

Title

Tumour volume as a predictor of postoperative speech impairment in children undergoing resection of posterior fossa tumours: a prospective, multicentre study.

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Authors

Aske Foldbjerg Laustsen^{1,2}, Shivaram Avula, Jonathan Grønbaek, Barry Pizer, Per Nyman, Pelle Nilsson, Radek Frič, Magnus Aasved Hjort, Vladimír Beneš, Peter Hauser, Beatrix Pálmafy, Giedre Rutkauskiene, Florian Wilhelmy, Rick Brandsma, Astrid Sehested, René Mathiasen, Marianne Juhler

Corresponding author: Aske Foldbjerg Laustsen (e-mail: aske.foldbjerg.laustsen@regionh.dk)

Affiliation of corresponding author:

¹Department of Neurosurgery, Rigshospitalet, Denmark

²Department of Paediatrics and Adolescent Medicine, Rigshospitalet, Denmark

Supplementary material

Supplementary table A other tumours (as registered by the paediatrician or neurosurgeon)

Tumour classification included under "other"-category	Amount (n = 29)
Diffuse midline glioma	5
Ganglioglioma	5
Glioblastoma	4
Haemangioblastoma	2
Schwannoma	2
Embryonal tumour with multilayered rosettes	1
Choroid plexus papilloma	1
Pineoblastoma	1
Meningioma	1
Mixed glioneuronal tumour	1
Diffuse low grade glioma without further specification	1
Astrogloma without further specification	1
Germ cell tumour without further specification	1
Subclassification not available	3

Supplementary table B ordinal speech outcome for medulloblastoma patients

Risk of postoperative speech impairment	Univariate analysis	Multivariate analysis 1	Multivariate analysis 2
Tumour volume (per 1 cm ³ increase)	1.03 (1.01; 1.06)	1.04 (1.01; 1.07)	1.04 (1.01; 1.07)
Tumour location (reference = 4 th ventricle)			
Brain stem	-	1.39 (0.41; 4.74)	1.40 (0.41; 4.79)
Vermis	-	0.19 (0.06; 0.62)	0.19 (0.06; 0.62)
Cerebellar hemisphere	-	0.08 (0.02; 0.42)	0.08 (0.02; 0.42)
Age (per increase in year)	-	-	0.98 (0.88; 1.10)

Supplementary table C Tumour volume ABC/2

Risk of postoperative speech impairment (ordinary, 3 levels)	Univariate analysis	Multivariate analysis 1 (Tumour type)	Multivariate analysis 2 (M1 + tumour location)	Multivariate analysis 3 (M2 + age)
Tumour volume (ABC/2; OR per 1 cm ³ increase) Number of observations: 57 Mean: 61.64 Range: 22.80;91.30	0.98 (0.94; 1.03)	0.98 (0.94; 1.03)	0.99 (0.94; 1.04)	0.98 (0.93; 1.04)

Supplementary Table D Demographics of excluded cohort (no available preoperative MRI T1 contrast-enhanced scan)

	All patients (n=365)		
	N	% of total	% of known status
Sex			
Male	205	56	58
Female	148	41	42
Unknown	12	3	
Age (Years; Median and Range)	6.8 (0.4; 17.8)		
Tumour histology			
Pilocytic astrocytoma	116	32	46
Medulloblastoma	74	20	29
Ependymoma	30	8	12
Atypical Rhabdoid/Teratoid tumour	3	1	1
Other	30	8	12
Unknown	112	31	
Tumour location			
Brain stem	76	21	24
4 th ventricle	110	30	34
Vermis	61	17	19
Cerebellar hemisphere	75	21	23
Unknown	43	12	
Postoperative speech			
Habitual	228	63	78
Reduced	28	8	10
Mutism	38	10	12
Unknown	71	19	

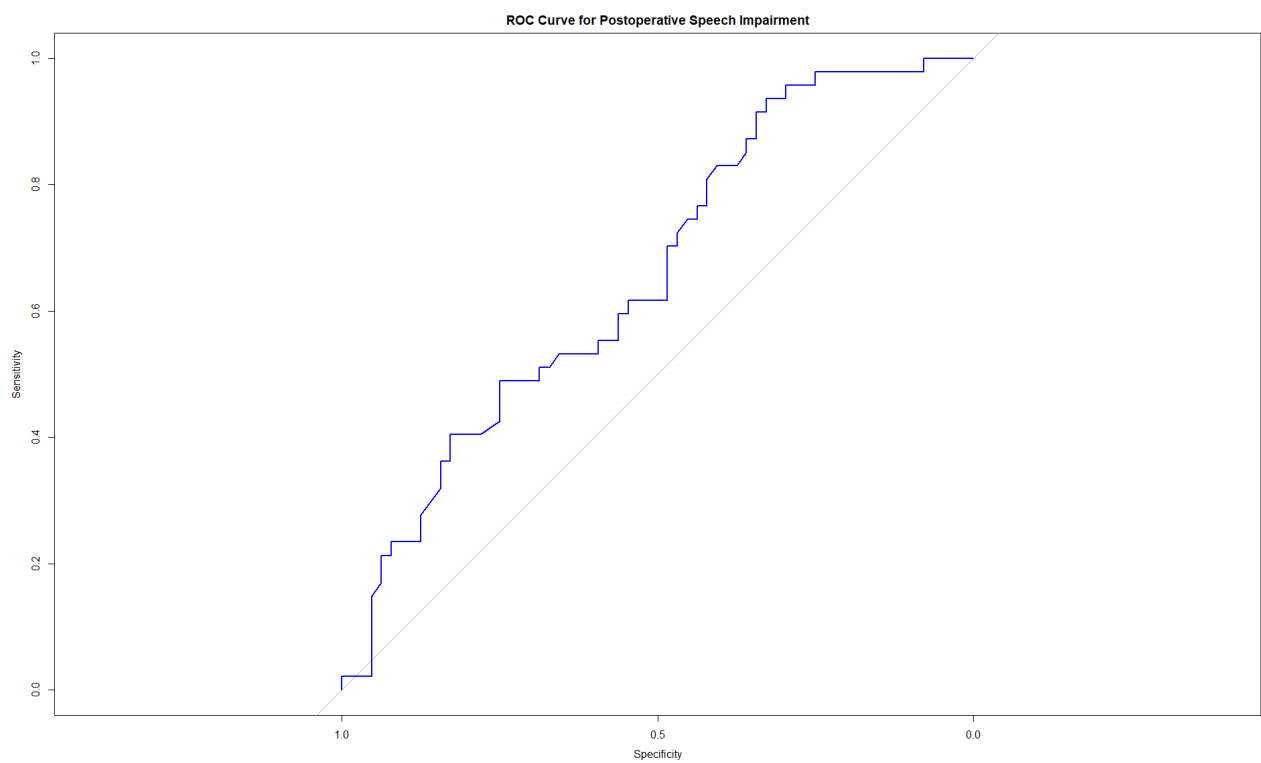
Supplementary table E Risk of Postoperative Speech Impairment

Univariate analysis			Multivariate analysis		
			Model 1 (n=345)	Model 2 (n=340)	Model 3 (n=340)
	(n=360)	Missing tumour pathology removed (n=345)			
Tumour volume (per 1 cm ³ increase)	1.00 (0.97;1.01)	1.00 (0.97;1.01)	0.99 (0.97;1.01)	0.99 (0.97;1.01)	0.99 (0.97; 1.01)
Tumour pathology					
Pilocytic astrocytoma (PA)	-		1 (ref)	1 (ref)	1 (ref)
Medulloblastoma (MB)	-		0.95 (0.32;2.84)	0.63 (0.19; 2.04)	0.62 (0.19; 2.06)
Ependymoma (EP)	-		3.53 (0.72;17.37)	2.49 (0.45; 13.77)	2.15 (0.39; 11.82)
Atypical Teratoid/Rhabdoid Tumour (AT/RT)	-		3.21 (0.43;24.01)	3.88 (0.29; 52.14)	2.63 (0.18; 37.85)
Other	-		0.81 (0.22;3.00)	0.56 (0.14; 2.19)	0.69 (0.17; 2.78)
Interaction between tumour volume and pathology					
Tumour volume and PA	-		1 (ref)	1 (ref)	1 (ref)
Tumour volume and MB	-		1.04 (1.01;1.08)	1.04 (1.01; 1.08)	1.04 (1.01; 1.08)
Tumour volume and ependymoma	-		0.99 (0.94;1.05)	0.98 (0.92; 1.04)	0.97 (0.92; 1.03)
Tumour volume and AT/RT	-		1.01 (0.92;1.11)	1.01 (0.92; 1.12)	1.01 (0.91; 1.11)
Tumour volume and other tumours	-		1.03 (1.00;1.06)	1.03 (1.00; 1.06)	1.03 (0.99; 1.06)
Tumour location					
Brain stem	-		-	0.92 (0.47; 1.80)	0.88 (0.45; 1.72)
4 th ventricle	-		-	1 (ref)	1 (ref)
Vermis	-		-	0.33 (0.16; 0.68)	0.32 (0.15; 0.66)
Cerebellar hemisphere	-		-	0.16 (0.07; 0.35)	0.17 (0.07; 0.39)
Age (per 1 year increase)	-		-	-	0.91 (0.85; 0.98)

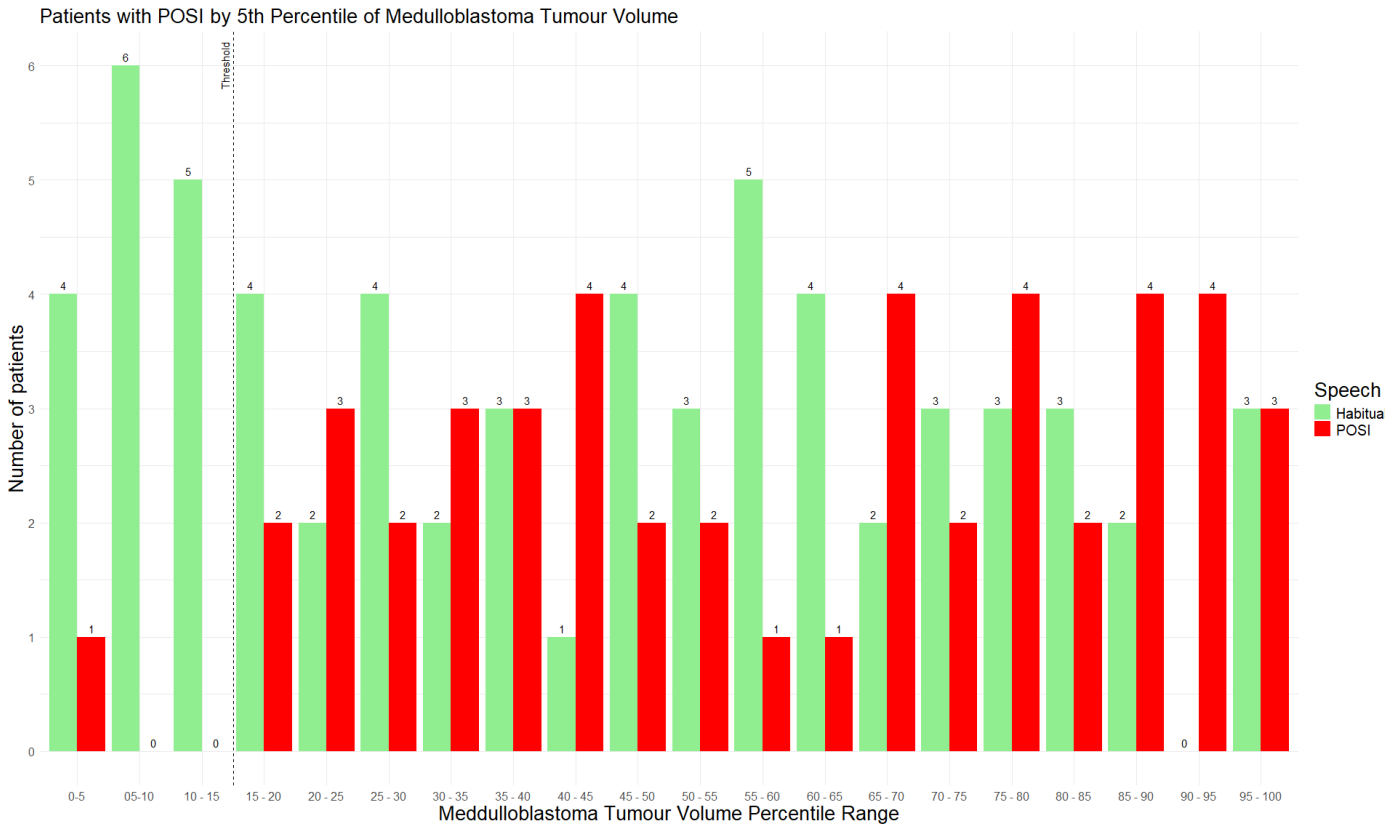
Supplementary table F Odds ratio for POSI (yes/no) for medulloblastoma

Risk of speech impairment (binary outcome)	Univariate OR (Lower CI; Upper CI)	Multivariate analysis 1	Multivariate analysis 2
Tumour volume (per 1 cm ³ increase)	1.04 (1.01; 1.07)	1.04 (1.01; 1.08)	1.04 (1.01; 1.08)
Tumour location (reference = 4 th ventricle)			
Brain stem	-	1.27 (0.32; 5.10)	1.28 (0.32; 5.13)
Vermis	-	0.22 (0.07; 0.74)	0.22 (0.07; 0.75)
Cerebellar hemisphere	-	0.09 (0.02; 0.45)	0.09 (0.02; 0.45)
Age (change per increase in year)	-	-	0.99 (0.88; 1.11)

Supplementary fig. 1 ROC curve



Supplementary fig. 2 Minimum threshold for medulloblastoma tumour volume in the risk prediction model



Supplementary table G Optimal volume cut-off

Youden's index results	Predicted probability cut-off	Adjusted Optimal volume cut-off
	0.34	16.5 cm ³