

CPAG Summary Report for Clinical Panel – 1619 Deep Brain Stimulation for Tourette’s Syndrome

The Benefits of the Proposition			
<i>No</i>	<i>Outcome measures</i>	<i>Grade of evidence</i>	<i>Summary from evidence review</i>
1.	Survival	Not measured	
2.	Progression free survival	Not measured	
3.	Mobility	Not measured	
4.	Self-care	Not measured	
5.	Usual activities	Not measured	
6.	Pain	Not measured	
7.	Anxiety / Depression	Not measured	
8.	Replacement of more toxic treatment	Not measured	
9.	Dependency on care giver / supporting independence	Not measured	
10.	Safety	Adverse events identified [B]	<p>A systematic review (Baldermann 2016) listed a number of adverse effects (AEs) that were noted both in general and in association with specific parts of the brain that were stimulated. Depending on area of stimulation, these varied and included :</p> <ul style="list-style-type: none"> • gaze disturbances or transient visual symptoms • mood deterioration and stimulation-dependent dysarthria • depressive symptoms, memory impairment; anxiety; agitation; constant tiredness • increased anxiety levels

			<ul style="list-style-type: none"> hypomania and depression <p>Other general side effects included apathy, dizziness and weight change.</p> <p>These results were not quantitatively analysed as they were mostly based on incidental findings rather than studies specifically set up to look for them and can only be considered to be descriptive. Therefore, these AEs may or may not occur in other patients undergoing the same treatment. Long term safety could not be determined from these findings.</p>
11.	Delivery of intervention	Not measured	

Other health outcome measures determined by the evidence review			
No	Outcome measure	Grade of evidence	Summary from evidence review
1.	Yale Global Tic Severity Scale (YGTSS)	Grade B	<p>YGTSS comprises of an assessment of motor and phonic tics in terms of their number, frequency, complexity, intensity and interference with behaviour (Max score= 50). A separate section quantifies the impairment caused by the tics (Max score =50). An impact on this scale demonstrates proof of concept that electrical stimulation can reduce the severity of tics.</p> <p>A meta-analysis (Baldermann et al 2016) reported a significant decrease in median YGTSS score: declining from 83.0 to 35.0 at the last available follow up, resulting in a median improvement of 52.68% (n=156; p<0.001). There was a median improvement rate of 48% for tic severity (n=73; p<0.001).</p> <p>The results suggest that DBS is of statistically significant (i.e. not due to chance) clinical benefit to patients. An improvement by half</p>

			<p>was seen in YGTSS and tic severity in patients treated with DBS.</p> <p>The results must be interpreted with caution as the studies these results were based on were mostly of low quality. They showed wide differences in improvement and amalgamated the different sites of stimulation in the brain. Long term efficacy could not be determined.</p>
2.	Modified Rush Video-based tic rating scale (MRVRS)	Grade B	<p>The MRVRS is a video-based objective rating scale of tics.</p> <p>A meta-analysis (Baldermann et al 2016) reported a median improvement of 48% (n=27; $p < 0.001$) in the MRVRS score.</p> <p>The results suggest that DBS is of statistically significant (i.e. not due to chance) clinical benefit to patients. An improvement by approximately half was seen in MRVRS in patients treated with DBS.</p> <p>Please see last paragraph in 'Summary from evidence review' for metric 1 – 'YGTSS' for a commentary on uncertainties of evidence from Baldermann et al. 2016.</p>
3.	Gilles de la Tourette syndrome quality of life scale (GTS-QOL)	Grade B	<p>GTSQoL is a scale that quantitatively measures a patient's health-related quality of life.</p> <p>In a study (Kefalopoulou et al 2015) comparing baseline and continuous stimulation, an improvement of 38.9% (95% CI 19.7-58.0; $p = 0.001$) in the GTS-QOL score.</p> <p>The results suggest that DBS is of statistically significant (i.e. not due to chance) clinical benefit to patients. An improvement by approximately one-third in GTS-QOL scores was seen.</p>

			<p>The results are based on 13 patients from a small study that had only 15 participants in total. There is uncertainty about the positioning of DBS electrodes and long term efficacy could not be determined.</p>
4.	Yale Brown Obsessive Compulsive scale (Y-BOCS)	Grade B	<p>Y-BOCS scores a list of features of obsessions and compulsions, with a maximum score of 40.</p> <p>A meta-analysis (Baldermann et al 2016) reported a median reduction in Y-BOCS of 31.25% (n=112). The median preoperative score was 16.0 and the median postoperative score was 10.7. A subgroup analysis did not show significant differences in response between brain targets (p=0.812).</p> <p>The results suggest that DBS is of clinical benefit to patients. An improvement by approximately one-third in Y-BOCs scores was seen.</p> <p>Please see last paragraph in 'Summary from evidence review' for metric 1 – 'YGTSS' for a commentary on uncertainties of evidence from Baldermann et al. 2016.</p>