

Does glycerol have an effect on pain during nasal packing removal

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Background/aim: The aim of this study was to investigate the efficacy of lubricating and moistening of Merocel nasal packs with glycerol on reducing pain and bleeding during nasal packing removal in patients who had undergone endoscopic sinus surgery or with epistaxis.

Materials and methods: Fifty patients were included in the study. Glycerol was used on one side while saline was used on the other side of the same patient as a control. All patients were blinded to which side received glycerol and which side received saline. In the glycerol group, glycerol was infiltrated into the Merocel packing in the nasal cavity. In the saline group, 0.9% saline solution was infiltrated into the Merocel packing in the other nasal cavity of the same patient. Both applications were performed 15 min before removal of the packs. The patients were asked to score the severity of the pain that occurred in both nasal passages according to a visual analog scale (VAS). Bleeding was recorded as mild (no bleeding), moderate (leakage), and severe (active bleeding requiring intervention).

Results: The mean VAS score was significantly lower in the glycerol group than in the saline group (3.02 vs. 4.86, $P < 0.05$). Although no significant difference was observed between the groups in the amount of bleeding, lower amounts of bleeding were seen in the side that received glycerol.

Conclusion: Administration of glycerol is a cost-effective and easily performed method of analgesia for nasal packing removal in patients who undergo endoscopic sinus surgery or with epistaxis.

Key words: Glycerol, nasal packing, visual analog scale, nasal surgery, bleeding

1. Introduction

Various materials, including nasal packs, nasal splints, tissue adhesives, and sutures, are used to prevent complications such as bleeding, septal hematoma, septal edema, and postoperative adhesion that may emerge following nasal surgery and to stop bleeding due to epistaxis (1–4). According to a survey found in the literature, which was conducted by Erkan et al., 84% of physicians used nasal packing after nasal surgery. Merocel (hydroxylated polyvinyl acetate) packs were used by 67% of surgeons. Regarding the patients, 54% considered pain and 21% considered bleeding as the most important problem (5).

Patients reported that the pain experienced during the removal of the nasal packing was the most severe pain they felt during and after the operation (6–10). As the nasal mucosa is very sensitive to pain, patients are afraid of nasal surgery and may postpone it for years. Infiltration of local anesthetics into the packing during the postoperative period immediately before the removal of the packing

seems a good option to reduce pain. In numerous studies local anesthetics such as prilocaine, lidocaine, tetracaine, bupivacaine, and levobupivacaine were used for this purpose (2,6).

Glycerol has multiple uses due to its lubricating and moisturizing properties. Glycerol use for the prevention of the pain encountered during the removal of nasal packing has not been investigated yet. The objective of this prospective placebo-controlled study was to investigate the effect of glycerol infiltrated into the nasal packing on the pain during nasal packaging removal.

2. Materials and methods

2.1. Study population

Fifty patients between the ages of 18 and 71 years (mean: 32 years; 64% males) with standard Merocel nasal packs (expandable polyvinyl acetate nasal packing; Medtronic Xomed, Jacksonville, FL, USA) inserted after endoscopic sinus surgery or due to epistaxis in the Adana Numune

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Research and Training Hospital between April and June 2016 were included in the study. Patients with severe cardiovascular, renal, psychiatric, hepatic, or respiratory diseases were excluded. Patients with peripheral neuropathy or diabetes were also excluded from the study. In addition, considering that incision-related pain would occur and might influence the results of the study, patients with packing inserted following septoplasty were also excluded. Paracetamol (500 mg) was used for postoperative analgesia. Glycerol (85%, GE Healthcare, 17-1325-01, pack of 1000 mL) was infiltrated into the Merocel 15 min before the removal of the packs in one nostril of each patient.

2.2. Ethical approval

All patients were informed about the procedures and provided written consent to participate in the study. All procedures were in accordance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. The study was approved by the ethics committee of the Adana Numune Research and Training Hospital (2016/69).

2.3. Study design

Fifty patients were included in the study. Glycerol was applied to the packing in one of the nasal cavities of patients while saline was applied to the packing in the other nasal cavity of the same patient. The nasal cavities with saline application constituted the control group. All patients were blinded to the application side of glycerol and saline. The surgeon who removed the packs and measured the visual analog scale (VAS) scores with the patients was also blinded to the application side of glycerol and saline. In the glycerol group, 5 mL of glycerol was infiltrated into the Merocel packing in the nasal cavity. In the saline group, 5 mL of 0.9% saline solution was infiltrated into the Merocel packing in the other nasal cavity of the same patient. Both applications were performed in the last 15 min before removal of the packs by another surgeon, who also measured the VAS score. Glycerol was administered with a dropper and physiological saline solution was infiltrated

into the packing with a 25-gauge injector carefully in order not to touch the patient's nasal mucosa with the needle. The packs were removed on the second or third day after the operation. We first removed the glycerolized packs and then removed the packs with saline.

The patients were asked to score the severity of the pain that they experienced in both nasal passages according to a VAS. The patients were told that 0 points meant no pain, while 10 points indicated the most severe pain.

The severity of the bleeding was also compared between the nasal cavities. Bleeding following the removal of the nasal tampon was evaluated as follows: no bleeding (mild), leakage (moderate), and active bleeding requiring intervention (severe) (7). VAS scores and the severity of the bleeding were compared between the glycerol and the saline groups.

Statistical analysis was performed using the Mann-Whitney U test to compare differences between two groups, and $P < 0.05$ was considered statistically significant.

3. Results

Distribution of age and sex among the patients is summarized in Table 1. Although no significant difference was observed between the groups in the amount of bleeding, lower amounts of bleeding were seen in the side that received glycerol ($P > 0.05$). The mean VAS score was significantly lower in the glycerol group than in the saline group (3.02 vs. 4.86, $P < 0.05$). None of the patients encountered complications or adverse effects related to the use of glycerol (Table 2).

4. Discussion

Application of anterior packing is an important intervention used often by ENT specialists to prevent postoperative complications and to preserve homeostasis (1–6). As the removal of the packing is a considerably painful and uncomfortable procedure, some authors in the literature suggested that postoperative packs should not be used (3,4,8,9).

Table 1. Distribution of age and sex among the patients.

Age		N	Mean	Median	Minimum	Maximum	SD
		50	34.4	32.0	18.0	71.0	14.4
Sex, n (%)	Female	18 (36)					
	Male	32 (64)					

Table 2. Comparison of bleeding and visual analog scale (VAS) pain scores between the groups.

Variable	Group	N	Mean	Median	Minimum	Maximum	SD	Rank mean*	P
Bleeding	Glycerol	50	0.58	0.0	0.0	3.0	1	47.95	>0.05
	Saline	50	0.80	0.5	0.0	3.0	1	53.05	
VAS score	Glycerol	50	3.02	2.5	0.0	9.0	2	38.38	<0.05
	Saline	50	4.86	5.0	0.0	10.0	2	62.62	

*According to Mann–Whitney U test.

Merocel is the most commonly used one among anterior packs. We also prefer Merocel in our practice for the prevention of postoperative complications and bleeding. The severity of the discomfort caused by Merocel application in the postoperative period is similar to that of other packing brands, but several studies demonstrated that the pain experienced during the removal of the packing was more severe with Merocel (10–12). There are several studies in which the authors tried to reduce the pain experienced during the removal of Merocel packs with different methods. In many centers and also in our clinic, the packs are dampened with saline before removal. The most appropriate time for removal of Merocel is controversial. In some studies, it was suggested that the packs could be removed starting from the 2nd hour to the 5th day after the operation (13,14).

Hwang et al. applied sphenopalatine ganglion block by injecting 1% xylocaine through the greater palatine canal. The authors concluded that this was an effective and simple method and reported lower pain scores at the site of injection (15). However, the number of patients in that study was limited, the method was invasive, and hematomas occurred in 10% of the cases. Administration of agents by infiltration into the packing has become increasingly popular in recent years. Local anesthetics are the most commonly used agents. In studies focused on the use of 5%, 4%, and 2% lidocaine during removal of Merocel packing, no significant differences in pain reduction were found in respect to different concentrations of anesthetics (16–18).

Studies demonstrated that the infiltration of 0.25% tetracaine into Merocel packing resulted in lower VAS scores (2). Although adverse events such as depression in the central nervous, cardiovascular, and cardiopulmonary systems due to mucosal absorption of tetracaine were observed, this method was considered as safe unless toxic doses exceeding 1 mg/kg were used (19). It could also be used for local anesthesia in septoplasty (20) and functional endoscopic sinus surgery (FESS) (21). Apuhan et al. investigated the effects of prilocaine and levobupivacaine on pain reduction and concluded that these two agents

were significantly more effective than the control treatment, although there was no statistically significant difference between the effectiveness of these two agents (22). In another study comparing bupivacaine, prilocaine, and lidocaine, lidocaine was more effective than the other two agents in the reduction of both pain and bleeding (23). In addition to the reduction in pain, a reduction in bleeding is also important for patients. Bleeding increases patients' anxiety and disrupts their comfort as well. In our study, we found that bleeding and pain were both lower in nostrils receiving glycerol than in those receiving saline.

Another method of reducing pain during removal of nasal packing is preemptive analgesia (24). Naproxen sodium, acetaminophen, diflunisal, and ibuprofen have been used for this purpose (25,26). In a study of 38 patients, Tulunay et al. administered 1 g of dipyron intramuscularly for preemptive analgesia 45 min before removal of the packing and reported that it provided efficient analgesia (27). Although this is an effective application, it may not be preferred because the procedure itself is rather painful. Yilmazer et al. administered 1 g of diflunisal orally 150 min before removal of the packing and reported that pain occurring during removal of the packing was significantly lower. However, this method of analgesia causes many gastrointestinal side effects and discomfort (28).

Glycerol is a nontoxic, clear liquid, which is also added as an ingredient in dermal creams and is used in many areas in medicine as a softener. It is also an ingredient found in nasal sprays and gels used after epistaxis, for the postoperative recovery of nasal moisture, and against intranasal drying due to weather conditions and atrophic rhinitis (29). No glycerol-related allergic reactions have been reported. As glycerol is produced in large amounts by transesterification, it is inexpensive and abundant.

In the present study, we used glycerol, as we considered that it might enable easier removal of the packing depending on its softening and moisturizing properties, thus helping to reduce pain and bleeding. Although glycerol has no analgesic effect, it provides a remarkable reduction of pain in patients undergoing nasal packing removal. We found no significant difference between the groups regarding the

severity of the bleeding, although it was less on the glycerol side ($P > 0.05$), but the mean VAS score was significantly lower in the glycerol group than in the saline group ($P < 0.05$). We found that the lubricating properties of glycerol make the removal of the packing significantly easier. We concluded that glycerol was preferable to local anesthetics for this purpose.

Our study had some limitations, such as a small subject size and a limited number of evaluated parameters. Further comprehensive studies with larger sample size and more parameters evaluating the effect of glycerol during nasal packing removal on pain are required.

In conclusion, the removal of nasal packing is a rather painful procedure. Ideally, the procedure should be easy to carry out, should not make the patient uncomfortable, should not cause any additional pain or side effects, and should be inexpensive and safe.

In this study, we administered glycerol into the nasal packs and found that removal of the packing was more tolerable. Patients may be more comfortable with the application of glycerol into Merocel packs. Furthermore, glycerol application is inexpensive, easy to perform, and a safe method.

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