

A Quasi-Experimental Study To Assess The Effectiveness Of Application Of Ice Chips Versus Normal Saline On Oral Mucositis Among Patients Receiving Chemotherapeutic Agents At MIMS Hospital, Calicut, Kerala

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Abstract

This study investigated the efficacy of ice chips versus normal saline in mitigating oral mucositis among patients undergoing chemotherapy at MIMS Hospital, Calicut. Key objectives included independently assessing the effect of ice chips and normal saline on oral mucositis severity, directly comparing their effectiveness, and identifying potential associations between oral mucositis incidence and the clinical variables like cancer type and specific chemotherapeutic agents.

The research employed a rigorous time-series design featuring multiple interventions. A purposive sampling technique was utilized to select 60 eligible patients. Data were meticulously gathered through structured and semi-structured interviews, complemented by a comprehensive observational checklist to document oral mucositis progression. Betty Neuman's Systems Model served as the guiding theoretical framework for this inquiry.

Data analysis, incorporating both descriptive and inferential statistics, yielded significant findings. Both intervention groups demonstrated a notable reduction in oral mucositis severity between Day 1 and Day 4. However, the application of normal saline emerged as demonstrably more effective than ice chips in managing chemotherapy-induced oral mucositis. This study compellingly highlights the critical role of simple, non-invasive interventions in improving patient comfort and well-being throughout their arduous chemotherapy journey, providing valuable evidence for clinical practice.

Keywords: Ice chips, Normal saline, Oral mucositis, Cancer, Chemotherapeutic agents, Time series design

Introduction

Cancer, marked by uncontrolled cell growth, invades tissues and organs, causing 9% of global deaths (over 5 million annually). It's the second leading cause of death in developed nations, fourth in developing ones, and is projected to rise.

Oral mucositis, a painful inflammatory condition, frequently complicates high-dose chemotherapy. It causes redness, painful ulcers, and bleeding, potentially leading to airway issues and even death. Effective management includes 0.9% saline and sodium bicarbonate rinses, and cryotherapy for vasoconstriction, especially with bolus chemotherapy.

Early detection and diligent nursing measures are crucial to prevent oral mucositis complications like septicemia, the need for parenteral nutrition, and endotracheal intubation, ultimately improving patient outcomes during cancer treatment.

Review of literature

Fllah & Kharazmi (2009) conducted a study on the global cancer incidence. In 2002, global cancer incidence was 8.7% (11.81 million new cases), with men at 13.3% (6.57 million) and women at 3.4% (5.24 million). Developing countries had a 7-19% incidence.

A prospective study by Amador et al. (2010) assessed oral mucositis in 29 acute leukemia patients undergoing chemotherapy. Oral mucositis is a frequent, early chemotherapy side effect, strongly linked to oral pain and swallowing difficulty.

Karagozoglu & Ulusoy (2007) conducted a study on oral cryotherapy's effect on chemotherapy-induced mucositis. Sixty patients were split into study and control groups. Oral cooling significantly reduced mucositis in the study group (36.7%) compared to controls (90.0%).

A quasi-experimental study conducted by Bashir and Afzal (2010) compared normal saline and honey dressings for skin graft wound preparation in 60 patients. Saline dressing prepared wounds significantly faster (10 days) and more cost-effectively than honey (27 days).

Research methodology

The study proposed to compare the effect of application of ice chips and normal saline on oral mucositis among patients receiving chemotherapeutic agents.

Research approach:

This quasi-experimental study randomly assigned patients with oral mucositis to receive ice chips or normal saline.

Research design:

The design used for the study is a time series with multiple institutions of treatment for two comparative groups.

Variables:

Independent variable: Application of ice chips or normal saline

Dependent variable: Oral mucositis among patients receiving chemotherapeutic agents

Schematic design of the study:

Group 1: O₁ X₁ O₂ X₁ O₃ X₁ O₄

Group II: O₁ X₂ O₂ X₂ O₃ X₂ O₄

O₁: Baseline assessment and grading of oral mucositis before treatment.

X₁: Oral mucositis was treated with ice chips twice daily for three days.

X₂: Oral mucositis was treated with normal saline twice daily for three days.

O₂, O₃, O₄: Oral mucositis was observed, assessed, and graded based on subjective symptoms on mornings of days two, three, and four.

Research setting:

The setting for this study was conducted in oncology ward of the Malabar Institute of Medical Sciences, Calicut

Population:

In this study the population is the patients with oral mucositis induced by the administration of chemotherapeutic agents.

Sample: A sample of 60 patients who have oral mucositis caused by administration of chemotherapeutic agents.

Sampling technique: Purposive sampling.

Data collection instruments:

Tool I: A semi-structured interview collected demographic and clinical information.

Tool II: WHO oral toxicity scale provided objective oral mucositis grading via observation.

Tool III: A structured interview assessed subjective patient symptoms (11 items).

Method of data collection:

After baseline assessment, Group 1 received ice chips, Group 2 normal saline, both twice daily for three days; re-assessed daily.

Plan for Data Analysis:

Data analysis will use descriptive statistics.

Inferential tests (Chi-square, Kruskal-Wallis H, Mann-Whitney U) will assess oral mucositis associations and intervention effects.

Hypothesis:

H₁: There is significant difference in oral mucositis with application of ice chips in patients receiving chemotherapy

H₂: There is significant difference in oral mucositis with application of normal saline in patients receiving chemotherapy

H₃: There is significant difference in oral mucositis with application of ice chips and normal saline in patients receiving chemotherapy

H₄: There is significant association between incidence of oral mucositis and clinical variable such as type of cancer and chemotherapeutic drugs

Results

This chapter analyzes data from 60 patients from MIMS hospital to compare ice chips versus normal saline for chemotherapy-induced oral mucositis.

Section A: Effect of ice chips on oral mucositis and subjective symptoms

Table I: Kruskal –Wallis H test to evaluate the Effect of ice chips on oral mucositis

The table demonstrates that ice chips significantly reduced oral mucositis severity from Day 1 to Day 4, evidenced by a dramatic decrease in mean ranks.

Group	Days	Mean Rank	Kruskal –Wallis H test	Df	P value
I (Ice)	1	84.62	50.55	3	0.05*
	2	77.45			
	3	45.12			
	4	34.82			

Table II: Chi-square test to find the effect of Ice Chips on Subjective Symptoms

Symptoms	χ^2	Df	p-value
Pain in the mouth while taking food	27.94	3	0.05 *
Difficulty in opening the mouth	13.79	3	0.05 *
Alteration in taste sensation	20.02	3	0.05 *
Burning sensation in the mouth while taking food	37.32	3	0.05 *
Difficulty in speaking	0.417	3	0.937
Difficulty in chewing	.000	3	1.000
Difficulty in swallowing	.000	3	1.000

It is evident from the above data that Ice chips significantly reduced pain, difficulty opening mouth, altered taste, and burning sensation from Day 1 to Day 4.

Section B: Effect of normal saline on oral mucositis and subjective symptoms**Table III: Kruskal –Wallis H test to evaluate the effect of normal saline on oral mucositis**

Group	Days	Mean Rank	Kruskal –Wallis H test	Df	P value
II (NS)	1	100.53			
	2	70.27	88.4	3	0.05 *
	3	35.60			
	4	35.60			

Above table indicates normal saline significantly reduced oral mucositis severity from Day 1 to Day 4, with a drastic decrease in mean ranks.

Table IV: Chi-square test to find the effect of Normal Saline on Subjective Symptoms

Symptoms	χ^2	Df	P
Pain in the mouth while taking food	83.58	3	0.05 *
Difficulty in opening the mouth	48.76	3	0.05 *
Alteration in taste sensation	74.75	3	0.05*
Burning sensation in the mouth while taking food	64.52	3	0.05 *
Difficulty in speaking	18.21	3	0.05 *
Difficulty in chewing	15.74	3	0.05 *
Difficulty in swallowing	3.025	3	.388

This table shows normal saline significantly reduced most oral mucositis symptoms from Day 1 to Day 4, but not difficulty swallowing.

Section D: Comparison of the effect of Ice Chips and Normal Saline on Oral Mucositis and subjective symptoms

Table V: Mann Whitney U Test to compare the effect of Ice Chips and Normal Saline on Oral Mucositis

Days	Group	Mean Rank	Mann Whitney U Test (Z value)	Significance
1	I	30.50	.000	1.000
	II	30.50		
2	I	39.03	4.086	0.05 *
	II	21.97		
3	I	41.13	5.415	0.05 *
	II	19.87		
4	I	38.07	4.136	0.05 *
	II	22.93		

The table

clearly indicates that normal saline significantly reduced oral mucositis more effectively than ice chips from Day 2 through Day 4.

Table VI: Chi-square test to Compare the effect of Application of Ice Chips and Normal Saline on Subjective Symptoms

Symptoms	Days	χ^2	Df	P value
Pain in the mouth while taking food	1	All patients have pain		
	2	2.05	1	.152
	3	18.47	1	0.05 *
	4	13.42	1	0.05 *
Difficulty in opening the mouth	1	.61	1	.436
	2	9.32	1	0.05 *
	3	5.46	1	0.05 *
	4	5.46	1	0.05 *
Alteration in taste sensation	1	1.02	1	.313
	2	4.81	1	0.05 *
	3	25.45	1	0.05 *
	4	13.02	1	0.05 *
Burning sensation in the mouth while taking food	1	.417	1	.519
	2	2.86	1	.091
	3	5.46	1	0.05 *
	4	5.46	1	0.05 *
Difficulty in speaking	1	.000	1	1.000

	2	4.04	1	0.05 *
	3	6.67	1	0.05 *
	4	5.46	1	0.05 *
Difficulty in chewing	1	.42	1	.519
	2	1.46	1	.228
	3	5.46	1	0.05 *
	4	5.46	1	0.05 *
Difficulty in swallowing	1	.000	1	1.000
	2	1.02	1	.313
	3	1.02	1	.313
	4	1.02	1	.313

It is evident from the table that there is a significant difference in the use of ice chips and normal saline in the reduction of symptoms except difficulty in swallowing

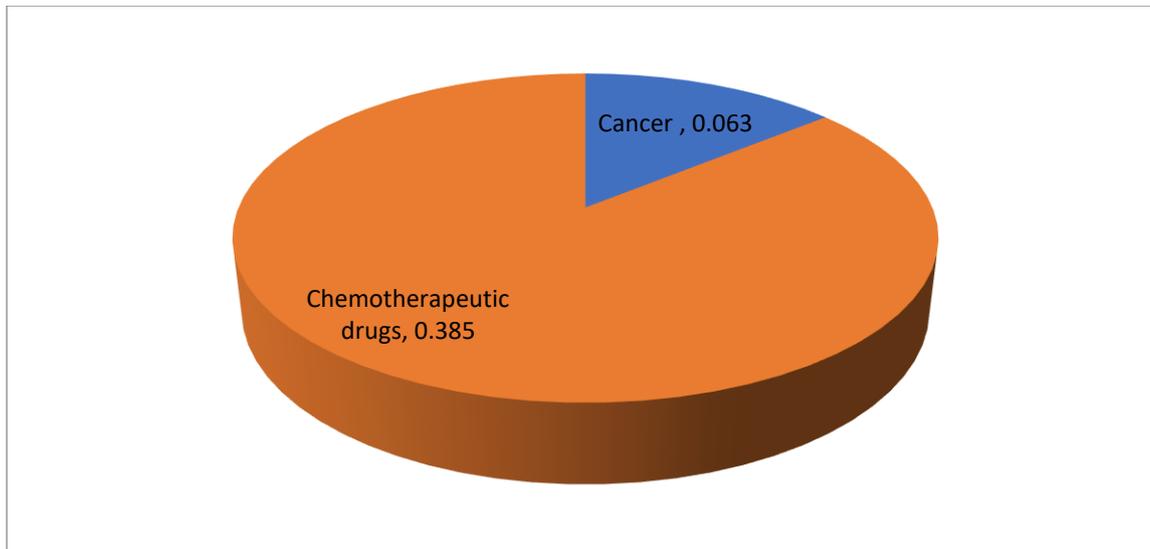
Table VI: Chi-square test to find the Degree of Effect of Application of Ice Chips and Normal Saline on Subjective Symptoms

Symptoms	Group	Day1		Day2		Day3		Day 4	
		No	Yes	No	Yes	No	Yes	No	Yes
Pain in the mouth while taking food	Ice	0	30	6	24	14	16	17	13
	NS	0	30	11	19	29	1	29	1
Difficulty in opening the mouth	Ice	15	15	15	15	25	5	25	5
	NS	12	18	26	4	30	0	30	0
Alteration in taste sensation	Ice	1	29	3	27	9	21	14	16
	NS	0	30	10	20	28	2	27	3
Burning sensation in the mouth while taking food	Ice	5	25	18	12	25	5	25	5
	NS	7	23	24	6	30	0	30	0
Difficulty in speaking	Ice	23	7	24	6	24	6	25	5
	NS	23	7	29	1	30	0	30	0
Difficulty in chewing	Ice	25	5	25	5	25	5	25	5
	NS	23	7	28	2	30	0	30	0
Difficulty in swallowing	Ice	29	1	29	1	29	1	29	1
	NS	29	1	30	0	30	0	30	0

The table shows normal saline was more effective than ice chips for oral mucositis, with more patients reporting symptom absence daily.

Section D: Association between Cancer, Chemotherapeutic Drugs and the Incidence of Oral Mucositis

Figure 1: Chi-square association between Cancer, Chemotherapeutic Drugs and the Incidence of Oral Mucositis



The Pie Diagram shows no association between oral mucositis and clinical variables like cancer or chemotherapeutic drugs.

Discussion

This study found no link between oral mucositis and cancer type/drugs. Both saline and ice chips reduced oral mucositis, but normal saline was more effective for patient comfort and healing

Conclusion

Both normal saline and ice chips effectively reduced oral mucositis severity from Day 1 to Day 4. However, saline demonstrated superior efficacy, and no association was found between oral mucositis and cancer type/drugs

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