



Morphometric analysis of Corpus Callosum in autistic and typically developing Indian children

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Background

- Corpus callosum (CC) is the largest commissural white matter bundle in the brain, responsible for the integration of information between hemispheres
- Partial agenesis and hypoplasia of the CC has been associated with impaired interhemispheric connectivity among individuals with autism [1, 2]
- There are no data available on the variation of CC morphometry between Indian children with and without autism

Objective

- To investigate the variation in CC morphometry between Indian children with autism spectrum disorder (ASD) and typically developing children (TD)
- To examine the association between CC morphometry and the severity of autism

Methods

- 61 children with ASD (age: mean = 4.95, range = 3-11) and 61 TD (age: mean = 9.81, range = 9-11) were studied
- The thickness of rostrum, body and splenium of CC, the anterior to posterior length and the maximum height of CC were measured on the midsagittal MRI slice using ITK-SNAP (v 3.6) software (Fig.1)
- Severity of ASD was assessed using the Childhood autism rating scale-second edition (CARS-2)
- Independents sample t-test was used to study the variation in CC morphometry between ASD and TD children

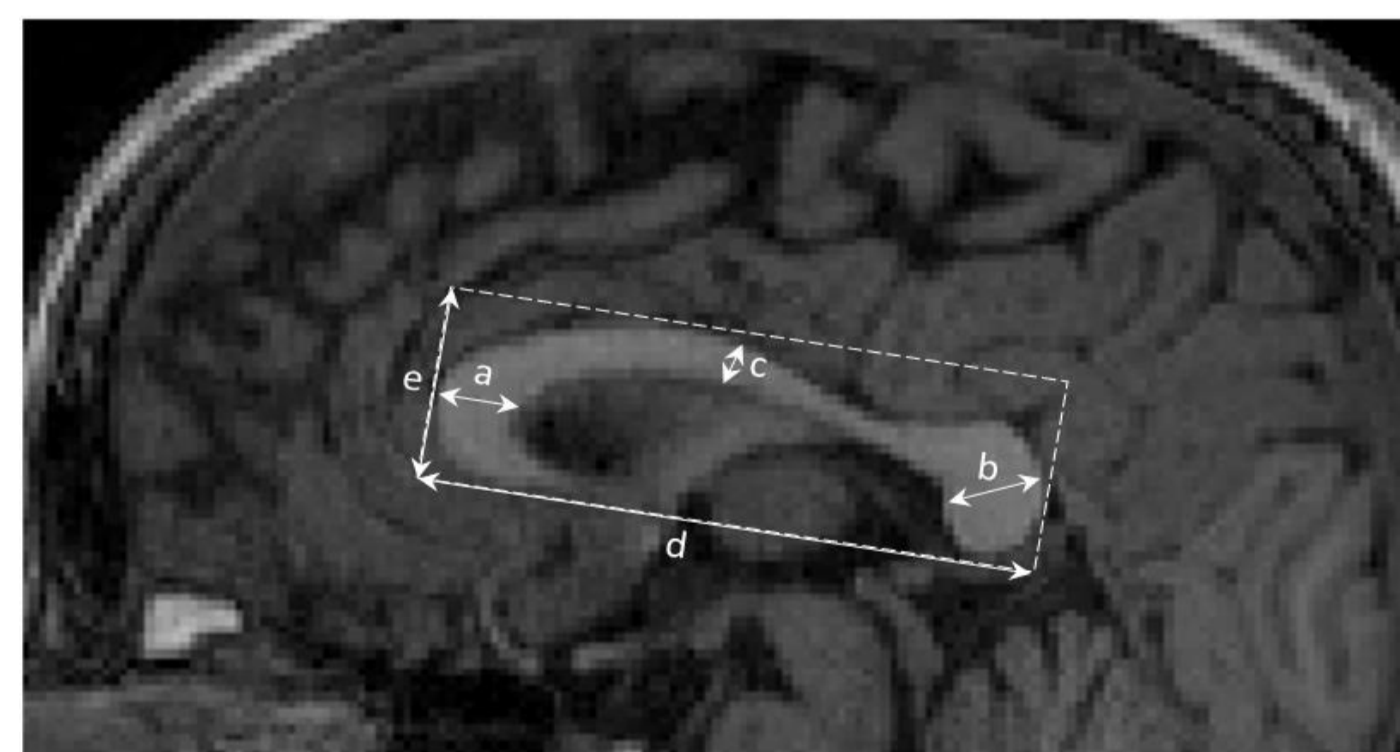


Fig. 1 Sites of measurement of corpus callosum: *a* width of rostrum, *b* width of splenium, *c* width of body, *d* anterior to posterior length, *e* height

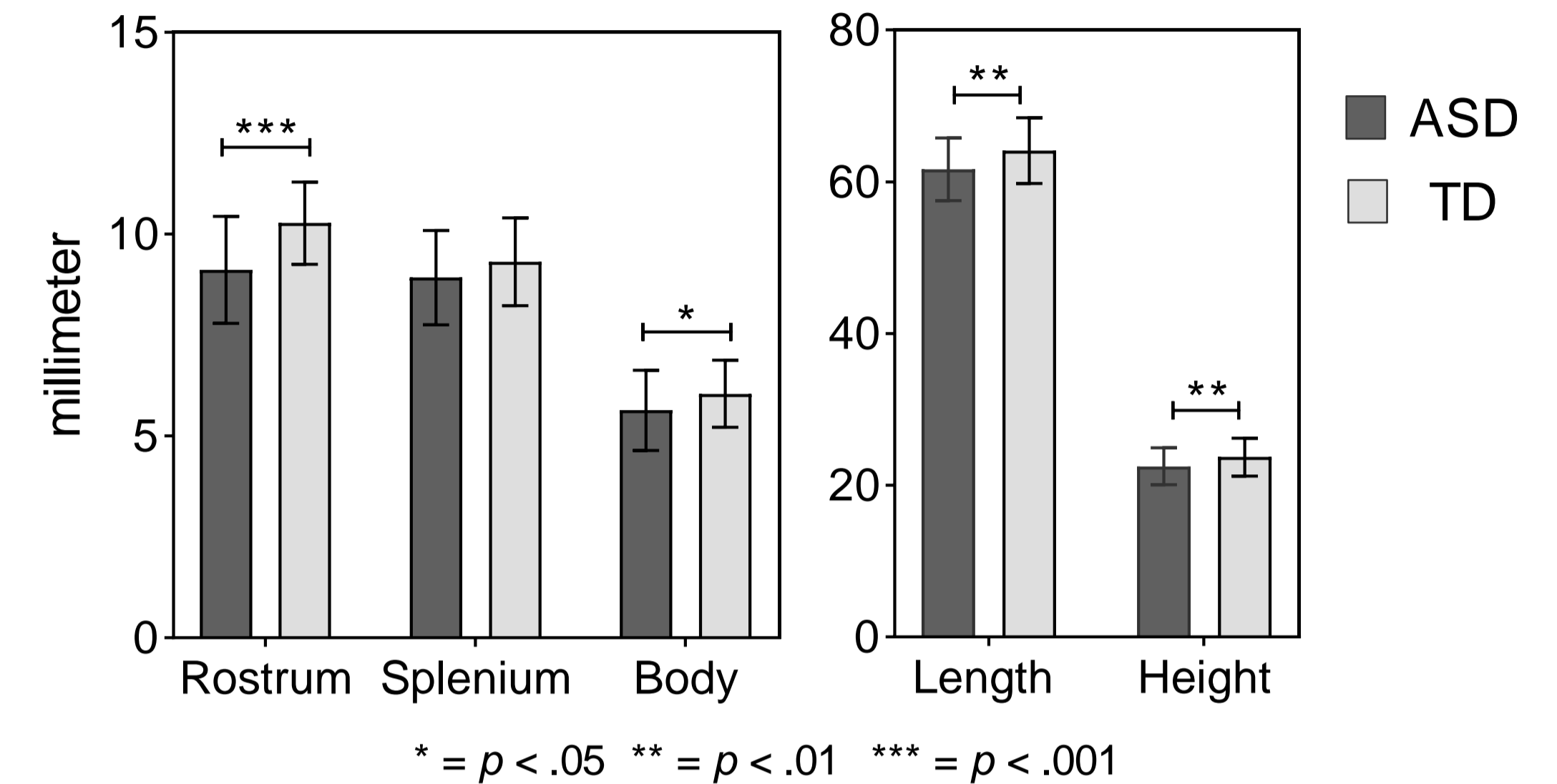


Fig. 2 Morphometric difference in CC between ASD and TD children

Results

- The thickness of rostrum and body was significantly thinner in children with ASD compared to TD children (Fig. 2)
- The anterior to posterior length and height of CC was significantly smaller in children with ASD compared to TD children (Fig. 2)
- There was no significant association between any of the morphometric measures of CC and the severity of autism (Table. 1)

Table. 1 Association between CC morphometry and autism severity

	Autism severity	
	$\beta \pm SE$	<i>p</i> -value
Rostrum	-0.04 ± 0.04	.30
Splenium	-0.02 ± 0.04	.58
Body	-0.02 ± 0.03	.59
Length	-0.07 ± 0.15	.60
Height	-0.06 ± 0.09	.46

Conclusion

- Children with ASD displayed a distinct reduction in CC morphometry compared to TD children
- There may be no association between the morphometric measures of CC and the severity of autism

References

1. Renteria-Vazquez, T., et al., *Social Inferences in Agensis of the Corpus Callosum and Autism: Semantic Analysis and Topic Modeling*. Journal of Autism and Developmental Disorders, 2021.
2. Siffredi, V., et al., *A Neuropsychological Profile for Agensis of the Corpus Callosum? Cognitive, Academic, Executive, Social, and Behavioral Functioning in School-Age Children*. Journal of the International Neuropsychological Society, 2018. **24**(5): p. 445-455.