

# Viscous lidocaine solution versus lidocaine spray for pharyngeal local anesthesia in upper gastroesophageal endoscopy

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**Background:** Advantage of using local sedation during upper gastrointestinal endoscopy (UGE) is still challenging. In the current study, the effect of lidocaine spray versus lidocaine viscous solution for pharyngeal local anesthesia during UGE has been compared. **Materials and Methods:** This is a randomized clinical trial conducted on 130 patients conducting UGE in 2013. Patients were randomly divided into two groups of viscous lidocaine solution (Group V) and lidocaine spray (Group S). Patients' tolerance, satisfaction, pain/discomfort, and anxiety (based on 11-point numerical score scale) and ease of endoscopy were compared. **Results:** Ease of procedure, patients' tolerance, and patients' satisfaction were not statistically different between two groups ( $P > 0.05$ ). Patients' pain/discomfort and anxiety during endoscopy were significantly different between groups ( $P < 0.05$ ). **Conclusion:** As a conclusion, there was not any difference between two groups except for pain, discomfort, and anxiety that was higher in those who administered spray that might be due to the method of usage.

**Key words:** Lidocaine, topical anesthesia, upper gastrointestinal endoscopy

**How to cite this article:** Khodadoostan M, Sadeghian S, Safaei A, Shavakhi AR, Shavakhi A. Viscous lidocaine solution versus lidocaine spray for pharyngeal local anesthesia in upper gastroesophageal endoscopy. J Res Med Sci 2018;23:102.

## INTRODUCTION

Upper gastrointestinal endoscopy (UGE) is a common minimally invasive procedure used widely for the diagnosis of malignant or benign conditions of gastrointestinal (GI) tract and is a safe means of operating therapeutic procedures.<sup>[1,2]</sup>

The stimulation of gag reflexes during gastroduodenoscope passage from pharynx to GI tract may cause severe discomfort during this procedure.<sup>[3,4]</sup> Most physicians prefer using local anesthesia with/without intravenous sedation for better tolerance of patients.<sup>[5]</sup> An important point about whether or not to use anesthetics during endoscopy is sedation-associated UGE complications.<sup>[6]</sup> On the other hand, using anesthetic during UGE has been proved to be associated with better tolerance of patients and also ease of procedure.<sup>[7]</sup>

Number of studies in which various forms of topical anesthesia during UGE has been compared in, are limited.

One of the most common topical anesthetics used during UGE is lidocaine. Local forms of lidocaine are viscous solution and sprays. Tolerance of these two forms by patients is different as spray can stimulate gag reflex and the other form is bitter and also irritating for swallowing.<sup>[5,8]</sup>

The aim of the current study is to compare the satisfaction of patients and endoscopists during UGE using lidocaine spray and viscous solution.

## MATERIALS AND METHODS

This study was a randomized clinical trial conducted on 130 patients referred to Al-Zahra Hospital for conducting UEA (affiliated to Isfahan University of Medical Sciences) in 2013.

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10.4103/jrms.JRMS\_579\_17

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**Received:** 17-07-2017; **Revised:** 20-09-2017; **Accepted:** 20-09-2018

Inclusion criterion was age of  $\geq 15$  years and exclusion criteria were as follows: (1) clinical findings of hepatic encephalopathy, (2) Class IV–V physical status based on the American Society of Anesthesiologists, (3) existence of contraindications for upper gastroesophageal endoscopy,<sup>[9]</sup> (4) sedation necessity during endoscopy procedure, and (5) patients' unwillingness to participate in the study.

Consent forms for participating were assigned by the patients. This study was conducted based on approval of Research Council and Ethics Committee of the School of Medicine of Isfahan University of Medical Sciences (389081).

Patients were divided to two groups randomly. Patients were randomized through simple randomization method using random allocation software. The first group received viscous lidocaine solution (Group V) and lidocaine spray was used for the second group (Group S) [Figure 1].

Patients underwent local anesthesia in the recovery room by a resident of anesthesiology in the absence of endoscopist and his assistant.

All patients underwent esophagogastroduodenoscopy using device of Fujinon 2500 Japan.

Group V was supposed to gurgle 5 ml of lidocaine 2% viscous solution (20 mg/ml) (Xylocaine 2%, AstraZeneca, London, UK) and should not swallow it for 5 min; finally, they could swallow.

In Group S, 5 puffs of lidocaine spray 10% (Xylocaine 10% spray, AstraZeneca) which is equivalent to 10 mg lidocaine was sprayed to pharynx of patients after tongue putting aside by a laryngoscope.

Similarly to Group V, 5 min before upper esophagogastroduodenoscopy (UGE) in Group S, local anesthesia was evaluated by nausea reflex testing. About 5 mg/kg of lidocaine was supposed as maximum dose of lidocaine in both groups.

After endoscopy initiation, endoscopist evaluated ease of procedure with ranking scores of 1 = without attempt, 2 = easy, 3 = fair, and 4 = difficult.<sup>[3]</sup> Endoscopist was supposed to fill the checklist of patients' tolerance during procedure and also patients' satisfaction of local anesthesia as follows: 1 = excellent, 2 = good, 3 = not bad, and 4 = poor.<sup>[3]</sup>

Then, due to inappropriate distribution, patients with results of 1 and 2 were considered as Group A and those with results of 3 and 4 as Group B.

Pain/discomfort and anxiety were assessed for all patients using 11-point numeric scales (each patient scored 0–10).<sup>[4]</sup>

Then, data were analyzed using IBM® SPSS® version 20 – United States software. Descriptive data were reported in mean. For analytic data, independent *t*-test, paired *t*-test, and Chi-square test were used.  $P < 0.05$  was considered significant.

## RESULTS

This randomized clinical trial was conducted on 130 patients supposed to undergo upper GI endoscopy. Patients' demographics have been presented in Table 1.

Table 2 shows patients' tolerance based on endoscopists' opinion, endoscopists' satisfaction of procedure, and patients' satisfaction of procedure.

In addition, anxiety and pain/discomfort score<sup>[4]</sup> of patients was assessed, and results were  $3.9 \pm 2.1$  and  $5.3 \pm 2.1$  for Group V and Group S, respectively. This variable was significantly different between groups ( $P < 0.001$ ).

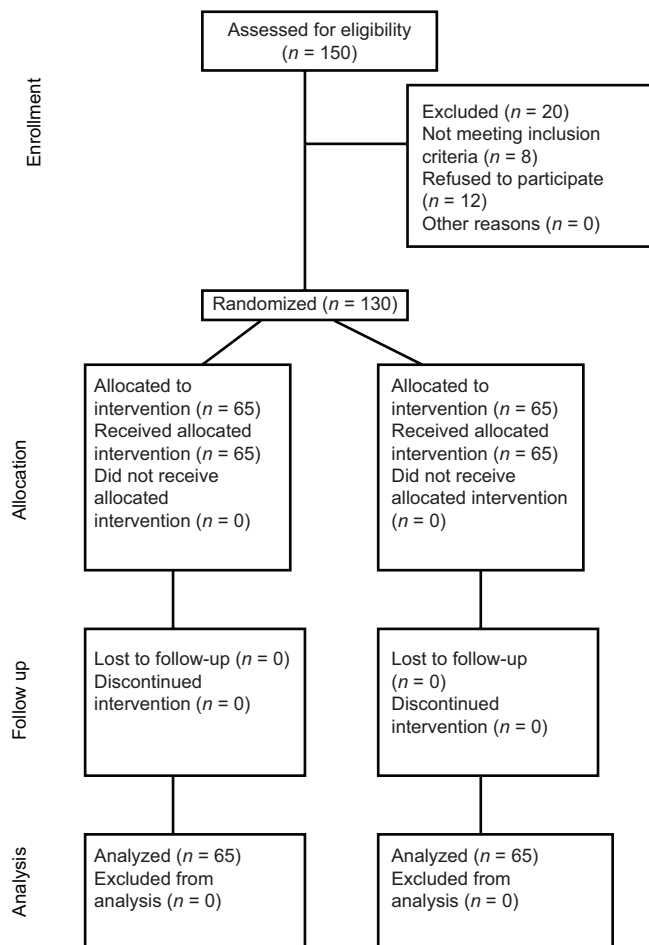


Figure 1: Consort diagram of studied population

**DISCUSSION**

UGE as a minimal invasive, safe, well-tolerable procedure for the diagnosis of esophagogastroduodenal malignant/benign conditions has been used widely.<sup>[10]</sup> This procedure can be irritating for patients in case of not using sedatives due to gag reflex stimulation.<sup>[2]</sup> UGE without using sedatives has some advantages including lower incidence of cardiopulmonary complications, shorter duration of procedure, fewer costs, and patients’ ability of controlling self-care after endoscopy.<sup>[11,12]</sup> On the other hand, sedation can cause better tolerance and less irritation for patients.<sup>[7]</sup>

In general, advantage of using local anesthesia during UGE is controversial, as a randomized study presented no facilitation of endoscopy using lidocaine spray,<sup>[13]</sup> whereas another double-blind clinical trial has reported better tolerability of UGE using local anesthesia.<sup>[14]</sup>

In the current study, we have assessed patients’ and endoscopists’ satisfaction of using two methods of lidocaine spray versus lidocaine viscous solution.

Regardless of the type of local anesthesia, over 90% of patients experienced easy procedure. Another point was patients’ tolerance of endoscopy after local anesthesia that

was acceptable in over 70% of patients. In general, using local anesthesia without considering type of used anesthetic was accompanied with acceptable outcomes and acceptable satisfaction of endoscopists and patients.

These findings were consistent with previous double-blind randomized studies that separately assessed the topical use of lidocaine and reported better tolerance and acceptance of patients.<sup>[14]</sup>

Comparison of lidocaine spray with viscous lidocaine solution in our study showed that none of the local anesthetics used in the current study was superior to the other ease of endoscopy, patients’ tolerance, and patients’ satisfaction. The only difference was found in pain/discomfort and anxiety assessments (based on 11-point numerical scales) where patients who underwent viscous lidocaine solution experienced less pain/discomfort and anxiety in comparison to those who were treated with lidocaine spray. This significant difference may be due to the shape of spray that was not well known for patients, or it might be related to the route of administration that is more visible for the patient.

Amornyotin *et al.* conducted a similar study and found significantly higher tolerability and satisfaction of patients and endoscopists in Group S.<sup>[12]</sup> These differences may be due to larger studied population of their study. In general, due to easier and more aimful use of sprays, lidocaine spray form can be utilized widely.

Hayashi *et al.* presented that the use of lidocaine spray alone was not inferior to combination of spray and viscous solution.<sup>[15]</sup> This result was presented by İbiş *et al.* as well regarding patients’ tolerance while spray plus benzydamine

**Table 1: Comparison of age and gender distribution between patients treated with viscous solution versus those treated with lidocaine spray**

	Viscous solution	Spray	P
Age (mean±SD)	46.3±14.5	43.5±14.6	0.27
Gender (%)			
Female	37 (56.9)	39 (60)	0.72
Male	28 (43.1)	26 (40)	

SD=Standard deviation

**Table 2: Endoscopy-associated variable comparison among patients treated with viscous solution and spray**

	Group V	Group S	Variables	Group V	Group S	OR (95% CI)	P
Ease of endoscopy							
Effortless	17 (26.2)	14 (21.5)	Group A	46 (70.8)	39 (60)	1.35 (0.57–3.19)	0.488
Easy	29 (44.6)	25 (38.5)					
Fair	13 (20)	20 (30.8)	Group B	19 (29.2)	26 (40)		
Difficult	6 (9.2)	6 (9.2)					
Patients’ tolerance							
Excellent	24 (36.9)	24 (36.9)	Group A	50 (76.9)	47 (72.3)	1.076 (0.44–2.5)	0.885
Good	26 (40)	23 (35.4)					
Not bad	12 (18.5)	12 (18.5)	Group B	15 (23.1)	18 (27.7)		
Poor	3 (4.6)	6 (9.2)					
Unsatisfactory	3 (4.6)	7 (10.8)					
Patients’ satisfaction							
Completely satisfactory	13 (20)	14 (21.5)	Group A	47 (72.3)	41 (63)	1.35 (0.61–2.99)	0.460
Satisfactory	34 (52.3)	27 (41.5)					
Neutral	11 (16.9)	18 (27.7)	Group B	18 (27.7)	24 (37)		
Unsatisfactory	7 (10.9)	6 (9.2)					

OR=Odds ratio; CI=Confidence interval

was accompanied with less sore throat and easier esophageal intubation.<sup>[2]</sup> It should be noted that less sore throat may have occurred because of local anti-inflammatory effect of benzydamine regardless of lidocaine spray.

In the study of Mogensen *et al.*, lidocaine lozenge was better accepted by patients in comparison to viscous solution. In addition, lidocaine lozenge had appropriate taste and appearance.<sup>[3]</sup>

It should be mentioned that assessed groups in the current presentation were not statistically different regarding age and gender; thus, there was no confounding variable that could affect results of two groups.

Some physiological reactions to external stimulators may be affected by age group and gender. There are studies that have reported higher rate of nausea and vomiting reaction of females in comparison with males to physical and psychological external stimulators.<sup>[16]</sup>

One of the limitations of our study was lack of assessment of complications occurred during procedure. In another study that had assessed complications, they found a significant higher rate of overall complication incidence in viscous solution receivers, but Group S and Group V were not statistically different regarding sheer evaluation of tachycardia, bradycardia, nausea/vomiting, hypertension, and sore throat.<sup>[12]</sup>

## CONCLUSION

Based on findings of our study, although using local anesthesia causes better tolerance and higher rate of satisfaction for both patients and endoscopists and this finding is similar to what was reported by other studies, neither lidocaine spray nor viscous solution is superior to the other. Therefore, as the use of lidocaine spray is easier in comparison to solution, it may be more useful during endoscopy. On the other hand, pain/discomfort and anxiety score was significantly higher using lidocaine sprays, but we have not controlled confounding variables about patients' anxiety score using sprays. In this term, further studies are recommended.

## Acknowledgments

We are grateful to Al-Zahra Hospital's head office, nurses, and employees.

## Financial support and sponsorship

The study was sponsored by Isfahan University of Medical Sciences.

## Conflicts of interest

There are no conflicts of interest.

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