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Effectiveness of Aloe vera gel and Thrombophob gel in the management of Thrombophlebitis among Patients receiving Intravenous Therapy in Selected hospitals of Aizawl, Mizoram

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Abstract: ***Introduction: Peripheral intravenous (IV) cannulation is one of the most frequently performed invasive procedures in hospitalized patients. Despite its importance in administering medications, fluids, blood products, and nutritional support, it is associated with complications such as thrombophlebitis. Topical pharmacological agents like Thrombophob gel are routinely used for treatment, while Aloe vera gel has emerged as a natural alternative because of its anti-inflammatory, antimicrobial, antioxidant, analgesic, and wound-healing properties.***
Title of the study: Effectiveness of Aloe vera gel and Thrombophob gel in the management of Thrombophlebitis among patients receiving intravenous therapy at selected hospitals in Aizawl, Mizoram
Objectives: To compare the effectiveness of Aloe vera gel and Thrombophob gel in reducing peripheral intravenous cannula-induced thrombophlebitis among hospitalized patients.
Methodology: A quantitative quasi-experimental pre-test and post-test control group design was adopted among 60 patients with peripheral intravenous cannula-induced thrombophlebitis admitted to Civil Hospital, Aizawl. Thirty patients received Aloe vera gel (experimental group), while thirty received Thrombophob gel (control group). Thrombophlebitis severity was assessed using the Visual Infusion Phlebitis (VIP) Scale before and after intervention. Descriptive statistics, Wilcoxon Signed-Rank Test, and Mann–Whitney U Test were used for data analysis.
Results: Both Aloe vera gel and Thrombophob gel significantly reduced thrombophlebitis scores following treatment. However, Thrombophob gel produced a greater reduction in VIP scores compared with Aloe vera gel, and the difference between the groups was statistically significant ($p < 0.05$).
Conclusion: Aloe vera gel is an effective, inexpensive, safe, and easily available nursing intervention for managing peripheral intravenous cannula-induced thrombophlebitis. It can be considered an alternative or complementary therapy in routine nursing practice.
Keywords: Aloe vera gel, Thrombophob gel, Peripheral intravenous cannulation, Thrombophlebitis, Visual Infusion Phlebitis Scale, Nursing intervention.

I. INTRODUCTION

Peripheral intravenous (IV) cannulation is one of the most common clinical procedures performed in hospitals for the administration of medications, intravenous fluids, blood products, electrolytes, chemotherapy, and parenteral nutrition. It is estimated that nearly 70–90% of hospitalized patients require peripheral intravenous therapy during their hospital stay. Although intravenous therapy plays a vital role in patient management, it is frequently associated with complications that can compromise treatment outcomes and patient comfort. Thrombophlebitis is one of the most common complications associated with peripheral intravenous cannulation. It is characterized by inflammation of the venous wall, often accompanied by thrombus formation, leading to pain, erythema, warmth, swelling, tenderness, and induration along the affected vein. If not managed promptly, thrombophlebitis may progress to cellulitis, bloodstream infection, interruption of intravenous therapy, prolonged hospitalisation, and increased healthcare costs.

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Several factors contribute to the development of thrombophlebitis, including prolonged cannula dwell time, inappropriate catheter size, repeated cannulation attempts, hyperosmolar solutions, irritating medications, poor insertion techniques, inadequate catheter stabilisation, and insufficient monitoring of intravenous sites. Therefore, early identification and effective management are essential to prevent disease progression and improve patient outcomes. Conventional management of thrombophlebitis includes removal of the affected cannula, warm compresses, limb elevation, analgesics, and topical pharmacological agents. Thrombophob gel, containing mucopolysaccharide polysulfate, is widely used because of its anti-inflammatory, anticoagulant, and fibrinolytic properties, which help reduce pain, swelling, and inflammation while promoting healing.

In recent years, interest has grown in herbal therapies that provide effective, affordable, and safe alternatives to conventional pharmacological treatment. Aloe vera (*Aloe barbadensis* Miller) is a medicinal plant rich in bioactive compounds such as acemannan, polysaccharides, flavonoids, vitamins, enzymes, amino acids, and phenolic compounds. These constituents exhibit anti-inflammatory, antimicrobial, antioxidant, analgesic, and wound-healing activities that accelerate tissue repair and reduce inflammatory responses. Several studies have demonstrated that Aloe vera gel effectively reduces pain, erythema, edema, and inflammation associated with thrombophlebitis. In addition to its therapeutic benefits, Aloe vera is inexpensive, readily available, easy to apply, and associated with minimal adverse effects, making it an attractive nursing intervention.

Although both Aloe vera gel and Thrombophob gel have been individually studied for thrombophlebitis management, evidence directly comparing their effectiveness remains limited. Therefore, this study was undertaken to compare the effectiveness of Aloe vera gel and Thrombophob gel in reducing peripheral intravenous cannula-induced thrombophlebitis among hospitalised patients. The findings may support evidence-based nursing practice by identifying an effective and economical intervention for managing thrombophlebitis.

II. OBJECTIVES OF THE STUDY

1) To assess the pre-test level of thrombophlebitis among patients receiving Aloe vera gel and Thrombophob gel.
2) To evaluate the effectiveness of Aloe vera gel in reducing thrombophlebitis.
3) To evaluate the effectiveness of Thrombophob gel in reducing thrombophlebitis.
4) To compare the post-test level of thrombophlebitis scores between patients receiving Aloe vera gel and Thrombophob gel.

III. REVIEW OF LITERATURE

The review of literature relevant to the study is presented below:

1) Literature review related to intravenous cannula induced thrombophlebitis

Lide et al. (2022) conducted an observational study in Bahir Dar to determine the prevalence and predictors of phlebitis among patients with peripheral intravenous (IV) cannulas admitted to a medical ward. The study involved 462 patients and employed Jackson's Visual Infusion Phlebitis (VIP) Scoring System to assess the severity of phlebitis. Continuous monitoring of patients with IV cannulation was carried out to identify the occurrence of phlebitis and its associated contributing factors. The findings of the study showed that 37.01% of the participants developed phlebitis during hospitalization, with a median survival period of six days before the onset of the condition. Several significant predictors of phlebitis were identified, including the presence of chronic illnesses, improper cannula dressing practices, and prolonged cannula dwell time. Furthermore, patient-related characteristics such as age were also found to influence the likelihood of developing phlebitis. The researchers concluded that both patient-related and treatment-related factors play an important role in the development of phlebitis.

2) Literature review related to effectiveness of aleo vera gel on thrombophlebitis

Thapa and Jaimini (2025) conducted a true experimental study at Government Doon Medical College and Hospital to evaluate the effectiveness of aloe vera gel application on thrombophlebitis among patients receiving intravenous therapy. The study included 60 patients randomly assigned to experimental and control groups. Aloe vera gel was applied topically at the IV-cannulation site in the experimental group, while the control group received routine nursing care. Thrombophlebitis severity was assessed using the Visual Infusion Phlebitis (VIP) scale. The findings showed a statistically significant reduction in pain, redness, and inflammation among patients treated with aloe vera gel. Faster improvement in VIP scores was observed in the experimental group, indicating reduced thrombophlebitis severity. The study concluded that aloe vera gel is a safe, effective, and cost-efficient intervention for thrombophlebitis management.

3) Literature review related to pharmacological management of thrombophlebitis

Khan et al. (2024) conducted a quasi-experimental study to evaluate the effectiveness of topical heparin-based treatment in reducing complications associated with intravenous cannulation among hospitalized patients. A total of 60 patients were selected and divided into experimental and control groups. The experimental group received topical heparin application at the IV-cannulation site, while the control group received routine nursing care. The IV-site condition was assessed using a standardized phlebitis grading scale. The findings revealed a statistically significant reduction in pain, inflammation, and incidence of thrombophlebitis among patients in the experimental group compared to the control group. Patients receiving topical heparin showed better improvement in local symptoms and overall, IV site condition. The study concluded that topical heparin-based interventions are effective in preventing and reducing intravenous cannulation-related complications.

4) Literature review related to comparative studies on management of thrombophlebitis

Nisha M. (2026) conducted a true experimental study at PRS Hospital, Thiruvananthapuram, to compare the effectiveness of aloe vera gel and Thrombophob gel in reducing intravenous phlebitis among adult patients. The study adopted a quantitative post-test only control group design and included 60 patients selected through simple random sampling. Patients were equally divided into experimental and control groups. The experimental group received aloe vera gel application, while the control group received Thrombophob gel at the Intravenous cannulation site. Phlebitis severity was assessed using the Visual Infusion Phlebitis (VIP) scale. The findings showed a statistically significant reduction in phlebitis among patients treated with aloe vera gel compared to those receiving Thrombophob gel. The study concluded that aloe vera gel is more effective and can be used as a cost-effective nursing intervention for managing intravenous phlebitis.

IV. RESEARCH METHODOLOGY

1) *Research Approach: In the present study,* A quantitative research approach was adopted to compare the effectiveness of Aloe vera gel and Thrombophob gel in the management of peripheral intravenous cannula-induced thrombophlebitis among hospitalized patients admitted to Civil Hospital, Aizawl, Mizoram.
2) *Research design:* A quasi-experimental pre-test and post-test control group design was used to compare the effectiveness of Aloe vera gel and Thrombophob gel in reducing peripheral intravenous cannula-induced thrombophlebitis among hospitalized patients at Civil Hospital, Aizawl, Mizoram.
3) *Research Variables*: The independent variable was the topical application of Aloe vera gel (experimental group) and Thrombophob gel (control group). The dependent variable was the severity of thrombophlebitis measured using the Visual Infusion Phlebitis (VIP) Scale.
4) *Demographic Variables:* The demographic and clinical variables included age, gender, educational status, occupation, diagnosis, site of intravenous cannulation, cannula size, duration of cannulation, type of intravenous fluid, and previous history of intravenous cannulation.

A. Setting of the Study

The study was conducted in Civil Hospital, Aizawl, Mizoram.

B. Population

The population comprised all hospitalized patients with peripheral intravenous cannula-induced thrombophlebitis admitted to Civil Hospital, Aizawl, Mizoram.

C. Target Population

The target population included all adult hospitalized patients with peripheral intravenous cannula-induced thrombophlebitis receiving treatment at Civil Hospital, Aizawl, Mizoram.

D. Sample and Sample Size

The sample consisted of 60 hospitalized patients with peripheral intravenous cannula-induced thrombophlebitis admitted to Civil Hospital, Aizawl, Mizoram. Thirty participants were assigned to the experimental group and thirty to the control group.

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E. Sampling Technique and Sampling Criteria

A non-probability purposive sampling technique was used.

Inclusion Criteria

- Hospitalized patients aged 18 years and above.
- Patients with peripheral intravenous cannula-induced thrombophlebitis.
- Patients willing to participate in the study.

Exclusion Criteria

- Patients with known allergy to Aloe vera gel or Thrombophob gel.
- Patients with skin disorders or open wounds at the cannulation site.
- Critically ill patients and those with central venous catheters.

F. Description of the Tool

The tool consisted of two sections.

Section A: Demographic and clinical variables including age, gender, education, occupation, diagnosis, cannulation site, cannula size, duration of cannulation, type of intravenous therapy, and previous history of intravenous cannulation.

Section B: The Visual Infusion Phlebitis (VIP) Scale was used to assess the severity of thrombophlebitis before and after the intervention. Higher scores indicated greater severity of thrombophlebitis.

G. Content Validity of the Tool

The tool and intervention protocol were validated by experts in Medical-Surgical Nursing and related clinical specialties. Modifications were made according to their suggestions before the final study.

H. Reliability of the Tool

The reliability of the Visual Infusion Phlebitis (VIP) Scale was established during the pilot study and was found suitable for the main study.

I. Ethical Considerations

- Ethical approval was obtained from the Institutional Ethics Committee (IEC), RIPANS, Aizawl, Mizoram, on 26 February 2026.
- Administrative permission was obtained from the Medical Superintendent, Civil Hospital, Aizawl, Mizoram.
- Written informed consent was obtained from all participants before data collection.
- Participation was voluntary, and participants had the right to withdraw from the study at any stage.
- Confidentiality, anonymity, and privacy of all participants were strictly maintained.
- The interventions (Aloe vera gel and Thrombophob gel) were safe, non-invasive, and administered according to standard clinical guidelines.

J. Pilot Study

A pilot study was conducted at Mizoram State Cancer Institute, Aizawl, Mizoram, from 30/03/2026 to 02/04/2026 among 10 patients (5 experimental and 5 control) using a quasi-experimental pre-test and post-test control group design. Data were collected using the Visual Infusion Phlebitis (VIP) Scale. The findings confirmed the feasibility of the research design, intervention, sampling technique, and data collection tool, with no major modifications required before the main study.

K. Main Study

The main study was conducted at Civil Hospital, Aizawl, Mizoram, after obtaining ethical clearance and administrative permission. A total of 60 eligible patients with peripheral intravenous cannula-induced thrombophlebitis were selected using non-probability purposive sampling. The participants were allocated into two groups, with 30 patients in the experimental group receiving Aloe vera gel and 30 patients in the control group receiving Thrombophob gel. Baseline thrombophlebitis was assessed using the Visual Infusion Phlebitis (VIP) Scale. Fresh Aloe vera gel was prepared by washing mature Aloe vera leaves, removing the outer rind, and aseptically extracting the inner gel.

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Approximately 2–3 mL of Aloe vera gel was applied over the affected site twice daily for three consecutive days. The control group received Thrombophob gel in the same quantity and frequency. Post-test assessment was carried out using the VIP Scale after completion of the intervention. Data were analysed using descriptive and inferential statistics, including the Wilcoxon Signed-Rank Test and Mann–Whitney U Test, with $p < 0.05$ considered statistically significant.

V. RESULTS

Table I: Frequency and percentage distribution of socio-demographic and clinical variables of experimental and control Groups

n= 60

Sl no.	Socio-demographic and Clinical characteristics	Experimental group (n = 30)		Control group (n = 30)	
		(f)	(%)	(f)	(%)
1.	Age in years				
	18-31	8	(26.7%)	12	40.0%
	32-45	11	36.7 %	4	13.3%
	46-59	9	30.0%	5	16.7%
	60 years and above	2	6.6%	9	30.0%
2	Gender				
	Male	22	73.3%	15	50.0%
	Female	8	26.7%	15	50.0%
3	Educational Status				
	No formal education	2	6.7%	7	23.3%
	Primary education	10	33.3%	5	16.7%
	Secondary education	10	33.3%	11	36.7%
	Graduate and above	8	26.7%	7	23.3%
4	Arm of Cannulation				
	Right arm	12	40.0%	18	60.0%
	Left arm	18	60.0%	12	40.0%
5	Cannula Size (Gauge)				
	16G	2	6.7%	0	0.0%
	18G	8	26.7%	1	3.3%
	20G	8	26.7%	3	10.0%
	22G	7	23.3%	16	53.3%
	24G	5	16.7%	10	33.3%
6	Site of Insertion				
	Radial veins	16	53.3%	12	40.0%
	Basilic veins	6	20.0%	7	23.3%
	Cephalic veins	8	26.7%	9	30.0%
	Dorsal venous arch	0	0.0%	2	6.7%
7	Number of IV Cannulation				
	Single IV cannulation	7	23.3%	11	36.7%
	Two IV cannulations	9	30.0%	5	16.7%
	Multiple IV cannulation	10	33.3%	13	43.3%
	None	3	10.0%	1	3.3%
	Others	1	3.3%	0	0.0%
8	Duration of Cannula Remain in Situ				
	Less than 24 hours	2	6.7%	2	6.7%
	25–48 hours	19	63.3%	19	63.3%
	49–72 hours	7	23.3%	4	13.3%
	More than 72 hours	2	6.7%	5	16.7%
9	Types of IV Infusion				
	Intermittent	30	100.0%	30	100.0%
10	Length of Hospital Stay (in days)				
	Less than 3 days	4	13.3%	3	10.0%
	3–5 days	17	56.7%	16	53.3%
	6–10 days	5	16.7%	7	23.3%
	More than 10 days	4	13.3%	4	13.3%
11	History of Previous Vascular Diseases				
	No	30	100.0%	30	100.0%

As presented in Table I, the demographic and clinical characteristics of participants were comparable between the experimental and control groups before the intervention, indicating baseline homogeneity.

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Table II: Pre-test level of thrombophlebitis among patients in experimental and control groups

n= 60

Group	Interpretation	Frequency	Percentage (%)
Experimental group	No sign of phlebitis	0	0
	Slight pain/redness	0	0
	Pain with erythema	0	0
	Pain with swelling	1	3.3
	Severe phlebitis	16	53.3
	Advanced phlebitis	14	43.3
Control group	No sign of phlebitis	0	0
	Slight pain/redness	0	0
	Pain with erythema	0	0
	Pain with swelling	6	20.0
	Severe phlebitis	12	40.0
	Advanced phlebitis	12	40.0

As presented in Table II, the majority of participants in both the experimental and control groups had severe and advanced thrombophlebitis before the intervention, indicating a comparable baseline severity.

Table III: Comparison of pre-test and post-test thrombophlebitis scores within groups using Wilcoxon signed-rank test

n=60

Group	Test	Z-value	p-value
Experimental group	Wilcoxon	-4.941	<0.001
Control group	Wilcoxon	-4.956	<0.001

As presented in Table III, the Wilcoxon Signed-Rank Test showed a statistically significant reduction in thrombophlebitis scores after Aloe vera gel application ($Z = –4.941$, $p < 0.001$), indicating that Aloe vera and Thrombophob gel were effective in reducing thrombophlebitis.

Table IV: Comparison of effectiveness between experimental group (aloe veral gel) and control group (Thrombophob gel) using Mann–Whitney u test

n=60

Group	Mean Rank	U-value	p-value
Experimental group	44.18	39.500	<0.001
Control group	16.82		

As presented in Table 5, the Mann–Whitney U Test revealed a statistically significant difference in post-test thrombophlebitis scores between the experimental and control groups ($U = 39.500$, $p < 0.001$), indicating a significant difference in the effectiveness of Aloe vera gel and Thrombophob gel.

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VI. DISCUSSION

The present study found that the majority of patients in both the experimental and control groups had moderate to severe thrombophlebitis before the intervention, indicating that thrombophlebitis is a common complication associated with peripheral intravenous therapy. The absence of a significant difference in pre-test scores confirmed that both groups were comparable at baseline. These findings are consistent with those of Lide et al. (2022), Nikhila et al. (2022), and Marsh et al. (2018), who reported that prolonged cannulation, repeated venipuncture, administration of irritant medications, and inadequate catheter care are major contributors to the development of thrombophlebitis. The present study further demonstrated that both Aloe vera gel and Thrombophob gel significantly reduced thrombophlebitis severity following the intervention ($p < 0.001$), indicating that both treatments are effective in relieving pain, redness, swelling, and inflammation at the intravenous cannulation site. These findings are in agreement with previous studies by Thapa and Jaimini (2025), Sathya et al. (2023), Rahimi et al. (2019), Widjaja et al. (2018), and Sharma and Rani (2020), which reported that Aloe vera gel and Thrombophob gel possess significant anti-inflammatory, analgesic, and tissue-healing properties that promote recovery from thrombophlebitis. Comparison of the post-test scores between the two groups revealed that Aloe vera gel was more effective than Thrombophob gel in reducing the severity of thrombophlebitis. Similar findings were reported by Chen et al. (2023), Hajiabadi et al. (2023), and Anggraeni et al. (2021), who concluded that Aloe vera gel provides faster relief from pain, erythema, swelling, and local inflammation due to its potent anti-inflammatory, antioxidant, antimicrobial, and wound-healing properties. These therapeutic effects promote tissue regeneration, reduce inflammatory responses, and enhance healing at the cannulation site, making Aloe vera gel a safe, effective, economical, and easily applicable intervention for the management of thrombophlebitis among patients receiving intravenous therapy.

VII. CONCLUSION

Both Aloe vera gel and Thrombophob gel were effective in reducing peripheral intravenous cannula-induced thrombophlebitis. However, Thrombophob gel demonstrated greater effectiveness in reducing thrombophlebitis severity compared with Aloe vera gel Thrombophob gel. Considering its low cost, easy availability, and minimal adverse effects, Aloe vera gel may be recommended as an effective nursing intervention for the management of thrombophlebitis among hospitalized patients. Further multicentre studies with larger sample sizes are recommended to strengthen the evidence.

VIII. IMPLICATIONS OF THE STUDY

Nursing Education: The study highlights the importance of teaching evidence-based management of thrombophlebitis, including the use of Aloe vera gel and the Visual Infusion Phlebitis (VIP) Scale.

Nursing Practice: Aloe vera gel may be used as a safe, effective, and economical intervention for reducing thrombophlebitis. Regular assessment of IV sites can help in early detection and timely management.

Nursing Administration: Hospital administrators should promote evidence-based protocols and provide training on thrombophlebitis prevention and the use of Aloe vera gel in clinical practice.

Nursing Research: Further studies with larger sample sizes and multicentre settings are recommended to confirm the findings and compare Aloe vera gel with other treatment modalities.

IX. RECOMMENDATIONS OF THE STUDY

Based on the findings of the present study, the following recommendations are made:

1) Aloe vera gel may be considered as a safe, effective, and cost-efficient topical intervention for the management of thrombophlebitis in patients receiving intravenous therapy.

2) Routine monitoring of intravenous sites using standardized tools such as the VIP scale should be strengthened for early detection and prompt management of thrombophlebitis.

3) Hospital protocols may be updated to include evidence-based complementary therapies for the prevention and management of IV-related complications.

4) Further studies may be conducted with larger sample sizes and multicentric settings to enhance the generalizability of the findings.

5) Comparative research may be encouraged to evaluate the effectiveness of Aloe vera gel with other pharmacological and non-pharmacological interventions.

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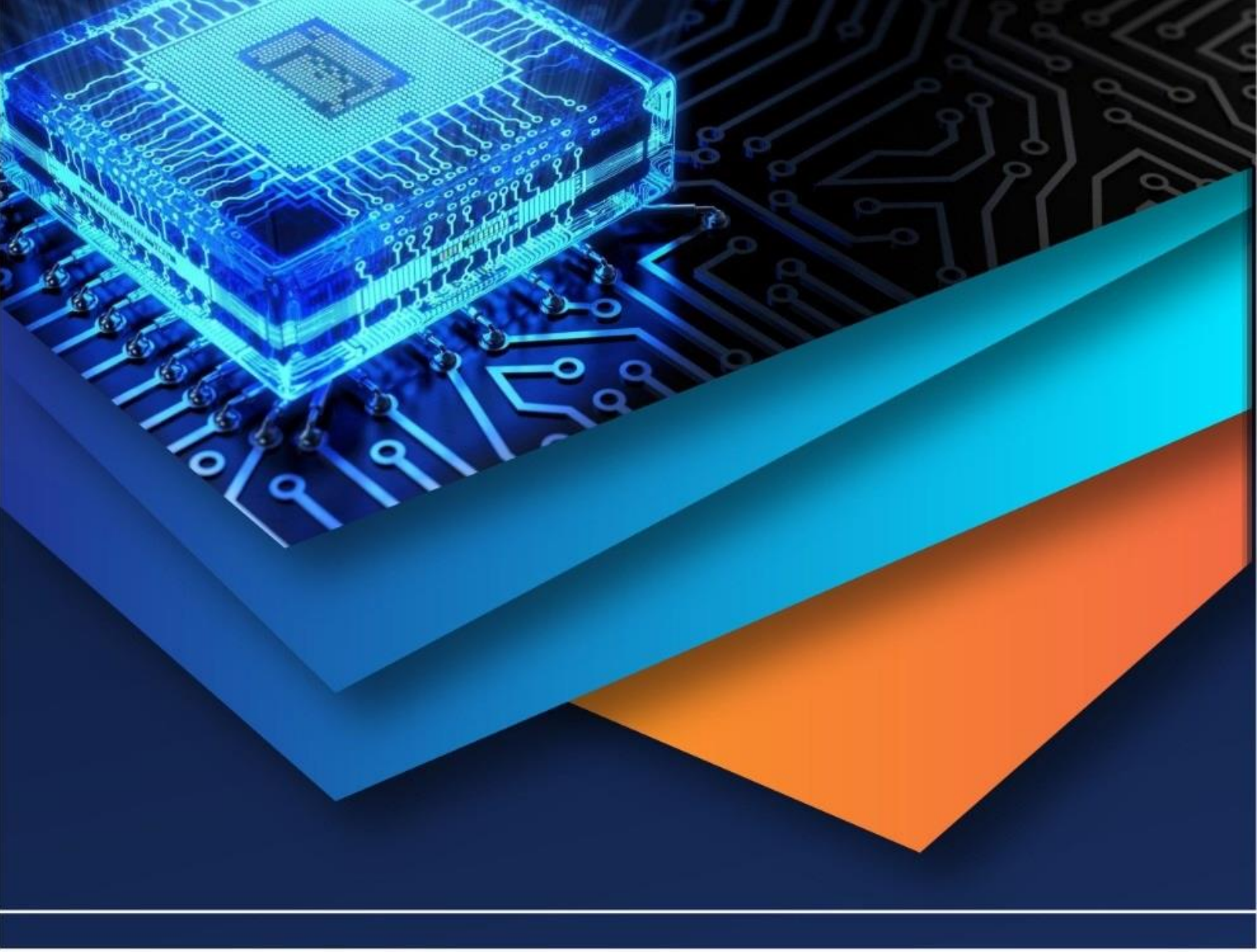
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