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Section 1 Averaged ventilatory and biochemical data by time-point group

Variables	Day 1 n = 83	Day 2-4 n = 73	p-value
VT, ml	500 (450-550)	500 (485-562)	0.43
VT-PBW, ml/kg	7.6 (6.8-8.8)	7.6 (6.9-8.7)	0.92
MV, L/min	7.0 (6.2-9.0)	7.8 (6.6-9.7)	0.10
RR, Breaths/min	14 (12-16)	14 (12-17)	0.15
PIP, cmH ₂ O	20 (18-24)	22 (18-25)	0.78
PEEP, cmH ₂ O	5 (5-7)	5 (5-9)	0.0360
FiO ₂	0.35 (0.3-0.5)	0.3 (0.25-0.4)	0.0217
PaO ₂ , mmHg	102 (83-137)	81 (74-97)	0.06
PaCO ₂ , mmHg	40 (36-45)	39 (36-43)	0.91
pH	7.37 (7.32-7.41)	7.41 (7.38-7.44)	0.0002
Bicarbonate, mmol/L	23 (20-26)	26 (23-28)	0.0002

Section 1 Legend

VT = tidal volume, VT-PBW = tidal volume per kilogram predicted body weight, MV = minute ventilation, RR = respiratory rate, PIP = peak inspiratory pressure, PEEP = positive end-expiratory pressure, FiO₂ = fraction of inspired oxygen, PaO₂ = partial pressure of arterial oxygen, PaCO₂ = partial pressure of arterial carbon dioxide

Section 2

Univariate associations between selected variables and tidal volume per predicted body weight using linear regression analysis

Variable	β co-efficient	Standard error	95% CI	p-value
Sex	-0.46	0.28	-1.0 to 0.94	0.10
Height	-0.05	0.14	-0.08 to -0.02	<0.0001
Age	0.008	0.01	-0.1 to 0.28	0.43
APACHE II	0.007	0.008	-0.009 to 0.02	0.39
Hospital type	0.04	0.29	-0.53 to 0.62	0.88
Admission type	-0.16	0.27	-0.70 to 0.37	0.55
Admitting team	-0.14	0.27	-0.68 to 0.40	0.60
Hypercapnia contraindication	0.53	0.28	-0.03 to 1.08	0.06
Neurology	-1.32	0.64	-2.6 to -0.05	0.042

Section 2 Legend

95% CI = 95% confidence interval

Section 3

Baseline characteristics by hypercapnia group

Variable	HPA n = 53	HPC n = 64	p-value
Age (years)	63 (45 - 76)	62 (53 - 69)	0.83
Male (%)	64	64	0.99
Height (cm)	170 (164 - 179)	172 (165 - 177)	0.88
Actual Body Weight (kg)	80 (65 - 90)	85 (66 - 98)	0.33
Ideal Body Weight (kg)	63 (57 - 74)	66 (57 - 72)	0.93
Body Mass Index (kg/m ²)	26 (25 - 31)	29 (24 - 34)	0.36
APACHE II	20 (13 - 33)	24 (17 - 39)	0.25
Hospital type (%)			
Tertiary/Teaching	72	77	0.55
Admission type (%)			
Unplanned	70	52	0.045
Parent specialty (%)			
Medical	57	39	0.06

Section 3 Legend

HPA = Hypercapnia potentially physiologically acceptable, Hypercapnia potentially physiologically contraindicated = HPC, CAP = community acquired pneumonia

Section 4

Initial ventilatory and biochemical data by hypercapnia group

Variables	HPA, n = 53	HPC, n = 64	p-value
Ventilatory Mode			0.54
VCV (%)	4	11	
SIMV – VC (%)	75	63	
SIMV – PC (%)	13	18	
PCV (%)	6	9	
VT 500ml (%)	41	30	0.26
VT-PBW (%)			0.024
< 8ml/kg	81	51	
8.1 - 9ml/kg	11	30	
9.1-10ml/kg	8	13	
>10ml/kg	0	3	
VT, ml	500 (450-500)	500 (450-600)	0.09
VT-PBW, ml/kg	7.3 (6.9-7.9)	8 (6.9-8.9)	0.06
MV, L/min	7.1 (6.2-9.1)	7.0 (6.3-8.9)	0.79
RR, Breaths/min	14 (12-17)	15 (12-17)	0.62
PIP, cmH ₂ O	19 (15-25)	22 (19-23)	0.10
PEEP, cmH ₂ O	5 (5-7)	5 (5-6)	0.90
FiO ₂	0.3 (0.25-0.4)	0.35 (0.3-0.5)	0.0419
PaO ₂ , mmHg	93 (76-112)	99 (80-143)	0.0145
PaCO ₂ , mmHg	40 (36-43)	41 (36-45)	0.69
pH	7.4 (7.37-7.44)	7.37 (7.31-7.41)	0.0086
Bicarbonate, mmol/L	24 (23-27)	23 (18-26)	0.0171

Section 4 Legend

HPA = Hypercapnia potentially physiologically acceptable, Hypercapnia potentially physiologically contraindicated = HPC, VT = tidal volume, VT-PBW = tidal volume per kilogram predicted body weight, MV = minute ventilation, RR = respiratory rate, PIP = peak inspiratory pressure, PEEP = positive end-expiratory pressure, FiO₂ = fraction of inspired oxygen, SpO₂ = pulse oximetry oxygen saturation, SaO₂ = arterial oxygen saturation, PaO₂ = partial pressure of arterial oxygen, PaCO₂ = partial pressure of arterial carbon dioxide