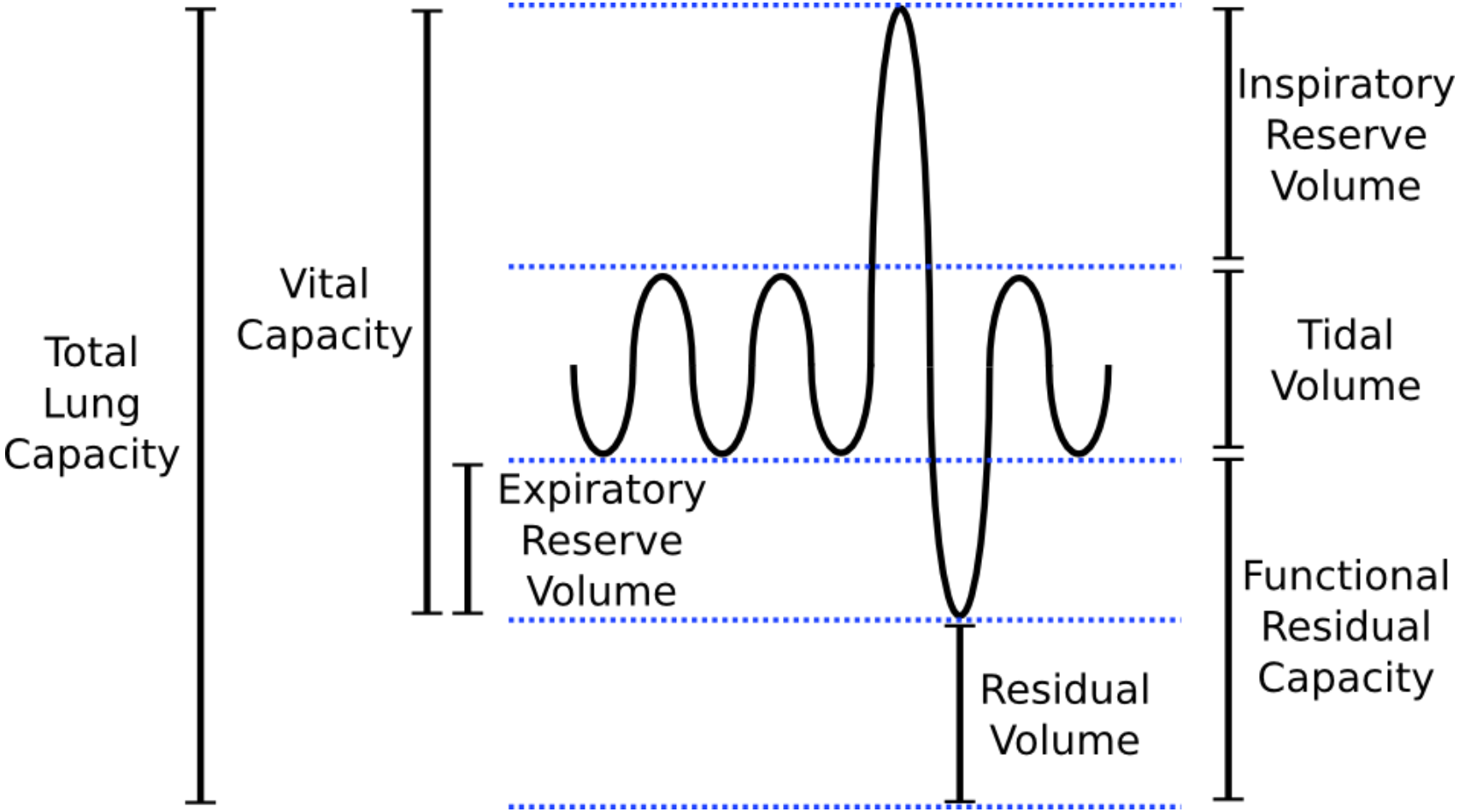
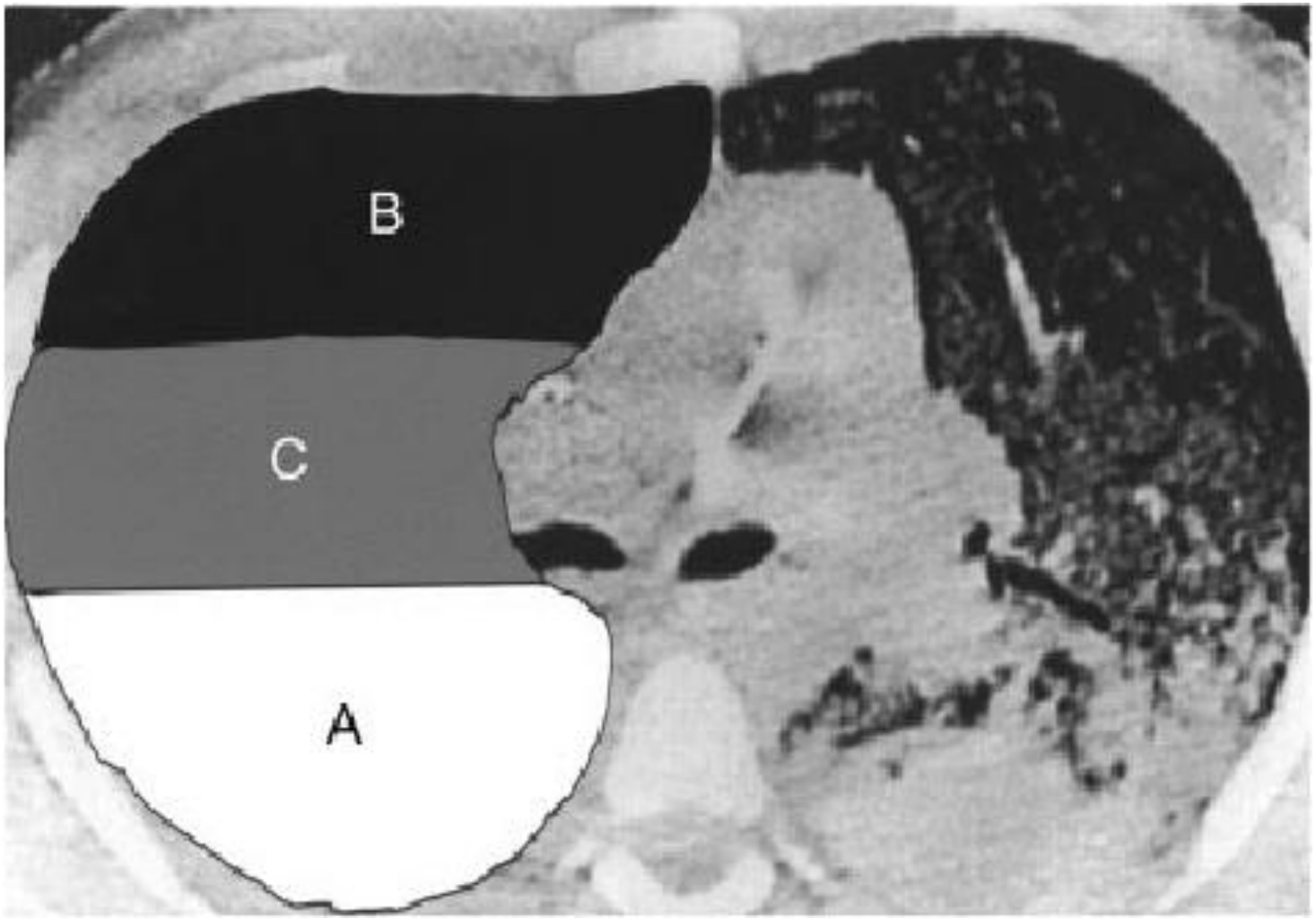
VENTILATION WITH LOWER TIDAL VOLUMES IN PEDIATRIC ARDS

PHYSIOLOGY


Total Lung Capacity
Vital Capacity
Expiratory Reserve Volume
Residual Volume
Inspiratory Reserve Volume
Tidal Volume
Functional Residual Capacity

PATHOLOGY



Acute lung injury in pediatric intensive care in Australia and New Zealand—A prospective, multicenter, observational study*

Design: **Multicenter prospective study during a 12-month period.**

Setting: **Intensive care unit.**

Patients: **Identified patients were followed for 28 days or until death or discharge.**

Pediatr Crit Care Med 2007; 8:317–323

Table 2. Ventilatory variables and their relationship to mortality

	25th Percentile	50th Percentile	75th Percentile	OR	95% CI
PEEP	7	8.5	11	1.25	1.09–1.43
MAP	14	19	22	1.14	1.06–1.23
PIP	25	28	31	1.10	1.02–1.19
$V_{T_{max}}$	7.8	9.3	11.6	0.79	0.66–0.94
$V_{T_{med}}$	6.4	8.0	9.0	0.82	0.67–0.99

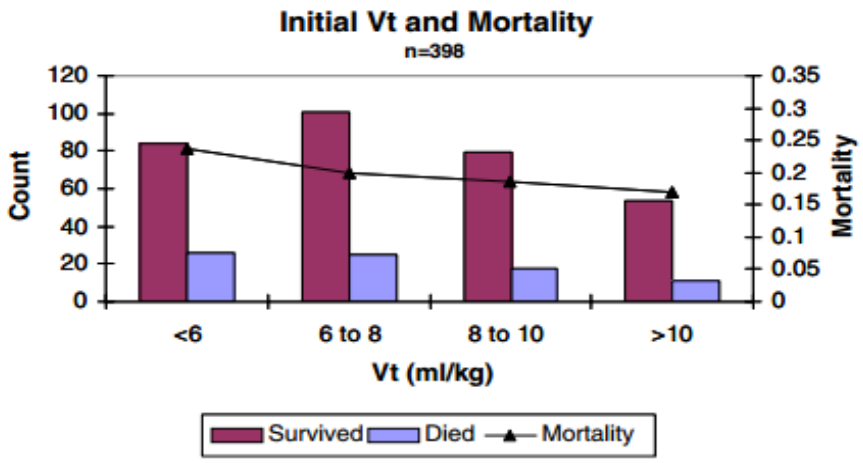
OR, odds ratio; CI, confidence interval; PEEP, positive end-expiratory pressure; MAP, mean airway pressure; PIP, positive inspiratory pressure; $V_{T_{max}}$, maximum tidal volume; $V_{T_{med}}$, median tidal volume.

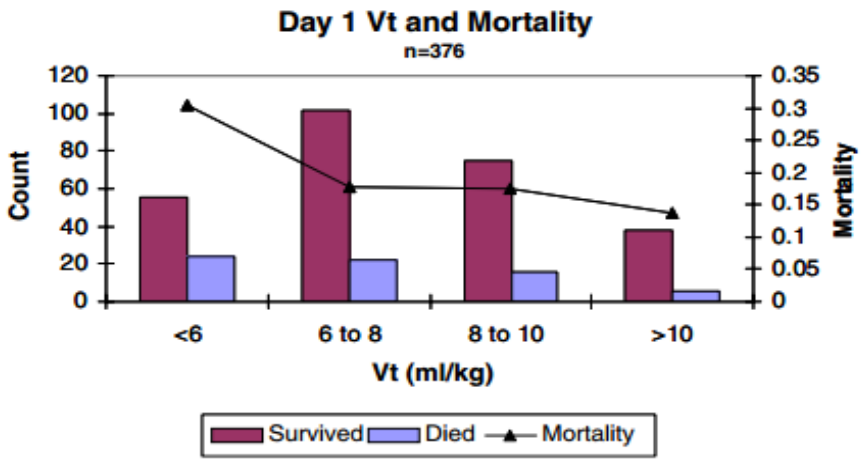
Intensive Care Med (2009) 35:1428–1437
DOI 10.1007/s00134-009-1527-z

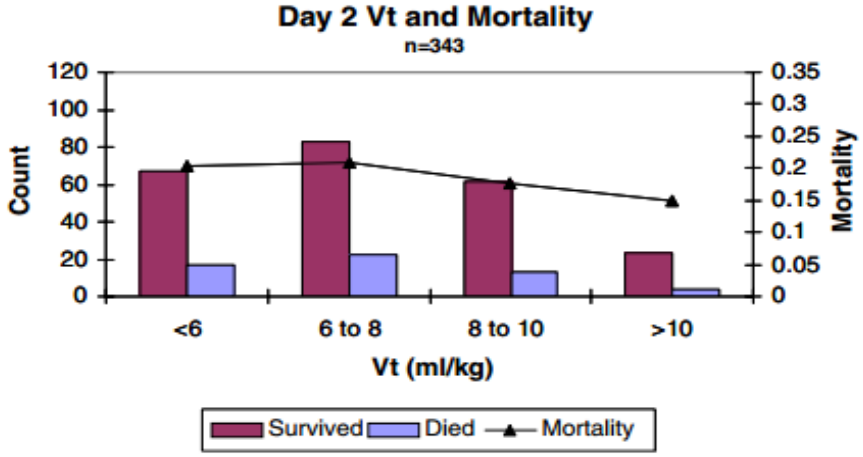
PEDIATRIC ORIGINAL

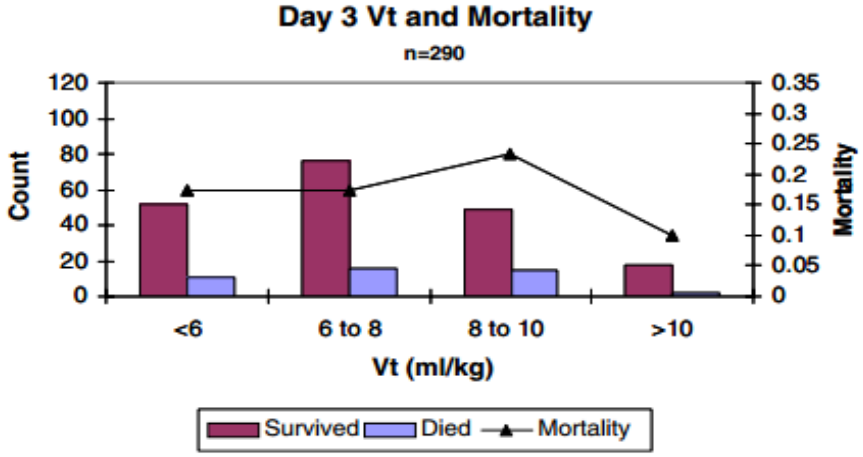
Effect of tidal volume in children with acute hypoxemic respiratory failure

- Retrospective review of all admissions to a tertiary care PICU between January 2000 and July 2007 was conducted.
- 398 endotracheally intubated and mechanically ventilated children with PF ratio \300.
- Outcomes were mortality and 28-day ventilator free days.


Initial Vt and Mortality
n=398
Count
Mortality
120
100
80
60
40
20
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
<6
6 to 8
8 to 10
>10
Vt (ml/kg)
Survived
Died
Mortality


Day 1 Vt and Mortality
n=376
Count
Mortality
120
100
80
60
40
20
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
<6
6 to 8
8 to 10
>10
Vt (ml/kg)
Survived
Died
Mortality


Day 2 Vt and Mortality
n=343
Count
Mortality
120
100
80
60
40
20
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
<6
6 to 8
8 to 10
>10
Vt (ml/kg)
Survived
Died
Mortality


Day 3 Vt and Mortality
n=290
Count
Mortality
120
100
80
60
40
20
0
0.35
0.3
0.25
0.2
0.15
0.1
0.05
0
<6
6 to 8
8 to 10
>10
Vt (ml/kg)
Survived
Died
Mortality

Tidal Volume and Mortality in Mechanically Ventilated Children: A Systematic Review and Meta-Analysis of Observational Studies*

Crit Care Med 2014; 42:2461–2472

TABLE 2. Effect of Tidal Volume Threshold on Mortality

Author (Reference)	< 7 mL/kg		7–8 mL/kg		8–10 mL/kg		10–12 mL/kg		> 12 mL/kg	
	n	Mortality	*n*	Mortality	*n*	Mortality	*n*	Mortality	*n*	Mortality
Albuali et al (9)[a]	8	12.5	12	16.7	53	28.3	67	29.9	19	57.9
Erickson et al (10)[b]	30	43.3	7	42.3	26	27.0	16	25	12	0
Flori (19)[c]	43	16.3	19	21.1	60	18.3	47	25.5	45	35.6
Khemani (22)	168	23.2	68	17.7	97	18.6	35	20	30	13.3
Silva (24)	4	50	6	33.3	14	28.6	24	37.5	1	0
Total	253	24.5	112	20.5	250	22	189	27.5	107	29.0

Conclusions: A relationship between tidal volume and mortality in mechanically ventilated children could not be identified, irrespective of the severity of disease.

Crit Care Med 2014; 42:2461–2472

Ventilatory Support in Children With Pediatric Acute Respiratory Distress Syndrome: Proceedings From the Pediatric Acute Lung Injury Consensus Conference

Peter C. Rimensberger, MD[1]; Ira M. Cheifetz, MD, FCCM[2]; for the Pediatric Acute Lung Injury Consensus Conference Group

Pediatr Crit Care Med 2015; 16:S51–S60

Tidal Volume Delivery

Recommendations:

3.2.1 In any mechanically ventilated pediatric patient, we recommend in controlled ventilation to use tidal volumes in or below the range of physiologic tidal volumes for age/body weight (i.e., 5 to 8 mL/kg predicted body weight [PBW) according to lung pathology and respiratory system compliance. *Weak agreement (88% agreement)*

3.2.2 We recommend to use patient-specific tidal volumes according to disease severity. Tidal volumes should be 3–6 mL/kg PBW for patients with poor respiratory system compliance and closer to the physiologic range (5–8 mL/kg ideal body weight) for patients with better preserved respiratory system compliance. *Weak agreement (84% agreement)*

Pediatr Crit Care Med 2015; 16:S51–S60

CONCLUSION

- Till now, No further randomized controlled trial regarding the effect of tidal volume on the mortality of pediatric patients had been conducted.

- The use of tidal volume is still controversial and current practices usually based on studies extrapolated from the studies on adults.


THE END
THANK YOU FOR YOUR ATTENTION