Occlusion-amblyopia following high dose oral levodopa combined with part time patching

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Part time occlusion therapy is not reported to cause occlusion (reverse) amblyopia. However, when combined with high dose oral levodopa, an increase in the plasticity of the visual cortex can lead to occlusion amblyopia. In this case report, we describe a six year old child who developed occlusion amblyopia following part time patching combined with oral levodopa.

Key words: Levodopa, occlusion amblyopia, reverse amblyopia

Prior studies have evaluated role of levodopa in the treatment of amblyopia.[1-6] Levodopa (0.5 to 2 mg/kg three times a day) with carbidopa (in the ratio of 4 : 1) combined with part time or full time occlusion (adjunctive therapy) is reported to be safe and useful in the treatment of anisometropic and strabismic amblyopia. So far, no ocular side effects have been reported. In this report, we describe a child who developed occlusion amblyopia following treatment with high dose oral levodopa and part time occlusion therapy. Vision became normal in three months after stopping levodopa and occlusion therapy. There were no systemic side effects of the therapy and the improved vision was retained for at least two and a half years after cessation of the treatment.

Access this article online

Quick Response Code:

Website: www.ijo.in

DOI: 10.4103/0301-4738.109516

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Manuscript received: 23.09.11; Revision accepted: 23.03.12

Case Report

A six year old boy presented with the complaint of poor vision in the left eye since six months for which he had tried treatment elsewhere. He was recommended the use of spectacle and full time patching of the right eye (5 days on and 1 day off). His reports revealed that six months back his best corrected visual acuity (BCVA) was 20/32 in the right eye with +4.75DS, and 20/80 in the left eye with +5.25DS+0.5DC × 85 [Fig. 1]. The parents claimed 100% compliance to patching and the spectacle wear. The child at this point of time was very reluctant to pursue patching.

After six months of initial therapy (as mentioned above), he presented to us with the BCVA of 20/25 in the right eye with +4.5DS and 20/50 in the left eye with +5.0DS+0.5DC × 85. The best corrected binocular visual acuity was 20/22. Because of the latent nystagmus, his monocular visual acuity was measured by fogging the other eye using a +6.0DS lens. Absence of a visually appreciable nystagmus and fixation switch was confirmed before recording the visual acuity. Ocular motility examination had revealed latent nystagmus and 6 prism diopter exophoria. Worth four dot test revealed the presence of binocular single vision for near (30 cm) and distance (6 meters). The stereoacuity was 550″ on Lang test. Rest of the ocular examination was within the normal limits.

We advised full time spectacle wear and 1% atropine eye drops on Friday and Saturday night in the right (dominant) eye. Over four months, despite of a good compliance, there was no improvement in the vision. He was advised to continue spectacles and start patching of the right eye 6 hours/day. The parents were informed about the merits and demerits of an adjunct therapy with oral levodopa to improve compliance to patching. After taking an oral informed consent, the child was started on levodopa/carbidopa 2.5/0.6 mg/kg (i.e. half Tab. Syndopaplus, Sun Pharmaceutical Industries Ltd, Mumbai, India) three times daily. Patient was then lost to follow up. However, he continued the treatment and returned after five months.

After five months, when he returned for an eye examination, his BCVA in the right eye was 20/80 and in the left eye was 20/22. Worth four dot test revealed suppression in the right eye for the near and distance. Stereopsis was not assessed.

Rest of the examination was normal. He was diagnosed with occlusion amblyopia in the right eye. He was then advised to stop the right eye patching and occlude the left eye for 2 hours/day and continue levodopa. After 1 month, vision in the right eye had improved to 20/40 and that of the left eye remained stable (20/22). The same treatment was continued. After one more month, the vision in the right eye had improved to 20/32 but that of the left eye had dropped to 20/32.

Levodopa and the patching were discontinued, and the parents were advised to review after 1 month. However, the patient did not return for a follow up. After three months, the patient returned for an eye examination when his BCVA was 20/22 in each eye and stereopsis was 550" on Lang test.

On the last follow up (two and a half years after treatment with levodopa), BCVA in each eye was 20/22, with +3.0DS in the right eye and +3.5DS+0.5DC × 85 in the left eye. The binocular vision was 20/20.

Discussion

Several reports indicate that Levodopa either alone or in combination with occlusion, can be useful to improve vision in the amblyopic eye.[1-6] 0.5 to 2mg/kg/dose thrice a day is considered a safe and effective dose. When combined with 25% carbidopa, conversion of Levodopa to dopamine is prevented in the peripheral circulation, which reduces the systemic side effects of levodopa. So far, occlusion amblyopia in patients treated with levodopa and occlusion therapy has not been reported.

Visual acuity gained from the treatment with oral levodopa is reported to have a high incidence of regression. However, when used as an adjunct to the occlusion therapy, levodopa can be associated with long-term improvement in the vision, and may have better compliance to patching. In India, Levodopa in syrup formulation is not available. The lowest dose available is 100 mg levodopa with 25 mg carbidopa (tablet Syndopaplus, Sun Pharmaceutical Industries Ltd, Mumbai, India). These tablets are small and difficult to divide into a quarter. The taste of the drug is bitter; however, some investigators have smartly used it with a protein energy drink.[7] We prefer the use of half a tablet 1-3 times/day. In this patient, half tablet three times daily turned out to be a slightly higher dose than the recommended. Given that, the dose was well tolerated by the child and also there was a significant visual improvement after the commencement of oral levodopa, and hence, we continued with the same dose. Although, nausea, vomiting and abdominal cramps are the most common systemic side effects seen and reported with this dose of oral levodopa, this patient had none of those, and no symptoms/signs of any other systemic toxicity.

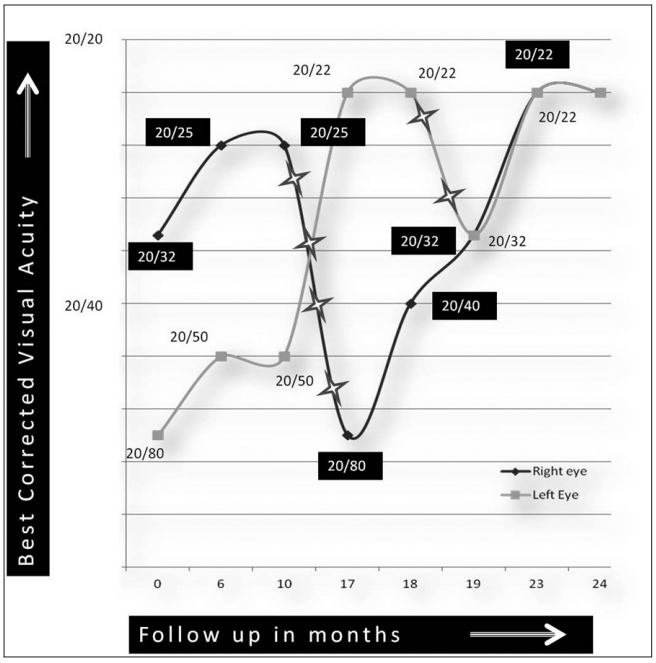

Figure 1: Graphical presentation of monocular best corrected visual acuity (BCVA) of the child on treatment with patching and oral levodopa. Duration in months denoted on X axis, visual acuity along the Y axis and the event of occlusion amblyopia is marked with stars

Occlusion amblyopia is a rare, special form of stimulation deprivation amblyopia that is seen with the prolonged occlusion of the dominant eye, as the vision in the amblyopic eye reaches normal or near normal. However, in some children it can occur when fixation switch occurs after a shorter period of occlusion. In most cases, the amblyopia is mild and fully reversible as the fixation switches back to the initially dominant eye after stopping the occlusion, or after a few days of occlusion of the initially amblyopic eye. In most cases, the end result is equal vision in both eyes. However, there are rare cases in which the initially dominant eye may be left with lesser vision.[8-10] Levodopa, when not combined with patching/penalization, doesn't cause occlusion amblyopia because both eyes are stimulated. Similarly, part time patching is also not reported to cause occlusion amblyopia whether used with or without adjunctive levodopa. Occlusion amblyopia is mostly reported to occur with atropine penalization specially when combined with optical penalization.[8-10]

In the patient reported here, occlusion amblyopia was probably due to a young age of the child and a higher dose of levodopa. Both these factors together might have resulted in an increase in the plasticity of the visual cortex there by increasing the risk of an occlusion amblyopia. We humbly acknowledge the authors of a previously published paper where such a probability was anticipated.[5] With the benefit of the hindsight, we believe, our over enthusiastic use of levodopa in this patient was not warranted. Part time patching alone, or more parental and patient counseling to pursue full time occlusion could have been sufficient. At present, we would continue to use oral levodopa with occlusion therapy only for residual amblyopia (if there is no improvement in the vision of the amblyopic eye after six months of a sincere attempt of patching). We also use combination of patching with levodopa as a primary treatment in older children (12-18 years of age) with severe (BCVA ≤ 6/60) unilateral amblyopia and a poor compliance to patching. Even though there is a possibility that the association of levodopa/carbidopa in this case may be casual rather than causal, we recommend that young children (< 8 years) on levodopa and occlusion therapy (even if it is part time patching), should be more frequently followed up (one week/year) especially when the vision of the amblyopic eye approaches that of the better eye. This fact may also hold true for the cases on other combination of therapies, namely, patching with pharmacological penalization or optical penalization. When the inter eye acuity difference is ≤ 2 lines (logarithm of

the Minimum Angle of Resolution - log MAR) , the duration between the follow up visits should become shorter. The parents should be warned about the possibility of occlusion amblyopia, and the need to stop levodopa and/or patching in case they are unable to return for the examination.

Conclusion

In conclusion, it may be advisable to avoid levodopa, or use a dose of oral levodopa less than 2 mg/kg/dose three times per day when combined with patching therapy, especially, when used in younger children or for a longer duration.

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Cite this article as: Kothari M. Occlusion-amblyopia following high dose oral levodopa combined with part time patching. Indian J Ophthalmol 2014;62:1163-5.

Source of Support: Nil. **Conflict of Interest:** None declared.