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The Effect of Lidocaine Gel on Needle Puncture Pain in Hemodialysis Patients: A Randomized Controlled Trial

Hemodiyaliz Hastalarında İğne Girişi Ağrısı Üzerine Lidokain Jelinin Etkisi: Randomize Kontrollü Bir Çalışma

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Abstract

Aim: This study was conducted to evaluate the effect of lidocaine gel on cannulation-related pain during arteriovenous fistula access in patients undergoing hemodialysis.

Materials and Methods: Prior to the study, necessary approvals were obtained from the ethics committee, the institution, and the patients. The sample size was determined through power analysis, and those patients who met the inclusion criteria were randomly assigned to the intervention (n=34) and placebo (n=34) groups. Data were collected using a questionnaire, and the Visual Analog Scale. The procedure was carried out over three consecutive hemodialysis sessions, during which the participating patients were asked to indicate their level of pain on the Visual Analog Scale after each needle insertion.

Results: In the intervention group, the mean pain score before the application of lidocaine gel was "4.50±3.30". This score decreased to "3.52±2.67" after the first session, to "3.41±2.67" after the second session, and slightly increased to "3.55±2.31" after the third session (p>0.05). In the placebo group, the baseline pain score before the application of physiological saline was "4.47±3.30", which decreased to "4.32±3.14" after the first session, to "4.17±2.70" after the second session, and to "3.88±2.79" after the third session (p>0.05).

Öz

Amaç: Bu çalışma, hemodiyaliz hastalarında arteriovenöz fistül enjeksiyonu sırasında uygulanan lidokain jelinin invaziv ağrı üzerindeki etkisini değerlendirmek amacıyla yürütülmüştür.

Gereç ve Yöntem: Çalışma öncesinde etik kurul, kurum ve hastalardan gerekli izinler alınmıştır. Örneklem büyüklüğü güç analizi ile belirlenmiş, çalışma kriterlerini karşılayan hastalar müdahale (n=34) ve plasebo (n=34) gruplarına rastgele atanmıştır. Veriler, anket formu ve Görsel Analog Skala kullanılarak toplanmıştır. Uygulamalar üç ardışık hemodiyaliz seansı boyunca gerçekleştirilmiş, her iğne girişimi sonrasında hastalardan Görsel Analog Skala üzerinde hissettikleri ağrı düzeyini belirtmeleri istenmiştir.

Bulgular: Müdahale grubunda, lidokain jel uygulaması öncesi ortalama ağrı skoru "4,50±3,30" iken; birinci seans sonrası "3,52±2,67", ikinci seans sonrası "3,41±2,67"'ye düşmüş ve üçüncü seans sonrası "3,55±2,31"'e yükselmiştir (p>0,05). Plasebo grubunda ise fizyolojik tuzlu su uygulaması öncesi ortalama ağrı skoru "4,47±3,30" olup; birinci seans sonrası "4,32±3,14", ikinci seans sonrası "4,17±2,70" ve üçüncü seans sonrası "3,88±2,79" olarak kaydedilmiştir (p>0,05).

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Conclusion: The results of the study indicated that there was no statistically significant difference in pain scores across the four repeated measurements in either the lidocaine gel or placebo groups (p>0.05).
Keywords: Arteriovenous Fistula; Hemodialysis; Lidocaine Gel; Nursing; Pain

Sonuç: Elde edilen bulgular doğrultusunda, hem lidokain jel hem de plasebo grubunda dört tekrarlı ölçümler sonucunda ağrı skorlarında istatistiksel olarak anlamlı bir fark saptanmamıştır (p>0,05).
Anahtar Kelimeler: Arteriovenöz Fistül; Hemodiyaliz; Lidokain Jel; Hemşirelik; Ağrı

INTRODUCTION

Chronic kidney failure (CKF) is characterized by progressive nephron loss, a deterioration in kidney function and a decrease in glomerular filtration rate (GFR) (1). This reduction in the rate of glomerular filtration results in the adjustment of the fluid-electrolyte balance of the kidney, and deterioration in performing metabolic-endocrine functions (2). According to the research conducted by the Turkish Society of Nephrology, the most commonly preferred KRT method is hemodialysis treatment with 76.1% as of the end of 2016 (3). Arteriovenous fistula (AVF) is considered to be the best route for vascular access in patients undergoing hemodialysis (4, 5). The presence of a vascular access pathway for these patients is vital in terms of creation of appropriate blood flow, removal of toxins, and improvement of the quality of dialysis (6). Patients undergoing hemodialysis should continue this treatment two, or three times a week, and they are exposed to stress, and pain caused by fistula access approximately 300 times a year (4). Patients experience significant pain due to the diameter and length of the needles used in repeated AVF punctures (7). From a patient-centered perspective, pain and discomfort related to vascular access are highly relevant outcomes in hemodialysis care. The Standardized Outcomes in Nephrology-Hemodialysis (SONG-HD) initiative, which aimed to identify core outcomes that are most important to patients, caregivers and health professionals, identified vascular access as a core outcome domain that should be routinely measured and reported in hemodialysis trials. This highlights the importance of addressing patient-reported experiences, including pain during AVF cannulation, as part of improving the quality of hemodialysis care and research (8). Patients undergoing hemodialysis frequently report pain during AVF cannulation. A recent cross-sectional study reported that 92.6% of participants experienced pain during AVF cannulation (9). Arab et al. demonstrated that the application of 2% lidocaine gel prior to AVF cannulation significantly reduced pain intensity measured by the visual analogue scale, although Hegu point ice massage resulted in greater pain reduction (4). In a placebo-controlled and double-blind crossover trial, Kitamoto et al. reported that the use of 10% lidocaine gel significantly decreased pain during fistula needle insertion compared with placebo (10). Therefore, there is a need for a variety of pharmacological agents to reduce this pain associated with fistula needle entry. One of the pharmacological methods used for this purpose is the application of lidocaine gel. Lidocaine gel blocks active, and inactive sodium channels and thus contributes to the delivery block, and eliminates stimulation. Lidocaine gel is a topical anesthetic which is effective in terms of reducing transmission. It can be safely used as it has moderate, and low systemic toxicity (4). The primary objective of this study is to evaluate the impact of lidocaine gel on the pain associated with fistula needle insertion in patients undergoing hemodialysis.

MATERIALS AND METHODS

Research Type

The study was conducted as a randomized, controlled, and experimental study with patients receiving treatment at a private hemodialysis center.

Population and Sample

The population of the study consisted of all patients receiving treatment at the hemodialysis center. The sample size was calculated using power analysis, and a total of 68 patients were included in the study, with at least 34 patients in each group.

Data Collection Tools

Research data were collected by the researcher using a face-toface interview technique with a questionnaire containin information on sociodemographic characteristics, disease, and hemodialysis treatment, and a Visual Analog Scale (VAS) used to assess patients' pain levels before and after the procedure.

Setting and Participants

The study population consisted of all patients receiving HD treatment at a private hemodialysis center. The research was conducted in accordance with the Declaration of Helsinki Principles, and permission was obtained from the Gaziantep University Clinical Research Ethics Committee (protocol no: 2018/241). Before commencing the research, the institution and the participants were informed about the study, and written and verbal informed consent was obtained.

Participants were eligible for inclusion if they:

- Were aged 18 years or older;
- Were literate and able to communicate verbally and visually;
- Had no cognitive impairment;
- Had been receiving hemodialysis via an AVF for at least three months;
- Agreed to participate in the study.
- Participants were excluded if they:
- Had a known allergy to lidocaine;
- Required more than one needle insertion during fistula cannulation;
- Had impaired or damaged skin integrity at the AVF site;
- Had taken analgesics within the previous three hours;
- Had neuropathy or peripheral vascular disease;
- Had depression, anxiety, or other severe psychiatric disorders;
- Declined to participate in the study.

Sample Size

The sample size was calculated by power analysis and the minimum number of patients in each group was 34 (α=0.05 power= 0.80 effect size= 0.5) (5, 7). Accordingly, a total of 68 patients were included in the study.

Randomization and Allocation

The patients were randomized according to minimization method, and divided into intervention and placebo groups. The minimization method is a very effective method in terms of maintaining the balance between groups with regard to many prognostic factors. In this method, differences between the two groups were minimized in terms of the number of patients with certain risks. As a result of the study, it was found out that there was a significant relationship between the pain experienced by patients during fistula puncture, gender, age, and duration of hemodialysis. Based on this information, the patients were included in the groups according to age, gender, and hemodialysis time. The first patient was assigned to a random group by tossing a coin. According to the characteristics of the determined criteria, the calculations were evaluated in each group, and the second patient was assigned with the result obtained. If the patient had similar characteristics with the other patients, the number of patients in each group was calculated and the new patient was assigned to a group where the number of patients was incomplete. The patients with different characteristics were assigned to a random group by tossing a coin. The same procedure was repeated and the patients were given a balanced distribution according to their age, sex and hemodialysis time. This process was completed with a total of 68 patients, including 34 intervention and 34 placebo. Patients aged 18 and over who were literate, had verbal and visual communication skills, did not have cognitive problems, received HD treatment with AVF, received HD treatment for at least three months and accepted to participate in the study were included in the study. Those patients having allergy to lidocaine (lidocaine patch 5%); needing more than one needle input during fistula puncture; having cognitive disorders and damage on the AVF area and on the integrity of skin; taking a painkiller in the last three hours; having neuropathy or other peripheral vasuclar diseases; experiencing depression, anxiety, and other severe mental disorders; and refusing to participate in the research were not included in the study.

Flow of the Study

As ten individuals who met the inclusion criteria either declined participation or were unable to join due to reasons such as death or undergoing a transplant, the study was finalized with 68 participants-34 in the placebo group and 34 in the intervention group (Figure 1). All participants were informed about the study before it commenced.

Data Collection

The data of the study was collected by means of a Questionnaire, including questions about sociodemographic characteristics, disease information, HD treatment, and Visual Analog Scale (VAS) which was used to evaluate the pain levels of the patients.

Questionnaire

This form was prepared by reviewing the literature, and included questions related to age, gender, marital status, educational status, working status, smoking-alcohol use status, reason for HD treatment, duration of HD, vascular access route used actively, and duration of AVF use (4, 11).

Visual Analog Scale

It is a measurement tool used to evaluate the pain experienced by patients before, and after the application. In the scale, 0 means "no pain" whereas 10 means "sever pain". The patient reveals the pain level based on these two values.

Application Process for Intervention Group and Placebo Group

Before starting the data collection and application process, physicians, nurses, and HD nurses who would be involved in the process of vascular access were interviewed, and information was given about the study. The patients were informed about the application and explained how to evaluate the pain levels. They were told that they could indicate the level of pain they felt to be equal to any number on the VAS from 0 to 10.

Prior to the cannulation procedure, vascular access assessment and cannulation site selection were performed by the hemodialysis nurse as part of routine clinical practice. The cannulation site was determined by the hemodialysis nurse and was selected away from the needle insertion site used in the previous hemodialysis session, in accordance with standard vascular access care principles.

The study was conducted in four consecutive HD sessions. Intervention and pain assessments were performed over four consecutive hemodialysis sessions to allow for repeated and consistent evaluation of cannulation-related pain. Four sessions were deemed sufficient to observe within-individual variability and to offer a feasible approach consistent with routine clinical practice, minimizing patient burden. In the first HD session, questionnaire, and VAS were applied to the patients in the placebo and intervention groups in order to assess pain level during access to the fistula.

Intervention Group

- A 5% lidocaine gel (2 gr) was applied to the AVF area of the patients in the intervention group 30 minutes prior to the entry of the fistula needle in the patient transport service. The lidocaine gel was applied to the AVF site corresponding to the previous needle insertion area. At the end of the 30th minute of the application, the AVF area was cleaned, and disinfected from the gel by the hemodialysis nurse, and the pain level experienced by the patient immediately after the access to the fistula was re-marked by the patient on the VAS under the supervision of the researcher. This was conducted during three consecutive HD sessions, and at the end of each session, patients were asked to mark the level of pain they felt on the VAS.

- The duration, frequency, and amount of lidocaine administration was decided in accordance with the pharmacologist and the literature (4).

Placebo Group

- Those patients in the placebo group were applied physiological saline solution to the AVF area by sterile sponge prior to the HD session in the patient transport service. Prior to access to the fistula, the AVF area was disinfected by the hemodialysis nurse, and the patient's pain level during needle entry immediately after access to the fistula was marked by the patient on the VAS. This was conducted during three consecutive HD sessions, and at the end of each session the patients were asked to mark the level of pain they felt on the VAS (Figure 2).
- Cannulation procedures in both the intervention and placebo groups were performed by the same hemodialysis nurses, under identical clinical conditions and during the same time periods.
- Cannulation was performed according to the unit's routine clinical practice. No intentional differences in cannulation technique were applied between the intervention and placebo groups, and the cannulation type was determined by the hemodialysis nurse.

Lidocaine Gel Application

In the routine of this study, in order to alleviate the invasive pain experienced during the introduction of the fistula needle, the analgesic creams ordered by the physician were applied by the patients before the HD session. In the literature search, it was seen that the lidocaine gel had a medium-term low systemic toxicity, and was a fast-acting local anesthetic. Therefore, in this study, it was preferred to evaluate the effect of invasive pain on fistula needle insertion (4). Lidocaine gel was provided by the researcher, and maintained at room temperature in the dialysis center.

Ethical Considerations

The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Gaziantep University Clinical Research Ethics Committee (protocol no: 2018/241), the institution, and the scale owner. In addition, after information about the studies was provided from the patients participating in the study, the necessary written, and verbal permissions were obtained.

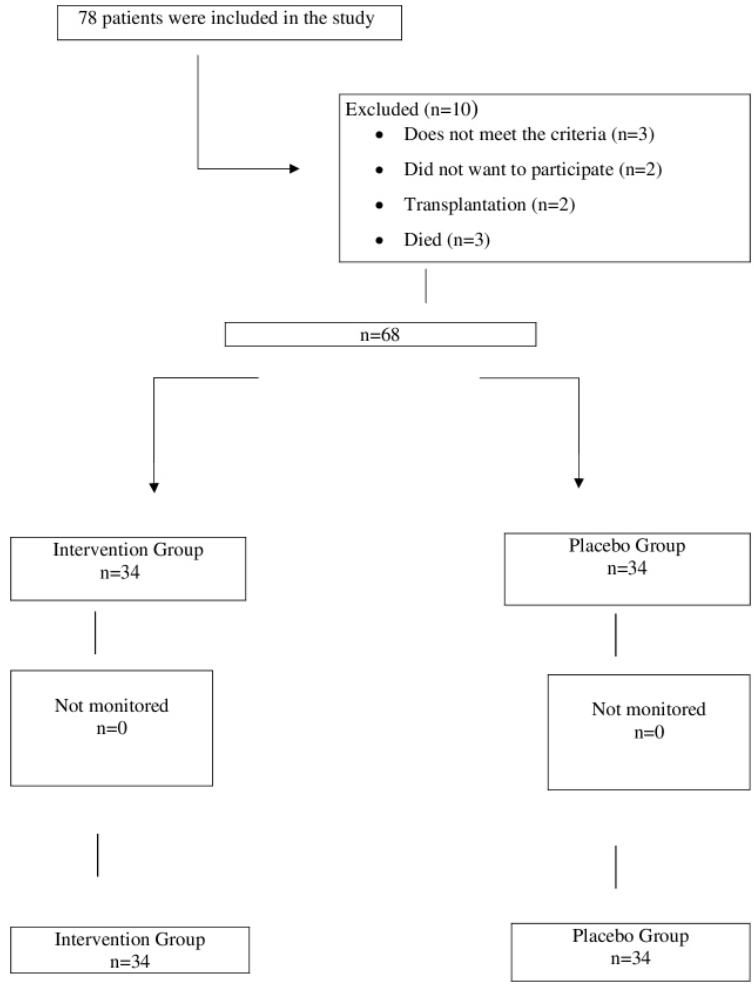

Figure 1. CONSORT flow diagramı

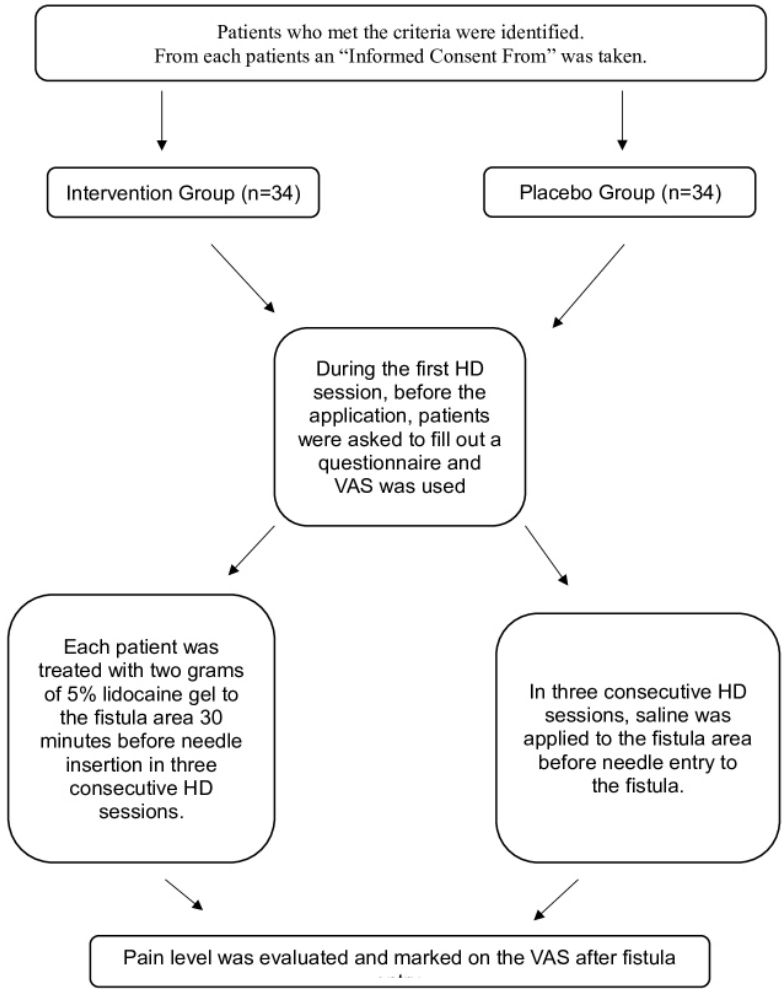

Figure 2. Flow of the study

In the intervention group, it was found out that 52.9% of the patients had been diagnosed with CKF for 1-5 years while 47.1% were diagnosed with diabetic nephropathy due to HD entry, 52.9% had received HD treatment for 1-5 years, 50.0% had had AVF for 1-5 years, 50.0% had been using their current fistulas for 1-5 years, the active vascular access route of 73.5% was left brachial AVF, 100% experienced pain during the fistula needle insertion, and no analgesics were used for this pain. In the intervention group, it was found out that 44.1% of the patients had been diagnosed with CKF for 1-5 years while 67.6% were diagnosed with diabetic nephropathy due to HD entry, 50.0% had received HD treatment for 1-5 years, 52.9% had AVF for 1-5 years, 61.8% had been using their current fistulas for 1-5 years, the active vascular access route of 64.7% was left brachial AVF, 100.0% experienced pain during the fistula needle insertion, and no analgesics were used for this pain. It was revealed that the patients in the intervention, and placebo groups had a homogeneous distribution in terms of the duration of CKF diagnosis, the duration, and reason of hemodialysis, the duration of AVF, the duration of the use of the current fistula, active vascular access, pain during access to the fistula, and analgesic use for this pain ($p>0.05$) (Table 2).

Table 1. Some Characteristics of Patients in Placebo and Intervention Groups

Characteristics	**Placebo n (%)**	**Intervention n (%)**	**x^2/p**
Gender			
Female	14 (41.2)	14 (41.2)	0.000/1.000
Male	20 (58.8)	20 (58.8)	
Age groups			
47-55	8 (23.5)	7 (20.6)	2.139/0.989
56-64	11 (32.3)	9 (26.5)	
65-73	12 (35.3)	14 (41.2)	
74 and above	3 (8.8)	4 (11.8)	
Marital status			
Single	4 (11.8)	5 (14.7)	0.128/0.720
Married	30 (88.2)	29 (85.3)	
Educational status			
Primary school	27 (79.4)	30 (88.2)	1.558/0.459
High school	6 (17.6)	4 (118)	
University	1 (2.9)		
Employment status			
Yes	-	2 (5.9)	2.061/0.151
No	34 (100)	32 (94.1)	
Income status			
Low	12 (35.3)	18 (52.9)	3.333/0.189
Moderate	16 (47.1)	14 (41.2)	
High	6 (17.6)	2 (5.9)	
Smoking			
Yes	8 (23.5)	5 (14.7)	0.856/0.355
No	26 (76.5)	29 (85.3)	
Alcohol consumption			
Yes	1 (2.9)	1 (2.9)	0.000/1.000
No	33 (97.1)	33 (97.1)	
Total	34 (100)	34 (100)	34 (100)
*n: Number, %: Percentage, x^2: Chi-square			

Table 2. Comparison of Findings about Disease Characteristics of Patients in Intervention and Placebo Groups

Characteristics	**Placebo n (%)**	**Intervention n (%)**	**x^2/p**
CKF diagnosis duration (years)			
Less than 1 year	2 (5.9)	-	3.044/0.550
1-5	15 (44.1)	18 (52.9)	
6-10	12 (35.3)	9 (26.5)	
11-15	3 (8.8)	4 (11.8)	
16 years and above	2 (5.9)	3 (8.8)	
Reason for hemodialysis			
Pyelonephritis	-	1 (2.9)	3.683/0.298
Diabetic nephropathy	23 (67.6)	16 (47.1)	
Hypertension	7 (20.6)	12 (35.3)	
Other	4 (11.8)	5 (14.7)	
Duration of hemodialysis (years)			
Less than 1	6 (17.6)	4 (11.8)	2.095/0.718
1-5	17 (50.0)	18 (52.9)	
6-10	8 (23.5)	8 (23.5)	
11-15	2 (5.9)	4 (11.8)	
16 years and above	1 (2.9)	-	
Life of arteriovenous fistula (years)			
Less than 1	5 (14.7)	4 (11.8)	1.706/0.790
1-5	18 (52.9)	17 (50.0)	
6-10	7 (20.6)	8 (23.5)	
11-15	3 (8.8)	5 (14.7)	
16 years and above	1 (2.9)	-	
Duration of the use of the current fistula (years)			
Less than 1	7 (20.6)	9 (26.5)	2.371/0.668
1-5	21 (61.8)	17 (50.0)	
6-10	3 (8.8)	5 (14.7)	
11-15	2 (5.9)	3 (8.8)	
16 years and above	1 (2.9)	-	
Active used vascular access pathway			
Right Brachial AVF	3 (8.8)	4 (11.8)	3.668/0.453
Left Brachial AVF	22 (64.7)	25 (73.5)	
Right radial AVF	1 (2.9)	-	
Left radial AVF	8 (23.5)	4 (11.8)	
Left ulnar AVF	-	1 (2.9)	
Pain during fistula needle insertion			
Yes	34 (100)	34 (100)	
No	-	-	
The use of analgesics for pain			
Yes	-	-	
No	34 (100)	34 (100)	
Total	34 (100)	34 (100)	
*n: Number, %: Percentage, x2: Chi-square, CKF: Chronic kidney failure, AVF: Arterio venous fistula			

The average pain score in the intervention group prior to the application of lidocaine gel was recorded as 4.50±3.30. Following the application, the mean pain scores were 3.52±2.67 during the first hemodialysis (HD) session, 3.41±2.67 in the second session, and 3.55±2.31 in the third session (p>0.05). Similarly, in the placebo group, the pre-application mean pain score was 4.47±3.30. After the application of physiological saline, the scores were 4.32±3.14 in the first HD session, 4.17±2.70 in the second, and 3.88±2.79 in the third session (p>0.05). No statistically significant differences were found in the pain scores across the four repeated measurements within either the placebo or intervention groups (p>0.05) (Table 3). The mean pain scores of the patients in the placebo group on the first, second, third, and fourth days were 4.47±3.30, 4.32±3.14, 4.17±2.70 and 3.88±2.79. The mean pain scores of the patients in the intervention group on the first, second, third, and fourth days were 4.50±3.30, 3.52±2.67, 3.41±2.67 and 3.55±2.31, respectively. There was no statistically significant difference between the placebo and intervention groups in terms of the mean pain scores on the first, second, third, and fourth days (p>0.05) (Table 4).

Table 3. Comparison of Findings Related to Four Repetitive Measurements of Patients in Placebo and Intervention Groups

Duration / Group	**Placebo group (n=34) x̄ ± SD**	**Intervention group (n=34) x̄ ± SD**	**F**	**p**
VAS 1. day	4.47±3.30	4.50±3.30		
VAS 2. day	4.32±3.14	3.52±2.67		
VAS 3. day	4.17±2.70	3.41±2.67		
VAS 4. day	3.88±2.79	3.55±2.31		
		Intervention group	0.722	0.399
		Duration	1.875	0.146
		Duration intervention group	0.602	0.584
*VAS: Visual analog scale, n: number, x̄: Mean, SD: Standard deviation, F: One-Way ANOVA				

Table 4. Comparison of Mean Pain Scores of Patients in Placebo and Intervention Groups

	Placebo VAS	Intervention VAS	t/p
1. day	4.47±3.30	4.50±3.30	-0.037/0.971
2. day	4.32±3.14	3.52±2.67	1.120/0.267
3. day	4.17±2.70	3.41±2.67	1.173/0.245
4. day	3.88±2.79	3.55±2.31	0.520/0.605
*VAS: Visual analog scale, t: Student t-test			

DISCUSSION

Adequate vascular access is a prerequisite for hemodialysis treatment in patients with end-stage kidney disease (12). However, patients report pain during needle cannulation to AVF to perform hemodialysis (13). Puncture caused by invasion of fistula needles on the arteriovenous fistula causes pain in tissues with sensitive nerve endings. In repeated needle cannulations during each HD session, advancement of the needles into the tissue during the procedure is another factor that causes pain (14). In the management of this pain during access to arteriovenous fistula, the HD nurse, who is an indispensable member of the health care team working with patients, follows, and evaluates patients in all processes, and therefore, plays an active role (14). Hemodialysis nurses can control this pain using pharmacological methods (15). In the literature, it is revealed that the use of local anesthetic creams to the AVF area is recommended in patients who are sensitive to pain prior to needle insertion and that such creams are effective in reducing pain (16). Topical local anesthetics such as lidocaine formulations are widely utilized to provide superficial analgesia for various invasive procedures, including needle-related interventions such as venous access, arterial cannulation, and other superficial invasive techniques, by reducing procedural discomfort (17). In a study conducted by Arab et al. (4) the application of lidocaine gel prior to fistula access in patients undergoing hemodialysis was examined and found to effectively reduce pain levels. Similarly, research by Aliasgharpour et al. investigated the use of lidocaine gel before AVF needle insertion in patients undergoing hemodialysis, aiming to determine its potential to alleviate pain (18). In the study conducted by Shaheen et al. (19), prilocaine/lidocaine cream was found to provide better analgesic effect than piroxicam gel during arteriovenous fistula needling. Ibrahim et al. (20) reported that the topical application of lidocaine gel prior to arteriovenous fistula cannulation significantly reduced pain and anxiety in patients undergoing hemodialysis. Similar to the results of this study, in our study, the pain scores of the patients in the intervention group were decreased in the first two measurements of lidocaine gel compared to the pain scores before any intervention. Although a numerical difference in mean VAS scores was observed between the placebo and intervention groups in the final hemodialysis session, this difference did not reach statistical significance. Repeated-measures analysis revealed no significant time effect, group effect, or group x time interaction. Additionally, no differences were observed in clinical procedures, nursing staff, or treatment conditions across sessions. Therefore, the slight variation observed in the last session is most likely attributable to normal inter-individual variability in pain perception rather than to a cumulative or delayed effect of lidocaine gel. In addition, many patients expressed severe, or moderate pain during AVF cannulation, and stated that they wanted to do this before each AVF puncture. Based on these results, it is thought that lidocaine gel can be used by HD nurses for invasive pain control before vascular access.

Pain perception during arteriovenous fistula cannulation is known to be influenced by multiple factors, including cannulation technique, needle characteristics, and the experience of the hemodialysis nurse. More recent studies have compared lidocaine with alternative non-pharmacological interventions for reducing arteriovenous fistula cannulation pain. In a study conducted by Ozen et al. (21), cold needle application during arteriovenous fistula cannulation was found to significantly reduce invasive pain compared with room-temperature needle insertion. In the study by Foji et al. (22), lidocaine spray was reported to be more effective than ice spray in reducing the intensity of pain associated with catheter insertion. Similarly, in a study by Khosravi Pour et al. (23) investigating needle insertion pain in patients on hemodialysis, pain scores were significantly lower in patients who received cooling spray compared with those in the placebo and lidocaine spray groups.

In the present study, pain was assessed using the VAS, which reflects the subjective perception of pain. Although cannulation procedures were performed by the same hemodialysis nurses under identical clinical conditions, detailed variables such as specific cannulation techniques, needle size, and individual nurse experience were not recorded as separate study parameters. Therefore, the findings should be interpreted within this context, and future studies incorporating these variables may provide a more comprehensive understanding of factors influencing cannulation-related pain. This finding may be explained by individual differences in pain perception, repeated exposure to cannulation leading to adaptation, and the absence of cumulative anesthetic effects with topical lidocaine application.

Implications for Clinical Practice

It is suggested that further evaluation be conducted on the use of lidocaine gel for managing pain during invasive procedures such as AVF access. This should include efforts to standardize the dosage, application time, and method of administration, with the goal of integrating these practices into routine nursing care.

Study Limitations

One notable limitation of this study is that pain levels were assessed solely based on patients' self-reports. Additionally, the research was confined to a single-center setting, which may limit the generalizability of the findings.

Cannulation type was not standardized or systematically recorded in this study. As different cannulation techniques may influence pain perception during arteriovenous fistula access, this may have affected the reported pain outcomes and represents a limitation

CONCLUSION

The aim of this study was to evaluate the effect of lidocaine gel on invasive pain during access to fistula in patients undergoing hemodialysis. All the patients in both groups experienced pain during needle entry into fistula, and there was a decrease in pain levels after the application of lidocaine gel in the intervention group; however, this decrease did not produce a statistically significant difference. The lidocaine gel did not either cause any adverse effect. It can be used upon patient preference in pain control. In this regard, it can be suggested that invasive pain experienced by patients during needle insertion to the arteriovenous fistula should be evaluated by hemodialysis nurses and that the use of lidocaine gel can be used by HD nurses before access to AVF for pain control in non-risk patient groups.

ETHICS COMMITTEE APPROVAL

The research was conducted in accordance with the Declaration of Helsinki Principles, and permission was obtained from the Gaziantep University Clinical Research Ethics Committee (protocol no: 2018/241).

DECLARATION OF CONFLICT OF INTEREST

Any financial or other interest related to the study there is no conflict.

FINANCIAL SUPPORT

No institution/organization provided financial support related to the study.

PEER REVIEW

External independent, double blind.

AUTHOR CONTRIBUTIONS

Study conception and design: BAK, ÖO
Data collection: BAK, ÖO, SS
Data analysis and interpretation: BAK
Manuscript preparation: BAK, ÖO

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