

The Immediate Effect of Chest Manipulation and Neurophysiological Facilitation on Haemodynamic Parameters in Ventilator Dependent Organophosphorus Poisoning Patients

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ABSTRACT

These organophosphorus agents are traditionally known as nerve gas. Commit suicide by exposure to this is pesticides a key problem. Poisoning is the fourth most common cause of mortality in rural India. Clinical presentation of Organophosphorus exposure depends on the specific agent the quantity and the route of entry. Respiratory arrest can occur within 50 minutes of inhalation. Immediate attention to due airway and adequate oxygenation is essential. Frequent suctioning of the airway along with chest physiotherapy is usually necessary until the patient is recovered.

Aim: To determine the immediate effect of Chest Manipulation and Neurophysiological Facilitation on haemodynamic parameters in ventilator dependent organophosphorus poisoning patients.

Procedure: Data was collected from 28 Patients (male and female, within age group 18 to 45 years) with endotracheal tube in situ and ventilated within 48 hours. Data was obtained from ventilator readings. Values of Haemodynamic parameters were recorded pre interventionally and the post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours from the ventilator and Pulse oximetry. 28 Organophosphorous poisoning patients were equally divided into Groups A and B. The intervention was given for 2 Days once daily. Immediately after the intervention suctioning was done for both the Groups A and B.

Conclusion: A present study showed that Chest Manipulations helps to improve haemodynamic parameters on Day 1 as well as maintain the improvement in preinterventional readings on Day 2 and used as an early intervention in organophosphorus poisoning patients.

Key words: Chest Manipulation, organophosphorus poisoning patients, Neurophysiological Facilitation

INTRODUCTION

Tetraethyl pyrophosphate was first to be manufactured in liquid form in 1950. Since then numerous compounds have been synthesized and used as agricultural insecticide.¹ it is chemical agents traditionally known as nerve gas which have been in military arsenals since World War II.

Despite them being a major cause of morbidity and mortality there are no rules and regulations governing the purchase of these products, and they are therefore readily available "over the counter". It is a more common cause of poisoning than the chronic exposure experienced by farmers or sprayers in contact with pesticides. Intoxication occurs following absorption through the skin, ingestion via the

gastrointestinal tract or inhalation through the respiratory tract. Early diagnosis and prompt treatment is required to save the patient's life.²⁻⁴

Treatment for the above effect is immediate supportive measures due to decrease airway and inadequate oxygenation. And frequent suctioning of the airway along with chest physiotherapy is usually necessary until the patient is consciousness. Further pulmonary support is given with the Cardiac monitoring during atropine administration is indicated⁵ and which further continue with antidotal therapy.

Chest Manipulation in the form of percussion, vibrations and shaking are followed usually. The chest care of patients with Organophosphorus poisoning is particularly challenging because of their inability to participate in the treatment approach. Vertebral pressure and co-contraction of abdomen are the few Neurophysiological Facilitation Techniques routinely used. Loss of central inspiratory drive due to poisoning and the effect of this paralyses the respiratory muscles. Neurophysiological Facilitation Techniques is usually given when the patient is unconscious and uncooperative in the active Chest Manipulation procedure.⁶⁻⁹

So in this study the researcher tried to finding the immediate effect of Chest Manipulation and Neurophysiological Facilitation Technique to know the improvement of haemodynamic parameters in ventilator dependant Organophosphorus poisoning patients.

NEED FOR STUDY

Organophosphorus poisoning needs early diagnosis and appropriate treatment, in patients with respiratory failure and who are on ventilatory support, where mortality is very high.^{2,3} As such there is no literature available where Chest Manipulations and Neurophysiological Facilitation Techniques are given to patients with organophosphorus poisoning. So by this study we can find which these techniques can help in

improving the haemodynamic parameters and also determine which technique can bring immediate effect in the haemodynamic parameters.

AIM AND OBJECTIVES

AIM:

- To determine the immediate effect of Chest Manipulation and Neurophysiological Facilitation on haemodynamic parameters in ventilator dependent organophosphorus poisoning patients.

OBJECTIVES:

- To determine the immediate effect of Chest Manipulation on haemodynamic parameters in ventilator dependent organophosphorus poisoning patients.
- To determine the immediate effect of Neurophysiological Facilitation on haemodynamic parameters in ventilator dependent organophosphorus poisoning patients.

MATERIALS AND METHODOLOGY

- **Type of study** : Experimental study.
- **Study design** : Cross over design.
- **Sample size** : 28 patients.
- **Sampling method**: Convenience sampling method.
- **Study duration** : 1 Year.
- **Place of study** : MIP College of physiotherapy Latur
- **INCLUSION CRITERIA:**
 - Both males and females.
 - Age between 18-45 years.
 - Patients diagnosed with Organophosphorus poisoning.
 - Endotracheal intubated and ventilated patients within 48 hours.
- **EXCLUSION CRITERIA:**
 - Patients with ribs and vertebrae fracture.
 - Patients with Chronic obstructive pulmonary diseases.
 - Patients with past history of cardiac disease and disorder.

OUTCOME MEASURES:

Lung Compliance, Minute Ventilation, Oxygen Saturation, Respiratory Rate, Heart Rate and Blood Pressure.

PROCEDURE FOR STUDY

Data was collected from 28 Patients (male and female, within age group 18 to 45 years) with endotracheal tube in situ and ventilated within 48 hours. Data was obtained from ventilator readings. Values of Haemodynamic parameters (Compliance, Minute Ventilation, Oxygen Saturation, Respiratory Rate, Heart Rate, and Blood Pressure) were recorded pre interventionally and the post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours from the ventilator and Pulse oximetry. 28 Organophosphorous poisoning patients were equally divided into Groups A and B. The intervention was given for 2 Days once daily. Immediately after the intervention suctioning was done for oth the Groups A and B.

IN GROUP A

On 1st DAY-

The pre-interventional readings were recorded from the ventilator and Pulse oximetry following which Chest Manipulation was given, this treatment lasted for 15 minutes. The post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours recorded from the ventilator and Pulse oximetry.

On 2nd DAY-

The pre-interventional readings were recorded from the ventilator and Pulse oximetry following which Neurophysiological Facilitation technique was given, this treatment lasted for 15 minutes. The post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours recorded from the ventilator and Pulse oximetry.

IN GROUP B

On 1st DAY-

The pre-interventional readings were recorded from the ventilator and Pulse oximetry following which Neurophysiological Facilitation technique was given, this treatment lasted for 15 minutes. The post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours recorded from the ventilator and Pulse oximetry.

On 2nd DAY-

The pre-interventional readings were recorded from the ventilator and Pulse oximetry following which Chest Manipulation was given, this treatment lasted for 15 minutes. The post-intervention reading was taken immediately, after half an hour, after 2 hours and after 4 hours recorded from the ventilator and Pulse oximetry.

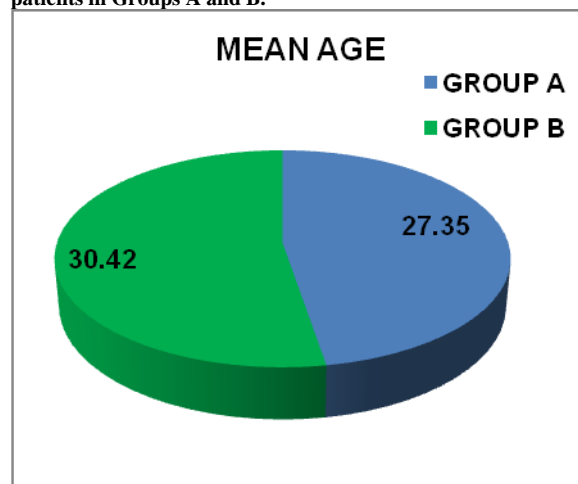
DATA PRESENTATION

1. AGE DISTRIBUTION:-

Table no. 1

GROUPS	MEAN AGE (years)	SD	't' value	P value
GROUP A	27.35	8.50	1.025	0.3146
GROUP B	30.42	7.303		

Graph no. 1: Graphical presentation of Age Distribution of patients in Groups A and B.



Age Group of all patients ranged between 18-45 years with the mean age of individual Group A was 27.35, Group B was 30.42. Age group was compared by applying unpaired test which showed that there was no significant difference in age of

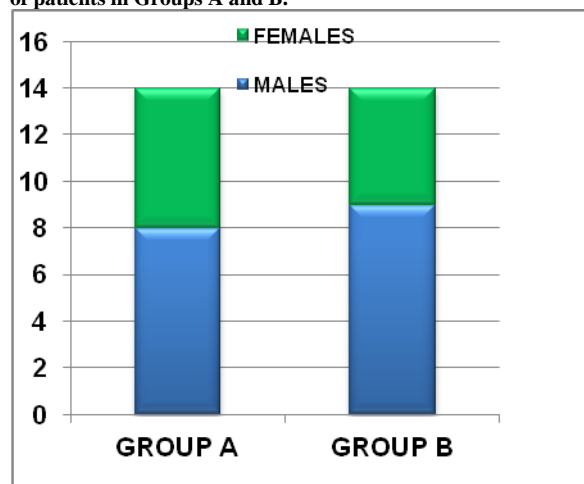
patients in Groups A and B (t value=1.025 P value is 0.3146).

2. GENDER DISTRIBUTION:-

Table no. 7.2

GROUPS	MALES	FEMALES	TOTAL
GROUP A	8	6	14
GROUP B	9	5	14
TOTAL	17	11	28

Graph no 7.2: Graphical presentation of Gender Distribution of patients in Groups A and B.



Total 28 patients were taken for the study, Out of 28 patients 17 were males and 11 were females. Gender was compared by applying Fisher's exact test which showed that there was no significant difference in Gender of patients in Groups A and B (P value is 1.0000).

DATA ANALYSIS AND INTERPRETATION

A. LUNG COMPLIANCE-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Lung Compliance immediately after post intervention, after ½ hours, 2 hours and 4 hours as compared to pre intervention (P value is <0.0001).

B. MINUTE VENTILATION-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Minute Ventilation immediately after post intervention, after ½ hours as compared to pre intervention. In comparison to pre intervention, Minute Ventilation reduced significantly after 4 hours (P value is 0.1572).

C. OXYGEN SATURATION-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Oxygen Saturation immediately after post intervention and after 4 hour as compared to pre intervention (P value is 0.1485).

D. RESPIRATORY RATE-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Respiratory Rate immediately after post intervention as compared to Pre Intervention. In comparison to pre intervention, Respiratory Rate reduced significantly after 4 hours (P value is <0.001).

E. HEART RATE-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Heart Rate immediately after post intervention as compared to Pre Intervention. In comparison to pre intervention, Heart Rate reduced significantly after 4 hours (P value is <0.0001).

F. SYSTOLIC BLOOD PRESSURE-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Systolic Blood Pressure immediately after post intervention as compared to Pre Intervention. In comparison to pre and Immediate Post intervention, Systolic Blood Pressure reduced after 4 hours (P value is <0.0001).

G. DIASTOLIC BLOOD PRESSURE-

Tukey Kramer Multiple Comparison test revealed that there was significant raise in Diastolic Blood Pressure immediately after post intervention and after ½ hours as compared to Pre Intervention. In comparison to pre and Immediate Post intervention, Diastolic Blood Pressure reduced significantly after 4 hours (P value is <0.0001).

DISCUSSION

Exposure to organophosphates in an attempt to commit suicide is a key problem, particularly in the developing countries, and is a more common cause of poisoning than the chronic exposure experienced by

farmers or sprayers in contact with pesticides. Estimates from the World Health Organization indicate that each year, 1 million accidental poisonings and 2 million suicide attempts involving pesticides occur worldwide. Intoxication occurs following absorption through the skin, ingestion via the Gastro intestinal tract or inhalation through the respiratory tract. Early diagnosis and prompt treatment is required to save the patient's life.²⁻⁴

Literature reviewed the effectiveness of Chest physiotherapy to reduce hospitalization and mechanical ventilation length support, pulmonary infection Rate and mortality in Intensive Care Unit patients.¹⁰ Literatures have supported the fact, that chest Physiotherapy shows improvement in cardio-respiratory function on mechanically ventilated patients.¹² Attenuation of the Hemodynamic Responses to Chest Physical Therapy¹¹ and Neurophysiological Facilitation of respiratory system in the unconscious adult patient also showed improvements in lung functions.⁶

This study was undertaken considering all the mentioned points, the aim of this study was to determine the immediate effect of Chest Manipulation and Neurophysiological Facilitation on haemodynamic parameters in ventilator dependent organophosphorus poisoning patients. The conclusion was drawn by the outcome measures which were Haemodynamic Parameters.

The given intervention was significantly effective in improving the haemodynamics values on Pulse oximetry and Mechanical ventilator but Chest Manipulation showed considerable improvement in haemodynamic parameters as compared to Neurophysiological Facilitation Techniques.

SUMMARY

This study was undertaken with the aim to determine the immediate effect of Chest Manipulation and Neurophysiological Facilitation on haemodynamic parameters in

ventilator dependent organophosphorus poisoning patients. Statistical analysis by repeated ANOVA showed that there was extremely significant difference between haemodynamic parameters measured at different times after Chest Manipulations as compared to Neurophysiological Facilitation Technique. Hence this study concludes that Chest Manipulation helps to improve haemodynamic parameters in organophosphorus poisoning patients.

CONCLUSION

Based on the result and interpretation the present study showed that Chest Manipulations helps to improve haemodynamic parameters on Day 1 as well as maintain the improvement in preinterventional readings on Day 2 as compared to Neurophysiological Facilitation in organophosphorus poisoning patients. Hence Chest Manipulations can be used as an early intervention in organophosphorus poisoning patients.

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