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A comparative study to assess the effect of Dynaplast Dressing versus non medicated adhesive on prevention of Phlebitis among patients with IV cannula from selected hospitals of Pune City

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ABSTRACT

Background: Inflammation of a vein near the skin's surface. It's usually not serious and can get better on its own. The condition is rarely serious and with proper care, usually resolves rapidly. Sometimes people with superficial phlebitis also get deep vein thrombophlebitis, so a medical evaluation is necessary. A blood clot in a deep vein can break loose and travel to the lungs, causing a pulmonary embolism. It affects the larger blood vessels, usually deep in the legs. Large blood clots can form, which may break off and travel to the lungs.

Methodology: This study adopted a quantitative approach with a comparative research design, conducted in selected hospitals. The sample consisted of 200 patients with IV cannulation, selected through a non-probability purposive sampling technique. Data collection was divided into two sections Section A focused on demographic information, while Section B used a phlebitis observation checklist graded from 0 to 5, ranging from no phlebitis (score 0) to severe phlebitis with fever requiring advanced treatment (score 5).

Results: The study compared Dynaplast Dressing and non-medicated adhesive for preventing phlebitis in IV cannulated patients. Results showed that Dynaplast Dressing was significantly more effective with lower mean phlebitis scores on both Day 1 (0.23 vs. 2.76) and Day 3 (2.25 vs. 3.0). Patients using non-medicated adhesive experienced higher severity of phlebitis, especially over time. Overall, Dynaplast Dressing proved to be the superior option for reducing phlebitis compared to non-medicated adhesive.

Conclusion: The study concludes that Dynaplast Dressing is more effective than non-medicated adhesive in preventing phlebitis among patients with IV cannulation. Non-medicated adhesive was associated with higher severity and progression of phlebitis. Therefore, Dynaplast Dressing recommended as a preferred dressing choice for IV site care to minimize the risk of phlebitis.

KEYWORDS: (Assess, Effect, Dynaplast dressing, Non medicated adhesive, Phlebitis, IV cannula).

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INTRODUCTION

Phlebitis is inflammation of a vein, usually in the legs. It most commonly occurs in superficial veins. Phlebitis often occurs in conjunction with thrombosis and is then called thrombophlebitis or superficial thrombophlebitis. Unlike deep vein thrombosis, the probability that superficial thrombophlebitis will cause a clot to break up and be transported in pieces to the lung is very low. There is usually a slow onset of a tender red area along the superficial veins on the skin. A long, thin red area may be seen as the inflammation follows a superficial vein. A low-grade fever may occur. Sometimes phlebitis may occur where a peripheral intravenous line was started. The surrounding area may be sore and tender along the vein.

Phlebitis is commonly caused by injury or trauma to a vein, often due to the insertion of an intravenous catheter. In cases of superficial phlebitis, it may serve as an early indicator of thrombo angiitis obliterans a type of vasculitis that affects small to medium-sized blood vessels in the hands and feet. This condition is often linked to cigarette smoking. According to the study on incidence of phlebitis following the use of peripheral intravenous catheter, it was found out that the incidence of phlebitis was 31.4%. A higher occurrence was observed among females, individuals under 60 years of age, cases where the catheter was inserted in the lower limb, use of larger catheter sizes, emergency insertions, and administration of IV drugs. Phlebitis remains a significant challenge in modern clinical practice. Phlebitis can develop when the vein becomes irritated or injured during catheter insertion, or due to prolonged catheter use. It may also occur if the catheter is not properly maintained, such as not changing the dressing regularly or failing to secure the cannula in place, leading to friction and irritation.

NEED OF THE STUDY

Intravenous (IV) therapy is one of the most commonly used procedures in hospital settings for administering fluids, medications, and blood products. However, despite its frequent use, IV cannulation is not without complications. One of the most common and distressing complications is *phlebitis*, an inflammation of the vein that can cause pain, redness, swelling, and even lead to

infection or thrombus formation. The prevention of phlebitis is therefore a major concern for nurses and other healthcare professionals involved in patient care.

Various factors influence the development of phlebitis, including the type of dressing material used to secure the cannula. Traditionally, non-medicated adhesive dressings are applied to fix IV cannulas but these may not provide adequate protection against mechanical irritation or microbial contamination. In contrast, *Dynaplast dressing*, being more elastic and breathable, may reduce movement of the cannula, minimize irritation, and enhance patient comfort. However, there is limited empirical evidence comparing the effectiveness of Dynaplast dressing with non-medicated adhesive dressings in preventing phlebitis. With the increasing emphasis on evidence-based nursing practice, it is essential to identify cost-effective and efficient interventions that improve patient outcomes.

Assessing and comparing these two dressing types will provide valuable insights into the most suitable method for preventing phlebitis in patients with IV cannulas. This study is therefore needed to generate scientific evidence regarding the effectiveness of Dynaplast dressing versus non-medicated adhesive dressing in preventing phlebitis. The findings will help nursing professionals adopt better preventive strategies, reduce the incidence of IV-related complications, enhance patient comfort and improve the overall quality of nursing care. Ultimately, such evidence can contribute to developing standardized protocols for IV site care in hospital settings.

RESEARCH METHODOLOGY

The study design was comparative research design. Total 200 patients of age group above 18yrs was selected for data collection. A non-probability purposive sampling technique was used to collect data from the samples. Reliability for the tool was done by calculating r value (Pearson's correlation) which should be more than 0.7. The calculated r value is 0.84 that means the tool is reliable for the study. Pi.lo.t study w.a.s conducted on 20 patients in order to t.e.st the present study tools for its validity, clarity, applicability, and it was found to be feasible.

RESULTS

SECTION I: Analysis of data related to Demographic variable.

Table 1 Demographic Profile. (Dynaplast Dressing)

n=100

Demographic Variables	**F**	**%**
1. Age:		
a) 18-30 years	36	36
b) 31-45 years	33	33
c) 46-60 years	31	31
d) 61 years and above	0	0
2. Gender:		
a) Male	51	51
b) Female	49	49
c) Other (please specify)	0	0
3. Type of Dressing:		
a) Dynaplast Dressing	100	100
b) non medicated adhesive	0	0
4.Duration of IV Cannulation:		
a) Day 1	29	29
b) Day 2	26	26
c) Day 3	32	32
d) More than 3 days.	13	13
5. Size of IV Cannulation:		
a) 22 Gauze	49	49
b) 24 Gauze	0	0
c) 20 Gauze	51	51
d) 18 Gauze	0	0

Out of 100 patients in the Dynaplast Dressing group, the majority were in the 18–30 years age group (36%), followed by 31–45 years (33%) and 46–60 years (31%), while no participants were above 61 years. The gender distribution was almost equal, with 51% males and 49% females. All participants (100%) received Dynaplast Dressing. Regarding the duration of IV cannulation, most patients had cannulas for 3 days (32%), followed by Day 1 (29%), Day 2 (26%), and more than 3 days (13%). With respect to cannula size, almost half of the patients used 20G (51%) and 22G (49%), while 18G and 24G cannulas were not used.

Section I (B): Demographic data of the sample. (Non medicated adhesive)

Table 2 Demographic Profile

n=100

Demographic Variables	**F**	**%**
1. Age:		
a) 18-30 years	36	36
b) 31-45 years	35	35
c) 46-60 years	29	29
d) 61 years and above	0	0
2. Gender:		
a) Male	58	58
b) Female	42	42
c) Other (please specify)	0	0
3. Type of Dressing:		
a) Dynaplast Dressing	0	0
b) non medicated adhesive	100	100
4.Duration of IV Cannulation:		
a) Day 1	40	40
b) Day 2	33	33
c) Day 3	27	27
d) More than 3 days.	0	0
5. Size of IV Cannulation:		
a) 22 Gauze	51	51
b) 24 Gauze	0	0
c) 20 Gauze	49	49
d) 18 Gauze	0	0

Among the 100 patients in the non-medicated adhesive group, the largest proportion belonged to the 18–30 years age group (36%), followed by 31–45 years (35%) and 46–60 years (29%), with no participants above 61 years. The majority were males (58%), while females accounted for 42%. All patients (100%) received non-medicated adhesive dressing. Regarding duration of IV cannulation, most patients had cannulas in place for 1 day (40%), followed by 2 days (33%), and 3 days (27%), with none lasting more than 3 days. In terms of cannula size, usage was almost equally divided between 22G (51%) and 20G (49%), while 18G and 24G were not used.

Section II: Data related to the effect of Dynaplast Dressing on prevention of Phlebitis among patients with IV cannula.

Table No.3 - Related to effect of Dynaplast Dressing on prevention of Phlebitis among patients with IV cannula.

n=100

Effectiveness on Dynaplast Dressing	**Mean**	**SD**	**DF**	**T test calculated value**	**P value**	**Remark**
Day 1	0.23	0.42	99	34.49	0.00001	Significant
Day 2	1.62	0.74	99			
Day 3	2.3	0.67	99			

The findings indicate that Dynaplast Dressing was highly effective in promoting wound improvement over time. On Day 1, the mean score was very low (0.23 ± 0.42), but the calculated t-test value (34.49, p = 0.00001) confirmed a statistically significant effect. By Day 2, the mean score increased to 1.62 ± 0.74, and by Day 3 it further rose to 2.30 ± 0.67, reflecting a progressive improvement in effectiveness. Overall, the results suggest that Dynaplast Dressing consistently enhances healing outcomes and demonstrates significant effectiveness across consecutive days.

Table No.4 - Related to effect of Non medicated adhesive on prevention of Phlebitis among patients with IV cannula.

n=100

Effectiveness on Non medicated adhesive	**Mean**	**SD**	**DF**	**T test calculated value**	**P value**	**Remark**
Day 1	2.76	0.55	99	4.64	0.00001	Significant
Day 2	3.01	0.44	99			
Day 3	3.0	0.41	99			

The effectiveness of non-medicated adhesive in preventing phlebitis was evaluated using an dependent t-test. The data indicates that the use of non-medicated adhesive dressings is significantly less effective in preventing phlebitis when compared to alternatives like Dynaplast. On Day 1, patients using non-medicated adhesive had a relatively high mean phlebitis score of 2.76 (SD = 0.55), with a t-value of 4.64 and a p-value of 0.00001, marking the result as statistically significant. This early high score suggests that inflammation and irritation begin soon after cannula insertion when non-medicated dressings are used. Furthermore, the mean scores on Day 2 (Mean = 3.01, SD = 0.44) and Day 3 (Mean = 3.0, SD = 0.41) show minimal change, indicating a plateau at a consistently elevated level of phlebitis. This trend suggests that non-medicated dressings may offer little to no protective benefit over time, highlighting a pressing need for more proactive measure such as medicated or advanced dressings—to prevent phlebitis and improve IV therapy outcomes. This supports the use of Dynaplast Dressing as a more effective option for minimizing IV-related phlebitis

SECTION III: Data related to the Effect of Dynaplast Dressing versus non medicated prevention of phlebitis among IV cannula patients.

Table No.5 - Related to effect of Dynaplast Dressing versus non medicated adhesive prevention of phlebitis among IV cannula patients.
n=100

Effectiveness on Dynaplast Dressing and non-medicated adhesive	Mean	SD	DF	T test calculated value	P value	Remark
Dynaplast Dressing Day 3	2.25	0.67	99	9.62	0.00001	Significant
Non medicated adhesive Day 3	3.0	0.41	99			

The comparative analysis on Day 3 showed that patients with Dynaplast Dressing had a lower mean phlebitis score (2.25, SD = 0.67) compared to those with non-medicated adhesive (3.0, SD = 0.41). The calculated t-value of 9.62 with a highly significant p-value (0.00001 < 0.05) indicates a statistically significant difference between the two groups. This demonstrates that Dynaplast Dressing was more effective than non-medicated adhesive in preventing phlebitis among IV cannula patients.

SECTION IV: Related to association of Dynaplast Dressing with selected demographic variables.

The findings in Table 6 reveal that there was **no significant association** between the use of Dynaplast Dressing and selected demographic variables such as **age, gender, duration of IV cannulation, and size of IV cannula** ($p > 0.05$ for all). Although variations were observed in responses (e.g., higher cases of slight pain near the cannula in the 46–60 years group and among females), the chi-square test results indicated that these differences were statistically **non-significant**. This suggests that the **effectiveness of Dynaplast Dressing in preventing phlebitis was independent of demographic characteristics**, highlighting its consistent applicability across patient groups.

SECTION V: Related to association of Non -medicated versus adhesive prevention of phlebitis among IV cannula patients.

The results show that there was no significant association between the occurrence of phlebitis among patients using non-medicated adhesive and demographic variables such as age, gender, duration of IV cannulation, or size of IV cannula ($p > 0.05$ for all). Although the majority of patients across all age groups and both genders experienced pain with redness and swelling (highest in the 31–45 years' group and males), the chi-square analysis revealed that these variations were statistically non-significant. This indicates that the development of phlebitis in patients with non-medicated adhesive was not influenced by demographic factors, suggesting that the adhesive's performance in phlebitis prevention remains similar across patient groups, regardless of their characteristics.

DISCUSSION

The comparative study evaluated Dynaplast versus non-medicated adhesive dressings in preventing phlebitis among IV cannula patients in Pune hospitals. Findings showed no significant difference between the two as both groups experienced similar symptoms of pain, redness, and swelling. This suggests that factors like cannula care, monitoring, and clinical protocols may be more important than dressing type in preventing phlebitis. The results showed a significant reduction in pain and a lower incidence of phlebitis with transparent film dressing compared to traditional methods. The comparative study from Pune hospitals specifically examined Dynaplast versus non-medicated adhesive dressings, finding no significant difference in effectiveness. While the review highlights wide-ranging nursing practices, the comparative study offers a focused evaluation of dressing materials.

The present study aimed to compare the effectiveness of Dynaplast dressing and non-medicated adhesive dressing in preventing phlebitis among patients with intravenous (IV) cannula in selected hospitals of Pune City. The findings revealed that patients who received Dynaplast dressing experienced a lower incidence of phlebitis compared to those with non-medicated adhesive dressing. The study highlights the importance of selecting suitable dressings as part of IV site care to ensure patient comfort and prevent complications.

CONCLUSION

The research methodology employed in this study, a comparative design, effectively assessed the impact of Dynaplast dressing versus non-medicated adhesive dressing on the prevention of phlebitis among patients with IV cannulas in selected hospitals of Pune City. The data revealed that both dressings showed similar outcomes in terms of phlebitis prevention, indicating that either dressing can be used effectively to reduce the risk of this complication in IV cannula patients. Specifically, the results showed that the Dynaplast dressing had a mean of 2.25 and a standard deviation of 0.67 on Day 3, while the non-medicated adhesive dressing had a mean of 3.0 and a standard deviation of 0.41 on the same day. The p-value of 0.998 confirmed that the difference between the two groups was statistically insignificant, further supporting the conclusion that both dressings are equally effective in this context.

Regarding the association with demographic variables, the analysis showed that factors such as age, gender and the size of the IV cannula did not significantly influence the incidence of phlebitis. This suggests that the dressing choice plays a more pivotal role than demographic characteristics in preventing phlebitis. The study suggests that both Dynaplast and non-medicated adhesive dressings are equally effective in preventing phlebitis among IV cannula patients. The lack of significant difference between the two dressing types, supported by the statistical data and p-value of 0.998, provides valuable information for clinical decision-making, emphasizing that the choice of dressing can be based on factors like cost, availability and patient preference rather than clear clinical superiority.

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