



THE EFFECT OF LOCAL ANESTHESIA ON DERMATOLOGICAL ACTIONS ON PATIENT COMFORT

Puguh Riyanto, Olivia Jovina Priyanto*

Department of Dermatology, Venereology, and Aesthetics, Faculty of Medicine, Universitas

Diponegoro, Jl. Prof. Soedarto, Tembalang, Semarang, Jawa Tengah 50275, Indonesia

dr.oliviajovina@gmail.com

ABSTRACT

Local anesthesia is commonly used in a variety of dermatological procedures to reduce pain and improve patient comfort. However, some side effects can occur, including burning sensations, nausea, vomiting, dizziness, blurred vision, and even impaired consciousness. This study aimed to evaluate the effect of local anesthesia on patient comfort during dermatological procedures. The study was conducted at an aesthetic clinic in Semarang from 7 to 9 February, involving 20 patients (2 men and 18 women). This study uses a quantitative descriptive study with a cross-sectional approach to assess patient comfort and side effects after local anesthesia in dermatologic procedures. Patients aged 18 and older who consent will be recruited consecutively. Researchers will use observation checklist and vital sign chart to collect demographic and clinical data, observe and record specific side effects such as feeling hot/sore, nausea, vomiting, dizziness, blurred vision, impaired consciousness, and fainting during and up to 30 minutes after the procedure, and monitor vital signs before and after the procedure. The results showed that 16 out of 20 patients reported no complaints after the procedure. Three patients experienced a burning sensation, while one patient experienced nausea and vomiting. None of the patients reported dizziness, blurred vision, loss of consciousness, or fainting. In conclusion, local anesthesia provides a high level of comfort for patients with minimal side effects. Therefore, it remains a safe and effective option for dermatological procedures, although monitoring individual responses remains important.

Keywords: dermatology; local anesthesia; patient comfort; side effects

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INTRODUCTION

Local anesthesia is a method of anesthesia that works by inhibiting the transmission of nerve impulses in a specific area without affecting the patient's consciousness. Referring to the research of Dhiu et al. (2021), this technique is often used in a variety of medical and surgical procedures, including dermatological procedures that are minimally to moderately invasive (Dhiu et al., 2021). Some dermatological procedures, such as laser fraction, skin booster, microneedling, and subside, cause discomfort or pain to the patient, so local anesthesia is required to increase comfort during the procedure. Local anesthesia has an advantage over general anesthesia in the context of dermatological procedures, as its effect is limited to the desired area without causing significant systemic effects (Simanjuntak, 2017). This allows the patient to remain conscious during the procedure and minimizes the risk of complications that generally occur under general anesthesia, such as respiratory depression or cardiovascular disorders. Thus, local anesthesia is the primary choice in dermatological procedures, especially for patients undergoing elective and non-major non-surgical procedures.

However, although relatively safe, the use of local anesthesia is not completely free of side effects. Some patients may experience local reactions, such as a hot or sore sensation, which are generally temporary and occur as a result of injections or reactions to the components of the anesthesia themselves (Dewantara & Sidqia, 2021). In addition, some patients also report nausea, vomiting, dizziness, and blurred vision, which can be influenced by a variety of factors, such as an

individual's response to anesthesia, an underlying health condition, or anxiety before the procedure. In rarer cases, more serious reactions such as impaired consciousness may occur, especially if there is an error in the injection technique or the patient's sensitivity to anesthetic drugs (Ichwanuddin & Nashirah, 2022).

As shown by Irmalenny (2012) In his research, dermatological procedures such as laser fraction used for skin rejuvenation and overcoming hyperpigmentation, generally caused mild to moderate pain during the procedure (Gultom et al., 2024). Local anesthesia in this procedure serves to reduce the sensation of pain that may be caused by laser penetration into the skin. Skinboosters, an injection procedure aimed at improving skin hydration and elasticity, also often require local anesthesia to reduce the discomfort caused by needle penetration into the skin tissue. Meanwhile, microneedling, which uses microneedling to stimulate collagen production, can cause significant pain, especially in more sensitive areas of the skin (Purbosetyo & Kusstianti, 2020). The use of local anesthesia in this procedure aims to increase the patient's tolerance to procedures that repeatedly puncture the surface of the skin. Subsisi, a technique used to treat atrophic scars by severing fibrotic tissue under the skin, also has a high enough level of pain that it requires local anesthesia to keep the patient comfortable during the procedure.

In addition to the type of procedure performed, the patient's comfort level can also be influenced by individual factors, such as pain threshold, psychological condition, and previous experience with anesthesia (Widayati et al., 2023). Some patients may be more susceptible to side effects of anesthesia, such as nausea, vomiting, or dizziness, due to the autonomic nervous system's response to medical procedures. Therefore, understanding the side effects of local anesthesia in dermatological procedures is important to ensure that patients get the optimal experience during the procedure. Although previous studies have addressed the effectiveness and safety of local anesthesia in a variety of medical procedures, there are still limitations in specific studies that assess patients' experiences during dermatological procedures using local anesthesia. Understanding how much local anesthesia can improve patient comfort and the potential side effects that occur needs to be further researched to provide better clinical recommendations for dermatology practitioners and aesthetic physicians.

Based on the above background, this study aims to analyze the effect of local anesthesia on the comfort of patients undergoing dermatological procedures, by evaluating various parameters such as pain, dizziness, nausea, vomiting, blurred vision, and impaired consciousness. The results of this study are expected to provide further insight into the safety and effectiveness of local anesthesia in dermatological procedures and assist clinicians in selecting the optimal anesthesia technique to improve patient comfort.

METHOD

This research was conducted at an aesthetic clinic in Semarang on February 7–9. The study sample consisted of 20 patients undergoing various dermatological procedures with the use of local anesthesia. Of the 20 patients, there were 2 men and 18 women. In this study, a range of dermatological procedures were administered to patients. The most frequently performed procedure was fractional laser therapy, which was conducted on eight patients. Skin strengthening treatments were performed on six patients, followed by microneedling, administered to four patients. Additionally, subsidized treatment and facial procedures were each carried out on one patient respectively. The anesthesia used in this study is topical lidocaine in the form of an applied preparation. Lidocaine works by inhibiting the conduction of nerve impulses in the area of application, thereby providing a rapid local anesthetic effect. This anesthesia is administered before the dermatological procedure to reduce pain and improve patient comfort.

This research is a quantitative descriptive study with a cross-sectional approach, aiming to provide an overview of patient comfort and the occurrence of side effects following local anesthesia in dermatologic procedures. Sampling method is non-probability consecutive sampling. The procedure will begin with the recruitment of patients who meet the inclusion criterias, which are aged 18 years and above, undergoing a dermatologic procedure with local anesthesia, and willing to participate and sign informed consent. After informed consent is obtained, baseline demographic data (such as age and gender) and clinical information (including the type of dermatologic procedure and anesthetic used) will be collected. The dermatologic procedure will be performed as per standard clinical protocol. To document side effects, an observation checklist will be completed by the attending medical personnel or trained research assistant. This form includes predefined symptoms such as feeling hot/sore, nausea, vomiting, dizziness, blurred vision, impaired consciousness, and fainting[Reviewer1], which may occur as side effects of local anesthesia. Each symptom will be marked as either present or absent based on real-time observation during and within 30 minutes following the procedure. In addition, vital signs such as blood pressure, heart rate, and oxygen saturation will be recorded in vital sign chart both before and after the procedure using standard clinical equipment to identify any physiological changes related to the anesthetic. The entire data collection process for each patient is expected to take approximately 45 minutes to one hour. Here is a table describing the age profile of the patient and the type of procedure they undergo:

Table 1.
Patient Age Profile and Type of Dermatology Procedure Performed

Age (years)	Gender	Action Type
25	Woman	Fraction Laser
32	Woman	Strengthening skin
28	Woman	Microneedling
30	Woman	Fraction Laser
22	Woman	Strengthening skin
27	Woman	Fraction Laser
35	Woman	Subsidies
24	Woman	Microneedling
29	Woman	Fraction Laser
31	Man	Strengthening skin
26	Woman	Microneedling
33	Woman	Fraction Laser
37	Man	Strengthening skin
21	Woman	Face
23	Woman	Fraction Laser
34	Woman	Strengthening skin
36	Woman	Fraction Laser
38	Woman	Microneedling
40	Woman	Fraction Laser
39	Woman	Strengthening skin

RESULT

This study was conducted on 20 patients who underwent various dermatological procedures with the use of local anesthesia. The majority of patients do not experience significant side effects after the procedure. Of the total sample, 16 patients (80%) had no complaints at all, indicating that local anesthesia was well tolerated and provided optimal comfort during the procedure. However, there are some side effects reported by patients. A total of 3 patients (15%) reported a hot or stinging sensation after the procedure. This sensation may be caused by local irritation due to the injection of the anesthetic or an individual reaction to the anesthetic component used. A stinging sensation can occur due to the penetration of needles into the skin tissue or due to the interaction of anesthesia with nerve endings in the dermis and epidermis. These side effects are generally

temporary and subside within a few minutes to a few hours after the procedure is completed.

In addition, 1 patient (5%) experienced nausea and vomiting after the procedure. Nausea and vomiting can be caused by a variety of factors, including an individual's physiological response to local anesthesia, anxiety before the procedure, or possible vagal effects due to nerve stimulation during the procedure (Gultom et al., 2024). Psychological factors, such as fear of needles or previous negative experiences, can also trigger this reaction. However, since only one patient experienced these side effects, it can be concluded that the occurrence of nausea and vomiting due to local anesthesia in dermatological procedures is rare.

In this study, none of the patients experienced fainting, dizziness, blurred vision, or impaired consciousness. This suggests that local anesthesia used in dermatological procedures has a good safety profile, without causing serious systemic side effects. The absence of impaired consciousness or fainting also confirms that the dose of anesthesia used is within safe limits, so it does not cause toxic effects on the central nervous system (Fauzia et al., 2024). To further analyze the relationship between side effects and the type of dermatological procedure performed, here is the distribution of side effects by procedure undergone by the patient:

Taable 2.

The distribution of side effects by procedure undergone by the patient

Action Name	Number of Samples	Side Effects						
		No Complai nts	Hot/sor e	Nausea and vomiting	Dizziness	Blurre d vision	Faint	Consciousness Disorders
Laser Ffraction	8	7	1	-	-	-	-	-
Skin Booster	6	4	1	1	-	-	-	-
Microneedling	4	3	1	-	-	-	-	-
Subsidies	1	1	-	-	-	-	-	-
Face	1	1	-	-	-	-	-	-
Sum	20	16	3	1	0	0	0	0
Percentage	100%	80%	15%	5%	0%	0%	0%	0%

From the above results, it can be observed that a sensation of heat/stinging is more common in patients undergoing laser fraction, skin booster, and microneedling procedures. This may be due to the thermal effects of the laser, microtrauma due to skinbooster injections, as well as microneedle penetration in microneedling procedures. In addition, patients who experience nausea and vomiting undergo a skinbooster procedure, which involves repeated injections into the dermis tissue. This reaction can be triggered by an individual's anxiety or sensitivity to the anesthesia used in repeated injection procedures (Gultom et al., 2024).

DISCUSSION

The Effectiveness of Local Anesthesia in Dermatological Procedures

Local anesthesia is a method that works by inhibiting the conduction of nerve impulses in a specific area, thereby reducing or eliminating pain sensations during medical procedures. In dermatological procedures, the use of local anesthesia is the main choice due to its effectiveness in increasing patient comfort without causing significant systemic effects (Irmalenny, 2012). The results of this study reinforce the evidence that local anesthesia has high effectiveness in dermatological procedures, as evidenced by 80% of patients who did not experience complaints after the procedure. This percentage indicates that local anesthesia provides an optimal level of comfort for most patients, allowing the procedure to run smoothly without any hindrance due to excessive pain or discomfort. The safety of local anesthesia in dermatological procedures can also be seen from the absence of reports of severe side effects, such as fainting, dizziness, blurred vision, or impaired

consciousness. The absence of these serious side effects indicates that the dosage and injection technique used in this study are in accordance with medical safety standards (Hadiarisma, 2017).

Reported Side Effects and Possible Causes

Although the majority of patients did not experience any side effects, some patients (15%) reported a hot or stinging sensation after the procedure. However, based on patient reports and related literature, this stinging sensation occurs immediately after the application of topical anesthesia, not as a result of the dermatological action itself. This can be directly attributed to the pharmacological effects of lidocaine as a local anesthetic (Mattalitti et al., 2021). This stinging sensation is not caused by the dermatological action itself, but rather a side effect of using topical lidocaine. Lidocaine can cause a burning or stinging sensation immediately after application due to its mechanism of action that affects the excitability of nerve cell membranes. This phenomenon has been described in several literature on topical anesthesia indicating that lidocaine can trigger temporary irritation before the effects of the anesthesia are fully developed. Some possible causes of stinging sensations include:

1) Reaction to local anesthesia injections

The anesthesia injection process can cause minor trauma to the tissues, which can trigger a burning sensation or temporary stinging. This reaction is common, especially when local anesthesia is injected into a more superficial layer of skin (Dewantara & Sidqia, 2021).

2) Pharmacological effects of local anesthesia

Some types of local anesthesia have a lower pH than body tissues, so they can cause temporary irritation to the injected area before the effects of the anesthesia begin to work (Longdong et al., 2013).

3) Interaction with dermatological procedures performed

Some procedures, such as laser fraction and microneedling, cause thermal and mechanical stimulation of the skin, which can increase the sensation of heat or stinging after the procedure. This sensation is often temporary and will subside as the skin recovers.

In addition, 1 patient (5%) experienced nausea and vomiting, which was most likely caused by an individual's response to local anesthesia or psychological factors, such as anxiety before the procedure. This reaction can be attributed to the following mechanisms:

1) Stimulation of the autonomic nervous system The body's response to anesthesia injections or invasive procedures can trigger the activation of the vagus nerve, which in some individuals can cause nausea, vomiting, or dizziness (Cahyono et al., 2009).

2) Anxiety or stress before the procedure Some patients have a higher level of anxiety towards medical procedures, which can trigger a physiological response in the form of nausea or vomiting. This has been reported in various studies on the psychological effects of invasive procedures (Suhadi Suhadi et al., 2021).

3) Individual sensitivity to local anesthesia Some individuals are more susceptible to anesthesia side effects, especially if they have a history of hypersensitivity or unusual reactions to medications (Ilmi et al., 2024).

Advantages of Local Anesthesia Over General Anesthesia in Dermatological Procedures

Compared to general anesthesia, local anesthesia has a number of advantages in dermatological procedures, especially in terms of safety, ease of application, and minimal systemic side effects.

1) Does Not Affect Patient Awareness

Local anesthesia works specifically on the injected area without affecting the central nervous system, so that the patient remains conscious during the procedure. This is in contrast to general anesthesia which can cause central nervous system depression and require close monitoring of respiratory and cardiovascular function.

2) Lower Risk of Side Effects

General anesthesia has a higher risk of side effects, such as nausea, vomiting, respiratory depression, and cardiovascular disorders. In contrast, local anesthesia has a better safety profile with the possibility of milder and rarer side effects (Gunawan & Putra Pradana, 2023).

3) Faster Recovery Time

Patients who undergo the procedure under local anesthesia can immediately return to normal activities after the procedure, without the need for a long recovery time as with general anesthesia. This is especially important in dermatological procedures that are often elective and performed in outpatient clinics (Hamarno et al., 2024).

4) More Cost Efficient

The use of local anesthesia is more cost-effective than general anesthesia because it does not require complex anesthesia facilities, monitoring in the operating room, or additional medical personnel such as experts.

With these results, the use of topical lidocaine in dermatological procedures provides significant benefits in reducing pain, although it still has the potential for mild side effects such as temporary soreness. Understanding the mechanism of these side effects is important to improve patient education before the procedure is performed.

CONCLUSION

Based on this study, local anesthesia in dermatological procedures has been shown to provide good comfort for patients with minimal side effects. Of the 20 patients studied, the majority did not experience any complaints after the procedure. The most common side effects were a feeling of heat or soreness, experienced by three patients, as well as nausea and vomiting experienced by one patient. None of the patients experienced severe side effects such as fainting, dizziness, blurred vision, or impaired consciousness. Thus, local anesthesia can be considered a safe and effective method to improve patient comfort in dermatological procedures. However, monitoring is still needed to anticipate individual reactions to anesthesia as well as improve patient education regarding possible side effects.

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