Editorial

Is macular hole a risk factor for retinal detachment?

Hyun Woong Kim[1], Ji Eun Lee[2,3]

[1]Department of Ophthalmology, Busan Paik Hospital, College of Medicine, Inje University, Busan, Korea; [2]Department of Ophthalmology, School of Medicine, Pusan National University, Yangsan, Korea; [3]Medical Research Institute, Pusan National University Hospital, Busan, Korea

Correspondence to: Ji Eun Lee, MD, PhD. Department of Ophthalmology, Pusan National University Hospital, 179 Gudeok-ro, Seo-gu, Busan 602-739, Republic of Korea. Email: jlee@pusan.ac.kr.

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There was an 'outbreak' of retinal detachment after macular hole (MH) surgery in early 2000s (1,2). Retinal detachment in a vitrectomized eye may result in a disaster of proliferative vitreoretinopathy, if the vitreous has not been removed sufficiently. The outbreak was associated with several factors in the era.

More than a decade ago, the sutureless vitrectomy of 25 G system was introduced (3). The early instruments were much more flexible than the current instruments, and it was difficult to remove the peripheral vitreous (4,5). To make it worse, wide-viewing systems were not popular, and the contact prism lens was used to see the periphery. Perpendicular entrance, rather than oblique incision of the current technique, was used for insertion of the cannulas. Many surgeons preserved the peripheral vitreous intentionally to prevent postoperative leakage or hypotony. Partial hyaloidectomy is still valid for epiretinal membrane (ERM) surgery. However, MH surgery requires gas tamponade.

Surgical induction of posterior hyaloid detachment may also increase the risk of a retinal break (6). Gas tamponade displaces the remained vitreous to the periphery, causing traction to the vitreous base and subsequent formation of a retinal break. As gas is absorbed, the fluid becomes able to approach the break. Partially absorbed gas enhances inertial movement and traction to the retina, which promote progression of detachment. The remained vitreous, as well as inflammation related to the previous operation and gas tamponade provokes proliferative vitreoretinopathy. This was a story that happened occasionally.

As the instruments and surgical techniques developed, the incidence of retinal detachment after MH surgery decreased (7). Oblique entrance reduced postoperative hypotony in spite of extensive peripheral vitrectomy (8). The more rigid instruments, high-speed cutter, and wide-viewing system allow us to remove the peripheral vitreous efficiently, with less time and less chance of complications (9). Nonetheless, retinal detachment still occurs after MH surgery, to surgeons' disappointment. Postoperative retinal detachment would not be a just matter of the surgical procedure, as its incidence is higher in MH surgery than ERM surgery (1,6). Moreover, development of MH has been reported after successful management of retinal detachment (10,11).

It is rational to suspect that MH might be related to formation of a peripheral retinal break. What makes a difference between simple posterior vitreous detachment (PVD) and development of MH? It appears plausible that MH patients might have a strong vitreo-retinal adhesion and/or weakness in the retinal structure than the others. First of all, MH itself is a retinal break. Dr. Zhang's article (12), demonstrating the relationship between MH and retinal break/lattice degeneration in the current issue, is based on this speculation.

Dr. Zhang and the colleagues (12) demonstrated that retinal break and/or lattice degeneration were found in 62 eyes (33.9%) with full thickness MH, and there was no statistical difference of prevalence of retinal break and/or lattice degeneration between the pseudophakic eyes and phakic eyes. However, their report has several limitations. There is no control group in this study. They compared the prevalence to that of previous reports (13,14), rather than that of control group such as age-matched normal population. It is very important to design the control group in this kind of study. Although the reported prevalence of 6-10.7% in normal population seems lower than the current

report, debates still persist, as the prevalence of retinal tear or lattice degeneration is associated with many factors, including age (15), refractive error (16) and axial length (17).

Mean spherical equivalent refractive error was –1.17±1.55 (range, –4.00 to 1.50) diopters, but frequency of myopia was not presented in their study. Although high myopia was not included in this study, myopia can affect the prevalence of retinal break and/or lattice degeneration independently. The authors should take difference between ethnic groups into consideration, as the previous studies about retinal break/lattice degeneration have performed in Western countries, where hyperopia is more prevalent than Eastern Asia.

There was no statistical difference of prevalence of retinal break and/or lattice degeneration between the pseudophakic eyes and phakic eyes. This is a result conflicting to the previous reports showing an obvious casual relation between cataract surgery and PVD (18). The discrepancy would come from the small number of pseudophakic eyes (n=17, 9.3%). If more pseudophakic eyes are included in a future study, we will have additional understandings of the effects of PVD on retinal break/lattice degeneration in eyes having MH.

Discussions about genetic factors possibly related to MH and retinal break/lattice degeneration are noteworthy. Some hereditary degeneration and genetic variations are known to predispose retinal break/detachment or lattice degeneration (19-21). In the other hand, Alport syndrome has been reported to be associated development of large MH (22,23). Cystoid macular edema in retinitis pigmentosa may progress to full-thickness MH (24). Although there is no report regarding genetic predisposition to idiopathic MH, more researches are needed in this field.

The bottom line is that every surgeon should keep it in mind that MH surgery has a risk of postoperative retinal detachment. Adequate removal of the peripheral vitreous, meticulous examination before fluid-air exchange and careful postoperative examination will prevent the harassing complication.

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Footnote

Conflicts of Interest: The authors have no conflicts of interest to declare.

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