CASE REPORT

Post-traumatic tics and tetrabenazine treatment: a blinded video assessment

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SUMMARY

Traumatic head injury is a very rare cause of secondary tic disorders. We add another case by describing, for the first time, the response to tetrabenazine in a blinded video assessment. Our patient had a severe traumatic head injury and subsequently developed tics refractory to various agents including neuroleptics. We assessed tetrabenazine treatment by virtue of patient's impression, the treating neurologist's non-blinded (Yale Global Tic Severity Scale) and a second neurologist's blinded assessment (modified Rush Video Scale). The Yale Global Tic Severity Score improved by 24% on 12.5 mg twice daily and 45% on 12.5 mg thrice daily. Subjective improvement was 50% and 70%, respectively. The modified Rush Video scores improved by 21% and 28.5%, respectively. Post-traumatic tourettism can respond to tetrabenazine. The magnitude of benefit though, may be overestimated with open-label observations, thus there is a need for studies examining objectively the effect of tetrabenazine in tic disorders.

BACKGROUND

Tourette syndrome (TS) is a neuropsychiatric disorder with motor and phonic tics along with significant behavioural comorbidities, namely obsessive-compulsive disorder (OCD) and attention deficit hyperactivity disorder (ADHD).¹ Among the secondary causes of tic disorders, head trauma is considered rare, since only few case reports and small series are reported.^{2–7} Furthermore, some of these reports show questionable aetiological association between head injury and the development of tourettism.³

The consensus is that traumatic head injury must bear a causative relationship in the rare instance of posthead injury tourettism. However, because of its rarity, it is not a well-studied entity and little is known about effective treatment options. We report a man with tourettism after a severe head injury. We assess the efficacy of tetrabenazine by way of blinded video scoring according to the modified Rush Video-based rating protocol for tics.⁸

This report is unique because of the rarity of this condition and the fact that tetrabenazine treatment was never assessed in a blinded fashion, including several studies on TS.

CASE PRESENTATION

We report a patient with post-traumatic head injury tourettism. Videos were obtained in a standardised fashion according to the modified Rush Video-based rating (range 0–20; a sum of body regions involved severity and frequency of motor

and vocal tics; higher scores signify worse performance).⁸ We scored the videos before and after starting the treatment with tetrabenazine, and at different dosing schedules, in a blinded fashion. We also assessed the patient's subjective impression and the treating neurologist's open-label scoring based on the Yale Global Tic Severity Scale (range 0–100; a sum of total tic severity score plus impairment score; higher scores signify worse performance).⁹

Our patient suffered from a severe closed head injury after a head-on collision motor vehicle accident that resulted in multiple long bone and pelvic fractures. He was in coma for 1 month before recovery of his level of consciousness. Within the second month after the inciting event, he developed severe motor and a few mild phonic tics. He did not have a family history of tics, OCD or ADHD. He was not exposed to dopamine receptor-blocking agents before the onset of the tics.

The motor tics consist of complex behaviour (repetitive, stereotypical anterior flexion of the right shoulder, extension of the right elbow and wrist with simultaneous attempts to stop it with his left arm; rotatory shoulder movements) as well as truncal isometric contractions, platysma contractions, anterior neck dystonic-type flexion, occasional left torticollis and blepharospasm. Apart from the latter, all the movements were stable in location and character over the years with mild fluctuation in severity. The blepharospasm improved spontaneously. He was partially able to suppress the tics but with rebound flurry. He had premonitory sensory 'discomfort' in the respective areas. External stimuli (seat belt and tight shirt) would trigger the tics. He did not report vocalisations but he exhibited sniffing and throat clearing. He preferred positioning his household items in order, but this was not unsettling. On the contrary, he developed disinhibited, impulsive and reckless behaviour that was socially disruptive and lead to divorce.

INVESTIGATIONS

Head CT was unremarkable. MRI could not be performed due to intolerance. Workup for Wilson disease, inflammatory aetiologies (erythrocyte sedimentation rate, C reactive protein and antinuclear antibodies), thyroid stimulating hormone, blood smear, ferritin, calcium and magnesium levels was normal/negative.

TREATMENT

The movements were treated with haloperidol, pimozide (caused renal failure), trazodone, clonidine, sertraline, levodopa and baclofen with no

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Video 1 This is a video compilation of three different segments. The first is before starting treatment with tetrabenazine; the second is on 12.5 mg bid and the third on 12.5 mg tid. Each segment comprises of the first 30 seconds of filming.

benefit. Clonazepam provided a mild subjective improvement. Before starting treatment with tetrabenazine, he was on clonazepam 4 mg a day, baclofen 80 mg a day and botulinum toxin injections at the neck and shoulder area.

OUTCOME AND FOLLOW-UP

The Yale Global Tic Severity Scale score was 83 (total tic severity score of 33 plus impairment score of 50) before treatment with tetrabenazine; 63 (23 and 40, respectively), on 12.5 mg twice daily (24% improvement); and 45 (15 and 30, respectively) on 12.5 mg thrice daily (45% improvement).

Subjectively, he improved by about 50% on 12.5 mg twice daily and 70% on 12.5 mg thrice daily.

The modified Rush Video-based blinded score was 14 off tetrabenazine; 11 on 12.5 mg twice daily (21% improvement) and 10 on 12.5 mg thrice daily (28.5% improvement from baseline). However, on 12.5 mg thrice daily, he developed sleepiness, decreased concentration and mild parkinsonism (video 1).

DISCUSSION

Tetrabenazine is a dopamine depletor and weak dopamine receptor blocker. It is found to be beneficial in a variety of hyperkinetic movement disorders.¹⁰ In the treatment of TS, it has been tested in several retrospective and prospective, open-label studies without blinded assessments.^{10 11} In the few reports regarding post-traumatic tics, there is only one patient reported to have improved on tetrabenazine in open-label assessment.⁴ Our report is the first to prove the same point but with blinded video scoring.

Our patient had a clear benefit from tetrabenazine treatment both subjectively and objectively. It is noteworthy that in the blinded assessment, the degree of improvement was not as robust as in open label and subjective measures, in terms of total scores. However, in subscore analysis of the blinded assessment, we observed that motor tic frequency dropped from 62/minute (off tetrabenazine) to 15/minute on 12.5 mg twice daily (75% improvement) and 2/minute on 12.5 mg thrice daily (97% improvement), whereas the motor and phonic tic severity scores were almost unchanged. This specific aspect might explain the more significant global subjective benefit compared to the total scores of the scales used. On the same token, it highlights the need for blinded assessments in studies examining the efficacy of tetrabenazine in TS and secondary tic disorders. All the studies assessing the tetrabenazine effect in TS used open-label methods and showed significant benefit. Albeit true, we feel that the magnitude of improvement is probably an overestimation.

Another point of discussion is whether post-traumatic tic disorder is a disease caused by brain injury or due to the result of genetically predisposed individuals subjected to brain injury. Although difficult to prove, we think of the former. The temporal association, the non-fluctuating (unlike in TS) nature of tic phenomenology and location in our patient (and previous reports) and the absence of a family history of tics argue in favour of a causal relation; these features clinically differentiate between TS and post-traumatic tics. If brain injury was merely the impetus for developing tourettism in genetically predisposed persons, one would expect this combination to be a lot more common than a few case reports by virtue of chance alone, since both are common conditions.⁴ Therefore, it has to be a direct aetiological association.

Finally, the question of why more patients with traumatic brain injury do not develop tic disorder can be answered by speculating that it has to be a specific disconnected tract leading to this phenotype, rather than a generic, non-specific, fronto-striatal circuit impairment. Thus, further studies, possibly using tractography, in post-traumatic tics and TS could elucidate a specific disconnection pattern. If this holds true, it may prove itself useful in understanding the pathoanatomic substrate and developing more targeted therapeutic approaches.

Learning points

- ▶ Post-traumatic tics are a very rare cause of secondary tic disorders.
- ▶ It may respond favourably to tetrabenazine.
- ▶ Studies with blinded assessments are needed when assessing tetrabenazine treatment in tic disorders, since previous open-label studies in Tourette syndrome probably may have led to an overestimation.

Contributors MP was responsible for the idea and design of the study. He is also the guarantor of this paper. MH was responsible for the blinded video scoring.

Competing interests None.

Patient consent Obtained.

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