Effect of changing positions on Lung mechanics of traumatized ventilated patients

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Abstract

Background: Positioning is a major pc art of nursing care for critically ill patients. Turning the patients in bed promotes adequate ventilation and stimulates circulation. **Aim**: To investigate the effect of changing positions on Lung mechanics of traumatized ventilated patients in addition to explore the effect of changing positions on ABG, duration of connection with MV &ICU staying, and the occurrence of complications of traumatized ventilated patients**. Study design**: Quasi-experimental research design was used to conduct this study**. Setting**: The study was conducted in trauma ICU at Assiut University hospital**. Sample:** A purposive sample of 60 traumatized male and female patients**.** They were matched & randomly assigned into two equal groups of 30 patients in each (control group &intervention group). The Control group has received routine hospital care and the intervention group who were repositioned every 2 hours. **Tools:** two tools were used for data collection, Tool one: Patient assessment tool**,** Tool two: patient outcomes assessment tool. **Results:** it was observed that there was a statistically significant difference between intervention and control groups regarding lung mechanics, ABG (arterial blood gases), and decrease the length of ICU staying (P value < 0.05) especially in the last three days of the study period. **Conclusion**: changing patients' positions every 2 hours improved patients outcomes related to lung mechanics, oxygenation, and ventilation **Recommendation**: Early changing positions should be started early as possible for traumatized mechanically ventilated patients.

Keywords: Changing positions, lung mechanics, traumatized ventilation.

Introduction

Mechanically ventilated (MV) critically ill patients are often given strict bed rest and sometimes completely immobilized. This may be attributed to the severity of their illness and also to the administration of drugs such as sedatives and neuromuscular blocking agents. However, changes in the body position of patients on mechanical ventilation can improve outcomes for these patients including significantly shorter lengths of stay and improved functional outcomes ***(*Younis and Ahmed, 2015*)&* (Mezidi and Guérin, 2018).**

Preventative nursing measures include turning and repositioning every 2-4 hours can improve oxygenation by improved ventilation-perfusion matching. Positioning may initiate a beneficial sequence of events depending on its effects on oxygen delivery and oxygen consumption (**Koulouras, et al 2016**). Changing position is important to break through the routine monotonic delivery of mechanical ventilation and to favor the clearance of respiratory secretions. It also prevents ventilator-acquired pneumonia **(Guerin *et al.*, 2013).**

Peak inspiratory and plateau pressures should be assessed initially and periodically. Although it should be recognized that both pressures will be increased by extrapulmonary pressure, these measurements may help identify the location of resistance, especially if a graphical representation of airway pressures is available. Peak pressure reflects resistance to airflow. it is measured by the ventilator during inspiration. Plateau pressure is thought to reflect pulmonary compliance and measured by applying a brief inspiratory pause after ventilation. High peak pressure with normal plateau pressures indicates increased resistance to flow, such as endotracheal tube obstruction or bronchospasm. An increase in both peak and plateau pressures suggests decreased lung compliance, which may be seen in disease states such as pneumonia **(Stenqvist *et al.*, 2014)** & **(Cruz, *et al.*, 2018).**

Finally, care of the mechanically ventilated patient is at the core of a nurse's clinical practice in the intensive care unit (ICU). **(American Association for Respiratory Care, 2010).**

Significance of the study:

Nursing practice state that the position of critically ill patients should be changed frequently, i.e., every 1 to 2 hours. However, in many instances, position changes are performed without consideration of their potential adverse effects on oxygen transport. Changing patient positioning is used to improve oxygenation and promote ventilation for patients with invasive intervention, which is effective, low risk, and low cost. Critical care nurses need evidence-based outcomes in order to improve oxygenation in traumatized ventilated patients with a lung problem. Nurses who care for traumatized ventilated patients should benefit from the body position associated with the optimal effects on peripheral oxygenation, and the side effects should be minimized. It may also facilitate the weaning of patients from ventilator support in a shorter amount of time **(Jane *et al.*, 2013).** Changing of patient's position should be initiated early as possible to prevent respiratory complications rather than to wait until atelectasis or retained secretion occurs, turning should be started at least every 2 hours. More importantly, it also reduces the frequency of VAP, duration of stay in ICU, and hospital and mortality. In 2018, the number of patients admitted to trauma ICU and connected to MV was about 480 patients (Assuit University Hospital records,2018).

Aims of the study:

Primary aim of the study: To investigate effect of changing positions on lung mechanics of traumatized ventilated patients**.**

A secondary aim of the study: To explore the effect of changing positions on ABG, duration of connection with MV &ICU staying, and the occurrence of complications of traumatized ventilated patients**.**

Hypothesis:

- **Hypothesis (1)** Traumatized patients who receive changing position (intervention group) have significant improvement in lung mechanics than (control group) who receive routine care in the trauma intensive care unit.

- **Hypotheses (2)** Patients who receive reposition (intervention group) have significant improvement in arterial blood gases values than a control group.

- **Hypothesis (3)** Significances reduction in duration of connection with MV duration of ICU stay, and the occurrence of complications among patients who receive changing positions (intervention group) less than that of a control group

Patients and Methods:

Research design:

A quasi-experimental research design was used to conduct this study.

Setting:

This study was carried out in a Trauma intensive care unit (ICU) at Assiut university hospital. This unit admits traumatic patients.

Patients:

A purposive sample consisted of 60 traumatized male and female critically ill patients who were admitted to the above-mentioning setting. They were matched & randomly assigned into two equal groups of 30 patients in each (control group &intervention group). The Control group who has received routine hospital care and the intervention group were repositioned every 2 hours.

Criteria of the sample

Inclusion criteria: The study was included patients:-

- Recent admission to intensive care units.

- Age 18-60 years.

- All patients receiving mechanical ventilation for more than 24 hours.

Exclusion criteria:

- Patient with a head injury and abdominal trauma.
- Patient with CPAP mode on mechanical ventilation as couldn't estimate lung mechanics from the ventilator on this mode.
- Patient with previous chest disease.

Instrumentation and tools: Two tools were designed and used by the researcher for collecting data.

Tool one: Patient assessment tool:

This tool was developed by the researchers after reviewing of literature, which used to assess patient condition, and divided into 2 parts:

Part I: patient demographic and clinical data:

It includes demographic data (patient’s code, age, and sex), in addition to baseline clinical data which include (GCS, Sedation, Injury severity score, Haemoglobin, WBC, Platelets, initial mode of Mechanically ventilated (MV), Peep, Fio2, minute volume, and Peak airway pressure,

Injury severity score adopted from **(Bahloul, 2011)** to assess trauma severity correlates with mortality, morbidity, and hospitalization time after trauma. Glasgow Coma Scale (GCS) adopted from **(Chen *et al.*, 2017)** is used to describe the general level of consciousness in critically ill patients.

Part II: vital signs assessment sheet:

This part was used to assess vital signs includes temperature, respiratory rate, mean arterial blood pressure, and heart rate.

Tool 2:- patients outcomes assessment tool:-This tool was developed by the researcher after reviewing of literature, used to assess patient condition, and divided into three parts:

Part I: Arterial blood gas Assessment sheet:

This part used to assess **ABG as PH:** partial pressure of hydrogen ion**, Pao2:** arterial partial pressure of oxygen**, Paco2:** arterial partial pressure of carbon dioxide, **Hco_3:** bicarbonate**, and Sao2:** oxygen saturation every shift for 5 days

Part II: Lung mechanics assessment sheet:

This part includes lung mechanics as **(**Tidal volume, Peak airway pressure, Spontaneous minute volume, lung Compliance, and Plateau pressure

Part III: patients outcomes assessment sheet related to the duration of connection with MV and duration of ICU stay.The occurrence of complications related to MV as (Ventilator-associated pneumonia(VAP) and peripheral edema or both).

Methods

The study was conducted throughout three main phases:

1.Preparatory phase:-

- Permission to conduct the study was obtained from the hospital responsible authorities in the trauma intensive care unit after an explanation of the aim and nature of the study.
- The tools were developed by the researcher based on the relevant literature reviewing.
- A pilot study was carried out on (10% of the sample) were six patients to test the clarity, validity, and applicability of the tools. Also,, it is not encountered in the study sample and replaced with another group of patients.

- The developed tools were tested for content validity by selected 5 juries of critical care medical and nursing professionals to assess the clarity, feasibility, and applicability of the tools.
- The internal consistency was done on tools to conduct the study, two tools were tested by using coefficient Cronbach's alpha (reliability test) for a

tool I was 0.85 and for tool, II was 0.9 which were acceptable.

- Approval was obtained from the local ethical committee and the study followed the common ethical principles in clinical research.
- **Protection of human rights**: informed consent was obtained from each patient or the responsible person for the unconscious patient. The researcher emphasized that the patient is voluntary and the confidentiality and anonymity of the patients were assured through coding the data .patient was assured that he can withdraw from the study at any time without any rational.

2.An implementation phase for both groups:

Data collection started from the first January 2019 until September 2019. Patients were randomly assigned to the intervention group or the control group.

- During the implementation phase, the researchers assessed patients of both groups from the first day of admission and record the patient's bio-socio demographic and baseline clinical data before any data collection by taking this information from his/her sheet using tool 1 (part 1).

- The researchers assessed vital signs of patients, every shift for 5 days by using tool 1(part 2)

- Patients outcomes (ABG, Lung mechanics, and Occurrence of complications) were taken every 24 for 5 days by using tool 2.

- Lung mechanics estimated every 24 hours from the MV and included the following :

a. Peak inspiratory pressure (PIP (cmH2O): maximum pressure obtained during inspiration.

b. Plateau pressure (Pplt (cmH2O)): by occluding expiratory tubes at end of inspiration with no airflow

c. lung compliance = (Exhaled tidal volume)/ (Plateau pressure - PEEP)

d. Tidal volume and Spontaneous minute volume

- **For control group**: control group received routine hospital care in trauma ICU at Assiut University hospital.

For intervention group

- Before each position, vital signs were taken to a certain there wasn't any hemodynamic instability, in addition to oxygen saturation.

- reposition of each patient every 2 hours was applied. These positions were upright setting position, semi setting position, RT semi setting position, LT semi-sitting position, and LT lateral positions, and flat position.

- In supine and lateral positioning were done with the head of the bed (hob) at 20-degrees; one pillow supported the head. two nurses (the nurse researcher and a staff nurse) turned the patient45-degrees laterally. when the patient was turned laterally, a 45-degree wedge supported the patient's back, legs were flexed with one pillow between the legs, and one pillow was placed under the head. in the supine position, one pillow was placed under the patient's head.

- During reposition of the patient, any tubes and connections attached to the patient were observed to avoid pulling, stretching, or kinking.

Evaluation phase:

Each patient was evaluated daily for 5 days, 5 times during 1st,2nd,3rd. 4th, and 5th day by using tool I (part 2); and Tool II.

Statistical analysis

The mean and standard deviation values were calculated for each group in each test. Data were explored for normality using Kolmogorov-Smirnov and Shapiro-Wilk tests. Categorical variables were described by number and percent (N, %), where continuous variables were described by the mean and standard deviation (Mean, SD). We compare between Categorical variables by a chi- Square test and We compare between continuous variables by Independent sample t-test was used to compare between two groups in non-related samples for parametric (normal distribution), Mann Whitney was used to comparing between two groups in non-related samples for non-parametric (not normal distribution) variables. A two-tailed $p < 0.05$ was considered statistically significant. All analyses were performed with the IBM SPSS 20.0 software.

Results

Table (1) Illustrates demographic and clinical data of intervention and control groups. Regarding to age, it was noticed that the main age of intervention and control groups (35.5 ± 12.6 and 39.7 ± 13.9) respectively. Regarding to sex, the high presence of patients were male in intervention and control groups (66.67% and 73.33%) respectively, also there was no statistically significant differences between intervention and control groups regarding demographic and all baseline clinical data (p.value <0.05).

Figure 1(A, B, C, D): This figure shows vital signs of the patients of the intervention and control groups, it was observed that there were a statistical significant difference between intervention and control groups in all of vital signs in the last of three days during study period.

Table (2): shows a comparison between Study and Control group related to (ABG), it was observed that there was a statistically significant difference between intervention and control groups (P-value < 0.05) in all items of vital signs on the last day.

Table (3):- shows a comparison between intervention and control group related to lung mechanics on the ventilated patient, There was a statistically significant difference (P-value < 0.01) between the intervention group and control group in all items of lung mechanics in the last days of the study

Table (4): This table shows Comparison between intervention and Control group related to the occurrence of complications it was noticed that43.33% of the control group have complication as VAP, Peripheral Oedema, VAP and Peripheral edema (26.67 %, 10.00 %, 6.67 %), respectively. There were statistically significant differences between intervention and control groups (P-value < 0.05) related to the Presence of complication related to MV.

Figure 2: shows that duration of connection with MV, the majority of patients were connected Less than 6 days in the intervention group (60.%) versus 30

% in the control group, it was noticed that there were statistically significant differences between intervention and control groups in those items (P-value > 0.05).

Figure 3: shows a comparison between intervention and control group related to the duration in ICU, it was noticed that 63.3 % of intervention is from 6-10 days, while 40 % of control are more than 10 days and there were statistically significant differences between intervention and control groups in these items (P-value < 0.05).

Table(1): Distribution of demographic and baseline clinical data among studied groups

Demographic and base line clinical data	intervention group (n=30)	Control group (n=30)	P. value
Age	35.5±12.6	39.7 ± 13.9	0.225
Sex			
Male	20(66.67%)	22 (73.33%)	0.573
Female	10(33.33%)	8(26.67%)	
GCS	10 (1.25)	9.5 (3)	0.639
Sedation	10 (33%)	11 (36.7)	
Injury Severity Score	49 (13.75)	41.5 (28)	0.12
Haemoglobin	9.37±1.25	9.67±2.99	0.614
HCT Haematocrit	27.75±3.27	28.3±8.31	0.735
WBC	12.59±3.15	12.69±1.85	0.883
Platelets	254.1 ± 77.5	225.7 ± 71.1	0.145
The Initial Mode Of MV			
SIMV	20 (66.7%)	14 (46.6%)	0.294
PCV	7 (23.3%)	11 (36.7%)	
BILEVEL	3 (10%)	5 (16.7%)	
Peep	5 (2)	5 (5)	0.869
Fio2	50 (6.5)	50 (25)	0.055
Minute Volume	5857.3 ± 785.4	6221.9 ± 1048.4	0.133
Peak airway Pressure	23.1 ± 3.5	23.7 ± 4.2	0.529

- Independent t-test * Significant difference at p. value< 0.05, ** Significant difference at p. value<0.01
Chi-square test *Significant difference at p. value<0.05, ** Significant difference at p. value < 0.01.

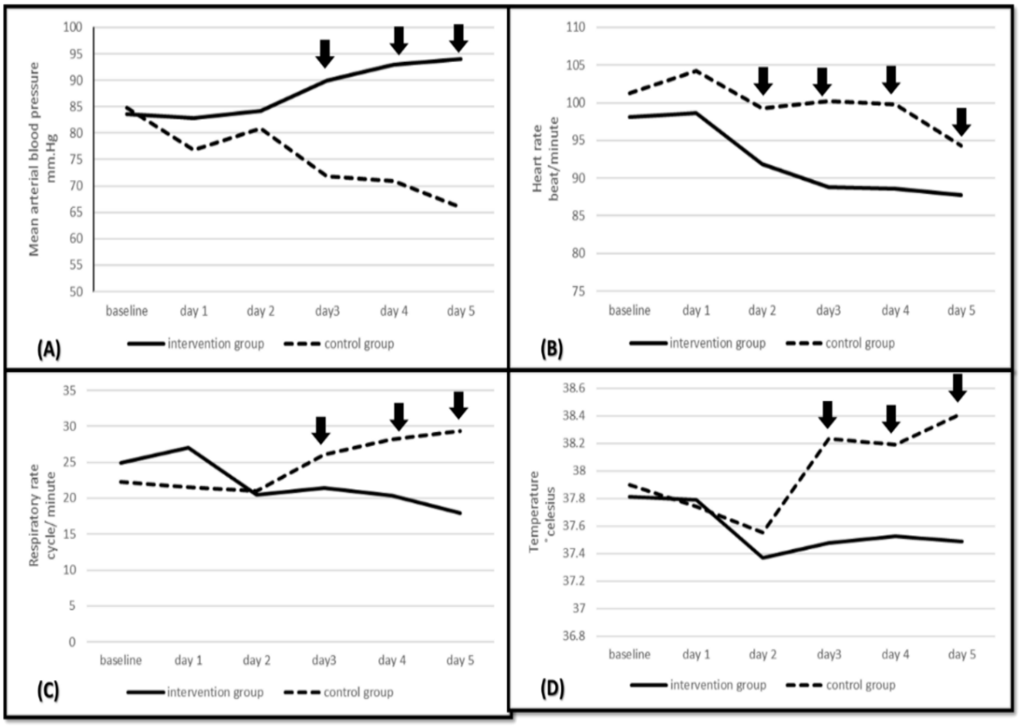

Figure 1: Comparison between intervention and Control group related to vital signs.

Mean Arterial Blood Pressure;
(B) Heart Rate;
(C) Respiratory Rate;
(D) Temperature

-↓ Arrows indicate significance. - Chi-square test

*Significant difference at p. value<0.05,

**Significant difference at p. value < 0.01. Independent t-test

** Significant difference at p. value<0.01

Table (2):Comparison between Intervention and Control group related to (ABG)

ABG	Control Mean±SD	Intervention Mean±SD	P.value
PH			
1st day	7.4±0.08	7.38±0.03	0.479
2nd day	7.41±0.12	7.46±0.07	0.112
3rd day	7.42±0.07	7.39±0.03	0.062
4th day	7.37±0.12	7.44±0.07	0.026*
5th day	7.38±0.09	7.48±0.05	<0.001**
Pao2			
1st day	120.62±60.35	138.97±52.37	0.319
2nd day	94.62±44.98	138.9±23.38	<0.001**
3rd day	104.08±41.07	126.5±15.58	0.012
4th day	92.46±29.95	127.13±13.82	<0.001**
5th day	93.12±40.34	127.58±9.36	<0.001**
Paco2			
1st day	32.31±9.27	32.23±4.67	0.972
2nd day	33±9.46	32.03±6.58	0.701
3rd day	32.46±10.28	32.8±2.5	0.865
4th day	32.31±7.62	33.67±2.77	0.392
5th day	32.69±6.48	35.37±1.72	0.040*
Sao2			
1st day	92.27±4.8	93.97±1.13	0.064
2nd day	93.7±2.76	94.8±1.3	0.052
3rd day	94.39±3.69	96.64±1.7	0.009**
4th day	93.62±2.84	97.25±0.96	<0.001**
5th day	91.27±2.56	98.78±0.54	<0.001**
Hco3-			
1st day	20.72±6.2	21.69±2.56	0.470
2nd day	21.82±5.91	23.34±4.24	0.343
3rd day	22.13±3.25	23.03±1.11	0.194
4th day	21.92±4.5	22.98±0.38	0.218
5th day	20.18±5.36	22.39±0.8	0.038*

Independent t-test *Significant difference at p. value < 0.05, **Significant difference at p. value < 0.01

Table (3):- Comparison between intervention and Control group related to lung mechanics

lung mechanics	Intervention Mean±SD	Control Mean±SD	P.value
Total Tidal volume			
1st day	588.83±137.32	525.07±144.36	0.423
2nd day	600.03±154.61	540.87±135.05	0.119
3rd day	580.17±144.51	494.27±114.75	0.020*
4th day	551.1±126.09	458±101.68	<0.001**
5th day	578.7±82.8	512.67±102.61	0.026*
Peak airway pressure			
1st day	23.13 ± 4.34	23.67 ± 6.99	0.724
2nd day	20.67±4.62	25.4±11.82	0.270
3rd day	20±4.41	23.07±6.1	0.059
4th day	19.17 ± 3.35	23.9 ± 5.57	0.000*
5th day	20 ± 3.48	23.2 ± 4.86	0.005*
Spontaneous minute volume			
1st day	2.12±1.61	2.49±2.38	0.747
2nd day	1.92±1.32	3.2±2.56	0.127
3rd day	1.34 ± 1.42	2.7 ± 1.82	0.004*
4th day	1.01 ± 1	1.91 ± 2.11	0.037*
5th day	1.39 ± 1.17	2.24 ± 1.89	0.039*
Lung Compliance			
1st day	41.11 ± 13.44	37.85 ± 19.85	0.460
2nd day	46.91 ± 14.12	36.72 ± 16.65	0.013*
3rd day	49.9 ± 15.19	35.56 ± 13.11	0.000*
4th day	48.24 ± 11.72	31.79 ± 11.35	0.000*
5th day	50.86 ± 12.41	32.85 ± 13.85	0.000*
Plateau pressure			
1st day	17.69 ± 4.96	18.21 ± 5.98	0.714
2nd day	17.32 ± 5.22	19.57 ± 5.6	0.114
3rd day	17.86 ± 5.39	18.88 ± 5.76	0.484
4th day	18.04 ± 2.36	20.1 ± 6.2	0.095
5th day	17.09 ± 2.58	21.91 ± 10.63	0.019*

Mann-Whitney Test *Significant difference at p. value <0.05,** Significant difference at p. value < 0.01

Total Tidal volume: mandatory tidal volume + spontaneous tidal volume.

Table (4)Comparison between intervention and Control group related to the occurrence of complications

Complication related to MV	study group (n=30)		Control group (n=30)		P. value
	No	%	No	%	
No	30	100.00	17	56.67	<0.001**
Yes	0	0.00	13	43.33	
If yes					
Ventilator associated pneumonia	0	0.00	8	26.67	0.002**
Peripheral Oedema	0	0.00	3	10.00	
VAP and Peripheral oedema	0	0.00	2	6.67	

Chi-square test * Significant difference at p. value < 0.05, ** Significant difference at p. value < 0.01,
Independent t-test ** Significant difference at p. value < 0.01, ICU:
MV: Mechanical ventilation, and VAP: Ventilator-associated pneumonia.

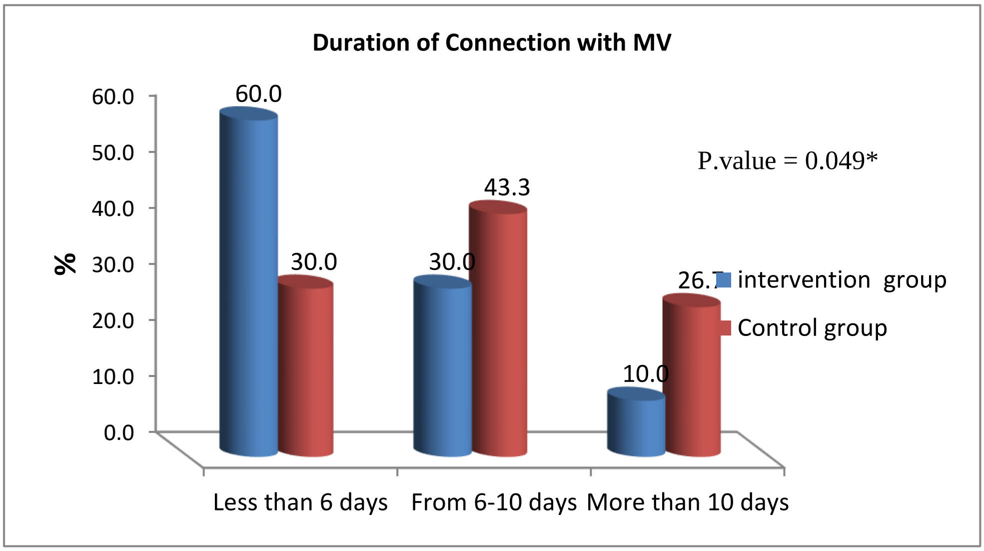

Figure 2: Comparison between intervention and Control group related to the duration of Connection with MV

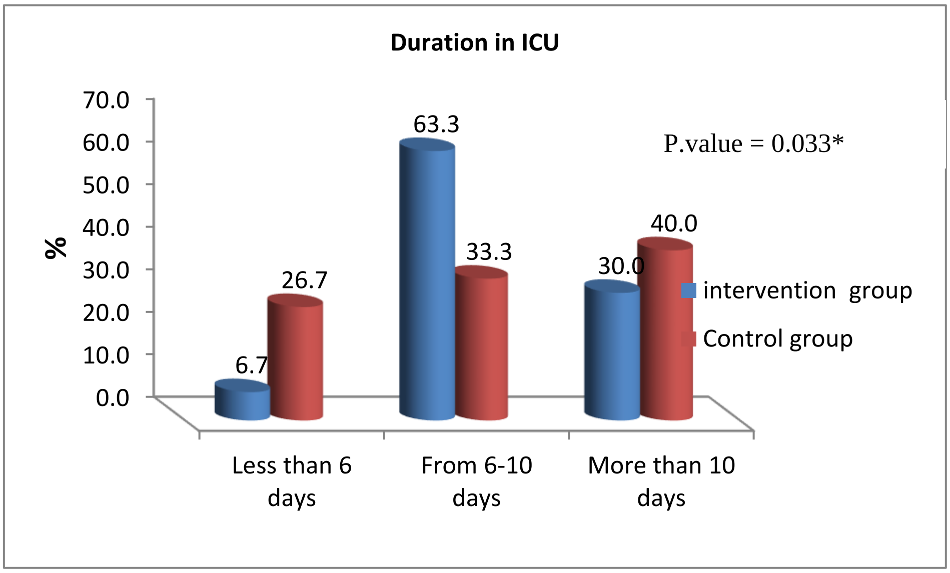

Figure 3: Comparison between intervention and Control group related to the duration of ICU stay.

Discussion

ICU patients are often immobilized due to a number of factors related to their illness and/or treatment, including cardio-respiratory instability, paralysis, and sedation. As such, 2 hourly repositionings of patients have long been advocated **Stiller, (2013).** The early Changing position is important to break through the routine monotonic delivery of mechanical ventilation and to favor the clearance of respiratory secretions, and ventilator-acquired pneumonia, and the improvement in lung volume and oxygenation. in selected patients **Guerin *et al.*, (2013).**

Socio-demographic characteristics of studied patients:

Based on the results of the present study: Regarding age, it was noticed that the main age in study and control groups (35.53±12.63 and39.7 ± 13.9) respectively and regarding sex, more than two-thirds of the patients were male in intervention and control groups (66.67% and 73.33%)this can be attributed to the higher exposure of young male adult to trauma than other due to their work almost outdoor more active, so they are more exposed to street accidents or falling from a height. This is the line with **Dong *et al.*, (2014),** who founded the study “Effects of early rehabilitation therapy on patients with mechanical ventilation.” that the median age was 52 years, but as regarding to gender the same most of his patients (70%) were males.

Related to the different MV mode high percent of intervention and control group used SIMV.VC mode.it agrees with **Amidei and Sole, (2013) & Younis and Ahmed, (2015)**, who mentioned that majority of the sample were treated with synchronized intermittent mandatory ventilation mode and pressure support mode.,.This may be due to that most of the sample may require placing the patient on mechanical ventilation.

Regarding sedation it was observed that there was no statistically significant difference between intervention and control groups, this may due to the same group received the same sedation regimen. It's not in line with **Morandi *et al.*, (2011),** who mentioned that there was found significant differences between the Study and Control group (P-value = 0.01) regarding sedation and delirium on a ventilated patient.

Regarding to Glasgow coma scale, there was found no significant differences between the Study and Control group (P-value < 0.001). It was not supported with **Chuanyan *et al.*, (2017)**, in this results showed there were significant differences in the composition of two groups in Glasgow Coma Scale (GCS) score (P < 0.05).

Regarding to vital signs, there were statistically significant differences between the intervention and Control group in vital signs in the last three days of the study this may due to changing position improve the hemodynamic status of the patients of the intervention group and improve circulation. This study agreed with **Hamlin *et al.*, (2015),** who showed that there were statistically significant changes in heart rate, mean arterial pressure, and pulse pressure that occurred with the manual turn. Return of the variables to baseline values required up to 45 minutes in the manual-turn patients (expected recovery time ≤ 5 minutes).

Also, **Şenduran *et al.*, (2012)** investigated the effects of early mobilization on hemodynamic and respiratory responses in critically ill patients and found that significant differences between respiratory rates before, after, and five minutes after mobilization.

Regarding laboratory investigation, the finding of the current study revealed that there was no statistically significant difference between the two groups. The present study is not supported by **Sharma, (2014).** Which showed a statistically significant difference between the study group compared to control group.

Regarding to arterial blood gases: the present study showed there was a statistically significant difference between intervention and control groups related to ABG, this may be attributed to changing position favor the clearance of respiratory secretions and it can increase utilization of oxygen inpatient and promote ventilation. The finding of the current study was supported by **Jondernet *al.*, (2012) & Castillejo *et al.*, (2015),** who showed a statistically significant difference between the intervention groups compared to the control group. This finding result can be interpreted that there was an effect of change position that promotes oxygenation saturation and increase ventilation. Also, **Nurten and Khorshid, (2019),** who stated that change positioning is important in patients with cardiovascular, cardiopulmonary dysfunction, and oxygenation problems, the correct positioning of patients can affect the blood oxygen saturation level by increasing lung volume, reducing the heart rate, helping secretions clearance, and improving ventilation/perfusion (*V*/*Q*) matching. Best oxygenation depends on the *V*/*Q* matching. The *V* and *Q* differences from the apex to the base of the lung have formerly been attributed to gravity and be inclined to disappear in the supine position. **Lumb *et al.*, (2019**)mentioned that the maximum exchange of carbon dioxide for oxygen in the lung happens when the best-ventilated areas are the most perfused.

Regarding correlation with positioning and lung mechanics as (tidal volume, peak pressure, spontaneous minute volume, compliance, and plateau pressure), the finding of the current study revealed that there was a statistically significant difference (P-value < 0.01) between the intervention group and control group in all items of lung mechanics in the last period of the study. Similar results were reported by **Genc *et al.*, (2014) & Adler and Malone, (2012)**, which found that overall activity-induced increases in tidal volume and minute ventilation were within acceptable ranges.

Similarly, **Azab *et al.*, (2015)** reported that there was an increase in tidal volume (VT), respiratory rate (RR), minute ventilation, and fractional inspiratory time during exercise and they decreased significantly during the recovery period. On the other hand, **Johan and West, (2017)** stated that compliance is defined as the volume change per unit of pressure change across the lung. The measurement is not reliable in supine subjects because of interference by the weight of the mediastinal structures.

As regards to the duration of Connection with MV in this study, more than fifty percent of patients were connected Less than 6 days in a study group and only one-third of the control groups Less than 6 days. it was noticed that there were statistically significant differences between intervention and control groups in those items (P-value > 0.05)This may be attributed to changing the position of the patients had a positive effect on reducing the duration of MV. This is the line with **Schweickert *et al.*, (2009)**, who mentioned that the mean duration value of mechanical ventilation has a positive relationship with receiving early physical and occupational therapy with statistically significant differences between study and control groups (P-value > 0.05). this study not agreed with **Patman *et al.*, (2001),** who mentioned physiotherapy during the period of mechanical ventilation following cardiac surgery influenced subject outcomes and has no significant differences between the two groups were detected for the length of intubation period, length of ICU stay, length of hospital stay.

Also, regarding to duration in ICU, it was noticed that there were statistically significant differences between intervention and control groups in this item (P-value < 0.05). In this regards **Lai *et al.*, (2017),** who mentioned that the mean duration of ICU stay after protocol group patients had shorter MV durations (4.7d vs 7.5d; P < 001) and ICU stays (6.9 d vs 9.9 d; P=.001) than did before protocol group patients.

Regarding the Occurrence of complications, it was noticed that there were statistically significant differences between study and control groups (P-value < 0.05) related to the Presence of complication related to MV. In this regards this study agreed with **Morris *et al.*, (2011),** who reported that mechanically ventilated patients had early mobility improve outcomes for patients receiving ICU care, decreased period of MV connection, and diminished complication of MV with statistically significant differences (P-value = 0.01). **Vourc'h *et al.*, (2015),** mentioned that the main associated complication in critically ill patients including aspiration, fatal arrhythmia, cardiac arrest, and died.

Conclusion:

Based on the findings of the current study, it can be concluded that changing patients positions every 2 hours improved patients outcomes related to lung mechanics, oxygenation and ventilation , duration of connection with MV & ICU staying,and the occurrence of complications of traumatized ventilated patients**.**

Recommendations:

- It is recommended that future investigations related to this study topic evaluate a greater time frame in order to capture a potentially larger sample population. Additionally.

- It may be worthwhile to develop a prospective study evaluating this same ideal as well as evaluate a broader scope of clinical outcomes both short term and long term.

- The early changing position should be started early as possible for traumatized ventilated patients.

Conflict of interest

There were no conflicts of interest.

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