USEFULNESS OF BISPECTRAL INDEX DURING CARDIOPULMONARY RESUSCITATION:

AN EXPERIMENTAL STUDY

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Purpose of study: Currently, there are no objective monitoring methods available to gauge the effectiveness of advanced life support for cerebral resuscitation.

We assessed the usefulness of measuring brain electrical activity by means of bispectral index system monitoring (BIS) as a marker for cerebral protection during cardiopulmonary resuscitation (CPR).

Methods: Twenty three Landrace x Large-White pigs underwent cardiac arrest (CA) by ventricular fibrillation. Advance life support was initiated after 5 minutes of CA with mechanical chest compressions (LUCAS) and mechanical ventilation. ECG, mean invasive arterial pressure (MAP), cardiac output by Swan-Ganz catheter, BIS and end-tidal CO₂ (ETCO₂) were measured before CA and every two minutes during resuscitation until 30 minutes post-CA. Data were analysed with SPSS statistical software v24. Sensitivity, specificity and area under the ROC curve were calculated.

Results: Twenty animals (87%) reached return of spontaneous circulation (ROSC). A BIS value < 30 was maintained, between 14 and 30 minutes, in 3 animals who did not achieve ROSC, with high sensitivity and specificity rates. Animals which did not present ROSC maintained MAP < 40 mmHg from 16 minute post-CA, and ETCO₂ < .15 mmHg from 18 minute post-CA. A potential correlation ($r^2 > 0.7$) was found between the values of BIS, MAP and ETCO₂

BIS <30 / No ROSC

	2 min	4 min	6 min	8 min	10 min	12 min	14 min	16 min	18 min	20 min	22 min	24 min	26 min	28 min	30 min
Sensitivity	<0,7	<0,7	<0,7	<0,7	<0,7	<0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7
Specificity	<0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7	>0,7

Conclusions: - In our experimental model BIS monitoring values < 30 showed correlation with low values of MAP, ETCO₂ and suggest the importance of BIS as a marker of survival during CPR.

- Further studies are needed to support these results.