

Yi-gan san for the Treatment of Visual Hallucinations in Patients with Charles Bonnet Syndrome Secondary to Meningioma

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Received November 08, 2018; Accepted November 28, 2018; Published January 09, 2019

ABSTRACT

Meningioma has various psychiatric symptoms, one of which is Charles Bonnet Syndrome (CBS). CBS is characterized by visual hallucination due to vision loss in the elderly. Meningioma of the elderly is often not operable depending on the preoperative condition and complications. Medication for CBS is not well established. *Yi-gan san* (YGS), a traditional Chinese medicine, has been reported to have high tolerability and efficacy against psychotic symptoms, including visual hallucination. It has been suggested that YGS might be an effective treatment for CBS induced by inoperable meningioma.

Keywords: *Yi-gan san*, Meningioma, Charles Bonnet syndrome, Visual hallucination

Abbreviations: CBS: Charles Bonnet syndrome; YGS: *Yi-gan san*; NPI: Neuropsychiatric Inventory; 5-HT: 5-Hydroxytryptamine

INTRODUCTION

As the average life expectancy has increased, so has the prevalence of meningioma among the elderly. However, surgical treatment may not be feasible in this group because they often present with various complications. It is therefore extremely important to decide whether to operate or not in the elderly, because they have a lower recovery reserve capacity than younger patients. Many studies have emphasized the importance of considering the preoperative condition, complications and optimal surgical timing [1].

In addition, meningioma can cause various neurological and psychiatric symptoms, which vary depending on the site of the lesion. One such phenomenon is Charles Bonnet syndrome (CBS), which is characterized by visual hallucinations [2] attributed to visual impairment due to peripheral and central nervous system lesions and ophthalmological disorders. Eliminating the underlying cause is the most effective treatment for visual hallucinations associated with ocular disorders or central optic pathway lesions in CBS patients. Indeed, some cases have been reported in which the hallucination improved after the background ophthalmological diseases were treated [3,4]. In addition, the few available case reports on CBS in meningioma patients [5,6] mention that the visual hallucinations resolved after surgical resection.

However, CBS is often found in the elderly, and vision impairment itself often accompanies aging. Furthermore,

some cases in which CBS is caused by a brain tumor, such as meningioma, cannot be treated by surgery due to an adverse preoperative condition or the presence of complications. Traditionally, when surgery is not possible, antipsychotic or antiepileptic drugs have been used for CBS patients. However, the use of antipsychotics increases the risk of fracture and aspiration pneumonia in the elderly [7-9].

Although psychotropic medications have been used to treat CBS, there is no established treatment for this condition. Because CBS is frequently observed in the elderly, it is important to use drugs with the fewest possible adverse reactions.

Kampo is a treatment option with proven safety and effectiveness for certain diseases. *Yi-gan san* (YGS) is one such *kampo* that has been proven effective for the treatment

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Citation: Danjo S, Danjo J, Ishikawa I & Nakamura Y. (2019) *Yi-gan san* for the Treatment of Visual Hallucinations in Patients with Charles Bonnet Syndrome Secondary to Meningioma. Int J Surg Invasive Procedures, 2(1): 34-36.

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of various psychiatric manifestations and has a well-established tolerability [10]. We previously reported the successful treatment of a patient with visual hallucinations and irritability caused by meningioma using YGS in whom surgical treatment was not indicated [11]. We presented our experienced case (**Table 1**). Similar studies have been reported with fewer numbers of subjects [12]. YGS is relatively safe and is as effective in improving psychiatric symptoms, such as hallucinations and delusions, in dementia

patients as antipsychotics [13]. YGS is not a simple preparation but is instead a crude drug mixture. An important component of YGS is *Angelicae radix*, which is known to affect gamma-aminobutyric acid and serotonin (5-HT) receptors. In particular, 5-HT_{2A} receptors are widely expressed throughout the central nervous system and are involved in neuronal excitation [14]. The 5-HT_{2A} antagonism by YGS may contribute to its antipsychotic effects.

Table 1. Characteristics of CBS case.

Case	Age	Gender	NPI score		Dose of YGS (g/day)	Associated treatment for meningioma
			Pre-treatment	Pro-treatment		
1	83	Male	15	6	7.5	None

Improvement of visual hallucination was seen by administration of YGS. We used NPI for the evaluation of vision with reference to previous research [12]. "NPI: Neuropsychiatric Inventory."

Although the underlying mechanism of CBS is not fully understood, it is generally believed that the loss of visual input (for whatever reason) causes the disinhibition of the visual cortex, which in turn leads to visual hallucinations [15]. We infer that the down-regulation of 5-HT_{2A} receptors by YGS may inhibit visual cortex activation, thereby resulting in the disappearance of visual hallucinations. Although a previous report has described the improvement of the cerebral blood flow after treatment with YGS in a Lewy body dementia patient, there have been few investigations of the effects of YGS in patients with other diseases [16]. Therefore, the mechanism underlying the effects of YGS remains unknown.

Treatment with YGS may ameliorate visual hallucinations and improve the quality of life in affected elderly patients.

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