Study of Airway pressure release ventilation versus low tidal volume ventilation in hospital outcome of acute respiratory distress syndrome

Osama Mahmoud Momtaz[1], Radwa Ahmed El Hefeny[2], Rabab Mahoumed Fawzy[1],Ahmed Fathy El Khateeb1

[1]critical care medicine Department, [2]chest disease Department, Faculty of Medicine, Fayoumuniversity, Egypt

***Corresponding author: Rabab MahoumedFawzy**

E mail:

Mobile phone:

Abstract

Background: around the globe, acute respiratory distress syndrome (ARDS) continues to be a major health problem and killer. Clinicians have reported success with different modalities of ventilation, such as airway pressure release ventilation, despite the widespread acceptance of lung-protective low-tidal volume ventilation (LTVV) as the standard of therapy for ARDS (APRV),

Aim and objectives; The purpose of this study is to evaluate the efficacy of the treatment strategies Airway Pressure Release Ventilation (APRV) and Low Tidal Volume Strategy (LTVS) for Acute Respiratory Distress Syndrome (ARDS) and to contrast them in terms of patient outcome prediction.

Methods; 100 ARDS patients in the Critical Care Unit were chosen for the study. Before being assigned to the APRV study or the low tidal volume strategy, all patients will have been breathing with a volume-controlled ventilation (VCV) ventilator. **Result;**There was a big difference between the two groups when it came to PaO3: it went up in group A and down in group B, with a P value of 0.003 and a P/F of 3. There wasn't a big difference between groups A and B, where 22 (44%) people lived and 28 (56%) died, and where 22 (44%) people lived and 28 (56%) people died.

Conclusion; APRV can be used safely in ARDS without harming blood flow or arterial blood gases. It can also improve oxygenation in a big way.

Keyword: Acute respiratory distress syndrome (ARDS), acute lung injury, airway pressure release ventilation (APRV), low tidal volume ventilation (LTVV).

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Introduction

Machine ventilation has been associated with alveolar atelectrauma, which is lung injury due to localised alveolar overstretching and/or repetitive alveolar collapse with shearing. This is true even though mechanical ventilation plays a crucial role in helping persons with ARDS survive (1).

The mortality rate for persons who need respiratory assistance is significant, even when they are treated with the standard lung-protective ventilation technique, which entails a low tidal volume and a high positive end-expiratory pressure (PEEP) (2). A "ideal" PEEP setting that prevents both under- and over-dilation may be hard to achieve. That's why this is

one of the main reasons why (3). However, airway pressure release ventilation (APRV) maintains a positive airway pressure and briefly releases air for a few seconds at a time. During the very high ventilation rate, the patient is able to employ just a small fraction of their whole lung capacity (4).

As a result, many who suffer ARDS continue to see ARPV as an experimental therapy. We hypothesised that providing the latest APRV approach to ARDS patients at an earlier stage would improve oxygenation and respiratory system compliance while reducing the requirement for mechanical ventilation (5).

Patientsand methods

From November 2018 to February 2021, researchers at Fayoum University analysed data from one hundred (100) patients admitted to the Critical Care Department.

Inclusion criteria: Individuals who were diagnosed with ARDS and fulfilled both the Berlin and Kigali criteria and required endotracheal intubation and mechanical ventilation for >48 hours at Fayoum University Hospital were included in the study.

Exclusion criteria: Women who are pregnant, those who have been diagnosed with intracranial hypertension, those with neuromuscular disorders that necessitate prolonged mechanical ventilation, those with severe chronic obstructive pulmonary disease, those who have experienced documented barotrauma, and those who are younger than 18 or older than 85.

Methodology in details: All patients admitted to the Critical Care Unit at Fayoum University Hospital with ARDS who required mechanical ventilation were considered for this study.

Within the first 24 hours after admission, all patients were submitted to the following examinations:

All patients or their family members were interviewed to collect comprehensive medical histories, with particular focus on age, sex, and the presence of any chronic diseases. Each patient underwent a comprehensive clinical evaluation, which included a general physical and a focused assessment of the chest and heart. At admission, each patient was given an APACHE II score, which takes into account their acute and chronic health conditions. Complete blood count (CBC), coagulation profile (PT, PC, INR, and PTT), liver function tests (ALT, AST, bilirubin, and albumin), kidney function tests (urea, creatinine), blood sugar, C-reactive protein (CRP), serum electrolytes (Na, K, and calcium), and other laboratory investigations as determined by the patient's condition upon admission and subsequently. Some patients also underwent CT chest scans, echocardiograms, and plain x-rays of the chest. During the first three days of the randomization process, arterial blood gases (ABG) were measured every 8 hours in both groups.

At admission, every patient was given an APACHE II score to reflect their current state of health. Workings of the lungs and respiratory system static compliance of the tidal volume pressure plateau We took readings of peak pressure, mean pressure, and minute ventilation at 8, 24, and 3 days post-randomization. PaO2/FiO2 respiratory indices were measured 8 hours, 24 hours, and 3 days after the start of randomization. Assessment of lung damage severity was performed on the day of randomization and again 3 days later.

Ventilator setting: Before being allocated to the APRV study or the low tidal volume method, all patients were ventilated for 8 hours with volume assisted-control ventilation (ACV) using a BELLAVISTA Ventilator. During the period of mechanical breathing, both groups worked on keeping the airway plateau pressure (P plat) at no more than 30 cmH2O.

LTV group: As a means of minimising misalignment between the patient and

ventilator, the tidal volume goal (VT) in the LTV group was set at 6 mL/kg projected body weight (PBW), with tolerances of 4-8 mL/kg PBW. After adjusting PEEP levels using the PEEP-FiO2 table, the ARDS net protocol called for adjustments to the patient's tidal volume and respiratory rate to bring about the desired changes in pH and Plateau Pressure.

In cases of severe respiratory acidosis (pH 7.15), the ARDS net protocol calls for an increase in breathing rate to 35 breaths per minute and an adjustment in tidal volume (the P plat target of 30 cmH20 could be exceeded).

APRV group: The following parameters were utilised to wean patients off of volume assist-controlled breathing and onto APRV:**P-High:** was set equal to plateau pressure measured of previous mode (AVC) often start ~25 cm. **P-Low: was**standardised to a pressure of 5 cmH2O (the minimum pressure level recommended for preventing atelectasis);**T-high: was** the main driver of the release frequency: Release frequency = 60/ **(**T-High + T-Low**)**, initially a frequency of 10-14 releases/minute is reasonable. **T-Low: was** set to 0.5 seconds initially and adjusted to achieve an end-expiratory flow equal to 75% of the peak expiratory flow rate. **FiO2:** was started high, titrated down rapidly based on oxygen saturation.

Sample size: Data analysis conducted using G-Power 3.1.7 software (Institute of experimental psychology, Heinrich Heine University, Dusseldorf, Germany). The sample size for each group has to be at least 45 people in order to achieve 80% power and a type I error of 0.05 with two tails.

Randomization and Blinding: One hundred patients who took part in the study were randomly put in either Group A (APRV) or Group B (low tidal volume strategy) based on a random number kept in a sealed envelope and split into 5 blocks with 50% of each group in each block. On the day of need ventilation, the sealed envelopes were opened. Both the people taking part and the researcher had their eyes covered.

Statistical analysis: Data were collected, coded to make data manipulation easier, and entered twice into Microsoft Access. SPSS software version 18 was used to analyse the data in Windows 7. Simple descriptive analysis in the form of numbers and percentages for qualitative data, and arithmetic means as a measure of central tendency and standard deviations as a measure of dispersion for quantitative parametric data.

Results

Our study was done in the medical ICU of Fayoum University Hospitals. One hundred (100) patients with ARDS who were getting mechanical ventilation took part. The characteristics of the people in group A (APRV) and group B at the start of the study (LTV). In group A, the average age was 53 (10.9 SD) years old. The average age of people in group B was 55.7 (12.6 SD), and there wasn't a statistically significant difference in age between groups A and B. (0.25). In group A, 27 (54%) of the people were men and 23 (46%) were women. In group B, 28 (56%) of the people were men and 22 (44%) were women. There was no statistically significant difference in gender between the two groups (p value) (0.8) table (1)

Table (1): Basic characteristics

	Group A (N=50)		**Group B (N=50)**		**P-value[#]**
	Mean	**SD**	**Mean**	**SD**	
Age (years)	53	10.9	55.7	12.6	0.254
	N	**%**	**N**	**%**	**P-value[##]**
Sex					
Male	27	54.0%	28	56.0%	0.841

Female	23	46.0%	22	44.0%	

#Independent-t test ##Chi-squared test

The mean APACHE II score was 20.2 (± 7.5 SD) in group A and the mean of APACHE II score was 22.4 (± 7 SD) in group B. There was no statistically significant difference between two groups with p value (0.13) table (2).

Table (2): APACHE II score in two groups

	Group A (N=50)		**Group B (N=50)**		**P-value#**
	Mean	**SD**	**Mean**	**SD**	
APACHE II score	20.2	7.5	22.4	7.0	0.136

#Mann Whitney U

In group A, 23 patients (46%) had pneumonia, 16 patients (32%) had sepsis, 9 patients (18%) had pancreatitis, 1 patient (2%) had major surgery, and 1 patient (2%) had ARDS caused by something else. According to what caused ARDS in group B, 27 patients (54%) had pneumonia, 20 patients (40%) had sepsis, 2 patients (4%) had pancreatitis, 1 patient (2%) had major surgery, and no other patients had ARDS. With a p value of 0.18, there was no statistically significant difference between the two groups in terms of what caused ARDS (3).

Table (3): causes of ARDS in two groups:

cause of ARDSG					
Group A	**Group B**				
Pneumonia	23	46.0%	27	54.0%	0.183
Sepsis	16	32.0%	20	40.0%	
Pancreatitis	9	18.0%	2	4.0%	
Major surgery	1	2.0%	1	2.0%	
Others	1	2.0%	0	0.0%	

#Independent-t test ##Chi-squared test

According to **systolic blood pressure**(**SBP**) there wasn't a statistically significant change in it the mean of SBP1 was 114.8 mmHg (± 17.6 SD), the mean of SBP2 was 117.5mmHg (±13.3 SD), the mean of SBP3 was 120.2 mmHg (± 15.5 SD) with p value (0.1). According to **central venous pressure(CVP)** it decreased significantly the mean of CVP1 was 3.2mmHg (± 4.3 SD), the mean of CVP was 6.4mmHg (±3.73 SD), the mean of CVP3 was 7.5 mmHg (± 3 SD) with p value (0.0001). According to **systolic blood pressure**(**SBP**) there wasn't a statistically significant change the mean of SBP1 was 119 mmHg (±21.9SD), the mean of SBP2 was 115 mmHg (±11.5 SD), the mean of SBP3 was 113.3 mmHg (±20.6 SD) with p value (0.1). According to **mean arterial pressure (MAP)** there wasn't a statistically significant change the mean of MAP1 was 88.4 mmHg (±15.8SD), the mean of MAP2 was 84.3 mmHg (±9.2SD), the mean of MAP3 was 87.1 mmHg (± 12.5 SD) with p value (0.1). We found there were statistically difference between two group as regard heart rate (HR3) and respiratory rate(RR3) it decreased significantly in group A than group B with p value (0.0001) table (5) fig (9: A&B). **Table (4)**

Table (4): Comparison of hemodynamic variables after 8hours of start of new mode of mechanical ventilation and after 24 hours then after 3 days of mechanical ventilation among two groups

		Group A (N=50)		**Group B (N=50)**		**P-value#**
		Mean	**SD**	**Mean**	**SD**	
SBP (systolic blood pressure)	**SBP1**	114.8	17.6	119	21.9	0.293
	SBP2	117.5	13.3	115	11.5	0.325
	SBP3	120.2	15.5	113.3	20.6	0.060

P-value##		0.108		0.193		
DBP (Diastolic blood pressure)	**DBP1**	70.8	12.3	74.4	14.2	0.177
	DBP2	72.7	8.6	70.8	10.1	0.314
	DBP3	75	10.9	72.4	12	0.261
P-value##		0.110		0.169		
MAP (Mean arterial blood pressure)	**MAP1**	85.3	13.7	88.4	15.8	0.298
	MAP2	85.2	10.4	84.3	9.2	0.649
	MAP3	89.5	12.7	87.1	12.5	0.346
P-value##		0.106		0.103		
HR (Heart rate)	**HR1**	115.2	10.8	115.3	10.8	0.956
	HR2	98.8	10	101.5	12.3	0.239
	HR3	85.7	9.9	95.7	12	**<0.0001***
P-value##		**<0.0001***		**<0.0001***		
RR (Respiratory rate)	**RR1**	26.7	4.2	26.5	4.2	0.757
	RR2	20.7	3.5	20.2	3.3	0.522
	RR3	15.9	3.1	20.2	2.9	**<0.0001***
P-value##		**<0.0001***		**<0.0001***		
CVP (central venous pressure)	**CVP1**	3.2	4.3	4.8	5.9	0.127
	CVP2	6.4	3.7	7.4	4.9	0.242
	CVP3	7.5	3	7.4	3.7	0.859
P-value##		**<0.0001***		**<0.0001***		

#Independent-t test ##Repeated measures ANOVA *Significant

There was high statistically significant difference between two studied groups as regard, Vtml/kg PBW (3) it low in group B than A with P value (0.0001) table (7) fig (11: A) &plateau pressure (3) it lower in group A than group B with P value (0.02) table (7) fig (11: B) & peak pressure (1) and peak pressure (2) it higher in group A than B with p value (0.001) table (7) fig(11:C) & P mean pressure (2) it higher in group A than group B with P value (0.0001) table (7) fig (11: D) and MV3. with higher in group B than group A with P value (0.0001) table (5).

Table (5) Mechanical ventilation parameter:

		Group A (N=50)		**Group B (N=50)**		**P-value#**
		Mean	**SD**	**Mean**	**SD**	
Vt (tidal volume)	**Vt ml(1)**	437.9	58.4	445.6	39.4	0.441
	Vt ml(2)	437.4	63.7	417.7	52.9	0.095
	Vt ml (3)	444.6	27.3	426.2	60.8	0.053
P-value##		0.633		**0.002***		
Vt ml/kg	**Vt ml/kg PBW1**	6.5	0.8	5.9	0.5	**<0.0001***
	Vt ml/kg PBW2	6.5	0.7	5.2	0.9	**<0.0001***
	Vt ml/kg PBW3	6.6	1	5.4	1.3	**<0.0001***
P-value##		0.749		**<0.0001***		
Plateau Pressure	**Plateau(1)**	29.4	3.9	27.7	3.3	**0.026***
	Plateau(2)	26.9	4.8	26.5	3.9	0.648
	Plateau(3)	22.3	5.6	25.2	6.7	**0.021***
P-value##		**<0.0001***		**0.015***		
Static Compliance	**C static(1)**	32.3	10.1	32.5	9.6	0.903
	C Static(2)	38	9.7	36	11.2	0.328
	C static (3)	48.1	15.3	41.4	19.1	0.057
P-value##		**<0.0001***		**<0.0001***		
Peak Pressure	**P Peak (1)**	31.3	3.4	28.8	2.5	**<0.0001***
	P Peak (2)	29.8	4.2	26.8	4.2	**0.001***

	P Peak (3)	26.2	3.8	26.2	6.5	1.000
P-value##		**<0.0001***		**0.004***		
Mean airway pressure	**P mean(1)**	19.2	2.6	17.7	4	**0.022***
	P mean (2)	22.9	2.4	18.4	3.1	**<0.0001***
	P mean(3)	19.3	3.4	18.3	3.9	0.173
P-value##		**<0.0001***		0.309		
Minute Ventilation	**MV(1)**	11	1.9	10.8	1.9	0.539
	MV(2)	9	1.2	8.7	1.4	0.293
	MV(3)	7.4	1.6	8.6	1.4	**<0.0001***
P-value##		**<0.0001***		**<0.0001***		

#Independent-t test ##Repeated measures ANOVA *Significant

In group A, according to lung injury score at 1st day (LIS 1), the mean was 2.4 (± 0.3 SD), according to lung injury score at 3rd day (LIS 1), the mean was 2.2 (± 0.6 SD). tablet (9) fig (13). In group B, according to lung injury score at 1st day (LIS 1), the mean was 2.1 (± 0.4 SD), according to lung injury score at 3rd day (LIS 1), the mean was 2.3 (± 0.5 SD) Table (9) fig (13). There was statistically significant difference between studied cases as regard lung injury score tablet (6).

Table (6): Lung injury score

		Group A (N=50)		**Group B (N=50)**		**P-value#**
		Mean	**SD**	**Mean**	**SD**	
LIS	**LIS 1**	2.4	0.3	2.1	0.4	**0.001***
	LIS 3	2.2	0.6	2.3	0.5	0.223
P-value##		**0.041***		**0.001***		

#Independent-t test ##Paired t test *Significant

*LIS (1): lung injury score at first day.

*LIS (3): lung injury score at third day.

In group Aaccording to pneumothorax complication 9 patients (18%) developed pneumothorax. table (10). In group B according to pneumothorax, 7 patients (14%) developed pneumothorax table (7). There was no statistically significant between two groups.

Table (7): Pneumothorax complication

	Group A (N=50)		**Group B (N=50)**		**P-value#**
	Mean	**SD**	**Mean**	**SD**	
Pneumothorax					
No	41	82.0%	43	86.0%	0.585
Yes	9	18.0%	7	14.0%	

#Mann-Whitney U test ##Chi-squared test *Significant

There was no statistically significance difference in two groups according to outcome. **Table (8)**

Table (8): Outcome

	Group A (N=50)		**Group B (N=50)**		**P-value#**
	Mean	**SD**	**Mean**	**SD**	
Mechanical ventilation days	9.6	4	11	4.2	0.085
	N	**%**	**N**	**%**	**P-value##**
Mortality					

Alive	28	56.0%	22	44.0%	0.230
Died	22	44.0%	28	56.0%	
successful extubation					
No	21	42.0%	28	56.0%	0.161
Yes	29	58.0%	22	44.0%	
Re-intubation					
No	42	84.0%	43	86.0%	0.779
Yes	8	16.0%	7	14.0%	

#Mann-Whitney U test ##Chi-squared test *Significant

There was no significant difference between both groups regarding mortality. **Table (9)**

Table (9): Relation between moderate &severe ARDS and Mortality in both groups

	Group A				**P-value#**	**Group B**				**P-value#**
	Died		**Survived**			**Died**		**Survived**		
	N	**%**	**N**	**%**		**N**	**%**	**N**	**%**	
ARDS (P/F1)										
<100	20	90.9%	4	14.30%	<0.0001*	23	82.10%	3	13.60%	<0.0001*
100-200	2	9.1%	24	85.70%		5	17.90%	19	86.40%	

#Chi-squared test *Significant

In both groups patients who had higher APACHEII score died with p value (0.0001). **Table (10)**

Table (10): Relation between Mortality and APACHE score II in both groups

	Group A				**P-value#**	**Group B**				**P-value#**
	Died		**Survived**			**Died**		**Survived**		
	Mean	**SD**	**Mean**	**SD**		**Mean**	**SD**	**Mean**	**SD**	
APACHE II Score	26.36	5.16	15.36	5.09	<0.0001*	25.93	6.52	17.86	4.59	<0.0001*

#Independent-t test *Significant

In group A: Patients who had lung injury Score (**I)** at the first day2.47 (SD ±0-3) died and patients who had Lung injury score**(I**) 2.26(SD ± 0.31) still alive with p value (0.029). In group B: Patients who had lung injury Score**(I)** at the first day with mean 2.08 (SD±0.41) died and patients who had lung injury score **I** with mean 2.1 (SD±0.38) still alive with p value (0.3) table (11).

Table (11): Relation between Mortality and LIS I in both groups

	Group A				**P-value#**	**Group B**				**P-value#**
	Died		**Survived**			**Died**		**Survived**		
	Mean	**SD**	**Mean**	**SD**		**Mean**	**SD**	**Mean**	**SD**	
LIS I	2.47	0.37	2.26	0.31	0.029*	2.08	0.41	2.1	0.38	0.881

#Independent-t test *Significant

Discussion

Patients hospitalised to the Intensive Care Unit with a diagnosis of ARDS and a need for invasive mechanical ventilation comprised the study population (Fayoum University Hospitals)

No statistically significant age, sex, or chronic disease differences were found between the groups. When comparing the APACHE II scores of the APRV group to the LTV group, there was no statistically significant difference. In addition, no statistically significant differences were found between the groups.

Causes of ARDS

The APRV group saw more rapid decreases in HR, RR, and CVP than the LTV group did, as shown by our research. The average heart rates of those in the APRV group were 115.2 beats per minute, 98.8 beats per minute, and 85.7 beats per minute 8 hours, 24 hours, and 3 days after

randomization, while those in the LTV group averaged 115.3 beats per minute, 101.5 beats per minute, and 95.7 beats per hour, respectively (p .0001). (0.0001)

The APRV group saw a notable reduction in their respiratory rate. There should be a statistically significant difference between the RR1 group's mean of 26.7 breaths per minute and the RR2 group's mean of 20.7 breaths per minute and the RR3 group's mean of 15.9 breaths per minute. The RR1 group in the LTV group averaged 26.5 breaths per minute, the RR2 group averaged 20.2 breaths per minute, and the RR3 group averaged 20.2 breaths per minute (0.0001)

This is consistent with the findings of Zhou et al. (6), who found a substantial ($p < 0.05$) improvement in HR and RR between the APRV and LTV groups (p value 0.001).

Consistent with our findings, Mc Mullen., et al. (7) reviewed the literature on medical, cardiac, surgical, and trauma patients and concluded that APRV was the optimal method of ventilation for ARDS because it improved hemodynamics and decreased the need for vasopressors and inotropes.

In addition, Daoud (8) observed that compared to standard breathing, APRV mode resulted in better hemodynamics and organ perfusion (urine output and mesenteric circulation).

Contrarily, Hameed et al. (9) compared APRV and CMV in twenty patients with ALI and observed statistically insignificant changes in hemodynamics parameters (heart rate, mean blood pressure, central venous pressure), $P > 0.05$.

PaO2, PaCO2, PaO2/FiO2, HCO3, and FIO2 were all considerably higher in the LTV group after 24 and 3 days (all p 0.0001) (P 0.0001). (Value of p = 0.0001)

There was a statistically significant difference between the two groups, with PaO2(3) being higher in the APRV group compared to the LTV group (p = 0.003), FiO2(3) being lower in the APRV group compared to the LTV group (p = 0.003), and PaO2/FiO2(3) being higher in the APRV group compared to the LTV group (p = 0.003). (p value 0.001).

Zhou et al. (6) reported results that are consistent with this. They discovered that the APRV group had greater increases in arterial oxygenation index (PaO2/FIO2) than the LTV group (p value 0.001)

Hussein et al. (10) found that mechanical breathing improved survival in individuals with ARDS. The following variables were assessed and compared after 1 hour, 6 hours, and 24 hours. After 1 hour, both groups had decreased pH, increased PaCO2, and increased PaO2/FiO2. Group LTV had a considerably higher pH and lower PaCO2 after 1h and up to 24h of ventilation. At no time did one group have significantly more oxygen available to them than the other.

Our results indicated that the APRV group had a considerably greater tidal volume (VT/ml/Kg) than the LTV group after 8 hours, 24 hours, and 3 days of ventilation (p value .05). (0.0001).

After 1 hour, 6 hours, and 24 hours of ventilation, Hussein et al. (10) showed that the APRV group had a considerably greater tidal volume than the LTV group (p value 0.05).

Results from our research showed that from day 1 to day 3, the APRV group saw statistically significant reductions in plateau pressure (p 0.0001), peak pressure (p 0.0001), mean pressure (p 0.0001), static compliance (p 0.0001), and minute breathing (p 0.0001).

Plateau pressure decreased (p=0.015), peak pressure decreased (p=0.004), static compliance increased (p=0.0001), and minute ventilation decreased (p0.0001).

When comparing the APRV group to the LTV group, the APRV group exhibited lower plateau pressure (p = 0.02), higher mean pressure (p = 0.0001), and lower minute ventilation (p = 0.0001). Static compliance was similar across the two groups.

P peak and P plat values were found to be considerably lower in the APRV group compared to the LTV group by Zhou et al. (6). (P value 0.01).

This is consistent with the claims that with APRV, the patient's own attempts to breathe increase alveolar ventilation and CO2 removal, and that the patient's periodic releases to P low may result in lower peak and plateau pressures for a given tidal volume than in traditional modes (6).

Within a limited physiological range, APRV produces greater mean airway pressure than traditional modes because to the longer time spent in inspiration induced by the inverted I.E. ratio. When the PAH is increased, the LVM grows and the PO2 rises (11).

According to research by Zhou et al. (6), there is a significant difference in the static compliance p value between the two groups (0.001).

Static compliance was shown to be same for both groups at all times by Hussein et al. (10).

Results from our research demonstrated a statistically significant variation in sedation levels across the groups we compared. Group APRV had less sedative than Group LTV (p value 0.0001).

According to research conducted by Zhou et al. (6), those who were given APRV had much less sedation than those who were given LTV (P 0.05).

Data from our investigation indicated that there were considerable variations between the groups. Physiological markers improved more rapidly in patients treated with APRV than in those treated with LTV ventilation; for example, the lung damage score decreased in the APRV group on day 3 (p = 0.04), while it increased in the LTV group (p = 0.001).

This is consistent with the findings of Zhou et al. (6), who discovered that patients treated with APRV had a lower lung damage score than those treated with LTV (0.05)

The risk of pneumothorax complications was similar throughout the populations we studied.

In our research, individuals treated with APRV required mechanical ventilation for a shorter period of time than those treated with LTV [9.6 days (4 SD) vs. 11 days (4.2SD)]. This difference, however, did not reach statistical significance.

This study's findings suggest that, compared to the LTV method, APRV may be utilised safely in ARDS patients, improving clinical, physiological, and respiratory parameters more quickly and with less adverse effects on blood flow. It has a more rapid and greater effect on improving oxygenation, respiratory mechanics, and systemic decompensation.

Conclusion

The findings demonstrate that APRV is safe for treatment in ARDS, improving clinical, physiological, and respiratory parameters more quickly than LTV with less adverse effects on blood flow. It expedites and enhances the parameters of oxygenation, breathing mechanics, and systemic decompensation. Benefits include decreased need for sedation, improved communication between ventilators, less time on mechanical breathing, and less stay in the intensive care unit. Last but not least, it achieves better outcomes than the LTV technique in terms of reduced mortality rates, but this finding was not statistically significant.

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