The patient was treated with the Gufoni maneuver for HC–BPPV cupulolithiasis [10]. Briefly, his head was quickly turned upward toward the ceiling after first being brought to the side-lying position on the affected side. This position was maintained for 5 minutes. We then found that his leftward nystagmus in the right–ear–down supine position disappeared during positional testing with Frenzel goggles; however, his rightward nystagmus in the left–ear–down supine position was still observed, although the rightward nystagmus was slightly attenuated compared with the initial observation. After another 10 minutes, we again observed the presence or absence of the nystagmus during positional testing with Frenzel goggles; however, the nystagmus was weak. The patient also reported that his vertigo became weak. Thus, he returned home.

Discussion

Onset of BPPV is rare in young people [11–14]. A previous study also showed that BPPV, head trauma, and other inner ear diseases were less common causes of vertigo in young people [15]. In contrast, head injuries and head contusion are known causes of BPPV in adults [13]. It is believed that in adults, especially older adults, otoconia are easily detached from the otolith organ due to head contusion, and the otocochlear enter the semicircular canal, resulting in the development of BPPV triggered by head position conversion and postural change.

Many cases of BPPV are believed to arise from the posterior semicircular canal, which is the most gravity-dependent canal [16]; however, the proportion of patients with HC–BPPV may be underestimated because involvement at this site is more likely to remit spontaneously than is involvement in the posterior semicircular canal [7]. However, since canalolithiasis and cupulolithiasis associated with HC–BPPV were reported with no evidence of central nervous system lesions [7,8], the number of reported cases of HC–BPPV has gradually increased.

Based on previous reports, a possible explanation of the BPPV in the present case is as follows. The patient was performing American football in high school and frequently sustained strong head contusions. Otoconia then detached from the otolith organ, and HC–BPPV developed after postural transformation. This suggests that young patients can develop BPPV due to head injuries and head contusion.

In the case of HC–BPPV, we have to consider the possibilities of both canalolithiasis and cupulolithiasis. Furthermore, the apogeotropic form of HC–BPPV can be even a canalolithiasis with the debris in the anterior part of the canal [16]. In our case, when we conducted positional testing, we observed apogeotropic direction-changing horizontal nystagmus. In addition, we identified a null point for lateral nystagmus, beyond which the nystagmus changed direction in the supine position [9]. Therefore, we were able to diagnose cupulolithiasis.

A recent study showed that the cupulolith repositioning maneuver, called the Gufoni maneuver, is an effective method for treating horizontal canal cupulolithiasis [10]. Kim et al. [10] showed that the Gufoni maneuver was effective in the treatment of HC–BPPV cupulolithiasis with a success rate of 73.1%. Although attenuation of nystagmus was moderate, we thought that the Gufoni maneuver was effective even in our patient. Further studies are required to assess the effect of the Gufoni maneuver in the treatment of HC–BPPV cupulolithiasis.

Conclusion

We analyzed HC–BPPV (cupulolithiasis) in an adolescent patient. We conclude that children can be diagnosed with a combination of careful history-taking and accurate examination of pathological nystagmus.

References


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