration, volumes, exposure times and temperatures of the gel.³

Various literatures have reported that warming local anaesthetic solutions to temperatures close to core body temperature reduced the pain associated with their intradermal or subcutaneous injection.⁷⁻¹⁴ Authors have postulated that warming lignocaine possibly increases the speed of its action by causing a temperature-dependent shift in its pKa.¹⁵ This alteration in the reaction equilibrium of the lignocaine hydrochloride solution makes more of the active form available to inhibit nerve impulse conduction before any noxious stimulus associated with delivery can be registered by nociceptors.^{9,12,13,16} However, some authors have argued that warming lignocaine does not reduce the pain sensation.¹⁷⁻²⁰

Similarly, some authors have stated that cooling lignocaine reduces the pain sensation.^{21,22} They have postulated that this is a cryo-analgesic phenomenon relating to the temperature of the gel vehicle and its thermal effect on nociceptors. There is good evidence that reducing temperature leads to reduced nociceptor responsiveness^{23,24} and therefore a reduced perception of pain associated with anaesthetic delivery. This has also been challenged by few authors.²⁵ We analyzed discomfort felt during initial instillation of the gel and during procedure. Although discomfort was lesser in both the instances with cooled lignocaine, initial discomfort was significantly lesser. Khan et al²⁶ explained that in tubular organs such as the ureter, vagina, gut, salivary and bile ducts, and sacular organs such as the urinary bladder, the pain/discomfort caused by distension works through a purinergic mechanosensory transduction mechanism so reduction of shear stress can be done by slow administration of lignocaine. We have also demonstrated that discomfort is lower when lignocaine was administered over 10 seconds compared to over 2 seconds with significant reduction in initial discomfort.

CONCLUSIONS

During rigid cystoscopy, discomfort is the most common complaint of male patients. This discomfort can be reduced by slow instillation of 2 % lignocaine gel over duration of 10 seconds compare to 2 seconds. Furthermore, the discomfort can also be minimized by using 2% lignocaine hydrochloride gel cooled to 40 C. Though procedural discomfort was also reduced in slow instillation and cooled lignocaine gel usage, it was not statistically significant. Hence, further study, involving large population may be helpful.

REFERENCES

1. Otis FN. The hydrochlorate of cocaine in genito-urinary procedures. N Y Med J. 1884;40:635-7. [Crossref](#)
2. Pliskin MJ, Kreder KJ, Desmond P, Dresner M. Cocaine and lidocaine as topical urethral anesthetics. J Urol. 1989; 141(5):1117-9. [Crossref](#)
3. Akkoc A, Kartalrı M, Aydın C, Topakta R, Altın S, Aykaç A. 2% Lidocaine gel or plain lubricating gel: Which one should be used in male flexible cystoscopy? Turk J Urol. 2016;42(2): 92-6. [Crossref](#)
4. Gee JR, Waterman BJ, Jarrard DF, Hedican SP, Bruskewitz RC, Nakada SY. Flexible and rigid cystoscopy in women. JSLS 2009;13:135-8. [Crossref](#)
5. Haines JS, Grabstald H. Xylocaine; a new topical anesthetic in urology. J Urol. 1949;62:901. [Crossref](#)
6. Rogers HJ, Spector RG, Trounce JR. Local anaesthetics. In Rogers HJ, Spector RG, Trounce JR, eds, A Textbook of Clinical Pharmacology, 1st edn, Chapt 11, London: Hodder and Stoughton, 1985. pp343-4. [Crossref](#)
7. Boggia R. Heating local anaesthetic cartridges. Br Den J 1967;122:287 [Crossref](#)
8. Bainbridge LC. Comparison of room temperature and body temperature local anaesthetic solutions. Br J Plast Surg 1991;44:147-8. [Crossref](#)
9. Davidson JAH & Boom SJ. Warming lignocaine to reduce pain associated with injection. BMJ 1992;30: 617-8. [Crossref](#)
10. Cragg AH, Berbaum K, Smith TP. A prospective blinded trial of warm and cold lidocaine for intra-dermal injection. Am J Roentgen 1988;150:1183-4. [Crossref](#)
11. Alonso PE, Perula LA, Rioja LF. Pain-temperature relation in the application of local anaesthesia. Br J Plastic Surg 1993;46: 76-8. [Crossref](#)
12. Finkel LI & Berg DJ. Heating lidocaine appears to prevent painful injection. Am J Radiol 1987;148:651. [Crossref](#)
13. Westblade AG. Temperature changes and local anaesthesia. Aus Dent J 1968;13:154-7 [Crossref](#)
14. Bell RW, Butt ZA. Warming lignocaine reduces the pain of injection during peribulbar local anaesthesia for cataract surgery. Br J Ophthalmol 1995;79:1015-7 [Crossref](#)
15. Kamaya H, Hayes JJ, Ueda I. Dissociation constants of local anaesthetics and their temperature dependence. Anaesth Analg 1983;62:1025-30. [Crossref](#)
16. Colaric KB, Overton DT, Moore K. Pain reduction in lidocaine administration through buffering and warming. Am J Emerg Med 1998;16:353-6. [Crossref](#)
17. Oikarinen VJ, Ylipaavalniemi P, Evers H. Pain and temperature sensations related to local anaesthetic solutions. Int J Oral Surg 1975;4: 151-6. [Crossref](#)
18. Dalton AM, Sharma A, Redwood M, et al. Does the warming of local anaesthetic reduce the pain of its injection? Arch Emerg Med 1989;6:247-50. [Crossref](#)
19. Kaplan PA, Lieberman RP, Vonk BM, Wadsworth J, Touquet R. Does heating lidocaine reduce the pain of injection. Am J Radiol 1987;149:1291. [Crossref](#)
20. Callear AB. The effect of temperature on the discomfort caused by topical local anaesthesia. J R Soc Med 1995;88: 709 [Crossref](#)
21. Thompson TJ, Thompson N, O'Brien A, Young MR, McClean 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(9):1035-7. [Crossref](#)
22. Goel R, Aron M. Cooled lignocaine gel: does it reduce urethral discomfort during instillation? Int Urol Nephrol. 2003;35:375-7. [Crossref](#)
23. Burke D, Mogyoros I, Vagg R, Kiernan MC. Temperature dependence of excitability indices of human cutaneous afferents. Muscle Nerve 1999;22:51-60. [Crossref](#)
24. Emst E, Fialka V. Ice freezes pain? A review of the clinical effectiveness of analgesic cold therapy. J Pain Symptom Management 1994;9: 56-9. [Crossref](#)
25. Bhomi KK, Rizal S, Pradhan M, Rijal A, Bhattachan CL. Pain during rigid cystoscopy: a prospective randomized controlled study comparing the benefit of cooled and room temperature lignocaine gel. Nepal Med Coll J. 2011;13:55-7. [Crossref](#)
26. Khan M, Beyzade B, Tau W, Virdi JS, Potluri BS. Effect of the Rate of Delivery of Lignocaine Gel on Patient Discomfort Perception prior to Performing Flexible Cystoscopy. Urol Int 2002;68:164-167. [Crossref](#)