Stereotact Funct Neurosurg 2014;92:413
DOI: 10.1159/000368271

Reply to the Letter by Lvque et al. Entitled 'Psychosurgery for Schizophrenia'

Bomin Sun, Wei Liu

Department of Stereotactic and Functional Neurosurgery, Ruijin Hospital, Shanghai Jiaotong University School of Medicine, Shanghai, China

We thank Dr. Marc Lvque et al. for their comments [1] on our article [2]. In their first paragraph, they mention a paper by Cai et al. [3], in which 87 schizophrenic patients were operated by multitarget lesions. It is difficult to compare the effect difference between cingulotomy and capsulotomy because of the small sample of patients who had capsulotomy (only 6 patients) and the interference of combined surgery. Besides, Cai et al. located the targets with CT. However, the anterior limb of the capsule cannot be identified accurately with a CT scan, therefore their capsulotomy location without MRI targeting may be unreliable.

In their second paragraph, Lvque et al. mention the high rate of aggressive behavior in our schizophrenia patients. There are several reasons: first, in China, the prevalence of violence in schizophrenia patients ranges from 9.1 to 49.6%, which is a little higher than that in the West because of the different definition of violence [4]. Secondly, aggressive behavior in schizophrenia is more refractory to antipsychotic medication compared with other symptoms of schizophrenia, thus psychiatrists refer more patients with aggressive behavior to surgical treatment. Therefore, the prevalence of aggressive behavior is higher than in other studies. Our results showed that less than half of the patients with refractory schizophrenia were incompetent to provide consent. These patients were evaluated first by an assessment team (including a neurosurgeon, a psychiatrist, a psychologist and a representative from the Ethics Committee) before they were admitted to hospital according to our inclusion criteria and the Mental Health Law in China. The hospitalization process for these patients is similar to that of psychiatric patients who need mandatory hospitalization or receive mandatory treatments such as electroconvulsive shock therapy. Once the patients had been confirmed by the assessment team, an enhanced consent using a PowerPoint presentation form was explained to their family or carers, and the informed content was signed by them only after they had received the information and fully understood the procedure.

Deep brain stimulation (DBS) is well accepted by psychiatrists and medical ethicists because it is reversible and noninvasive, and also because it could provide a sham stimulation group as control to reduce the bias. However, DBS has its disadvantages. First, DBS requires implantation of hardware that will need long-term maintenance. Schizophrenia is a more complex disorder with psychotic features. Therefore, it will be extremely challenging considering the long-term management of the DBS. Secondly, there are some

complications associated with DBS, such as electrode displacement, fracture of the extensions and infection. Lastly, it is too expensive for patients to pay for the DBS device and for the replacement of the implanted pulse generator every 1–2 years, especially for patients with a long history of disease. In China, most people do not have sufficient health insurance. Since ablative procedures such as capsulotomy and cingulotomy are very effective and safe, we believe ablative procedures are also an alternative therapy for patients with refractory schizophrenia.

We noticed that the results of 116 patients who underwent anterior capsulotomy by Leksell, which were published in 1961, were disappointing. However, the anterior capsulotomy was performed in the 1950s when MRI-guided stereotactic surgery did not exist. Unlike basal ganglia which are close to the anterior-posterior commissure line, the anterior capsule location varies individually, so the inaccurate targeting of and trajectory towards the internal capsule certainly contribute to the unsatisfactory results of old-time capsulotomies. Capsulotomy has rarely been used alone in schizophrenia since the 1980s [5]. The application of MRI improved the effect of anterior capsulotomy significantly with lower complications. Meanwhile, the side effects and complications decreased substantially with small and accurate lesions inside the anterior capsule. We agree with the authors that cingulotomy, limbic leukotomy and amygdalotomy were mainly used to treat schizophrenia because they belong to the same neurocircuit. Theoretically, making a lesion in any target of the circuit is reasonable; however, according to our experience, capsulotomy is more effective than other targets. In the study conducted by Leiphart and Valone [6] in 2010, the best results are obtained with cingulotomy. However, they did not mention the use of anterior capsulotomy in schizophrenia [6].

It is difficult to perform a randomized study with a control group even if it is convincing, but the limitation may be solved in the near future by the use of DBS. Although great progress was made in stereotactic functional neurosurgery in the recent 20 years, we must keep in mind that surgical therapy should only be considered as a complement of the medical treatment and that the inclusion criteria must be strictly followed, considering the irreversibility of this procedure.

References

- 1 Lvque M, Durand E, Weil AG: Psychosurgery for schizophrenia. *Stereotact Funct Neurosurg* 2014;92:412.
- 2 Liu W, et al: Long-term follow-up of MRI-guided bilateral anterior capsulotomy in patients with refractory schizophrenia. *Stereotact Funct Neurosurg* 2014;92:145–152.
- 3 Cai Y, et al: Follow-up study on refractory schizophrenia with brain stereotaxis therapy (in Chinese). *Zhong Nan Da Xue Xue Bao Yi Xue Ban* 2011;36:876–880.
- 4 Chen Q, Zhou J: Aggression of Chinese inpatients with schizophrenia: a systematic literature review (in Chinese). *Zhong Nan Da Xue Xue Bao Yi Xue Ban* 2012;37:752–756.
- 5 Soares MS, et al: Psychosurgery for schizophrenia: history and perspectives. *Neuropsychiatr Dis Treat* 2013;9:509–515.
- 6 Leiphart JW, Valone FH 3rd: Stereotactic lesions for the treatment of psychiatric disorders. *J Neurosurg* 2010;113:1204–1211.