Effectiveness of Palm Fisting Exercise on Occurrence of Thrombophlebitis among the IV Cannulated Patients Receiving Chemotherapy – A Selected Hospital of Delhi

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Abstract

Thrombophlebitis is a common complication among IV cannulated patients receiving chemotherapy. The main objectives of the present study were to compare the effect of palm fisting exercise on the occurrence of thrombophlebitis among the IV cannulated patients receiving chemotherapy in experimental and control groups and to find an association between the occurrences of thrombophlebitis with selected demographic variables in the experimental group. The quantitative research approach was used. The research design was post-test-only control design. Sample comprised of 60 patients who were newly cannulated in the arm and were receiving chemotherapy for at least two days from the medical oncology ward of Delhi State Cancer Institute, New Delhi, selected by the lottery method and assigned in to experimental and control groups. There was a significant difference of palm fisting exercise on the occurrence of thrombophlebitis among the IV cannulated patients receiving chemotherapy between the experimental and control groups. There was a significant difference of palm fisting exercise on the occurrence of thrombophlebitis among the IV cannulated patients receiving chemotherapy between the experimental and control group at 0.05 level of significance. In experimental group, there was a significant association between the occurrences of thrombophlebitis among the IV cannulated patients receiving chemotherapy with selected variables, viz., age, stages of cancer, duration of illness, concurrent illness, body mass index, size of the cannula, site of the cannula, duration of chemotherapy administration, number of present cycles of chemotherapy and other treatment modalities at 0.05 level of significance. So, palm fisting exercise with soft ball was effective in reducing the occurrence of thrombophlebitis among the IV cannulated patients receiving chemotherapy.

Keywords: Palm fisting exercise, Thrombophlebitis, IV Cannulated patients

Introduction

Cancer is the second most common cause of death in the US and accounts for nearly 1 of every 4 deaths. The World Health Organization¹ estimates that worldwide, there were 14 million new cancer cases and 8.2 million cancer-related deaths in 2012. Cancer is ultimately the result of cells that uncontrollably grow and do not die. In spite of good advancements for diagnosis and treatment, cancer is still a big threat to our society. After the diagnosis, patients undergo various interventions including 4 to 6 months of chemotherapy administration. Chemotherapy is a very common treatment

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Chemotherapeutic drugs are known to be the most irritant and a vesicant drug as it has to act on the most deadly, rapidly multiplying cells of cancer. Gullian and Xiao 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. Cancer is often associated with hypercoagulability due to changes in coagulation factors, local venous stasis, surgery, and the presence of a central venous catheter. Most of the times, patients already have fragile veins from previous chemotherapy treatment of their cancer. In addition, chemotherapy drugs may further increase the risk of thromboembolic disease. IV cannula associated thrombophlebitis is not a serious condition in normal situations, but it may be fatal if the thrombus is changed into emboli and causes pulmonary embolism and it is a life-threatening condition. This makes it very important for nurses to reduce the incidence of thrombophlebitis due to intravenous chemotherapy administration. However, the complete prevention of thrombophlebitis incidence due to chemotherapy administration is difficult. There are some interventions which may help to reduce the incidence of thrombophlebitis. Hands exercise is the simplest way to improve body's ability to circulate through the hands. The muscles of the hands and the surrounding blood vessels will dilate to allow more of oxygenated blood to flow through while doing hand exercise. The objectives of the present study were as follows:

- To determine the effect of palm fisting exercise on the occurrence of thrombophlebitis by using visual infusion phlebitis scale among the IV cannulated patients receiving chemotherapy in experimental and control groups.
- To compare the effect of palm fisting exercise on the occurrence of thrombophlebitis among the IV cannulated patients receiving chemotherapy in experimental and control groups.
- To find an association between the occurrences of thrombophlebitis with selected demographic variables among the IV cannulated patients receiving chemotherapy in the experimental group.

**Materials and Methods**

For the present study, quantitative research approach, using post-test-only control design was adopted. The independent variable in the study was palm fisting exercise with soft ball, and the dependent variable was occurrence of thrombophlebitis. The present study was conducted on 60 patients receiving chemotherapy through IV cannula at least for two days at Delhi State Cancer Institute, Delhi. The sampling technique used was purposive sampling technique. Ethical clearance was taken from the Jamia Hamdard Institutional Ethics Committee. Formal administrative approval was obtained from the concerned authority of Delhi State Cancer Institute, New Delhi. After establishing the rapport, self-introduction was given to the subjects. Purpose of the study was explained to the subjects and their relatives. Subjects were assured of confidentiality of their data and screened based on inclusion and exclusion criteria for the study. Patient information sheet was given to the patient and written informed consent was obtained. Sixty samples were divided into two groups: experimental group \( (n=30) \) and control group \( (n=30) \) by lottery method. The tool used for data collection was structured interview schedule. The collected information comprised of patients’ records regarding the demographic profile, disease condition, clinical profile and chemotherapy drugs administration. After cannulation, palm fisting exercise with soft ball was performed 20 times, by the patients before the first day of chemotherapy administration and repeated at a frequency of 20 times, three times in a day at an interval of four hours till the start of next day of chemotherapy excluding night hours from 10 p.m. to 7 a.m. in the experimental group. No intervention was provided to the control group. Observation was taken before the next day chemotherapy administration by using visual infusion phlebitis scale in both the groups and recorded in the recording sheet.

**Results**

Data was coded and entered in Microsoft Excel sheet (version 2010) and was analyzed by using descriptive and inferential statistics.
Data presented in Table 1 shows that there was no significant difference between experimental and control groups, viz., gender (p=1.00), age (p=0.596), educational status (p=0.822), occupation (p=0.346), religion (p=1.00), and family income per month (p=1.00). Both the groups were homogenous with respect to the demographic variables.

| S. No. | Variables      | Experimental Group (n₁=30) | Control group (n₂=30) | Fisher's Exact Test | p value |
|--------|----------------|---------------------------|-----------------------|---------------------|---------|
| 1      | Gender         |                           |                       |                     |         |
|        | a. Male        | 4                         | 4                     | 0.293               | 1.0     |
|        | b. Female      | 26                        | 26                    |                     |         |
| 2      | Age (Years)    |                           |                       |                     |         |
|        | a. 20–34       | 2                         | 3                     | 0.048               | 0.596   |
|        | b. 35–49       | 22                        | 18                    |                     |         |
|        | c. 50–65       | 6                         | 9                     |                     |         |
| 3      | Education      |                           |                       |                     |         |
|        | a. Illiterate  | 14                        | 15                    | 0.008               | 0.82    |
|        | b. Primary     | 10                        | 12                    |                     |         |
|        | c. Secondary   | 4                         | 1                     |                     |         |
|        | d. Higher Secondary | 1                   | 1                     |                     |         |
|        | e. Graduate & above | 1               | 1                     |                     |         |
| 4      | Occupation     |                           |                       |                     |         |
|        | a. Housewife   | 24                        | 26                    | 0.01                | 0.347   |
|        | b. Farming     | 0                         | 2                     |                     |         |
|        | c. Business    | 1                         | 0                     |                     |         |
|        | d. Daily wages | 4                         | 1                     |                     |         |
|        | e. Student     | 1                         | 1                     |                     |         |
| 5      | Religion       |                           |                       |                     |         |
|        | a. Hindu       | 25                        | 24                    | 0.247               | 1.0     |
|        | b. Muslim      | 5                         | 6                     |                     |         |
| 6      | Income         |                           |                       |                     |         |
|        | a. <10,000     | 25                        | 26                    | 0.147               | 1.0     |
|        | b. 10,000–20,000 | 4              | 4                     |                     |         |
|        | c. 20,000–30,000 | 1              | 0                     |                     |         |

*p <0.05 Level of significance
Data presented in Table 2 shows that there was no significant difference between experimental and control group, viz., stages of cancer (p=0.657), duration of illness (p=0.540), concurrent illness (p=0.671), body-mass index (p=0.510), size of cannula (p=0.796), site of the IV cannula (p=0.753), duration of chemotherapy administration (p=0.589), number of present cycles of chemotherapy administration (p=0.279), and other treatment modalities along with chemotherapy (p=0.063). Hence, it can be concluded that both the groups were homogenous with respect to the demographic profile, disease profile and clinical profile.

Data presented in Table 3 shows the occurrence of thrombophlebitis in experimental and control groups. There was a significant difference (p=0.03) in the occurrence of thrombophlebitis among experimental and control groups.
groups. More than half of the subjects (70%) in the control group developed thrombophlebitis on the 2nd day of chemotherapy whereas only 43.33% of the subjects in the experimental group developed thrombophlebitis on the 2nd day of chemotherapy.

Data presented in Table 4 shows frequency and percentage distribution of the subjects in experimental and control groups by the thrombophlebitis grades. Only 17 (56.6%) had grade 0, 9 (30%) had grade 1, 4 (13.3%) had grade 2, no one had grade 3 as assessed by visual infusion phlebitis scale in the experimental group. On the other hand, 9 (30%) had grade 0, 7 (23.3%) had grade 1, 11 (36.6%) had grade 2, 3 (10%) had grade 3 as assessed by visual infusion phlebitis scale in the control group. In the control group, 3 had grade 3 thrombophlebitis. Both the groups were compared by using Fisher’s Exact Test (p=0.027) for the grades of thrombophlebitis which was found to be significant.

**Discussion**

The findings of the present study showed that more than half (56.7%) of the patients with chemotherapy treatment, who had performed the palm fisting exercise with soft ball experienced no occurrence of thrombophlebitis as compared to patients who had not performed palm fisting exercise with soft ball. The study findings are consistent with a study by Zhang et al. to examine the effect of handgrip exercise on hemodynamic indices to determine the most effective regimen for promoting blood circulation. Venous blood flow velocity and blood flow increased significantly with each exercise relative to the resting state (p <0.01). Venous blood flow velocity and blood flow peaked with handgrip exercise at a frequency of 25 times/min for 2 min (p <0.01). Handgrip exercise is an effective method for improving blood circulation in the upper extremities.

**Conclusion**

In the light of the findings of the present study, palm fisting exercise with soft ball was effective in reducing the occurrence of thrombophlebitis among IV cannulated patients receiving chemotherapy; however, further studies can be done to compare palm fisting exercise with soft ball versus other thrombophlebitis management interventions.

**Conflict of Interest:** None

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