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Research Article

Solitary (Unilateral Unifocal Typical) Hypertrophy of Retinal Pigment Epithelium

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Abstract

Objective: To determine the prevalence of solitary typical hypertrophy of retinal pigment epithelium (RPE) in newborns. **Methods**: Analysis of published articles on large-scale screening studies of newborns (pre-term and term) performed using wide-field digital fundus imaging in which authors reported fundus lesions and abnormalities other than retinopathy of prematurity and retinal hemorrhages; counting of the cases in which an ocular fundus lesion diagnosed as solitary typical hypertrophy of the RPE was reported. **Results**: Eleven published articles on ocular fundus screening examinations of > 1,000 newborns reported fundus lesions and abnormalities other than retinopathy of prematurity in an aggregate total of over 300,000 cases. Only 3 newborns were reported to have hypertrophy of the RPE, and none of these cases was identified specifically as solitary (unilateral unifocal typical) hypertrophy of the RPE. **Conclusion**: Although a few congenital lesions diagnosed as solitary typical hypertrophy of the RPE have been reported, most lesions of this type do not appear to be congenital. In view of this, the term "congenital hypertrophy of the RPE" for all lesions of this type should probably be abandoned.

Introduction

The clinical lesion commonly referred to as congenital hypertrophy of the retinal pigment epithelium (frequently expressed as the acronym CHRPE) is a very distinctive ocular fundus lesion [1]. It is characteristically black (at least in part) and well-defined and therefore almost impossible for a qualified eye care professional (ophthalmologist or optometrist) to overlook during performance of a dilated fundus examination by binocular indirect ophthalmoscopy or for a reviewer of wide-field digital fundus photographs of affected eyes to miss. The word "congenital" in this lesion's common name reflects a commonly held belief that the lesion is a birth mark that is present and therefore detectable by fundus examination performed shortly after birth. However, very few patients with such a lesion detected prior to the age of 10 years have ever been reported, and the median patient age at initial detection of such lesions in the largest published series to date was 45 years [2].

The prevalence of lesions of this type in an unselected human population is unknown but generally believed to be low. However, one study of widefield fundus photographs of 1745 patients evaluated in an optometric practice reported detecting a lesion of this type in 21 (1.2%) [3]. Another study of 406 evaluated healthy college age persons in Israel identified "one or more CHRPE lesions" in 18 cases (4.4%) [4]. One cannot vouch independently for the accuracy of the diagnosis of hypertrophy of the retinal pigment epithelium (RPE) in these series, and (even if the diagnosis was correct in all cases) whether the reported lesions were solitary (unilateral unifocal typical) hypertrophy of the RPE, multifocal clustered typical hypertrophy of the RPE ("grouped pigmentation of the retina"), or multifocal non-clustered atypical hypertrophy of the RPE characteristic of Gardner syndrome [5]. Even if these prevalence figures are gross overestimations of the true prevalence of such lesions in the general population, one would certainly expect that many lesions of this type would have been detected and diagnosed by examiners of newborns who used binocular indirect ophthalmoscopy, wide field fundus photography, or both for ocular fundus evaluation if they are truly congenital.

The author searched the peer-reviewed literature for reports of fundus screening examinations of both selected (e.g., premature births) and unselected newborns in which the authors reported

ocular fundus findings other than retinopathy of prematurity and retinal hemorrhages in an attempt to determine how frequently "solitary" hypertrophy of the retinal pigment epithelium was detected and reported in those studies.

Methods

The author used PubMed to search for English language articles describing the results of ocular fundus screening evaluations of newborns published in peer-reviewed journals during years 2013 through 2023. The author reviewed the identified articles and determined both the method of fundus examination employed and the number of newborns evaluated in the reported study. The author excluded reports that described a study group of < 1000 cases and ones that used direct ophthalmoscopy only to examine the fundus. The author counted the number of cases in which a "solitary" hypertrophy of the retinal pigment epithelium was identified, diagnosed, and reported in each of them.

Results

The author's PubMed search identified 11 English language articles that reported results of ocular fundus screening evaluations performed using a wide-field digital imaging system on study groups consisting of >1000 newborns [6-17] (see Table 1). The Table identifies these articles, indicates their respective years of publication, describes the nature of the evaluated study group, and lists the number of newborns reported to have undergone ocular fundus screening in each study. The largest study group in these articles numbered 199,851 and the smallest numbered 1,152.

The authors of these articles in aggregate reported identifying 248 cases of choroidal or chorioretinal coloboma, 21 cases of retinoblastoma, 12 cases of choroidal nevus, 4 cases of capillary hemangioma of the optic disc, and at least 1 case of Coats' disease. However, the authors in aggregate reported identifying only 3 newborns (2 in one center, 1 in another center) categorized as having congenital hypertrophy of the retinal pigment epithelium [9,12]. A fundus photo of one of these 3 cases was included in a report from a single Indian center [9]. That photo shows multiple tiny spicular black fundus spots in two clusters in the affected eye and is certainly not consistent with solitary (unilateral unifocal typical) hypertrophy of the RPE. The authors who reported the other two cases [12] did not show photos or describe their findings in the affected newborns.

[ref. #]	study authors/center(s)	publication year	subjects	Number screened
[6]	Tang et al./8 Chinese centers	2018	pre-term & term newborns	1,99,851
[7]	Fei et al./9 Chinese centers	2021	pre-term & term newborns	64,632
[8]	Liu et al./1 Chinese center	2021	pre-term & term newborns	23,861
[9]	Ranjan et al./1 Indian center	2022	pre-term & term newborns	9,105
[10]	Li et al./1 Chinese center[a]	2013	healthy term newborns	3,573
[11]	Gursoy et al./1 Turkish center	2018	pre-term & term newborns	3,440
[12]	Ozturk et al./1 Turkish center	2022	pre-term newborns	1,569
[13]	Jayadev et al./1 Indian center	2015	pre-term newborns	1,450
[14]	Dabir et al./2 Indian centers	2023	pre-term newborns	1,437
[15]	Ali et al./1 Arabian center	2021	term newborns	1,220
[16]	Sitorus et al./2 Indonesian centers	2021	term newborns	1,208
[17]	Goyal et al./1 Indian center	2018	term newborns	1,152
			Total	308,925

[a]The cases reported in this article were almost certainly included in the subsequent report by Tang et al. [6], so these cases are not included in the total of reported screened newborns.

Table 1: Identified reports of large-scale ocular fundus screening studies of newborns published in peer-reviewed journals between 2013 and 2023, listed in decreasing order of number of newborns in the screened study group.

Although it was not identified by the PubMed search criteria mentioned in the Methods section above, one article was identified in which the authors reported fundus findings in 5527 infants evaluated within the first 3 months of life by smartphone-based fundus imaging [18]. Those authors indicated that they detected 14 congenital hypertrophy of the retinal pigment epithelium lesions in their series. The authors did not provide any summary information about the size distribution of these lesions, indicate how many of the lesions were solitary versus multiple in the affected child or eye, categorize the lesions as typical or atypical, or specify the number of screened infants in whom they detected such a fundus lesion. They illustrated one lesion they diagnosed as CHRPE in their article, and this lesion appears to be consistent with a small (approximately 1/5th of the optic disc's diameter) solitary unilateral unifocal typical hypertrophy of the RPE. The authors of this article also indicated that they detected 11 choroidal nevi and one case each of retinoblastoma, retinal astrocytic hamartoma, and combined hamartoma of the retina in their screened cases.

Discussion

The fact that only 3 cases of hypertrophy of the RPE were identified specifically in over 300,000 screened newborns in the aggregate study group evaluated by wide-field digital fundus imaging suggests strongly that most lesions of this type are not congenital. As indicated above, one of the three cases with reported CHRPE was illustrated by the authors [9] but appears inconsistent with the diagnosis of solitary (unilateral unifocal typical) hypertrophy of the RPE. If the other two (non-illustrated) cases were both solitary typical hypertrophy of the RPE, then the observed prevalence of such lesions in newborns would have been 2 cases in 308,925 newborns (6.5 cases/million newborns). If either or both of the non-illustrated cases had multifocal clustered typical or multifocal non-clustered atypical RPE lesions, then the prevalence would have been even lower. The one article that reported fundus findings detected by smartphone-based fundus imaging mentioned finding 14 CHRPE lesions in 5527 screened infants. If one assumes that all of these lesions were solitary (unilateral unifocal typical) cases (which was probably not the case), then the prevalence of such lesions could potentially have been as high as 14 cases per 5527 screened newborns (253 cases/100,000 newborns).

Because I did not have access to any of the wide-field digital fundus photos or smartphone-based fundus photos obtained in the cited studies except for those the authors published as illustrations, I cannot vouch independently for the accuracy of the diagnosis of RPE hypertrophy in the non-illustrated cases.

There are several reasons to be skeptical about the accuracy of some of the reported diagnoses in the cited newborn screening studies. The first reason is the substantial difference in frequency of certain diagnoses that were identified in the various cited studies. For example, Liu et al [8] reported finding a choroidal or chorioretinal coloboma in 42 of 23,861 screened newborns and Fei et al [7] reported finding a lesion of this type in 99 of 64,632 screened newborns while 5 of the cited sets of authors did not report detecting such a lesion in a single case. A second reason is use of vague diagnostic terms such as "abnormal fundus pigmentation" and "fundus pigment deposition", which may have included discrete fundus lesions of the RPE without identifying them specifically, by authors of some of the studies. A third reason is the unusually high frequency of diagnosis of certain lesions (e.g., choroidal nevus) which are generally acknowledged to be extremely rare in newborns [19] by authors of some studies. As mentioned in the final paragraph of the Results section above, the authors of one article based on wide-field digital fundus imaging reported finding 12 congenital choroidal nevi in 1568 screened newborns [12] and the authors of the study based on smartphone fundus imaging reported finding 14 such cases in 5527 screened infants [18]). I suspect strongly that many if not most or all of these lesions were either small patches of isolated choroidal melanocytosis [20] or prominent focal aggregates of normal or near normal uveal melanocytes (FANNUMs) in the choroid [21] and not true choroidal nevi. If these diagnoses were erroneous, then some of the others in the various studies were probably also erroneous.

Is it possible that classic solitary typical hypertrophy of the RPE was actually present in many of the screened eyes but not detected? Given the characteristic black color of these lesions and the prior observation that lesions of this type can occur in any region of the fundus [2], this seems highly unlikely.

Is it possible that lesions of this type were present in many of the screened eyes but not detectable because they had not yet accumulated the dense intracytoplasmic melanin characteristic of such lesions? Melanin pigment production and intracytoplasmic melanin accumulation are generally evident in most RPE cells by the fifth week of embryological development and tend to be prominent in almost all cases by the 8th week [22], so this explanation also seems unlikely.

Is it possible that lesions of this type were present and detected in many of the evaluated eyes in the cited series but not mentioned by the authors because they did not believe them to be noteworthy? Recognizing that the authors in aggregate reported at least 22 retinoblastomas and other discrete ocular fundus lesions, this also seems highly unlikely.

Is it possible that lesions of this type were present and detected in many of the evaluated eyes in the cited series but misdiagnosed as something other than hypertrophy with hyperpigmentation of the RPE? I suppose this is possible, but lesions of this type have such characteristic features that most would be diagnosed accurately by

most first year residents in ophthalmology if they were present and detected.

Is it possible that lesions of this type were present in a similar proportion of eyes evaluated by wide-field digital fundus imaging in the various cited studies and in the cited smartphone-based fundus imaging study but were somehow detected more successfully by smartphone-based imaging? I doubt it. The photos obtained by smartphone imaging are frequently more blurred than those obtained by wide field digital fundus imaging, so this also seems unlikely.

It's generally recognized that ocular lesions of many different types can be congenital. For example, as the screening studies summarized in this article indicated, several evaluated newborns were observed to have a congenital retinoblastoma. The fact that some retinoblastomas are congenital certainly does not warrant categorizing all retinoblastomas as congenital. The same can be said about classic solitary typical hypertrophy of the RPE. Although a few such cases in newborns have been reported, it appears inappropriate to categorize all lesions of this type as congenital. In view of this, this author strongly advocates for rejecting the common term "congenital hypertrophy of the retinal pigment epithelium" for all such lesions.

If lesions of this type are not congenital, then when, how and why do they develop? Unfortunately, at the present time, there are no satisfactory answers to these questions.

Conflict of Interest: None.

References

1. Buettner H (1975) Congenital hypertrophy of the retinal pigment epithelium. Am J Ophthalmol 79:177-189.
2. Shields CL, Mashayekhi A, Ho T, Cater J, Shields JA (2003) Solitary congenital hypertrophy of the retinal pigment epithelium. Clinical features and frequency of enlargement in 330 patients. Ophthalmology 110:1968-1976.
3. Coleman P, Barnard NAS (2007) Congenital hypertrophy of the retinal pigment epithelium: prevalence and ocular features in the optometric population. Ophthalmic Physiol Opt 27:547-555.
4. Shneor E, Millodot M, Barnard S, Gantz L, Koslowe K (2014) Prevalence of congenital hypertrophy of the retinal pigment epithelium (CHRPE) in Israel. Ophthalmic & Physiological Optics 34:385.
5. Shields JA, Shields CL, Shah PG, Pastore DJ, Imperiale SM (1992) Lack of association among typical congenital hypertrophy of the retinal pigment epithelium, adenomatous polyposis, and Gardner syndrome. Ophthalmology 99:1709-1713.
6. Tang H, Li N, Zhang M, Wei M, Huang C, et al. (2018) Fundus eamination of 199,851 newborns by digital imaging in China: a multicentre cross-sectional study. Br J Ophthalmol 102:1742-1746.
7. Fei P, Liu Z, He L, Li N, Xu L, et al. (2021) Early detection of ocular abnormalities in a Chinese multicentre neonatal eye screening program. 1-year result. Acta Ophthalmol 99:e415-e422.
8. Liu D, Zheng J, Lu Y (2021) Fundus examination of 23,861 newborns by digital imaging in Ningbo. J Ophthalmol 2021:6620412.
9. Ranjan R, Das A, Prema S, Shah PK (2022) Coincidental ocular findings during retinopathy of prematurity tele screening of 9105 neonates. Our J Ophthalmol 32:563-574.
10. Li LH, Zhang JY, Fei P, Zhang GM, Mao JB (2013) Findings of perinatal ocular examination performed on 3573 healthy full-term newborns. Br J Ophthalmol 97:588-591.
11. Gursoy H, Belgic MD, Erol N, Basmak H, Colak E (2018) The analysis of posterior segment findings in term and premature infants using RetCam images. Int Ophthalmol 38:1879-1886.
12. Ozturk T, Engin CD, Yigitaslan EK, Yaman A, Berk T (2022) Accidentally diagnosed ocular abnormalities identified during close screening for retinopathy of prematurity. Eur J Ophthalmol 32:3267-3273.
13. Jayadev C, Vinegar A, Bauer N, Mangalesah S, Mahendradas P, et al. (2015) Look what else we found - clinically significant abnormalities detected during routing ROP screening. Indian J Ophthalmol 63:373-377
14. Dabir S, Mohankumar A, Munusamy S, Rajan M, Azad R (2023) Review of incidental ocular pathologies detected during the screening of retinopathy of prematurity in preterm infants. Oman J Ophthalmol 16:258-262.
15. Ali SMA, Ossuetta I, Dahlmann-Noor A, Jayaram H, Kozak I (2021) Comprehensive ocular examination of healthy newborns in the Middle East. Ophthalmi Epidemiol 28:306-311.
16. Sitorus RS, Pambudy IM, Rohsiswatmo R, Barliana JD, Yulia DE, et al. (2021) Retinal abnormalities in universal eye screening of healthy, full-term newborn infants in Jakarta. The incidence and its risk factors: a pilot study. Int J Ret Vit 7:67.
17. Goyal P, Padhi FR, Pradhan L, Sutar S, Butola S, et al. (2018) Outcome of universal newborn eye screening with wide-field digital ritual image acquisition system: a pilot study. Eye (Lond) 32:67-73.
18. Acar DE, Ozgur A (2024) The evaluation of ocular posterior segment findings in 5527 term infants using smartphone-based fundus imaging. J Ophthalmol 2024:4065885.
19. Shields CL, Furuta M, Mashayekhi A, Berman EL, Zahler JD, et al. (2008) Clinical spectrum of choroidal nevi based on age at presentation in 3422 consecutive eyes. Ophthalmology 115:546-552.
20. Augsburger JJ, Brooks CC, Correa ZM (2020) Isolated choroidal melanocytosis: clinical update on 37 cases. Graefes Arch Clin Exp Ophthalmol 258:2819-2829.
21. Augsburger JJ (2021) Focal aggregates of normal or near normal uveal melanocytes (FANNUMs) in the choroid. A practical clinical category of small ophthalmoscopically evident discrete melanocytic choroidal lesions. Arch Clan Ophthalmol 1:8-19.
22. Streeten BW (1969) Development of the human retinal pigment epithelium and the posterior segment. Arch Ophthalmol 81:383-394.