A Case of Hemiballism in Elderly Stroke Improved by Conventional Rehabilitation Therapy and Low Dose Quetiapine

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Hemiballism describes involuntary severe, violent, arrhythmic, rotatory and large amplitude movements of limb from proximal joint. We experienced an elderly stroke patient with hemiballism accompanied dysphagia that persisted for several months severity was evaluated by the Universidade Federal de Minas Gerais Sydenham’s chorea rating scale (USCRS) and video fluoroscopic swallowing study (VFSS). In this case, we observed the improvement of hemiballism by conventional rehabilitation therapy and low dose quetiapine. Therefore, we recommend geriatrists considers these therapies in elderly patients with hemiballism.

Key Words: Hemiballism, Rehabilitation therapy, USCRS, Quetiapine

INTRODUCTION

Hemiballism is a rare symptom and defined as involuntary, erratic flinging of proximal part of hemiparetic limbs. Subthalamic nucleus is regarded as the most pathognomonic lesion but any focal lesion located in basal ganglia may induce hemiballism. Previous studies have focused mainly on pharmacologic therapy or stereotactic neurosurgery. Indeed, the severity or functional outcomes were not only assessed using standardized tools, but also conventional rehabilitation such as physical and occupational therapy was rarely applied.

Therefore, we reported a case of an elderly stroke patient with hemiballism accompanied dysphagia that was evaluated by the Universidade Federal de Minas Gerais Sydenham’s chorea rating scale (USCRS) and video fluoroscopic swallowing study (VFSS) and that improved after applying conventional rehabilitation therapy and low dose quetiapine.

CASE REPORT

Fifteen years ago, a 65-year-old female was diagnosed as right hemiplegia due to left middle cerebral artery territory (MCA) infarction and atrial fibrillation. Although the muscles of right shoulder, elbow, hip, and knee muscles were grade
2/5, and that wrist, hand, and ankle muscles were grade 1/5 in the manual muscle testing (MMT), most of the activities of daily living (ADL) required minimal assistance.

On the 3rd of January 2011, she visited emergency room in another hospital, because of altered consciousness. On the onset date, brain magnetic resonance imaging revealed a right MCA and anterior cerebral artery infarction (Fig. 1A, B), but the laboratory tests were unremarkable.

On day 3 postonset, the left-sided involuntary movements, dysphagia, and dysarthria abruptly occurred and a high signal lesion newly appeared in the right caudate nucleus (Fig. 1C, D). And then, she was transferred to the department of neurology in Jeju National University Hospital. The neurologist prescribed clonazepam (0.5 mg/day), chlorpromazine (100 mg/day), and quetiapine (25 mg/day) at night and her symptoms of hemiballism were slightly improved. However, because of severe somnolence, neurologist decided to discontinue all medications.

On day 14 postonset, a VFSS revealed that oromandibular dyskinesia and cervical dystonia caused disorganization of tongue movement and incomplete bolus formation. As a consequence, oral transit time was too delayed and the risk of aspiration was too high. Therefore, we decided to provide nutrition only through nasogastric tube.

On day 28 postonset, she was transferred to the department of rehabilitation medicine. Her mental status was alert, but she had difficulty sustaining attention. The score of Korean version of the Mini-Mental State Examination was 8/30 points. MMT showed that right upper and lower extremities were grade 3/5, but the involuntary movements of left side were so violent that she could not perform any daily activities or participate in rehabilitation therapy. A functional evaluation revealed that she could not maintain a sitting posture and was totally dependent in ADL (Korean version of the Modified Barthel Index [K-MBI], 0/100). The severity of her hemiballism was evaluated using USCRS (18/24, behavior score; 24/28, ADL score; and 28/32, motor function score). There were no impairments in sensory functions or in range of motion for any joints.

She complained of sleeping difficulty as well as violent involuntary movements. By considering her response to previous prescription, only 25 mg/day of quetiapine was prescribed and her insomnia and dyskinetic movements were improved at rest and could take part in conventional rehabilitation therapy.

Somatosensory stimulation was applied for improving sitting balance and gait training. Her hand was restrained manually by a physical therapist or was put in a pocket with grasping an object. One-kilogram sand-bag was applied to her left ankle (Fig. 2.). Neuromuscular electrical stimulation was applied to thoracic paravertebral muscles.

For treating dysphagia, postural control of her head and neck and oromotor inhibitory training were performed by an occupational therapist. The back support and manual re-
striction of left extremities were also carried out. Ice stick rather than lemon ice bolus that might increase the risk of aspiration, was applied to stimulate oropharyngeal sensory systems and to slow dyskinetic oropharyngeal movements. On day 60 postonset, she could maintain the sitting posture for several minutes and walk about 30 meters with supervision. In addition, the all domains of USCRS scores decreased (behavior, 13; ADL, 16; and motor function, 18) (Fig. 3) and the K-MBI score increased from 0 to 23.

Moreover, although incomplete bolus formation and poor lingual control were still observed in VFSS, oral transit time was decreased and oromandibular dyskinesia and cervical dystonia improved. Accordingly, we decided to start the nutrition orally.

**DISCUSSION**

Hemiballism has very low incidence of about 0.45 case per hundred thousand of the population, which is 500 times rarer than Parkinson disease. Patients typically present with acute or subacute onset of flinging movements of one side of the body that increase with voluntary action and decrease with relaxation or are absent during sleep. Typical neuroleptics such as chlorpromazine were commonly used as first line therapy for control of abnormal movements, but have more side effects than atypical neuroleptics such as a quetiapine. Besides, the pharmacokinetic and pharmacodynamics in the elderly are so different from the young that can potentiate the adverse effects. Therefore, we prescribed 25 mg/day of quetiapine and observed the improvement of hemiballism.

Our case has several notable findings. First, we evaluated the severity of hemiballism by the USCRS, which was designed to provide detailed quantitative descriptions of ADL performance, behavioral abnormalities, and motor function. Second, the dysphagia associated with oromandibular dyskinesia and cervical dystonia was improved after applying the occupational therapy and was confirmed by VFSS.

Third, we observed that insomnia and involuntary movements had improved gradually especially at rest by low dose quetiapine (25 mg/day) that were not commonly prescribed. Although there is some uncertainty about the mechanism underlying its effects, the favorable response of quetiapine in this case might be considered for control of hemiballism in elderly. Last, conventional rehabilitation therapy including somatosensory stimulation such as partial weight bearing and gripping an object within pocket had a beneficial effect on the functional outcome and hemiballism on volition. Several authors suggested that basal ganglia was involved in the gating of somatosensory information, particularly proprioception, and this might be fundamental to the pathophysiology of diverse involuntary movement disorders and to their responses to peripheral stimuli. Furthermore, in our case study, it was found that increased tactile contact reduced involuntary movements.

There are several limitations in this case report. As hemiballism is transient and lasts a few days in most cases, we could not ignore the nature of the hemiballism. However, it should be focused on that her hemiballism still persisted on volition. Therefore, rather our treatments than natural process might induce the functional improvements. Another limitation was that long term therapeutic effect was not exactly assessed. Thirdly, we used the USCRS which was designed in Sydenham’s chorea in scoring hemiballistic symptoms, because there was no available tool to determine the severity of hemiballism. Further research on the scale of its own should be required for hemiballism. Finally, she had a previous history of stroke in right side. It might interfere with interpreting the outcome of our patient.

In the described case, we experienced that hemiballism and accompanied dysphagia improved with low dose quetiapine and conventional rehabilitation therapy. This case report might be beneficial for the treatment of hemiballism, including movement disorders in elderly.

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