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Effectiveness of clobetasol and nitroglycerin ointment therapy: a systematic review

Efectividad de la terapia con pomadas de clobetasol y nitroglicerina: revisión sistemática

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Abstract

Introduction: The aim of this study was to determine the effect of clobetasol ointment with nitroglycerin ointment on the prevention of superficial phlebitis caused by Angio catheter.
Materials and methods: This study was performed as a clinical trial on 110 patients admitted to the surgical ward. Patients were randomly divided into three groups: clobetasol, nitroglycerin group and control group. The data collection tools of the questionnaire included demographic information, information about intravenous treatment and phlebitis measurement scale. In the intervention groups, after venipuncture, 1.5 cm (about 2 g) of ointment was applied in the distal part of the Angio catheter and the site was dressed with sterile gauze. In three time periods of 24, 48 and 72 hours from the time of venipuncture, the site was examined for phlebitis.
Results: The results showed that the age group of 18 to 30 years was the most common age group. The most common site of cannulation was 62.5% in the clobetasol group, 59.5% in the nitroglycerin group and 46.9% in the control group. The incidence of phlebitis in the study groups by the time elapsed since the placement of the Angio catheter showed that, in the first 72 hours after the placement of the Angio catheter, there was no significant difference between the three groups. But at 96 and 118 hours after catheter placement between intervention and control groups was significant (P <0.0001).
Conclusion: The results of this study showed that the use of nitroglycerin ointment was more effective than clobetasol ointment in preventing superficial phlebitis caused by Angio catheter. Therefore, based on the results of this study, it is recommended to use clobetasol ointment and nitroglycerin ointment to prevent the occurrence of phlebitis in patients who need long-term use of Angio catheter (more than 96 hours).

Keywords: Surgery, patient, clobetasol ointment, nitroglycerin ointment, phlebitis, angio catheter.

Resumen

Introducción: El objetivo de este estudio fue determinar el efecto de la pomada de clobetasol con la pomada de nitroglicerina en la prevención de la flebitis superficial causada por el angiocatéter.
Materiales y métodos: Este estudio se realizó como un ensayo clínico en 110 pacientes ingresados en la sala de cirugía. Los pacientes se dividieron aleatoriamente en tres grupos: clobetasol, grupo de nitroglicerina y grupo de control. Los instrumentos de recogida de datos del cuestionario incluían información demográfica, información sobre el tratamiento intravenoso y la escala de medición de la flebitis. En los grupos de intervención, tras la venopunción, se aplicó 1,5 cm (unos 2 g) de pomada en la parte distal del angiocatéter y se vendó el lugar con una gasa estéril. En tres periodos de tiempo de 24, 48 y 72 horas desde el momento de la venopunción, se examinó el lugar en busca de flebitis.
Resultados: Los resultados mostraron que el grupo de edad de 18 a 30 años fue el más frecuente. El lugar de canulación más frecuente fue el 62,5% en el grupo del clobetasol, el 59,5% en el grupo de la nitroglicerina y el 46,9% en el grupo de control. La incidencia de flebitis en los grupos del estudio según el tiempo transcurrido desde la colocación del angiocatéter mostró que, en las primeras 72 horas tras la colocación del angiocatéter, no había diferencias significativas entre los tres grupos. Pero a las 96 y 118 horas después de la colocación del catéter, la diferencia entre los grupos de intervención y de control fue significativa (p <0,0001).
Conclusión: Los resultados de este estudio mostraron que el uso de la pomada de nitroglicerina fue más eficaz que la pomada de clobetasol en la prevención de la flebitis superficial causada por el angiocatéter. Por lo tanto, basándose en los resultados de este estudio, se recomienda utilizar la pomada de clobetasol y la pomada de nitroglicerina para prevenir la aparición de flebitis en los pacientes que necesitan un uso prolongado del angiocatéter (más de 96 horas).

Palabras clave: Cirugía, paciente, pomada de clobetasol, pomada de nitroglicerina, flebitis, angiocateter.

Introduction

Intravenous therapy is 70 years old, but the injection of drugs into the arteries has undoubtedly been a human dream for centuries. Today, more than 80 to 90% of hospitalized patients receive intravenous treatment during their treatment, and more than 500 million peripheral venous catheters are placed annually. In a study conducted in Yazd and 50% of similar studies in Tehran, 55% of hospitalized patients were treated intravenously, which indicates the extent of the use of this treatment in the country. More than 25 million intravenous catheters are placed in American hospitals each year[1-3].

Catheters are used to deliver nutrients to the body, to correct or prevent water and electrolyte disturbances, to transfuse blood or blood products, to prescribe drugs, and to draw blood[4]. Harrison writes that the intravascular method is appropriate when oral medications are ineffective, the level of drug concentration in the blood is unknown, or higher doses of the drug are required for treatment. Intravascular is associated with many risks, but the intravenous route is often the best or only option[5-6]. The purpose of venipuncture is to access the venous bloodstream to obtain blood for laboratory or diagnostic tests, fluid injections, electrolytes, medications, blood products, nutritional supplements, and hemodynamic monitoring. One of the most common invasive methods of medical care today is the use of intravenous injections. Phlebitis, in addition to being dangerous on its own, leads to clot formation, thrombophlebitis 1, embolism 2, and shortened lifespan of 3 venous cannulas. Research has shown that the main reason for removing peripheral catheters is phlebitis[7-9].

The high prevalence of phlebitis increases economic costs, wastes nurses 'time, increases patients' problems such as infection, patient discomfort, and ultimately leads to catheter removal and placement in a new location, which in turn makes access more difficult. The arteries become narrower and may lead to more invasive procedures, such as catheter insertion into central veins, which have far more complications. Intravenous medications may also be delayed and even the length of hospital stay may be increased.[10-11]

In the presence of bacterial phlebitis, the risk of septicemia increases up to 18-fold. Phlebitis is a potentially dangerous source of systemic infections, so the chances of developing systemic infections in the presence of phlebitis increase eightfold. The American Nursing Association puts the acceptable prevalence of phlebitis at 5 percent or less, while studies from 1966 to 1801 reported an overall prevalence of phlebitis of 25 to 35 percent. Another study reported a prevalence of phlebitis in patients with intravenous injections of between 25 and 70%. The results of research show that the prevalence of complications due to intravenous injections in our country is higher than other parts of the world (18 to 80%). In the 1950s, the average survival of peripheral catheters was less than 118 hours, in the 1970s from 96 to 118 hours, and today it is 96 to 96 hours. What is certain is that many of the complications of intravenous injections are preventable.

The important point for nurses is that the best treatment for chemical, mechanical and bacterial phlebitis is to prevent its occurrence. Frequent control of the Angio catheter placement area and, if the first signs of redness, tenderness, and inflammation are observed, change the location of the Angio catheter[12- 13].

Studies to prevent superficial phlebitis due to fluid infusion into peripheral veins have been performed for many years, the use of each of which is controversial for a number of reasons. A study by Schussler in 2016 stated that although in several studies the use of chlorhexidine solution was significantly different from that of betadine in reducing phlebitis and catheter infection, in other studies there was a significant relationship between the use of chlorhexidine solution. Alcohol and betadine have not been reported for phlebitis and catheter infection[14-15].

In other studies, such as the study of Iwachow et al. And Rashid et al, there was no significant difference in the use of chlorhexidine solution compared to alcohol and betadine, and its use is controversial. Also, the discussion about the effects of different types of dressings on the catheter entry site is still ongoing. On the other hand, studies have not yet been able to show the significant effect of using antiseptic ointment at the catheter entrance site on reducing the prevalence of phlebitis. For many years, the prevention of infection and phlebitis caused by infusion and its relationship with the choice of dressing has been controversial[16-18].

There is a great difference between the two methods of fixing the venous catheter using ordinary adhesive and wound adhesive with sterile gas. Given what has been said about the variety of dressing procedures at the catheter insertion site, it is clear that there is still insufficient research infrastructure to determine and support preferred dressings to reduce the prevalence of phlebitis. Heparin 1, corticosteroids 2, venous fluid filtration (intracellular filters) and topical nitroglycerin 3 ointment have been suggested[19].

However, the use of heparin is associated with the possibility of bleeding in the surgical area following the reduction of platelets and the use of intracellular filters is also expensive. Other methods to prevent phlebitis include the use of nonsteroidal anti-inflammatory drugs (NSAIDs). NSAIDs, such as diclofenac, have been used both systemically and topically as a gel, which only reduces some of the symptoms of phlebitis, but it should be noted that nonsteroidal anti-inflammatory drugs

(NSAIDs) have gastrointestinal side effects.

Avaze et al. Conducted a clinical trial to investigate the effect of topical nitroglycerin on the incidence and severity of venous catheter phlebitis.[39] The study was performed as a double-blind trial on 82 patients admitted to the teaching hospitals. Patients were randomly divided into case and control groups. After intravenous catheter placement, nitroglycerin ointment was used in the case group and 1.5 cm in the control group with a width of2×4cm in the distal part of the catheter and it was covered with 5× 5 cm sterile gas. After 12 hours, the catheter site was examined for the presence or absence of phlebitis symptoms and its severity using a checklist and the dressing was replaced by reusing the ointments. This operation was repeated at 118, 36, 96, 60 and 118 hours later. Data were analyzed using the results using t-test, chi-square and relative risk. The results showed that there was a significant difference between the frequency (p = 0.001) and severity of phlebitis (p = 0.005) in the case and control groups. The results also showed an increase in catheter lifespan in the case group compared to the control group (p = 0.01). Therefore, he suggested the use of nitroglycerin ointment in cases where a catheter is needed for more than 96 hours.

This clinical trial was performed on 64 patients admitted. Patients were randomly divided into two groups, 32 patients in the experimental group using sterile gauze and 32 patients in the control group routinely glued. The results of research on phlebitis with P<0.05 showed that gauze dressing Sterile is effective in preventing its occurrence. While Fisher's exact statistical test with P> 0.05 showed that sterile gauze dressing was ineffective in preventing local infection of venous catheters. In the end, the researchers concluded that the use of sterile gauze dressing can be effective in preventing phlebitis and colonization[20].

Mosca et al. conducted a study to investigate the effect of sesame oil on the prevention of chemotherapy-induced phlebitis. This study was performed as a randomized clinical trial on 60 patients with colorectal cancer undergoing chemotherapy and hospitalization in the oncology ward, based on the characteristics of the study units. According to the results of the study, the external use of sesame oil has an effective role in the prevention of phlebitis caused by chemotherapy and has been suggested by the researcher as a suitable prevention method to reduce the rate of this complication[21-23].

Taghinejad et al in a study to compare the effect of skin disinfection with chlorhexidine solution and alcohol on the incidence of peripheral venous catheter phlebitis in cardiac patients admitted to the emergency, CCU and post-CCU wards of Shahid Mostafa Khomeini Hospital affiliated to the University Medical sciences and health services in Ilam[24].
The results showed that the incidence of phlebitis in the chlorhexidine group was 15% and, in the alcohol, group was 37.5%. The researcher suggested the use of chlorhexidine solution before peripheral venous catheter placement to reduce phlebitis. Conti et al conducted a study on the prophylactic and therapeutic effect of clobetasol ointment on superficial phlebitis caused by the drug. In this study, the drug DP-b99, which is used as a neuroprotective agent after stroke, causes post-injection phlebitis[25]. Finally, the researcher states that although an animal study cannot be a basis for human studies, but this study guarantees the positive effect of clobetasol on phlebitis in human samples and if the use of topical corticosteroids in humans is proven, it can replace the drug Heparin and other non-steroidal anti-inflammatory drugs[26]. Singhal et al. conducted a study on the effect of corticosteroids on phlebitis caused by injecting chemotherapy drugs into rabbits. Histopathological results showed that dexamethasone injection significantly reduced phlebitis compared to the control group. The researcher suggested the use of dexamethasone as a way to treat phlebitis caused by vinorelbine[27].

Therefore, due to disagreements over various studies in the field of prevention of phlebitis and studies on the effectiveness of different methods in this the field is not sufficient and they do not have a solid scientific foundation and are not routinely performed in hospital wards. Also, due to the high cost of nitroglycerin ointment, it is often not possible for the patient to supply it[27-29]. Due to the importance and disagreement of people in the use of various devices and drugs, in this study to prevent superficial phlebitis venous catheter placement of clobetasol ointment, which is a strong, available and inexpensive anti-inflammatory ointment for the first time to prevent Angio catheter-induced superficial phlebitis was compared with nitroglycerin ointment[30]. Due to differences in the use of other methods to prevent the occurrence of Angio catheter-induced phlebitis, we decided to conduct a study comparing the effect of clobetasol ointment and nitroglycerin ointment on the prevention of Angio catheter-induced superficial thrombophlebitis[31-35].

Methodology

Study population, sampling method and sample size: This study is a single-blind clinical trial that was performed on all patients admitted to the surgical ward who met the inclusion criteria.

Sampling method: All patients admitted to the surgical ward were selected provided they met the inclusion criteria. Necessary explanations were given to the patients in the study and written informed consent was received from all patients. Then, all patients were removed from the bag by the patient himself using a simple random allocation using three named balls, and according to the removed ball, the patient was placed

in the same group. "Clobetasol ointment (intervention)", group B "nitroglycerin ointment (intervention)", group C "routine (usual method)" was divided.

Sample size: Taking into account alpha 0.05, Power = 80% and maximum effect size equal to EF = 0.45, and using Altman nomogram, the number of sample size in each group was calculated 96 people, which the total number of patients in the three groups was 144.

Execution Method
(research and data collection method)

The data collection tools consisted of three sections: demographic information, information on intravenous therapy, and checklist on the presence and severity of phlebitis. Demographic information included: age and type of disease. Information on intravenous therapy included: site of cannulation, type of serum received, amount of serum 118 hours, and medications received. Patients were divided into three groups in terms of disease type, serum intake, 118-hour serum intake and medications.

The Phlebitis Symptoms Checklist included the Phlebitis Visual Measurement Scale. This scale was introduced by Jackson in 1998 and was introduced to the Intravenous Injection Nursing Association in 1806 as a measure of phlebitis. Its reliability has been confirmed. The visual scale of phlebitis is as follows:

Zero-degree phlebitis: no clinical symptoms.
Grade 1 phlebitis: One of the symptoms of pain or redness.
Grade 2 phlebitis: pain, redness or edema at the site, unclear vein boundaries, no rope vein on touch.
Grade 3 phlebitis: pain, redness or edema at the site, clear blood vessels, no rope vein on touch.
Grade 4 phlebitis: the presence of pain and erythema or edema at the site, the clearness of the arteries and the rope of the vein on touch.

Venipuncture and dressing in all patients with the help of the first researcher in accordance with the principles mentioned in the reference books (washing hands before starting work and wearing disposable gloves, choosing the right place, choosing the right vein, cutting the hair at the injection site with scissors, Disinfect the area for at least 30 seconds with alcohol (70%) evenly with pink Angio catheter No. 18 manufactured by Haryana factory in India. If the vein is removed more than twice, a new location was chosen for the vein.

Patients were instructed in the maintenance of venipuncture. According to the group in which the patients were located, after venipuncture, 1.5 cm (about 2 g) of the ointment was rubbed in the distal part of the Angio catheter in a width of 2×4 cm and sterile gauze with anti-adhesive adhesive. Sensitivity was covered.

Due to the fact that in some studies, serum set replacement was considered effective in the occurrence of phlebitis, in this study, serum sets were changed equally every 96 hours in both groups. The maximum storage time of Angio catheter was 118 hours in three groups.

To measure the incidence and severity of phlebitis according to the Jackson scale, patients were evaluated at 72, 96 and 118 hours after venipuncture. First the dressing was done. To determine the severity of phlebitis, observation, examination and interview were used and the information was recorded in a checklist related to data collection. In this method, 3 dressings were required in the first hour of placement, 118 and 96 hours after placement of the Angio catheter. Also, topical drugs based on the type of patient group were used for 3 times, in the first hour of placement, 118 and 96, one hour after Angio catheter placement. In order to blind the research, a similar coating was applied on the ointments so that patients and colleagues could not identify the ointments. At the same time, two assistants of the researcher, the first person undertook the cannulation and dressing, and the second person performed the examination for the severity of phlebitis in order to observe a research blindness.

Comparison of subjects in terms of contextual and confounding variables by study groups

Due to the fact that in this study, most of the confounding variables were removed by uniformity method, in this section, patients are examined in terms of two variables, age and location of cannulation.

Discussion and comparison

Comparison of Patients Based on Age Group and Type of Study Group

The mean age of clobetasol group was 1/17±1/45 years, nitroglycerin group was 5/18±6/45years and control group was 3/18±6/50years. Based on the results of one-way analysis of variance, the mean age of the studied age groups was statistically different. Not seen (P = 0/28).

Table I details the frequency distribution of different age groups. As the results of this table show, in the clobetasol group, the majority of patients were 41.7%, in the nitroglycerin group, 51.1%, and in the control group, 34.7%, in the age group of 18-30 years.

The age group of 18-30 years was the most common age group. There was no significant difference between the groups in the distribution of other age groups and finally the three groups did not have a statistically significant difference in terms of frequency distribution of different age groups (P = 0.31) (**Table I**).

Table I: Frequency distribution of different age groups in the studied patients by type of groups.

Age group	18-30 Number (Percent)	40-59 Number (Percent)	60-79 Number (Percent)	80≤ Number (Percent)	Total Number (Percent)	P Value (Percent)
Group Clobetasol	18 (7/41)	16 (3/33)	12 (25)	0 (0)	96 (100)	31/0
Group Nitroglycerin	118 (1/51)	8 (17)	13 (7/27)	2 (3/4)	47 (100)	
Group Control	17 (7/34)	14 (6/28)	15 (6/30)	3 (1/6)	49 (100)	

Table II: Frequency distribution of cannulation site in the studied patients by type of groups.

Location of cannulation group	Back of the hand	Forearm	Wrist	elbow	Total	P Value
Group Clobetasol	30 (5/62)	13 (1/27)	4 (3/8)	1 (1/2)	96 (100)	15 /0
Group Nitroglycerin	28 (5/59)	8 (17)	9 (1/19)	2 (3/4)	47 (100)	
Group Control	123 (9/46)	19 (8/38)	7 (3/14)	0 (0)	49 (100)	

Table III: Frequency distribution of phlebitis in the study groups by duration after cannulation.

Group and Phlebitis Time	Clobetasol		Nitroglycerin		Control		P Value
	has it	does not have	has it	does not have	has it	does not have	
	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	3 (3/6)	45 (8/93)	1 (1/2)	46 (9/97)	3 (1/6)	46 (9/93)	56/0 Accurate Fisher
96 hours after Convolution	8 (7/16)	40 (3/83)	8 (17)	30 (83)	23 (9/46)	26 (1/53)	001/0> Squared
118 hours after Convolution	27 (3/56)	21 (8/43)	18 (6/42)	27 (4/57)	41 (7/83)	8 (3/16)	01/0001> Squared
Total	38 43/26)	106 63/73)	29 56/18)	122 44/79)	67 6/45)	79 4/54)	

Comparison of Patients Based on Location of Cannulation and Type of Study Group

Table II compares the frequency distribution of catheter cannulation sites in the three groups studied. As the results in the table show. In the clobetasol group, the highest cannulation site was 62.5% and the lowest elbow area was 2.1%, in the nitroglycerin group was 59.5% and, in the control, group was 46.9%. According to Fisher's exact test, there was no difference in the canola location between the three groups (P = 0.15).

Comparison of Subjects in Terms of Response Variables (phlebitis) by Study Groups

Table III compares the frequency of phlebitis (with any degree) at different times after cannulation in the three groups studied. On the first day (118 hours after placement) in the clobetasol ointment group 3 cases 6.3%, in the nitroglycerin ointment group 1 case 2.1% and in the control group 3 cases 6.3% phlebitis with different degrees was seen, which is based on a detailed test. Fisher The difference in the incidence of phlebitis in the first 118 hours by groups was not statistically significant (P = 0.56).

In the first 96 hours after cannulation, in the clobetasol ointment group 8 cases 16.7% and in the nitroglycerin group 8 cases 17% and in the control group 23 cases 46.9% phlebitis with different intensities was seen. It was statistically significant (P = 0.001).

In the first 118 hours after cannulation, in the clobetasol ointment group 27 cases were 56.3% and in the nitroglycerin ointment group 18 cases were 42.6% and in the control group 41 cases 83.7% phlebitis was seen with different degrees. The difference was statistically significant (P <0.0001).

Table IV: Frequency distribution of phlebitis severity in the study groups by duration after cannulation.

Time	group	Severity of phlebitis				P Value
		Classy	grade two	third degree	Total	
		Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	Clobetasol	1 (3/33)	2 (7/66)	0 (0)	3 (100)	15/0
	Nitroglycerin	1 (100)	0 (0)	0 (0)	1 (100)	
	Control	3 (100)	0 (0)	0 (0)	3 (100)	
96 hours after Convolution	Clobetasol	7 (5/87)	0 (0)	1 (5/12)	8 (100)	079/0
	Nitroglycerin	5 (5/62)	2 (25)	1 (5/12)	8 (100)	
	Control	12 (3/52)	11 (8/47)	0 (0)	23 (100)	
118 hours after Convolution	Clobetasol	19 (4/70)	6 (3/22)	2 (4/7)	27 (100)	026/0
	Nitroglycerin	17 (85)	2 (10)	1 (5)	18 (100)	
	Control	18 (9/43)	18 (9/43)	5 (2/12)	41 (100)	

In **table IV**, the frequency distribution of phlebitis severity in the study groups is examined separately by the time elapsed since cannulation. In the first 118 hours after cannulation, 33.3% of first-degree phlebitis occurred in clobetasol 1 group and 66.7% of second-degree phlebitis in 2 cases, and 100% of first-degree phlebitis in nitroglycerin group and 100% in 3 control groups. All cases of phlebitis were first-degree, but according to Fisher's exact test, this difference was not significant (P = 0.15).

In the first 96 hours after cannulation, the majority of phlebitis in the clobetasol group was 87.5% first degree and 12.5% third degree and in the nitroglycerin group 62.5% was first degree phlebitis and 25% was second degree and 12.5% was third degree. In the control group, 52.2% were first degree and 47.8% second degree, but according to Fisher's exact test, this difference was not significant (P = 0.079).

In the evaluation performed at 118 hours after cannulation, in the clobetasol group 70.4% of cases were first-degree phlebitis and 22.2% were second-degree phlebitis and 7.4% were third-degree phlebitis, and in the nitroglycerin group 85% were first-degree phlebitis and 10% Phlebitis was second degree and 5% was third degree, but in the control group 43.9% were first degree phlebitis, 43.9% were second degree and 12.2% were third degree, which was significant based on Fisher's exact test (phlebitis degree Two and three were more in the control group than the other two groups (P = 0.026).

Comparison of subjects in terms of the relationship between contextual and confounding variables and response variables by study groups

Table V shows the frequency distribution of phlebitis in patients receiving clobetasol at different times after cannulation by age. As the results of the table show, in none of the 118, 96 and 118 hours after cannulation was there any difference in the incidence of phlebitis in the clobetasol group by age and different age groups (P> 0.05). Although in all three times the incidence of phlebitis in the age groups of 40-59 and 60-79 was higher than the age group of 18-30 years, but this difference was not statistically significant.

Table VI shows the frequency distribution of phlebitis in patients receiving nitroglycerin at different times after cannulation by age. As the results of the table show, in none of the 118, 96 and 118 hours after cannulation was there any difference in the incidence of phlebitis in the nitroglycerin group by age and different age groups which were not statistically significant based on the results of Fisher's exact test.

Table VII shows the frequency distribution of phlebitis in patients receiving clobetasol at different times after cannulation by site of cannulation. As shown in the table, in the first 118 hours, the most cases of phlebitis according to the location of cannulation in the wrist was 7.7% and the lowest was 0% in the elbow area, which according to Fisher's exact test, this difference was not significant (P = 0 / 94). In the first 96 hours after cannulation, the most cases of phlebitis in the wrist area were 23.1% and the lowest in the back area was 0%, but despite this difference, the difference in the frequency distribution of phlebitis according to the site of cannulation was not statistically significant. (P = 0/079). Also, in the first 118 hours after cannulation, the highest number of cases of phlebitis was 100% in the back of the hand, followed by 84.6% in the wrist, and the lowest was in the forearm, which according to Fisher's exact test, this difference was not significant (P = 0.068).

Table V: Frequency distribution of phlebitis in patients receiving clobetasol at different times after cannulation by age.

Age and Phlebitis Time	18-30		40-59		60-79		P Value
	has it	does not have	has it	does not have	has it	does not have	
	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	0 (0)	18 (100)	2 (5/12)	14 (5/87)	1 (3/8)	11 (7/91)	28/0 Fisher exact test
96 hours after Convolution	2 (10)	18 (90)	3 (8/18)	13 (3/81)	3 (25)	9 (79)	79/0 Fisher exact test
118 hours after Convolution	8 (40)	12 (60)	10 (5/62)	6 (5/37)	9 (75)	3 (25)	12/0 Test Squared

Table VI: Frequency distribution of phlebitis in patients receiving nitroglycerin at different times after cannulation by age.

Age and Phlebitis Time	18-30		40-59		60-79		80≤		P Value
	has it	does not have	has it	does not have	has it	does not have	has it	does not have	
	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	0 (0)	118 (100)	0 (0)	8 (100)	1 (7/7)	12 (3/92)	0 (0)	2 (100)	44/0
96 hours after Convolution	3 (5/12)	21 (5/87)	1 (5/12)	7 (5/87)	3 (1/23)	10 (9/76)	1 (50)	1 (50)	5/0
118 hours after Convolution	9 (5/37)	15 (5/62)	3 (5/37)	5 (5/62)	8 (5/61)	5 (5/38)	0 (0)	2 (100)	29/0

Table VII: Frequency distribution of phlebitis in patients receiving clobetasol in different times after cannulation, depending on the location of the cannula.

Place of cannulation and phlebitis time	Forearm		wrist		elbow		behind hand		P Value
	has it	does not have	has it	does not have	has it	does not have	has it	does not have	
	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	2 (7/6)	28 (3/93)	1 (7/7)	12 (3/92)	0 (0)	4 (100)	0 (0)	1 (100)	94/0
96 hours after Convolution	4 (3/13)	26 (7/86)	3 (1/23)	10 (9/76)	1 (25)	3 (75)	0 (0)	1 (100)	079/0
118 hours after Convolution	13 (3/43)	17 (7/56)	11 (6/84)	2 (4/15)	2 (50)	2 (50)	1 1(100)	0 (0)	068/0

Table VIII: Frequency distribution of phlebitis in patients receiving nitroglycerin at different times after cannulation by site of cannulation.

Place of cannulation and phlebitis time	Forearm		wrist		elbow		behind hand		P Value
	has it	does not have	has it	does not have	has it	does not have	has it	does not have	
	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	Number (Percent)	
118 hours after Convolution	0 (0)	18 (100)	1 (5/12)	7 (5/87)	0 (0)	9 (100)	0 (0)	2 (100)	17/0
96 hours after Convolution	4 (3/14)	118 (7/85)	2 (25)	6 (75)	1 (1/11)	8 (9/88)	1 (50)	1 (50)	51/0
118 hours after Convolution	11 (3/30)	17 (7/60)	4 (50)	4 (50)	6 (7/66)	3 (3/33)	18 (6/42)	27 (4/57)	34/0

Table VIII shows the frequency distribution of phlebitis in patients receiving nitroglycerin at different times after cannulation by site of cannulation, which was not statistically significant based on the results of Fisher's exact test.

The effect of intervention on phlebitis

Due to the importance of intravenous injections and its complications, this issue has been discussed and studied for many years and has been researched from various aspects in different centers. Specific studies on the use of topical drugs in prevention Phlebitis due to venous catheters is limited and studies on phlebitis have further examined methods such as the use of different dressings or different skin disinfection methods. In the field of topical medicine, nitroglycerin ointment has been used in several studies in Iran and abroad, but clobetasol ointment has been used in only a few studies with animal samples abroad and in the country, Drug used, not found.

In this regard, this study was conducted to compare the effect of clobetasol ointment with nitroglycerin ointment on the prevention of superficial phlebitis caused by Angio catheter. Ascending progress and changes in the health system of the country, this rate in the control group compared to the results in Dastgerdi research decreased by 76.7% and is 36.1% higher than the results of the original study.[36]

But in both groups, the intervention decreased. However, this rate is far from the acceptable prevalence of phlebitis reported by the American Nursing Association, which is 5% or less. However, Callaghan writes that the reported prevalence of phlebitis in peripheral catheters varies widely because the definition of phlebitis, patient choice, duration of venous follow-up, and injection technique vary.[37]

Regarding the frequency of phlebitis in patients regardless of the degree of phlebitis at different times, the results showed that the frequency of phlebitis in the intervention groups in the first 118 hours after cannulation was not statistically significant compared to the control group.

The frequency of phlebitis in the first 118 hours in the clobetasol group was equal to the control group, which is probably due to the long-lasting effect of clobetasol ointment. The control group was observed to have a statistically significant difference between the two intervention groups and the control group.

In an 1803 study entitled Comparison of the effect of nitroglycerin ointment and anti-inflammatory gel on phlebitis, the incidence of nitroglycerin ointment was 30.8%. While in the present study, the amount of phlebitis in the clobetasol ointment group was 26.43% and in the nitroglycerin ointment group was 18.56%, which is probably due to the cannulation performed by a researcher and the use of sterile gas for dressing and it is good to fix the catheter.

Regarding the frequency distribution of phlebitis severity in the study groups by duration of cannulation, the results showed that statistically, the severity of phlebitis occurred in the intervention groups in the first 118 and 96 hours after cannulation compared to the control group. Was not however, comparing the severity of phlebitis in the intervention groups in the first 118 hours after cannulation compared to the control group, it was observed that there is a statistically significant difference between the two intervention groups and the control group, meaning that second-degree phlebitis and Three in the control group in the first 118 hours after cannulation were more than the two intervention groups.

In the intervention groups, the severity of phlebitis was lower in the nitroglycerin ointment group than in the clobetasol ointment group. Regarding the severity of first-degree phlebitis, the highest rate of phlebitis was observed between the experimental and control groups in the two groups of Clobetasol ointment and control. However, chi-square test did not show a significant difference between the three groups from the first 118 hours to the first 118 hours after catheter placement. In connection with the incidence of second-degree phlebitis between the experimental and control groups, the highest percentage of incidence of second-degree phlebitis was observed in the control group. Showed that this could be due to the effect of nitroglycerin ointment and clobetasol ointment in the two experimental groups. This result confirmed the findings of Saleh Moghadam et al in 2009 regarding the highest incidence of second-degree phlebitis from 118 hours to the first 118 hours.[38] Regarding third degree phlebitis, although the highest incidence was observed in the control group from 118 hours to the first 118 hours, but there was no statistically significant difference. In both experimental groups, the incidence of phlebitis with any degree in nitroglycerin ointment group was lower than clobetasol ointment group. Based on the results of the study and comparing it with the research hypotheses, the research hypothesis was confirmed. The research hypothesis states that the effect of clobetasol ointment and nitroglycerin ointment is different from the usual method on the incidence of phlebitis.

As the results showed, the use of clobetasol and nitroglycerin reduced the incidence and severity of phlebitis compared to the usual method used in the control group. Then, by comparing the effect of the two interventions with each other, it was found that the effect of nitroglycerin ointment was more than clobetasol ointment. In line with the present study, Avaze et al in 2003 conducted a study to investigate the effect of topical nitroglycerin on the incidence and severity of phlebitis caused by venous catheter.[39] In this study, phlebitis occurred at times 118, 36, 96, 60 and 118 after placement. Catheter was examined and the results showed that there was a

significant difference between the frequency (p = 0.001) and severity of phlebitis (p = 0.005) in the case and control groups. The results also showed an increase in catheter life in the case group compared to the control group (p = 0.01). At the end of this study, the use of nitroglycerin ointment was recommended in cases where a catheter was needed for more than 96 hours. In another study conducted by Foster et al. (2012), they concluded that the incidence of phlebitis in the experimental group (nitroglycerin ointment) was lower than the control group (P <0.001) and second-degree phlebitis in the control group.[40] It was significantly higher than the experimental group (P <0.05), so they suggested to use nitroglycerin ointment in cases where catheters are needed for more than 96 hours, which resulted in the present study which showed second-degree phlebitis in the control group. More intervention than the two groups is quite similar. Also, in a study conducted by Borzo et al in year 2003 with the aim of investigating the effect of topical nitroglycerin ointment in the prevention of phlebitis, the results showed that the use of topical nitroglycerin ointment is effective in cases where intravenous administration is required for more than 50 hours.[41] Was suggested as a method of choice. The results of these studies are consistent with the results of the present study. No research has been done on clobetasol ointment and its effect on the prevention of phlebitis due to catheter placement in human specimens and only in some cases in animal specimens. The treatment of clobetasol ointment in superficial phlebitis due to injection of DP-b99, which is used as a neuroprotective drug after acute stroke, was evaluated. As a result of injection of this drug, phlebitis occurs at the injection site. Phlebitis was measured at 1, 3, 5, 118, 32, 96, 56 and 118 hours after injection of the drug into the lateral vein of the ear. The highest rate of phlebitis was in the first 118 hours after catheterization.

Clobetasol reduced the symptoms of phlebitis throughout treatment and also shortened the duration of phlebitis. The highest effect of clobetasol was at 118 and 96 hours after clobetasol. Finally, the researcher states that although an animal study cannot be a basis for human studies, this study guarantees the positive effect of clobetasol on phlebitis in the human sample, and if the use of topical corticosteroids in humans is proven, it can replace heparin. And other non-steroidal anti-inflammatory drugs.

In the present study, clobetasol ointment reduced the incidence of phlebitis and the severity of phlebitis throughout the treatment compared to the control group, which was in line with the results of the study by Razavi et al. (2000), conducted a study entitled the effect of corticosteroids on phlebitis caused by injection of chemotherapy drugs in rabbits.[42] In this study, the prophylactic effect of intravenous dexamethasone on chemotherapy-induced phlebitis was investigated. Histopathological results showed that dexamethasone injection significantly reduced drug-induced phlebitis compared to the control group. Studies on clobetasol were consistent with the present study.

Finally, by examining the frequency distribution of phlebitis in patients in the intervention groups (clobetasol and nitroglycerin) at different times after cannulation by age and location of cannulation, the results showed that there was a statistically significant difference between the frequency of phlebitis and age and place of cannulation Does not exist.

Of course, it should be noted that in this study, most of the samples were between 18 and 30 years old, which may be one of the reasons for the insignificance of the study. Aslani (2017) in his research that aimed to determine the prevalence of phlebitis caused by environmental catheters did not find a significant relationship between the occurrence of phlebitis and age.[43] The results are similar to the present study.

But some researchers believe that age can play a role in the development of phlebitis. In the present study, the results between the incidence of phlebitis and the site of canola were the highest incidence of phlebitis in the back of the hand and then the wrist, but there was no statistically significant difference. These results are similar to the results of Sarani et al. (2000)[44].

According to the results of the present study, it was found that the most important factor in the incidence of phlebitis is time and the incidence of phlebitis increases over time. This result confirmed the findings of Ghadami in 2000 and Karadag et al. (2000) that the incidence of phlebitis increased with increasing catheter placement hours.[45-46]

While in the present study, in the two experimental groups that used nitroglycerin ointment and clobetasol ointment, the number of phlebitis cases in the two experimental groups was generally reduced compared to the control group over time, which could be due to the effect of clobetasol ointment and ointment Be nitroglycerin. In this study, it was found that the effect of drug use on phlebitis after 96 hours is significantly determined and due to the fact that Angio catheter replacement in patients has been done every 118 hours.

Therefore, the use of drugs to prevent phlebitis can delay the replacement of Angio catheter. In a study by Webster, (2011) which aimed to test two safe methods of catheterization, the group that used the dressing showed a 45% reduction in catheterization complications such as infection and phlebitis compared to the empty tape group.[47] In our study, in addition to using nitroglycerin ointment and clobetasol ointment, sterile gauze was used for dressing in the two intervention groups, which may have helped to reduce the incidence of phlebitis in the two intervention groups compared to the control group.

Conclusion

Early and frequent replacement of angiograms, in addition to the heavy costs imposed on the patient and the community, causes more physical and mental harm to the patient and makes him more susceptible to nosocomial infections. It also wastes nurses' time. As 81% of nurses spend more than 75% of their time on intravenous therapy, in addition, phlebitis itself is a potentially dangerous source of systemic infections, and the presence of phlebitis increases the chances of these infections 18-fold.

In a 1991 study on the durability of peripheral intravenous injections, Kawaja cited the impact of infusion at the infusion site as an important factor in the success of intravenous injections and stated that the skill of the catheter inserter is very important.[48] In this study, all stages of the venipuncture process were performed by a researcher, and on the other hand, the catheter with a large diameter was placed inside a small vein that causes inflammation of the inner layer of the vein, and the researcher, when choosing a vessel, the peripheral vessels that fit with pink Angio catheter, they were chosen. Injection-induced phlebitis causes the vessel to constrict at the injection site, which in turn can stimulate the endothelium with a catheter. The severity of this venous contraction is involved in the severity of phlebitis. Therefore, by keeping the vessel dilated and maintaining it with nitroglycerin ointment, the use of anti-inflammatory ointment, clobetasol, and its incidence can be reduced. Using nursing care to maintain the catheters for 118 hours, they reduced the rate of these symptoms from 12.6% to 2.6%. According to the research on the positive effect of using clobetasol ointment and nitroglycerin ointment on the prevention of phlebitis caused by Angio catheter, it is recommended that clobetasol and nitroglycerin drugs to prevent phlebitis in patients who need long-term use of Angio catheter, to be used. Considering that venous airway formation can be expressed as one of the first measures in the face of most patients and according to the results of this study, it is recommended in nursing and other treatment-related disciplines in connection with the complications. There should be more discussion about establishing a venous route, so that when students enter the field of treatment, they can prevent these complications as much as possible by taking small and low-cost measures.

Interests conflict

The researchers declare that they have no conflict of interest.

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