

PREDICTIVE PRESSURE HEMODYNAMIC MARKERS OF ACUTE KIDNEY INJURY

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Background: A value of Mean Arterial Pressure above 65 mmHg protects the kidney; this is, however, object of debate. Moreover, venous congestion affects kidney function negatively and is not accounted for. As proposed by Bellomo et al., we investigated whether Mean Perfusing Pressure (Mean Arterial Pressure - Central Venous Pressure) is a better prognostic index than Mean Arterial Pressure or Central Venous Pressure to predict Acute Kidney Injury.

Methods: 76 pigs were mechanically ventilated for with a mechanical power ranging from 7,8 J/min to 60,9 J/min for 48 hours. They were retrospectively divided into two groups according to the creatinine measured at the end of the experiment based on the RIFLE definition of Acute Kidney Injury - an increase of 2 times the basal serum creatinine -. Respiratory mechanics, hemodynamics, gas exchange, and fluid balance variables were analysed between groups to detect the best association with kidney failure.

Results: In table 1 we summarize the most relevant physiological variables. As shown, mechanical power, PEEP, fluid balance, and amines infusion were significantly higher in the high creatinine group. The Central Venous Pressure, a possible indicator of vascular congestion, was also higher in the high creatinine group. Although the two groups had different Mean Arterial Pressure, the Mean Perfusing Pressure had the greatest area under the ROC (0.741 vs 0.658) in predicting the outcome. Moreover, Mean Arterial Pressure was consistently above 65 mmHg in the *high creatinine group*.

Conclusions: In the *high creatinine group*, higher Mechanical Power and fluid balance could explain higher levels of Central Venous Pressure, indicating a degree of venous congestion, compared to the *low creatinine group*. Mean Perfusing Pressure, thusly, correlates better with Acute Kidney Injury than Mean Arterial Pressure or Central Venous Pressure.

Table 1

Variable	Low Creatinine group N = 48¹	High Creatinine group N = 28¹	p-value²
Mechanical power [J/min]	21 (10)	26 (10)	0,026
PEEP [cmH ₂ O]	10 (7)	15 (8)	0,014
Mean Airways Pressure [cmH ₂ O]	16 (6)	23 (9)	0,001
Mean Arterial Pressure [mmHg]	73 (7)	70 (7)	0,022
Mean Perfusing Pressure [mmHg]	64 (8)	57 (7)	<0.001
Central Venous Pressure [mmHg]	9.7 (4.1)	12.8 (5.0)	0,005
Fluid balance indexed [ml/Kg]	132 (92)	226 (185)	0,041
Amines indexed [mcg/h/Kg]	208 (259)	741 (753)	<0.001

¹ Mean (SD)

² Wilcoxon rank sum exact test; Wilcoxon rank sum test