Incidence of cilioretinal arteries in Chinese Han population

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Abstract

· AIM: To estimate the incidence of cilioretinal arteries among Han population of north China.

· METHODS: A cross-sectional sample of subjects aged from 20 years old to 80 years old were selected using a cluster sampling technique from Shenyang of Liaoning Province for Diabetic Eye Disease Study. Eligible subjects were recruited in the Community Health Center which took the stereo fundus photography using 45° Non-Mydriatic Fundus Camera. Data were analyzed by SPSS 14.0.

· RESULTS: The incidence of cilioretinal arteries in 5000 eyes of 2500 subjects was determined. One, two or more cilioretinal arteries were present in 876 of all subjects and in 923 of all the eyes. Difference of presence, number and distribution of cilioretinal arteries was observed. During the subjects, the arteries occurred bilaterally in 6.9% and contributed to some portion of the temporal circulation in 78.3%, nasal circulation 14.8%, respectively. Statistical analysis indicated that there was no significant difference in incidence between men and women, left and right eyes ( P > 0.05).

· CONCLUSION: 35.0% persons have the cilioretinal arteries in Han population of north China. Men and women have an equal distribution of cilioretinal arteries.

· KEYWORDS: cilioretinal artery; incidence; population

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INTRODUCTION

There is a close relationship between many eye diseases and the distribution pattern of retinal blood vessels. Studies have shown that blockage of some vessels supplied for retinal blood could lead to eye diseases and cilioretinal artery was proved to be one of this kind of vessels [1-3]. However, the prevalence of this artery varies for individual, in other word, not everyone has the cilioretinal artery. So understanding the incidence of cilioretinal artery may indirectly provide information for the prevalence of cilioretinal artery diseases. The prevalence of one or more cilioretinal arteries has previously been reported to be 49.5% of individuals and 32.1% of eyes, based on a review of stereo fundus photographs and fluorescein angiograms from 1000 subjects [4]. Another study found the incidence of cilioretinal arteries was 6.9% in Indians [5]. But to date, the incidence of this anatomical variations has never been invested among Chinese Han population. In this study, we used Non-Mydriatic Fundus Camera to analyze the incidence of cilioretinal artery in Han population of north China.
RESULTS
The presence of (one, two or more) cilioretinal arteries were 35.0% (95% CI: 23.7%-40.8%) in 876 of all subjects and 18.5% (95% CI: 13.5%-25.6%) in 923 of all the eyes. Of the total number of cilioretinal arteries, 78.3% (95% CI: 70.4%-83.5%) were located temporally (Figure 1A), 14.8% (95% CI: 10.3%-18.6%) were located nasally (Figure 1B) and 6.9% (95% CI: 3.4%-9.8%) were located bilaterally (Figure 1C). The number of individuals with cilioretinal arteries were 421 (34.2%, 95% CI: 29.6%-38.2%) and 455 (35.8%, 95% CI: 31.1%-38.3%) in men and women, respectively. 435 (17.4%, 95% CI: 13.2%-20.9%) cilioretinal arteries were in right eyes and 488 (19.5%, 95% CI: 15.8%-22.8%) in left eyes. No significant difference in incidence between men and women, left and right eye (P>0.05), was observed (Table 1).

DISCUSSION
The cilioretinal artery, which originates from the short posterior ciliary artery and goes through the optic nerve or its neighbor and enters in ocular to participate in the retina circulation, is different from the retina central artery [6]. Many people do not have such a vessel, if it exists, the inner retina is supplied by two vascular systems, cilioretinal artery system and retina central artery system. Both of the arteries are different in size, distribution and issue of position. Given these different characteristics, it could be easily distinguished by the fundus. Non-Mydriatic Fundus Camera is a very useful tool through which extremely sophisticated digital fundus image could be accessed. To date, it is widely used for screening or monitoring of diabet retinopathy, glaucoma and other serious illnesses [7-8]. In this study, the incidence of cilioretinal artery was 35.0% in all subjects and 18.5% in all the eyes. These data are higher than prior studies based on the direct visualization of the fundus 7%-29.6%. But it is a little lower than the study which is about the prevalence of cilioretinal arteries based on a review of stereo fundus photographs and fluorescein angiograms. This difference may be due to the methods for assessing cilioretinal arteries. Non-Mydriatic Fundus Camera could make the assessment more convenient and accurate because it was greater magnifying and much clearer than direct checking fundus, which was difficult to distinguish the retinal artery from the cilioretinal artery when they were staggered. So the lower incidence of the prior studies could be explained by the different assessing means. Due to the same reason with the prior studies, the incidence of temporal cilioretinal arteries was more than that of nasal ones. Temporal retinas vessels are larger than nasal retinas, which require more blood supplying. It may be the reason that previous study also observed that some cases of a cilioretinal artery supplying the entire retina [9]. Cilioretinal arteries are derived directly from the circle of Zinn, which is formed by some small branches from the short posterior ciliary arteries supplying the choroids. It is of clinical relevance that a temporal cilioretinal artery supplying the fovea may spare the fovea in case of central retinal artery occlusion. Therefore, the cilioretinal arteries are important for protecting macular in some retinal blood vessel or any other disease, for example, the high-tension open angle glaucoma which lead to central visual field damaged. Understanding the incidence of cilioretinal artery can predict the blood circulation of macula and inner retina, even though the central vision could be concluded after retinal vascular occlusion. Relatively, cilioretinal artery occlusion can also lead to macular or inner retinal diseases, but compared to this the previous meaning is more important.

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Table 1  Variation of cilioretinal artery  

<table>
<thead>
<tr>
<th></th>
<th>Yes</th>
<th>No</th>
<th>n</th>
</tr>
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<tbody>
<tr>
<td>Man</td>
<td>421(34.2)</td>
<td>809(65.8)</td>
<td>1230</td>
</tr>
<tr>
<td>Woman</td>
<td>455(35.8)</td>
<td>815(64.2)</td>
<td>1270</td>
</tr>
<tr>
<td>Right eye</td>
<td>435(17.4)</td>
<td>2065(82.6)</td>
<td>2500</td>
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<tr>
<td>Left eye</td>
<td>488(19.5)</td>
<td>2012(80.5)</td>
<td>2500</td>
</tr>
</tbody>
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Zhou, Li-Tao Gao, Yuan-Yuan Zhang, Hong Shi, Jin Geng, and De-Peng Shi et al.

REFERENCES