ERRATUM

A meta-analysis of outcomes and complications of magnetic resonance-guided focused ultrasound in the treatment of essential tremor

TO THE READERSHIP: We appreciate the publication of our article in the February issue of *Neurosurgical Focus* (Mohammed N, Patra D, Nanda A: A meta-analysis of outcomes and complications of magnetic resonance-guided focused ultrasound in the treatment of essential tremor. *Neurosurg Focus* 44(2):E4, 2018). Unfortunately, some errors were made. We want to report the following corrections to the article.

In our *Results*, we have corrected the mean age in the study by Schreglmann et al.² to be 70.7 ± 8.5 years instead of 71 ± 8.3 years and we have also corrected the pooled estimate of in-procedure dizziness in our study to be 43.4% rather than 45.5%. The correct percentage has been placed in the *Abstract* and Fig. 3A as well.

In Table 1, the study by Schreglmann et al. is now listed as prospective instead of retrospective. The mean age of patients in that study is now listed as 70.7 ± 8.5 years.

In Table 3, the in-procedure complication of “dizzy feeling” for the study of Schreglmann et al. has been changed to 4 patients instead of 5.

The title of Table 4 has been changed to “Complications occurring between 0 and 3 months (resolved and persisting).”

In Figure 3, we have revised the forest plot shown in panel A and we have updated the titles for panels C–F.

In *References*, we originally listed a study by Chang et al. published in 2016 (Reference 4). That was incorrect. We have replaced this reference with the following:

4. Chang WS, Jung HH, Kweon EJ, Zadicario E, Rachmilevitch I, Chang JW: Unilateral magnetic resonance guided focused ultrasound thalamotomy for essential tremor: practices and clinicoradiological outcomes. *J Neurol Neurosurg Psychiatry* 86:257–264, 2015

In addition, we have corrected all references to Chang et al. in Tables 1–5 in our paper to show the correct year of the replacement publication.¹

We apologize to the editors and readership for any confusion our errors may have caused, and we are grateful for the opportunity to correct them. The corrected figure and tables appear on the following pages.

The article has been corrected online as of July 1, 2018.

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References

1. Chang WS, Jung HH, Kweon EJ, Zadicario E, Rachmilevitch I, Chang JW: Unilateral magnetic resonance guided focused ultrasound thalamotomy for essential tremor: practices and clinicoradiological outcomes. *J Neurol Neurosurg Psychiatry* 86:257–264, 2015
2. Schreglmann SR, Bauer R, Hägele-Link S, Bhatia KP, Natchev P, Wegener N, et al: Unilateral cerebellothalamic tract ablation in essential tremor by MRI-guided focused ultrasound. *Neurology* 88:1329–1333, 2017

INCLUDE WHEN CITING

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FIG. 3. Pooled estimate of in-procedure complications, and complications at 3 and 12 months postprocedure. A: Pooled estimate of in-procedure dizziness. B: Pooled estimate of in-procedure nausea and vomiting. C: Pooled estimate of paresthesias occurring in patients at 3 months postprocedure. D: Pooled estimate of ataxia occurring in patients at 3 months postprocedure. E: Pooled estimate of paresthesias occurring in patients at 12 months postprocedure. F: Pooled estimate of ataxia occurring in patients at 12 months postprocedure.

TABLE 1. Details of studies included in a meta-analysis of MRgFUS in treatment of ET

Authors & Year	No. of Pts	Age in Yrs (range)	Sex (M/F)	Duration of Sx in Yrs (range)	Site of Lesion	Type of Study	Sonifications	Max Energy (Joules)	Peak Temp (°C)
Zaaroor et al., 2018	18	68.9 ± 8.3	NS	12.1 ± 8.9	Vim	Retro	21.0 ± 6.9	12,500 ± 4,274	56.5 ± 2.2
Schreglmann et al., 2017	6	70.7 ± 8.5	NS	24.5 ± 22.5	CTT	Pros	11 ± 3.2	12,008 ± 4,441	62.0 ± 2.5
Elias et al., 2013	15	66.6 ± 8	11/4	32 ± 21.3	Vim	Uncontrolled, pros study	17.9 ± 4.6	10,320 ± 4,537	58.5 ± 2.5
Lipsman et al., 2013	4	70.8 (58–77)	4/0	17.8 ± 8.18	Vim	Pros, uncontrolled	22.5 ± 7.59	NS	59 ± 2.87
Huss et al., 2015	15	67.2 (28–82)	10/5	NS	Vim	Retro	NS	NS	NS
Kim et al., 2017	23	64.7 (47–77)	20/3	20.5 (5–54)	Vim	Retro	NS	NS	55.62
Chang et al., 2015	8	65.72 (53–78)	9/2	30.6 ± 16.12	Vim	Retro	NS	NS	53 ± 3.3
Wintermark et al., 2014	15	67 ± 8	10/5	NS	Vim	Retro	NS	NS	NS
Elias et al., 2016	56	71 ± 8.3	37/19	16.8 ± 12.3	Vim	RCT	18.5 ± 5.2	14,497 ± 6,695	55.6 ± 2.3

NS = not specified; pros = prospective; pts = patients; retro = retrospective; Sx = symptoms; temp = temperature. Unless otherwise stated, values are presented as the mean ± SD.

TABLE 2. Baseline CRST Total, Part A, Part C, and QUEST scores, and percentage improvement at 3, 6, or 12 months

Authors & Year	CRST Total Score at Baseline (mean $\pm$ SD)	CRST Total Score at 3 or 6 Mos (mean $\pm$ SD)	CRST Total Score at 12 Mos (mean $\pm$ SD)	CRST Total Score, % Improvement
CRST Total				
Zaaroor et al., 2018	40.7 $\pm$ 11.6	8.2 $\pm$ 5.0 (6 mos)	NS	79.85
Schreglmann et al., 2017	43.8 $\pm$ 9.8	19.8 $\pm$ 6.8 (6 mos)	NS	54.79
Elias et al., 2013	54.9 $\pm$ 14.4	NS	24.3 $\pm$ 14.8	56
Lipsman et al., 2013	70.75 $\pm$ 19.6	35.25 $\pm$ 10.9 (3 mos)	NS	50.17
Huss et al., 2015	54.9	NS	17.7	67.75
Kim et al., 2017	NS	NS	NS	78.3% improved at 12 mos
Chang et al., 2015	46.72 $\pm$ 10.51	6.25 $\pm$ 7.16 (6 mos)	NS	80.43
Wintermark et al., 2014	19.8 $\pm$ 5*	4.6 $\pm$ 3 (3 mos)	NS	76.5
Elias et al., 2016	50.1 $\pm$ 14.0	29.6 $\pm$ 13 (3 mos)	32.4 $\pm$ 14.5	35
CRST Part A				
	CRST Part A score at baseline (mean $\pm$ SD)	CRST Part A score at 3 or 6 mos (mean $\pm$ SD)	CRST Part A score at 12 mos (mean $\pm$ SD)	CRST Part A score, % improvement
Schreglmann et al., 2017	14.3 $\pm$ 4.9	2.5 $\pm$ 2.1 (6 mos)	NS	82.51
Elias et al., 2013	20.4 $\pm$ 5.2	4.3 $\pm$ 3.5 (3 mos)	5.2 $\pm$ 4.8	74.50
Lipsman et al., 2013	7.25 $\pm$ 2.2	1.25 $\pm$ 0.95 (3 mos)	NS	82.75
Huss et al., 2015	13.4	NS	8.7	35.07
Chang et al., 2015	12.09 $\pm$ 2.9	1.4 $\pm$ 1.59 (6 mos)	NS	88.42
Elias et al., 2016	18.1 $\pm$ 4.8	9.6 $\pm$ 5.1 (3 mos)	10.9 $\pm$ 4.5	40
QUEST & CRST Part C				
	QUEST score, % improvement	CRST Part C score at baseline (mean $\pm$ SD)	CRST Part C score at 6 or 12 mos (mean $\pm$ SD)	CRST Part C score, % improvement
Zaaroor et al., 2018	94%	NS	NS	NS
Elias et al., 2013	37%	NS	NS	NS
Lipsman et al., 2013	NS	20.75 $\pm$ 4.5	10.25 $\pm$ 3.3 (12 mos)	50.60
Huss et al., 2015	37.5%	18.2	2.8 (12 mos)	84.61
Chang et al., 2015	NS	12.81 $\pm$ 3.62	2.75 $\pm$ 3.49 (6 mos)	78.51
Elias et al., 2016	46%	16.5 $\pm$ 4.6	6.3 $\pm$ 5.6 (12 mos)	62

Unless otherwise stated, values are presented as the mean $\pm$ SD.

* The score denotes Part A and Part B subsections only.

TABLE 3. In-procedure complications

Authors & Year	Headache	Dizzy Feeling	Nausea & Vomiting	Sensation of Heat, Warmth, or Flushing	Scalp Tingling	Paresthesias	Frame Related & Others
Zaaroor et al., 2018	0	14	5	0	3	2	Scalp numbness (5), subcutaneous hematoma (3)
Schreglmann et al., 2017	0	4	0	0	0	0	0
Elias et al., 2013	9	5	8	4	0	0	0
Lipsman et al., 2013	0	0	0	0	0	2	0
Huss et al., 2015	9	11	8	4	0	0	MRI pin site burn (2)
Kim et al., 2017	NS	NS	NS	NS	NS	NS	NS
Chang et al., 2015	0	5	0	0	0	0	Sonication failures (3)
Wintermark et al., 2014	0	0	0	0	0	0	Pin site burn (2), occipital numbness (4)
Elias et al., 2016	2	12	13	17	0	4	Pin site edema (3), back pain (5), anxiety (3)

TABLE 4. Complications occurring between 0 and 3 months (resolved and persisting)

Authors & Year	Paresthesias or Dysesthesias	Dysarthria	Dysphagia	Gait Instability, Ataxia, or Unsteady Feeling	Limb Weakness	Dysmetria	Tinnitus	Fatigue	Dysgeusia
Zaaroor et al., 2018	0	0	0	5	0	0	0	0	1
Schreglmann et al., 2017	0	0	0	2	1	0	0	0	0
Elias et al., 2013	15	1	0	9	1	1	0	0	0
Lipsman et al., 2013	2	0	0	0	0	0	0	0	0
Huss et al., 2015	14	1	0	5	1	0	0	0	0
Kim et al., 2017	1	0	0	1	0	0	0	0	1
Chang et al., 2015	0	0	0	1	0	0	0	0	0
Wintermark et al., 2014	0	0	0	9	1	0	0	0	0
Elias et al., 2016	14	1	0	18	2	7	3	3	2

TABLE 5. Summary of critical appraisal of included studies using the Newcastle-Ottawa Scale for assessing the quality of observational studies

Study	Selection	Comparability	Exposure
Zaaroor et al., 2018	**	*	**
Schreglmann et al., 2017	**		*
Elias et al., 2013	**		*
Lipsman et al., 2013	**		
Huss et al., 2015	***	**	*
Kim et al., 2017	***	**	*
Chang et al., 2015	**		
Wintermark et al., 2014	**		
Elias et al., 2016	****	**	***

Each of the 3 categories has further subcategories of assessment for which an asterisk is given. Studies with the maximum number of asterisks have a higher quality than those with fewer asterisks. Empty cells indicate that no asterisks could be scored for that category.