

Table 1: Comparison between NIV success and failure groups regarding demographic data

Variable	Total N=126	NIV Success group N=79	NIV Failure group N=47	P value
Age/year				
Mean \pm SD	57.76 \pm 13.37	49.38 \pm 8.91	71.85 \pm 5.27	<0.0001
(range)	(29-82)	(29-62)	(64-82)	
Gender				
Female	62 (49.21%)	38 (48.10%)	24 (51.06%)	0.75
Male	64 (50.79%)	41 (51.90%)	23 (48.94%)	
Pregnancy				
No	58 (93.54%)	34 (89.47%)	24 (100%)	0.29
Yes	4 (6.45%)	4 (10.50%)	0	
BMI				
Mean \pm SD	24.33 \pm 1.38	24.27 \pm 1.32	24.43 \pm 1.50	0.55
(range)	(20.91-27.21)	(20.91-27.21)	(20.91-27.21)	

*NIV: Non-invasive ventilation**BMI: Body mass index*

Table 2: Comparison between NIV success and failure groups regarding the clinical criteria

Variable No (%)	Total No (126)	NIV Success No (79)	NIV Failure No (47)	P value
Pneumonia				
Bacterial	49 (38.89%)	29 (36.71%)	20 (42.55%)	0.01
Viral	77 (61.11%)	50 (63.29%)	27 (57.45%)	
Causative organism				
K. Pneumoniae	12 (9.52%)	5 (6.33%)	7 (14.89%)	0.03
MRSA	9 (7.14%)	3 (3.80%)	6 (12.77%)	
MSSA	10 (7.94%)	7 (8.86%)	3 (6.38%)	
Pneumococci	18 (14.29%)	14 (17.72%)	4 (8.51%)	
Influenza virus	7 (5.56%)	2 (2.53%)	5 (10.64%)	
SARS-COV-2	70 (55.56%)	48 (60.76%)	22 (46.81%)	
ARDS severity				
Mild	50 (39.60%)	38 (48.10%)	12 (25.53%)	<0.0001
Moderate	57 (45.24%)	38 (48.10%)	19 (40.43%)	
Severe	19 (15.08%)	3 (3.80%)	16 (34.04%)	
Septic shock				
No	109 (86.51%)	72 (91.14%)	37 (78.72%)	0.04
Yes	17 (13.49%)	7 (8.86%)	10 (21.28%)	
DM				
No	104 (82.54%)	68 (86.08%)	36 (76.60%)	0.18
Yes	22 (17.46%)	11 (13.92%)	11 (23.40%)	
Hypertension				
No	114 (90.48%)	74 (93.67%)	40 (85.11%)	0.13
Yes	12 (9.52%)	5 (6.33%)	7 (14.89%)	

ARDS: Acute respiratory distress syndrome

DM:

Diabetes mellitus

MRSA: methicillin resistant staphylococcus aureus

MSSA: methicillin sensitive staphylococcus aureus

SARS-COV-2: severe

acute respiratory syndrome coronavirus 2

Table 3: Baseline clinical parameters of studied patients in relation to NIV outcome

Variable	Total N=126	NIV Success N=79	NIV Failure N=47	P value
GCS Mean ± SD (range)	14.21±0.91 (12-15)	14.61±0.63 (13-15)	13.55±0.93 (12-15)	<0.0001
Heart rate (bpm) Mean ± SD (range)	114.39±11.67 (110-154)	107.33±8.59 (89-125)	126.26±11.67 (110-154)	<0.0001
SBP (mmHg) Mean ± SD (range)	106.07±21.82 (40-150)	113.86±17.63 (60-150)	92.98±22.08 (40-120)	<0.0001
DBP (mmHg) Mean ± SD (range)	66.23±16.18 (20-80)	70.57±14.46 (20-95)	58.94±16.45 (20-80)	0.0001
Respiratory rate (cpm) Mean ± SD (range)	34.50±6.41 (23-60)	30.68±3.10 (23-38)	40.94±5.28 (34-60)	<0.0001
Temperature (°C) Mean ± SD (range)	37.46±2.90 (36.4-39)	37.71±0.78 (36-39)	37.68±0.81 (36.5-39)	0.81
Patrick scale Mean ± SD (range)	1.51±1.29 (0-4)	0.67±0.55 (0-2)	2.91±0.90 (1-4)	<0.0001

*GCS: Glasgow Coma Scale
Diastolic blood pressure
per minute*

*SBP: Systolic blood pressure
bpm: beat per minute
°C: degree Celsius*

*DBP:
cpm: cycle*

Table 4: Baseline ABG parameters in relation to NIV outcome

Variable	Total N=126	NIV Success N=79	NIV Failure N=47	P value
pH				
Mean ± SD	7.45±0.05	7.45±0.05	7.44±0.05	0.30
(range)	(7.35-7.59)	(7.35-7.59)	(7.36-7.5)	
SaO₂ (%)				
Mean ± SD	80.47±4.19	81.47±3.40	78.79±4.86	0.004
Median (range)	(68-86)	(71-86)	(68-86)	
PaO₂ (mmHg)				
Mean ± SD	47.53±3.78	48.42±3.20	46.04±4.21	0.005
(range)	(38-53)	(40-53)	(38-53)	
PaCO₂ (mmHg)				
Mean ± SD	32.02±4.52	31.96±4.57	32.11±4.47	0.86
(range)	(24-40)	(24-40)	(25-40)	
P/F ratio				
Mean ± SD	94.75±7.38	96.44±6.43	91.89±8.04	0.0007
(range)	(76-107)	(80-107)	(76-107)	
HCO₃⁻ (mEq/L)				
Mean ± SD	23.37±2.37	23.27±2.39	23.55±2.37	0.51
(range)	(20-27)	(20-27)	(20-27)	

*ABG: Arterial blood gas**pH: Power of Hydrogen ion**SaO₂: Oxygen saturation of arterial blood**HCO₃⁻: Bicarbonate ions**PaO₂:**Partial pressure of oxygen O₂ in arterial blood**PaCO₂: Partial pressure of carbon dioxide CO₂ in arterial blood**P/F ratio: Ratio of pressure of O₂ in arterial blood PaO₂ to fraction of inspiratory oxygen concentration FiO₂*

Table 5: APACHE II score, 1st, 2nd and 3rd day SOFA score in relation to NIV outcome

Variable	Total N=126	NIV Success N=79	NIV Failure N=47	P value
APACHE II score				
Mean ± SD	23.33±4.77	20.30±2.53	28.43±2.96	<0.0001
(range)	(17-33)	(17-26)	(23-33)	
SOFA score on 1st day				
Mean ± SD	2.52±1.54	1.66±0.77	3.96±1.44	<0.0001
(range)	(2-8)	(1-4)	(2-8)	
SOFA score on 2nd day				
Mean ± SD	0.93±1.36	0.52±0.60	4.56±0.53	<0.0001
(range)	(0-5)	(0-2)	(4-5)	
SOFA score on 3rd day				
Mean ± SD	0.38±0.90	0.23±0.45	4.33±0.58	0.0001
(range)	(0-5)	(0-2)	(4-5)	
SOFA score before weaning				
Mean ± SD		0.20±0.40		
(range)		(0-1)		

APACHE II: Acute physiology and chronic health evaluation

SOFA: Sequential organ failure assessment

Table 6: Baseline laboratory investigations in relation to NIV outcome:

Variable	Total N=126	NIV success N=79	NIV Failure N=47	P value
WBCs (thousand/cc) Mean ± SD (range)	14.46±10.43 (3.5-40)	12.85±9.27 (3.5-36)	17.16.5±11.74 (3.8-40)	0.06
HGB (gm/dl) Mean ± SD (range)	12.53±1.77 (3.5-16)	12.39±1.92 (3.5-15)	12.76±1.47 (9.8-16)	0.26
PLTs (thousand/cc) Mean ± SD (range)	375.12±122.75 (152-678)	358.0±116.84 (158-625)	403.9±128.2 (152-678)	0.09
Creatinine (mg/dl) Mean ± SD (range)	1.19±0.76 (0.4-4)	1.01±0.50 (0.4-2.8)	1.49±1.0 (0.4-4)	0.002
Na⁺ (mEq/L) Mean ± SD (range)	134.88±7.00 (120-147)	135.2±6.72 (120-147)	134.34±7.49 (120-147)	0.51
K⁺ (mEq/L) Mean ± SD (range)	3.67±0.84 (1.9-5.1)	3.64±0.84 (1.9-5.1)	3.72±0.85 (2.4-5.1)	0.60
Ca²⁺ (mmol/L) Mean ± SD (range)	1.0±0.11 (0.8-1.2)	1.00±0.11 (0.8-1.2)	0.995±0.11 (0.8-1.2)	0.75
AST (IU/L) Mean ± SD (range)	31.70±10.47 (15-52)	33.47±10.57 (15-52)	28.74±9.72 (15-51)	0.05
ALT (IU/L) Mean ± SD (range)	34.52±11.72 (15-52)	34.00±11.00 (20-52)	35.40±10.28 (15-52)	0.48
Total bilirubin (mg/dl) Mean ± SD (range)	1.25±0.42 (0.5-2.5)	1.21±0.38 (0.6-2.5)	1.31±0.47 (0.5-2.5)	0.28
Albumin (g/dl) Mean ± SD (range)	3.73±0.57 (2.5-5)	3.86±0.56 (2.7-5)	3.52±0.53 (2.5-4.3)	0.001
Total protein (g/dl) Mean ± SD (range)	6.21±0.45 (5.5-7)	6.22±0.47 (5.5-7)	6.18±0.43 (5.5-6.8)	0.61
CRP (mg/dl) Mean ± SD (range)	70.96±37.01 (18-154)	58.46±30.69 (20-140)	91.98±37.48 (18-154)	<0.0001

WBCs: White blood cells.

Na: serum sodium ions.

calcium ions.

Alanine transaminase.

HGB: Hemoglobin.

K: serum potassium ions.

AST: Aspartate transaminase.

CRP: C reactive protein.

PLTs: Platelets.

Ca: serum

ALT:

Table 7: Time of NIV failure

Time of NIV failure (hour)	Number (%)
2	20 (42.55%)
6	6 (12.77%)
12	13 (27.66%)
24	4 (8.51%)
48	3 (6.38%)
72	1 (2.13%)

Table 8: Causes of NIV failure

Causes of NIV failure	Number (%)
Refractory hypoxemia	23 (48.94%)
Excessive work of breathing	12 (25.53%)
Hemodynamic instability	9 (19.15%)
DCL (GCS<12)	3 (6.38%)

DCL: Disturbed conscious level

GCS: Glasgow coma scale

Table 9: Relation between time of NIV failure and cause of failure

Causes of NIV failure	Number	Time of NIV failure	
		Time/hour	Number (%)
Refractory hypoxemia	23	2	19 (82.61%)
		6	3 (13.04%)
		12	1 (4.35%)
Excessive work of breathing	12	6	3 (25.00%)
		12	9 (75.00%)
Hemodynamic instability	9	2	1 (11.11%)
		12	3 (33.33%)
		24	3 (33.33%)
		48	2 (22.22%)
DCL (GCS<12)	3	24	1 (33.33%)
		48	1 (33.33%)
		72	1 (33.33%)

DCL: Disturbed conscious level

GCS: Glasgow coma scale

Table 10: MV duration and ICU length of stay in relation to NIV outcome

Variable	Total N=126	NIV Success N=79	NIV Failure N=47	P value
Duration of mechanical ventilation in days Mean ± SD (range)	5.96±3.28 (2-14)	3.81±1.37 (2-7)	9.60±2.15 (6-14)	<0.0001
ICU Length of stay Mean ± SD (range)	7.62±3.06 (4-16)	5.73±1.32 (4-9)	10.78±2.47 (6-16)	<0.0001