



Skranes, J. H., Løhaugen, G., Schumacher, E. M., Osredkar, D., Server, A., Cowan, F. M., ... Thoresen, M. (2017). Amplitude-integrated electroencephalography improves the identification of infants with encephalopathy for therapeutic hypothermia and predicts neurodevelopmental outcomes at 2 years of age. *Journal of Pediatrics*, 187, 34-42. <https://doi.org/10.1016/j.jpeds.2017.04.041>

Peer reviewed version

Link to published version (if available):
[10.1016/j.jpeds.2017.04.041](https://doi.org/10.1016/j.jpeds.2017.04.041)

[Link to publication record in Explore Bristol Research](#)
PDF-document

University of Bristol - Explore Bristol Research

General rights

This document is made available in accordance with publisher policies. Please cite only the published version using the reference above. Full terms of use are available:
<http://www.bristol.ac.uk/pure/about/ebr-terms>

Table 1. Early clinical and 2-year outcome data divided into 3 groups according to their aEEG pattern at around six hours postnatal age

			CNV (n=15)	DNV (n=18)	SEVP (n=14)	CNV vs DNV	DNV vs SEVP
	Gestational age weeks	M(IQR)	39.7(38-41.1)	40.4(38.9-41.1)	39.6(38.6-39.9)	NS	NS
	Birthweight kg	M(IQR)	3.08(2.72-3.74)	3.56(3.15-3.89)	3.4(3.15-3.67)	NS	NS
Resuscitation	CPR during resuscitation	n=	4	3	11	NS	0.001
	Adrenalin during resuscitation	n=	1	0	8	NS	0.001
Physiological criteria	Apgar 10	M(IQR)	5(5,6)	5(4.3,6)	4(1,6.3)	NS	NS
	pH 1st hour	M(IQR)	6.89(6.86-6.99)	6.99(6.87-7.11)	6.91(6.83-7.09)	NS	NS
	BE 1st hour (mmol/L)	M(IQR)	17.9(13.6-19.2)	17.6(11.93-20.23)	15(12.3-18.9)	NS	NS
	Ventilation at 10 mins	% of n	73%	82%	93%	NS	NS
Neurological criteria	HIE grade I, II or III for each aEEG group		I:n= 2	I:n= 1	I:n= 1	NA	NA
			II:n=12	II:n=14	II:n= 6	NA	NA
			III:n= 1	III:n= 3	III:n= 7	NA	NA
Clinical data	*Lactate ≤5mmol/L	M(IQR)	8.1(4.4-12.3)	4.1(2.4-13.2)	8.38(6.3-22.7)	NS	0.037
	Troponin T at 72h	M(IQR)	59(39-77)	96(54-144)	119(58-469)	NS	NS
	LDH at 72h	M(IQR)	756(617-1118)	745(570-1580)	740(594-1547)	NS	NS
	Duration in h of inotropy	M(IQR)	0(0-33)	27(0-76)	44(11-79)	NS	NS
Short-term neurology	TTNT (h) for SEVP group	M(IQR)	NA	NA	18.5 (12-56)	NA	NA
	Seizure prevalence n/group (%)		1/15(7%)	9/18 (50%)	14/14 (100%)	0.05	0.002
	MRI lesion load 0-11	M(IQR)	1(0-2)	1(1-2.8)	2.5(1.3-9)	NS	0.059
Long-term neurology (outcome at 24 months) n=41	Deaths	n=	0	0	3	NS	0.09
	Children in each aEEG group	n=	15	17	9		
	Cognition Index (n=41)	M(IQR)	95(92.5-100)	100(90-105)	90(62.5-98.8)	NS	0.034
	Cognition Index 70-84 (n)		2	2	1		
	Cognition Index <70 (n)		0	0	1		
	Motor Index (n=41)	M(IQR)	91(85.5-95.5)	88(83.5-97)	82(50.5-89.5)	NS	0.093
	Motor Index 70-84 (n)		2	4	3		
	Motor Index <70 (n)		0	0	2		
	Seizures on AEDs	n=	0	1	0	NA	NA
Cerebral palsy	n=	0	1	2	NA	NA	

	Individual Cogn / Motor score		a)95/85	a)70/46, b)60/64		
Abnormal outcome survivors	n=	3	4	5	NS	0.02
				a) 100/82 b) 95/82 c) 85/79 d) 70/46 e) 60/64		
	Individual Cogn / Motor score	a) 95/82 b) 80/94 c) 80/79	a) 90/76 b) 85/82 c) 80/79 d) 75/79			
Total poor outcome	n (% of group)	3(20%)	4(22%)	8(57%)	NS	0.02
Total good outcome	n (% of group)	12(80%)	14(78%)	6(43%)		

AED: antiepileptic drug; BE: base excess; CNV: continuous normal voltage; CPR: cardiopulmonary resuscitation; DNV: discontinuous normal voltage; h: hours; HIE : hypoxic ischemic encephalopathy grading I =mild, II=moderate, III=severe, IQR: interquartile range; *Duration in hours when lactate has declined to ≤ 5 mmol/L; LDH: lactate dehydrogenase; M: median; MRI: magnetic resonance imaging; n; number; NA: not applicable; NS: not significant; SEVP: severe aEEG background patterns (Burst Suppression, Low Voltage or Flat Trace) ; TTNT: time to « normal » trace during cooling which is CNV or DNV).

Table 2 Stepwise linear regression

Cognition Score, Dependent Variable for combined DNV and SEVP group, survivors^a

Model	R=0.828 n=29	B	Std.Error	t	Sig
Constant		104.262	2.106	49.514	0.000
MRI (0-11)		-3.375	0.475	-7.104	0.000

Excluded variables, none to enter with significance <0.100

Motor Score, Dependent Variable for combined DNV and SEVP group, survivors^b

Model	R=0.649 n=29	B	Std.Error	t	Sig
Constant		96.932	3.048	31.798	0.000
MRI (0-11)		-3.154	0.688	-4.593	0.000

Excluded variables, none to enter with significance <0.100

Cognition Score, Dependent Variable, SEVP group only, survivors^a

Model	R=0.939 n=11	B	Std.Error	t	Sig
Constant		106.697	2.261	47.183	0.000
Time To Normal Trace in hours		-0.641	0.074	-8.609	0.000

Excluded variables, none to enter with significance <0.100

Motor Score, Dependent Variable, SEVP group only, survivors^b

Model	R=0.796 n=11	B	Std.Error	t	Sig
Constant		101.975	5.694	17.908	0.000
Time To Normal Trace in hours		-0.712	0.163	-4.36	0.001

Excluded variables, none to enter with significance <0.100

^{a,b} These regressions were also run including the 3 that died in the SEVP group, allocating them a numeric value one point lower than the subjects testable. This did not change the order by which the variables entered the regression but strengthened the model.

Cognition Score or Motor Score as Dependent Variables, CNV group n=15

There was no prediction of either cognitive or motor outcomes in the CNV group using the listed variables in linear regression analysis.

Five variables were used in all regressions: Birth weight in grams, number of antiepileptic drugs used, worst LDH during first 72h of life, numbers of hours with inotropic support and MRI (0-11). In addition for SEVP group: Time To "Normal Trace"

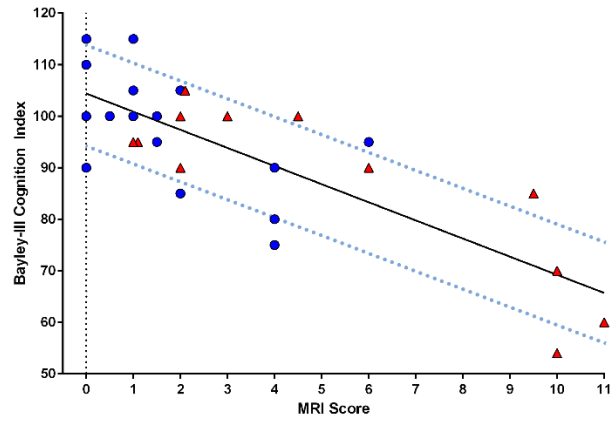


Figure 1a

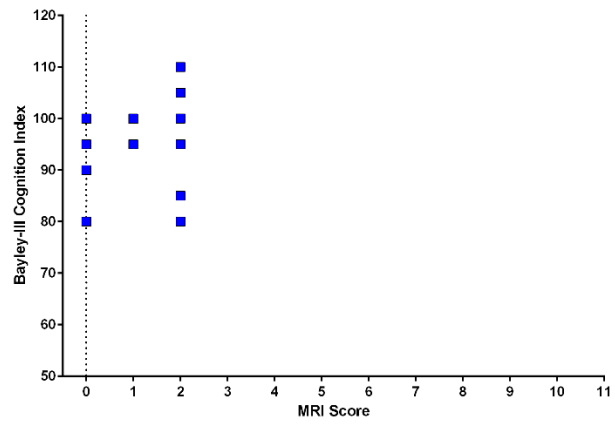


Figure 1b

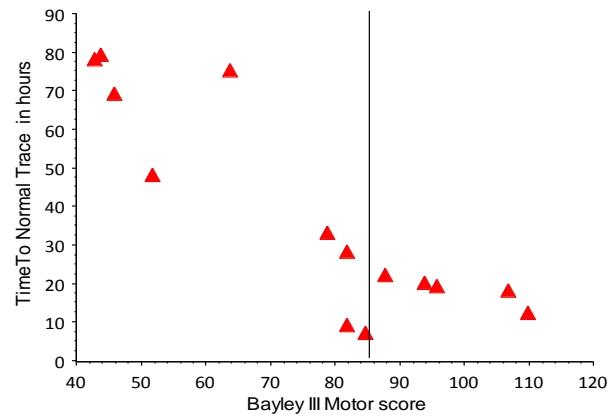


Figure 1c