



## Effectiveness of Heparin lock flush on Chemotherapy Induced Thrombophlebitis among Patients receiving Chemotherapy

Reena Thakur

Index Nursing College, Indore, INDIA

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### Abstract

Rate of catheter related thrombus formation is 66% in chemotherapy receiving patients while 32% in patients suffering from other disorders. Heparin lock flush is used to flush an intravenous catheter which helps to prevent clot in the tube after intravenous infusion. Therefore, an experimental study was undertaken to assess the effectiveness of heparin lock flush in prevention of chemotherapy induced thrombophlebitis by Baxter's scale among patients receiving chemotherapy at selected hospital of Indore. Research design was post test only control group design and sample size was 40 patients receiving 3 day chemotherapy cycle selected by using random sampling (lottery method). Comparison among experimental and control group in terms of development of chemotherapy induced thrombophlebitis in 3 days cycle of chemotherapy, the ' $\chi^2$ ' Value was 6.82 ( $P \leq 0.01$ ). The findings inferred that heparin lock flush is effective in reducing the development of chemotherapy induced thrombophlebitis.

**Keywords:** Chemotherapy, induced, thrombophlebitis, chemotherapy, cycle, Baxter's scale, Heparin lock flush.

### Introduction

Heparin lock flush is an anticoagulant. It works by preventing blood clots from forming in intravenous lines. Chemotherapy is a type of cancer treatment that utilizes chemical agents in order to stop cancer cells from growing any further<sup>1</sup>. Gullian and Sun Xiao 2010, reported intravenous chemotherapy is an important means of treatment of malignant tumors, but the intravenous chemotherapy drug dose, high concentration, medication for a long time, local venous puncture, repeated mechanical injury and chemotherapy side effects make easy access to form phlebitis which seriously affects the chemotherapy program implementation, thus affecting the treatment of disease<sup>2</sup>. Therefore, understanding the mechanism of phlebitis to develop protective measures to reduce the incidence of phlebitis is warranted.

**Need of the Study:** Superficial thrombophlebitis is a common complication of intravenous cannulation. "Phlebitis effects between 27% and 40% of all patients receiving intravenous therapy<sup>3</sup>. Ahlquist and others concluded from their respective studies that implementation of the guidelines resulted in significant improvement by means of decrease frequency of signs of thrombophlebitis and prolonged patency of the indwelling catheter<sup>4</sup>. Investigator during clinical practice had experienced that there is higher incidence of chemotherapy induced thrombophlebitis among patients who were receiving chemotherapy. And while reviewing the literature it was found that heparin lock flush is one of the well known means to prevent chemotherapy induced thrombophlebitis. Thereby the investigator had undertaken the present study.

**Problem Statement:** An experimental study to assess the effectiveness of heparin lock flush in prevention of chemotherapy induced thrombophlebitis among patients receiving chemotherapy in selected hospitals of Indore in the year 2010-2011.

**Objectives:** i. To assess the grades of chemotherapy induced thrombophlebitis on first day of chemotherapy cycle among control and experimental group. ii. To assess the grades of chemotherapy induced thrombophlebitis on second day of chemotherapy cycle among control and experimental group. iii. To assess the grades of chemotherapy induced thrombophlebitis on third day of chemotherapy cycle among control and experimental group. iv. To assess the effectiveness of heparin lock flush on chemotherapy induced on first day of chemotherapy cycle. v. To assess the effectiveness of heparin lock flush on chemotherapy induced thrombophlebitis on second day of chemotherapy cycle. vi. To compare the occurrence of chemotherapy induced thrombophlebitis in 3 days cycle of chemotherapy among experimental and control group. vi. To assess the mean of bleeding time and clotting time before and after intervention

**Hypotheses:** H1 There is significant effect of heparin lock flush in prevention of chemotherapy induced thrombophlebitis on first day of chemotherapy cycle among experimental group at  $p \leq 0.05$ . H2 There is significant effect of heparin lock flush in prevention of chemotherapy induced thrombophlebitis on second day of chemotherapy cycle among experimental group at  $p \leq 0.05$ . H3 There is significant difference in the occurrence of chemotherapy induced thrombophlebitis in 3 days cycle of

chemotherapy among control group and experimental group at  $p \leq 0.05$ .

**Conceptual Framework:** The present study used conceptual framework based on Jean Orlando's "Dyanamic Nurse Patient Relationship" Theory. The nursing problem presented by the patient is a condition faced by the patient, which the nurse can assist him or them to meet through the performance of her professional functions<sup>5</sup>.

### Methodology

The research design selected for study was Experimental posttest only control group design at 50 bedded Gov't SGPT Cancer Hospital, Indore. The sample for this study comprised of 40 patients receiving 3 days chemotherapy by Random sampling (Lottery method)<sup>6</sup>.

**Tool:** Tool consisted of two parts. Part I: consist of demographic variables. It comprises of 10 items for obtaining information regarding clinical impression, vein used for insertion cannula, age, sex, size of cannula, education, religion, monthly income, occupation, number of chemotherapy cycle, finance. Part II: consist of "Standardized Baxter's scale of thrombophlebitis". It consisted of 6 grades of thrombophlebitis development<sup>7</sup>.

### Results and Discussion

The findings revealed that there is significant reduction in chemotherapy induced thrombophlebitis development on first day of chemotherapy cycle after the administration of heparin lock flush in experimental group where  $U = 60.500$  at  $p \leq 0.01$ <sup>8</sup>

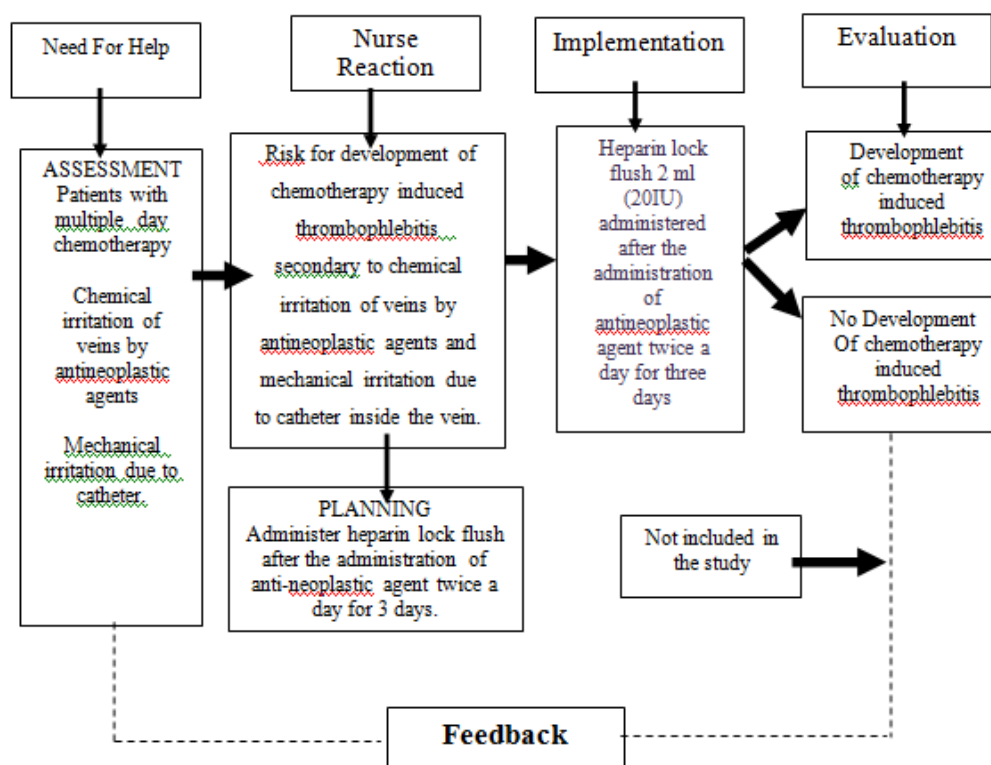


Figure-1  
Conceptual frame work based on Ida Jean Orlando (1961)

Table-1  
Shows mean rank, Sum of Rank, Mann-Whitney U value among control and experimental group for first day of chemotherapy cycle (n=40)

Group	N (samples )	Mean Rank	Sum of Rank	Mann Whitney U
Experimental Group	20	17.90	358.00	148.00 (S)*
Control Group	20	23.10	462.00	

$p < 0.05^*$ ,  $p < 0.01^{**}$ ,  $p < 0.001^{***}$ . S – Significant

The findings revealed that there is significant reduction in chemotherapy induced thrombophlebitis development on second day of chemotherapy cycle after the administration of heparin lock flush in experimental group where  $U = 148.00$  at  $p \leq 0.05^8$ .

heparin lock flush in experimental group where the  $\chi^2 = 8.64$  at  $p \leq 0.001^9$ .

**Table-2**

Shows mean rank, Sum of Rank, Mann-Whitney U value among control and experimental group for first day of chemotherapy cycle (n=40)

Group	N (samples)	Mean Rank	Sum of Rank	Mann-Whitney U
Experimental Group	20	13.52	270.50	60.500 (S)**
Control Group	16	24.72	395.50	

$p \leq 0.05^*$ .  $p \leq 0.01^{**}$ .  $p \leq 0.001^{***}$ . S – Significant.

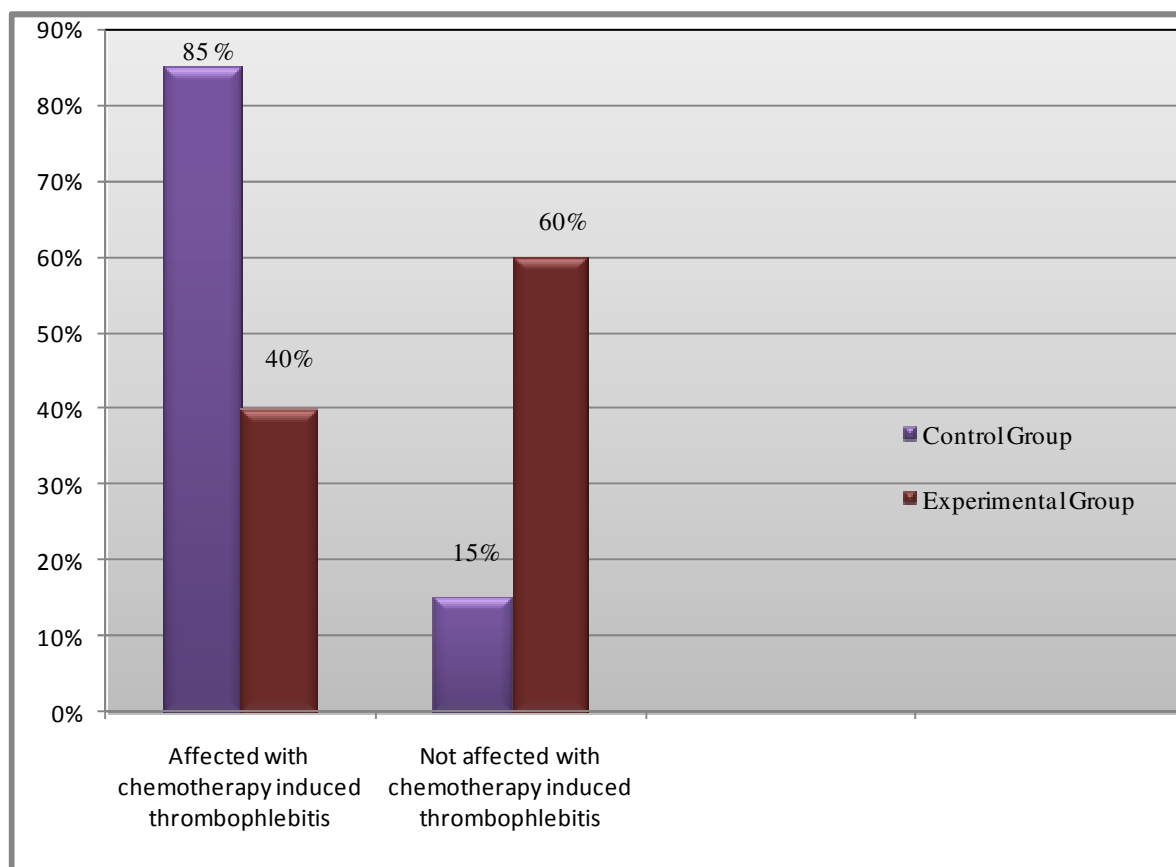
The findings revealed that there is a significant reduction in the chemotherapy induced thrombophlebitis development among chemotherapy receiving patients after the administration of

**Table-3**

Shows patients affected with chemotherapy induced thrombophlebitis, not affected with chemotherapy induced thrombophlebitis, Degree of Freedom (df),  $\chi^2$  value among control and experimental group for 3 days cycle of chemotherapy (n = 40)

Group	Affected with chemotherapy induced thrombophlebitis	Not affected with chemotherapy induced thrombophlebitis	df	$\chi^2$ Value
Control Group	17	3	1	8.64 (S)** *
Experimental Group	8	12		

$p \leq 0.05^*$ .  $p \leq 0.01^{**}$ .  $p \leq 0.001^{***}$ . S – Significant.



**Figure-2**

Bar diagram showing the occurrence of chemotherapy induced thrombophlebitis in 3 days cycle of chemotherapy among experimental and control group

It was found that before intervention mean of Bleeding Time was 1.65 and mean of Clotting Time was 3.765 and after intervention mean of Bleeding Time was 1.652 and mean of Clotting Time was 3.77. Both values before and after intervention, the values of Bleeding Time and Clotting Time were within normal range. Hence, heparin lock flush did not affect the coagulation profile of the selected samples<sup>9</sup>.

**Table-4**

**Shows mean of bleeding time and clotting time before and after the intervention among experimental group (n = 40)**

Mean Value	Before intervention		After intervention	
	Bleeding Time	Clotting Time	Bleeding Time	Clotting Time
	1.65	3.765	1.6525	3.77

**Discussion:** The findings of this study have been discussed with references to the objectives and hypothesis. The rate of thrombophlebitis is more in patients receiving chemotherapy in comparison to the other disorder patients this indicates the need for the use of heparin lock flush on cancer patients receiving chemotherapy. It is observed by reviewing researches that Heparin lock flush is very effective in prevention of clot formation in intravenous lines. In the experimental group, there were no toxic effects of heparin lock flush observed. The bleeding time and clotting time were within normal range before and after the completion of chemotherapy. Above given data was supported by study conducted by Ikeda, Douchi and Nagata investigate whether heparin infusion with the administration of anti-neoplastic agents in ovarian cancer can reduce the occurrence of phlebitis as a complication of chemotherapy. In the heparin group, there were no toxic effects of heparin observed. The prothrombin time, activated partial thromboplastin time, fibrinogen, and platelet count did not differ before and after the completion of chemotherapy. Thus, concurrent infusion of heparin and anti-neoplastic agents in ovarian cancer is a safe and effective method of preventing phlebitis induced by chemotherapy<sup>10</sup>. Thus, use of heparin lock flush can help the cancer patients to receive uninterrupted chemotherapy drugs.

## Conclusion

During administration of antineoplastic agents, they erode inner lining of vessels which promote the fibrin accumulation, attracts the clotting factors thus enhancing the formation of thrombus and inflammation and heparin lock flush is well known to alter this process by flushing the fibrin<sup>8</sup>. This is again supported by the present study that heparin lock flush found effective in prevention of chemotherapy induced thrombophlebitis.

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