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Challenges with Meta-Analysis in Deep Brain Stimulation

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In their publication, Nangunoori et al. [1] performed a pooled analysis of deep brain stimulation (DBS) studies that incorporate specific standardized psychiatric rating scales to assess the efficacy of DBS for major depressive disorder, obsessive-compulsive disorder (OCD) and Tourette’s syndrome. We argue that the study suffers serious flaws and that their conclusions are unwarranted.

First, we doubt whether it is useful to pool together results from different DBS targets. The STN target, for example, is distant from the other reviewed targets in OCD (ALIC, VS, VC/VS and NAcc) and although the latter targets are in closer proximity to each other, neuroanatomical coordinates of the stimulated area may still differ significantly. We have recently demonstrated with neuroimaging data that even within the same accumbal target, the actual stimulation coordinates vary substantially between patients, which significantly influenced clinical outcomes [2]. Therefore, we suggest that future pooled analyses are based on individual stimulation coordinates using neuroimaging data. Second, in their literature search, the authors failed to include a double-blind controlled study of DBS in OCD targeted at the accumbens, which clearly fulfills the criteria of the authors [3]. Without the results of the aforementioned study, the current analysis of 64 patients with OCD does not correctly characterize the evidence for DBS in OCD. In table 1 we show how these results would have changed the

pooled outcomes of DBS for OCD. Note that the standardized mean difference for the study by Denys et al. [3] is by far the largest one, i.e. 2.87 versus 1.20–1.77 for the other studies. Third, we suspect that the standardized mean difference for the study by Greenberg et al. [4] was miscalculated in the pooled analysis: it should be 1.77 instead of 7.3. The authors have probably divided the Y-BOCS change by the standard error of the mean that was used in this study, instead of the standard deviation. Finally, the authors report bilateral ALIC as the DBS target for the study by Huff et al. [5] whereas this should be unilateral NAc, which is relevant for the weighted results as unilateral DBS is less efficacious than bilateral DBS.

References

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Table 1. Responses to DBS in OCD

Study	Y-BOCS baseline	Y-BOCS last follow-up	Y-BOCS change	SD	Standardized mean difference
Pooled small series	390	230	13.33	8.17	1.63
Mallet et al. [6], 2008	28	19	9	7.5	1.20
Greenberg et al. [4], 2010	34	20.9	13.1	7.4	1.77
Huff et al. [5], 2010	32.2	25.4	6.8	5.35	1.27
Denys et al. [3], 2010	33.7	16.2	17.5	6.1	2.87