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Traumatic brain injury in children

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2016

document version

Publisher's PDF, also known as Version of record

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citation for published version (APA)

Konigs, M. (2016). *Traumatic brain injury in children: Impact on Brain Structure, Neurocognition & Behavior*. [, Vrije Universiteit Amsterdam].

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APPENDIX

TABLE SUMMARY OF FINDINGS

PART I - THE LITERATURE SECTION

Chapter	Sample	Methods	Measures	Main Findings
2	Meta-analytic sample of 855 children and adults with TBI derived from 21 studies	Wechsler Intelligence Scales	FSIQ, PIQ, VIQ	<ul style="list-style-type: none"> Mild TBI: no significant intelligence impairment Severe TBI: chronic impairment in FSIQ, PIQ & VIQ (<i>ds</i> -0.71 to -1.07) PTA duration strongly predicts the magnitude of intelligence impairment (<i>rs</i> -0.52 to -0.80)
3	Meta-analytic sample of 3,890 children and adults with TBI derived from 81 studies	Wechsler Intelligence Scales	FSIQ, PIQ, VIQ	<ul style="list-style-type: none"> Mild TBI: chronic impairment in FSIQ (<i>d</i> = -0.37) & VIQ (<i>d</i> = -0.30) Moderate TBI: chronic impairment in FSIQ (<i>d</i> = -0.19) & VIQ (<i>d</i> = -0.30) Severe TBI: chronic impairment in FSIQ, PIQ & VIQ (<i>ds</i>: -0.66 to -0.83) GCS score, LOC duration & PTA duration strongly predict the magnitude of intelligence impairment (<i>rs</i>: 0.22 to 0.69; -0.44 to -0.82; and 0.36 to -0.76, respectively) Adults have poorer long-term intelligence outcome of mild TBI than children (PIQ & VIQ) Children have poorer long-term intelligence outcome of severe TBI than adults (FSIQ & VIQ)

Note. FSIQ = full-scale intelligence quotient; GCS = Glasgow Coma Scale score; LOC = loss of consciousness duration; PIQ = performance intelligence quotient; PTA = post-traumatic amnesia; TBI = traumatic brain injury; VIQ = verbal intelligence quotient.

PART II - THE NEUROCOGNITIVE SECTION

Chapter	Sample Methods	Measures	Main Findings
4	113 TBI Attention Network Test 53 TC Ex-Gaussian Analysis	MRT & Accuracy <i>Tau</i>	<ul style="list-style-type: none"> No effects of TBI on alerting, orienting or executive attention Decreased processing speed after TBI (MRT: $d = 0.45$) Increased lapses of attention after TBI (<i>tau</i>: $d = 0.52$); Lapses of attention account for slower processing speed Lapses of attention mediate the negative relation between FSIQ and parent rated attention problems after pediatric TBI Lapses of attention increased after mild RF+ TBI ($d = 0.49$) and MS TBI ($d = 0.77$)
5	112 TBI Probabilistic Learning Test 52 TC	Accuracy	<ul style="list-style-type: none"> No effects of TBI on learning from inconsistent feedback Decreased <i>generalization of learning</i> after MS TBI ($d = -0.51$) Poorer <i>generalization of learning</i> predicted more parent rated externalizing problems after pediatric TBI (together with age and SES, $R^2 = .15$) <i>Generalization of learning</i> has clinical potential to identify children with clinically significant externalizing behavior problems (AUC = .77, sensitivity = 86%, specificity = 72%)
6	103 TBI Experimental paradigm for visual integration 44 TC Diffusion Model	MRT & Accuracy <i>Boundary separation, drift rate & non-decision time</i>	<ul style="list-style-type: none"> Decreased visual integration accuracy after TBI ($d = -0.50$) Effect of TBI traced back to reduced efficiency of visual integration (<i>drift rate</i>: $d = -0.76$) Decreased efficiency of visual integration after mild RF- TBI ($d = -0.73$) and MS TBI ($d = -0.81$) Decreased accuracy and efficiency of visual integration partly to fully mediated the impact of TBI on FSIQ
7	94 TBI Experimental paradigm for multisensory integration 39 TC Diffusion Model	MRT & Accuracy <i>Boundary separation, drift rate & non-decision time</i>	<ul style="list-style-type: none"> Decreased multisensory integration accuracy after TBI ($d = -0.51$) Effect of TBI traced back to reduced efficiency of multisensory integration ($d = -0.51$) Decreased efficiency of multisensory integration after mild RF+ TBI ($d = -0.44$) and MS TBI ($d = -0.63$) Decreased accuracy and efficiency of multisensory integration partly mediated the impact of TBI on FSIQ
8	76 MTBI Wechsler Intelligence Scale for Children III short form 53 TC Parent and teacher ratings of behavior problems (CBCL, TRF & SDQ)	FSIQ Behavior Problems composite score	<ul style="list-style-type: none"> No significant effects of mild RF- TBI Decreased neurocognitive functioning after mild RF+ TBI (FSIQ: $d = -0.52$) Increased behavior problems after mild RF+ TBI (parent/teacher ratings: $d = 0.72$) Effects of mild RF+ TBI not accounted for by intracranial pathology or premorbid psychiatry Most prevalent risk factors: abnormal head CT-scan (29%), impaired consciousness (25%) & persistent vomiting (24%) Presence of impaired consciousness had predictive value for decreased neurocognitive outcome (with lower SES, $R^2 = 30%$) and more behavior problems (with male gender and lower SES, $R^2 = 13%$) after mild TBI



APPENDIX

Note. AUC = area under the curve; CT = computed tomography; CBCL = Child Behavior Checklist; FSIQ = full-scale intelligence quotient; mild RF+ TBI = mild TBI with risk factors for complicated TBI; MRT = mean reaction time; MS TBI = moderate/severe TBI; TBI = traumatic brain injury; SDQ = Strengths & Difficulties Questionnaire; SES = socio-economic status; TC= trauma control; TRF = Teacher Report Form.

PART III - THE NEUROIMAGING SECTION

Chapter	Sample	Methods	Measures	Main Findings
9	37 TBI 27 TC	Acute CT Post-acute T1-scan Post-acute DTI	Intracranial pathology on CT Volumetric analysis (T1) DTI: FA, MD, AD, RD Tract-Based Spatial Statistics	<ul style="list-style-type: none"> Intracranial pathology after mild RF+ TBI (35%) and MS TBI (65%) Decreased white matter volume after mild RF+ TBI ($d = -0.74$) and MS TBI ($d = -0.80$) No effects of TBI on volumes of subcortical structures No significant effects of mild RF+ TBI on FA Decreased FA ($d = -1.88$), increased MD ($d = 0.84$) and increased RD ($d = 1.32$) after MS TBI MS TBI: affected FA in all assessed white matter tracts SLF, ILF & IFOF were most prominently contributed to the neuropathology of MS TBI GCC, BCC & SCC were most extensively affected by MS TBI Intracranial pathology predicted higher externalizing problems ($r = .35$) White matter volume was not related to aspects of functional outcome Lower FA predicted poorer FSIQ ($r = .29$), working memory ($r = .41$) and more internalizing problems ($r = -.26$) Regional associations between FA and FSIQ, working memory and encoding in verbal memory consistently involved the CC, and fully mediated the impact of TBI on FSIQ, working memory and encoding in verbal memory
10	36 TBI 27 TC	DTI Probabilistic Tractography Graph Theory Minimum Spanning Tree	Characteristic Path Length Transitivity Modularity Assortativity	<ul style="list-style-type: none"> Network definitions greatly influence connectome reconstruction in terms of interhemispheric connectivity and sensitivity for TBI The connectivity probability network primarily captures intrahemispheric connectivity The connectivity integrity network has increased sensitivity for interhemispheric connectivity Increased transitivity ($d = 0.70$) and assortativity ($d = 0.70$) in the connectivity probability network after MS TBI Increased characteristic path length in the connectivity probability network after MS TBI, when accounting for FA ($d = 0.79$) Increased characteristic path length in the connectivity integrity network ($d = 0.75$) after MS TBI, also in the backbone of this network as identified using the minimum spanning tree ($d = 0.66$) Increased characteristic path length after pediatric TBI was related to lower FSIQ (connectivity probability network: $r = -.35$) and poorer working memory (connectivity probability network: $r = -.44$; connectivity integrity network: $r = -.42$) Increased characteristic path length in the backbone of the probability network was related to better working memory performance ($r = .39$) Results suggested that the impact of MS TBI on global FA directly translates into increased characteristic path length

Note: AD = axial diffusivity; BCC = body of the corpus callosum; CC = corpus callosum; CT = computed tomography; DTI = diffusion tensor imaging; FA = fractional anisotropy; FSIQ = full-scale intelligence quotient; GCC = genu of the corpus callosum; ILF = inferior longitudinal fasciculus; IFOF = inferior fronto-occipital fasciculus; MD = mean diffusivity; mild RF+ TBI = mild TBI with risk factors for complicated TBI; MS TBI = moderate/severe TBI; RD = radial diffusivity; SLF = superior longitudinal fasciculus; SCC = splenium of the corpus callosum; TBI = traumatic brain injury; TC = trauma control.