

Assessing the effectiveness of the red reflex test (Brückner) in early diagnosis of congenital eye disorders

Hamza Yazgan¹, Aydın Yıldırım¹, Esengül Keleş¹, Arzu Gebeşçi¹, Mehmet Demirdöven¹, Bülent Baştürk¹, Selim Genç²

¹Private Sema Hospital, Clinic of Pediatrics, İstanbul, Turkey

²Kartal Education and Research Hospital, Clinic of Ophthalmology, İstanbul, Turkey

Summary

Aim: To evaluate the results of red reflex (Brückner) screenings in newborns and infants.

Material and Method: The study included 2718 newborns and infants screened between January 2007 and January 2010. Red reflex examination was done during routine visits at 2-8 weeks of age. In cases where the red reflex was not observed or abnormal red reflex was present, infants were referred to the ophthalmology outpatient clinic and risk factors were investigated. The study was approved by the ethics committee (15.01.2007-21).

Results: Red reflex examination of 2715 infants (99.8%) were normal. Red reflex was absent in both eyes in two infants (00.7%) and in one eye in one infant (00.2%). The infants with bilateral absence of red reflex were diagnosed with bilateral cataracts, while the infant with unilateral absence of red reflex was diagnosed with retinoblastoma. Risk factor investigation revealed that one of the infants with bilateral cataracts had Down syndrome. No risk factors were identified in the other cases.

Conclusions: This study highlights the appropriateness of usage of the red reflex test by pediatricians and primary care physicians during routine examinations of all newborns and infants in order to prevent vision loss and ensure that relevant treatment is successful. (*Türk Arch Ped* 2012; 47: 163-164)

Key words: Infant, red reflex test, newborn

Introduction

The frequency of blindness related to congenital causes in the childhood has been reported to be 1-6/10000 (1,2). If problems which cause obstacles in the vision axis are not diagnosed and treated at an early period, they may lead to irreversible vision problems (3,4). Untreated congenital cataracts account for approximately 10% of childhood blindness (1,5). In underdeveloped and developing countries, congenital cataracts are known to be the most common treatable visual defect of infancy and childhood (1). American Academy of Pediatrics organized and published its recommendations related to performing red reflex screening (Brückner test) during the newborn period (6). In addition, the World Health Organization included the diagnosis and treatment of congenital cataract in its primary goals (7). In this study, we aimed to share the red reflex test results of newborns and infants examined by pediatricians in our clinic during a 3-year period and determine the risk factors.

Material and Method

2718 newborns and 2-month old infants (infant: period between one month and one year of age) were included in the study between January 2007 and January 2010. 1350 of these were male (49.6%) and 1368 were female (50.4%). Screening was done during regular visits performed between 2 weeks and 8 weeks using an ophthalmoscope. The test was performed directly with an ophthalmoscope setting the lens power at zero and keeping the ophthalmoscope near the eye of the physician and focusing the pupil from a distance of 45 cm to the eye of the infant. The test was preferred to be performed in a dark environment to allow pupil dilatation to the highest level. Round and bright red-yellow reflex was considered as a positive red reflex. This reflex can be observed as dark pigments and it may be light-gray in brown eyes. Infants with absent red reflex in one or both eyes or with white reflex (leucocoria) were referred to an ophthalmologist and investigations were done to determine the cause. The study was approved by the ethics committee (15.01.2007-21).

Address for Correspondence: Hamza Yazgan MD, Private Sema Hospital, Clinic of Pediatrics, İstanbul, Turkey

Phone: +90 216 458 90 00 Fax: +90 216 458 90 41 E-mail: hzyazgan@hotmail.com **Received:** 12.05.2011 **Accepted:** 05.02.2012

Results

The red reflex was present in 2715 of 2718 newborns and infants (99,8%) who were screened. The red reflex was absent in both eyes in two infants (00.7%) and in one eye in one infant (00.2%). On detailed examination performed by an ophthalmologist, bilateral congenital cataract was found in two infants of one-month of age. Retinoblastoma was found in the 45-day-old infant in whom red reflex was absent unilaterally. When etiologic investigation was done, it was observed that one of the infants with cataract had Down syndrome. No etiology was found in the other infants. Bilateral surgery was performed in infants with cataract at two months of age under general anesthesia. They are being followed up in our clinic. Since our hospital had no division of oncology, the infant with retinoblastoma was referred to another center for investigations and treatment.

Discussion

The red reflex test was defined by Brückner for the first time in 1962 (8). For a positive red reflex the light of ophthalmoscope should reach directly to the retina passing through the transparent eye environment composed of the cornea, aqueous humor, lens and vitreous and be reflected from here in the same form (9,10). In normal eyes, the light which reaches the retina and is reflected is expected to be yellowish-red, bright and symmetrical. Black spots instead of normal reflection, absence of reflex, a blurred red reflex, a white reflex or non-symmetrical reflex in the eyes are considered as abnormal red reflex test (8,11). An abnormal test may be the indicator of cataract, intraorbital bleeding, intraorbital tumors, retinal detachment, anisometry and high degrees of refractive error (11,12). Intrauterine infections, metabolic causes, chromosome anomalies and genetic causes have been blamed in the etiology (1,2). Infants with a familial history of cataract, a familial history of retinoblastoma, metabolic diseases associated with eye diseases, presence of microphthalmia or hemangioma in the lid should be considered to have a risk in terms of eye diseases and should be examined by an experienced ophthalmologist (6). In the literature, we could not find a similar study performed in our country. In our study, one of the infants with bilateral cataract had Down syndrome. No risk factor could be found in the other two infants. The timing of surgery in infants is critical in terms of the highest vision potential. The reason for this is related to the specific developmental physiology of the human visual system (13). To achieve a good result in the long term the best surgical

timing in congenital cataracts closing the visual axis is the first three months and early surgical intervention is recommended up to 6 weeks in unilateral cataract (14,15). Our infants who had cataracts were operated when they were two months old and they are being followed up.

Conclusively, the red reflex is a convenient, simple, cheap and safe test which is not time-consuming. For diagnosis and treatment of early eye problems the red reflex test should be performed by all pediatricians and primary care physicians as a part of follow-up examination.

Conflict of interest: None declared.

References

- Lambert SR, Drack AV. Infantile cataracts. *Surv Ophthalmol* 1996; 40: 427-458.
- Francis PJ, Berry V, Bhattacharya SS, Moore AT. The genetics of childhood cataract. *J Med Genet* 2000; 37: 481-488.
- American Academy of Pediatrics, American Association of Pediatric Ophthalmology and Strabismus, and the American Academy of Ophthalmology. Eye examination in infants, children, and young adults by pediatricians. *Pediatrics* 2003; 111: 902-907.
- American Academy of Pediatrics, Section on Ophthalmology. Red reflex examination in infants, and children. *Pediatrics* 2002; 109(5): 980-981.
- Nelson LB. Diagnosis and management of cataracts in infancy and childhood. *Ophthalmic Surg* 1984; 15: 688-697.
- American Academy of Pediatrics, Section on Ophthalmology, American Association for Pediatric Ophthalmology and Strabismus, American Academy of Ophthalmology, American Association of Certified Orthoptists. Red reflex examination in neonates, infants, and children. *Pediatrics* 2008; 122: 1401-1404.
- Thylefors B. A global initiative for the elimination of avoidable blindness. *Am J Ophthalmol* 1998; 125: 90-93.
- Roe LD, Guyton DL. The light that leaks: Bruckner and the red reflex. *Surv Ophthalmol* 1984; 28: 665-670.
- Sotomi O, Ryan CA, O'Connor G, Murphy BP. Have we stopped looking for a red reflex in newborn screening? *Ir Med J* 2007; 100: 398-400.
- Eventov-Friedman S, Leiba H, Flidel-Rimon O, Juster-Reicher A, Shinwell ES. The red reflex examination in neonates: an efficient tool for early diagnosis of congenital ocular diseases. *IMAJ Isr Med Assoc J* 2010; 12: 259-261.
- Roe LD, Guyton DL. The light that leaks: Bruckner and the red reflex. *Surv Ophthalmol* 1984; 28: 665-670.
- Gole GA, Douglas LM. Validity of the Bruckner reflex in the detection of amblyopia. *Aust N Z J Ophthalmol* 1995; 23: 281-285.
- Elston JS, Timms C. Clinical evidence for the onset of the sensitive period in infancy. *Br J Ophthalmol* 1992; 76: 327-328.
- Lambert SR. Treatment of congenital cataracts. *Br J Ophthalmol* 2004; 88: 854-855.
- Chak M, Wade A, Rahi JS, British Congenital Cataract Interest Group. Long-term visual acuity and its predictors after surgery for congenital cataract: findings of the British congenital cataract study. *Invest Ophthalmol Vis Sci* 2006; 47: 4262-4269.