

form which we observe after the intracapsular operation. As traction on the ciliary body undoubtedly may lead to cyclitis, the possibility of this being the cause is apparent.

Dr. O'Brien has asked about anterior chamber hemorrhages. I have, fortunately, not had very many of these. Dr. Bracken, who is doing this operation a great deal in Memorial Eye Hospital, has been encountering this complication, and has asked me the cause of it. I do not know, unless it can be ascribed to the adrenalin in the retro-ocular injection.

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## FURTHER OBSERVATIONS ON DETACHMENT OF THE CHOROID AFTER CATARACT EXTRACTION\*

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In a previous study† of detachment of the choroid after cataract extraction it was discovered that separation occurred frequently during the operation or within a few minutes after delivery of the lens. In the report of that study the statement was made that, so far as could be determined, the sudden reduction of intra-ocular pressure almost invariably resulted in immediate transudation of fluid into the suprachoroidal space, with resultant detachment of the choroid at the time of operation. A report of further observations is herein offered as proof of the truth of that statement.

Ophthalmoscopic examination of the fundus was attempted immediately after cataract extraction in 140 consecutive uncomplicated cases. In 92 of the 140 cases the fundus was well visualized, and in 86 of these detachment of the choroid was observed, an incidence of over 93 per cent. In the 86 cases in which detachment was seen, the lens had been extracted intracapsularly in 81 and by the extracapsular method in the five remaining cases, which is evidence that the method

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† O'Brien: Tr. Am. Ophth. Soc., 1935, xxxiii, p. 325.

of extraction is not apparently a determining factor in the production of choroidal detachment.

In 54 cases the fundus was invisible, or could not be studied because of the presence of cortical remnants, blood or air in the anterior chamber, haziness of the cornea, or other less frequent obstructions to vision.

All the detachments were, as one would expect, more or less flat, and presented a characteristic appearance. The border of the detached area appeared as a dark, gently curved, elevated line with the convexity directed toward the nerve head. At this border the retinal vessels arched forward and accentuated the appearance of elevation. Peripheral to the border, over the area of detachment, the fundus had a light, translucent appearance. It has been suggested that the detachment resembles somewhat the appearance of a lens that is dislocated into the vitreous.

The location of the detachment varied, but in 75 cases it was in the inferior, inferior temporal, or inferior nasal fundus, usually well toward the periphery. In four cases the detachment was in the inferior temporal and inferior nasal fundus, with a normal intervening area; in four it was in both the inferior and superior fundus, and in the remaining two cases it was situated in the temporal fundus. It must be recorded that visualization of the extreme upper periphery of the eyeground after cataract extraction is difficult, and observations were not often satisfactory, consequently more detachments than have been mentioned may have been present in this area.

The detachments were variable in size, and in many cases were seen to increase during the period of observation. As a rule, the detached area was situated in the equatorial and more peripheral regions, and appeared to occupy from 90 to 120 degrees of the circumference at the ora serrata. Large areas of detachment, occupying approximately one-half of the fundus, and reaching almost to the nerve head, were observed in 16 cases.

With healing and closure of the corneal wound the choroid always reattached, and vision was unaffected.

#### CONCLUSIONS

Detachment of the choroid occurs with regularity either during or immediately after cataract extraction. In 140 consecutive uncomplicated cases the fundus was visible in 92, and in 86 of these the choroid was observed to be detached—an incidence of over 93 per cent.

#### DISCUSSION

DR. ARNOLD KNAPP, New York: Is it possible that there are two forms of detachment of the choroid, an early and a late one? I would like to ask Dr. O'Brien whether he has observed the early type which he has just described going into the later type that we are all familiar with; and, secondly, how long does this early and shallower detachment which he has just described usually last?

DR. P. C. JAMESON, Brooklyn: I am very much interested in Dr. O'Brien's paper. It recalls an interesting case which I reported at the New York Ophthalmological Society some years ago, when Professor Fuchs was present in New York. I asked him his opinion as to the cause of the phenomena which appeared, and which I will presently relate, and he immediately stated that he had found the condition to be due to choroidal detachment, and in some instances subchoroidal hemorrhage was the underlying cause, and he prognosticated good vision in such cases if closure was obtained.

Briefly, the case was as follows: The patient was a woman, aged eighty years, on whom I did an extracapsular operation. The operation had gone very satisfactorily, but just as I was completing the toilet of the wound, to my astonishment, a large body of clear vitreous slowly appeared. This was not an ordinary vitreous protrusion: it was a vitreous hernia, limited by and enclosed in membrane. It occupied about one-third of the area of the entire eyeball, and dislocated the corneal flap so that its anterior surface met and touched the anterior surface of the cornea below. I had never encountered this condition before, and incidentally was in a quandary as to how to combat it, but decided to push the corneal flap, by means of the lid, as far over the hernia as possible and apply a bandage over the lid with maximum pressure, renewing it every day

without inspection. This was accomplished without rupturing the protruding hernia. At the end of seven days the lips of the wound were absolutely in apposition and there was no evidence of the hernia. The vision obtained equaled 6/9.

Time will not permit me to report two other cases of a similar nature in which the results were not good, since closure was not obtained.

I describe this case in the belief that detachment of the choroid, as described by Dr. O'Brien, whether the origin be from sub-choroidal hemorrhage or from serous exudate, may, in the absence of normal pressure, throw light on the cause of some cases of vitreous protrusion and also on these rare cases of vitreous hernia with limiting membrane.

DR. F. H. VERHOEFF, Boston: From a theoretical standpoint I think that it is perfectly reasonable to assume that, as Dr. O'Brien says, after cataract extraction separation of the choroid occurs in all cases. I should be very glad to believe that, but I am of the opinion that when you make an incision in an eye you have the anterior chamber obliterated, which is due to either the cornea sinking in or the sclera sinking in, and in the majority of cases it is due to the sclera sinking in. Dr. O'Brien examines the eye very soon after the operation, when the sclera is sunken in, and I should think he might easily mistake the condition for separation of the choroid. I hope Dr. O'Brien can disprove this, because I should prefer to believe that it is separation of the choroid that he has observed. We might say that a noticeable increase in the condition excluded the possibility I have mentioned, were it not that fluid continues to come out of the vitreous, so that for a time we can secure an increase in indentation of the globe.

DR. C. S. O'BRIEN, closing: I wish to thank the gentlemen for their discussions. In answer to Dr. Knapp's first question, as to whether the flat detachment occurring at the time of operation may enlarge into the large bullous type which is seen a few days later, I am not sure. I have not followed a detachment through such stages and have made no attempt to do so. If the wound healed slowly and aqueous drainage persisted over a period of days, I see no reason why the detachment should not enlarge.

Dr. Knapp has also asked how long these detachments persist. No effort has been made to examine the fundus daily. In a few cases an ophthalmoscopic examination has been made on the third or fourth day and there was no evidence of the detachment.

Dr. Jameson and I are evidently speaking of entirely different conditions. The subchoroidal fluid is not blood.

Dr. Verhoeff questions the possibility of the fundus picture being the result of partial scleral collapse. Then the change in the fundus should appear over the area of the recti muscles, but it is not so situated. If the condition is due to scleral collapse, it should occur as soon as the incision is made, but sometimes after the extraction is completed it is several minutes before the detachment is visible. Furthermore, the gradual progress of the detachment may be observed; it has the appearance of fluid flowing under a membrane. Also the area of detachment presents a light, translucent appearance. Finally, experimental results in animals point to the collection of perichoroidal fluid immediately after opening the eye.

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OCULAR LESIONS ASSOCIATED WITH POSTOPERATIVE AND GESTATIONAL NUTRITIONAL DEFICIENCY\*

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AND

(By invitation)

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The occurrence of hemeralopia and xerophthalmia among persons whose diet is deficient in vitamin A has been well established. Experimental data have confirmed the effect of deprivation of vitamin A in the production of these conditions. That deficiencies in the intake of other vitamins can cause lesions of the eye has not been so clearly demonstrated, although a number of clinical and a few experimental reports can be found in the literature. Cataracts have been observed among experimental animals that were receiving diets deficient in vitamin G (O'Brien and Langston,

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