NORWEGIAN CONTRIBUTION TO THE DIAGNOSIS AND TREATMENT OF GLAUCOMA*

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NORWEGIAN ophthalmology has been especially interested in the glaucoma problem. One of the reasons of that may be, that this disease is comparatively frequent in our country. In this clinic the number of glaucoma patients is more than 200 in a year; most of the cases are glaucoma simplex.

In Norwegian ophthalmology, the names of two glaucoma research workers must come in the foreground: Prof. Schiötz, who was chief of this clinic until 1922 and died in 1927, and Dr. Holth, whom we are happy to see here to-day. They have both done excellent work in glaucoma researches.

It was from this clinic, that Prof. Schiötz in 1906 enriched the ophthalmological world with his instrument for measuring the tension of the eye, the tonometer. More and more it has been evident, that this instrument is quite indispensable for diagnosis of glaucoma and for judgment of therapeutic effects.

Perhaps it will be of some interest to hear how we perform the tonometry in our clinic. The last model of the tonometer, that we are using here, Prof. Schiötz worked out a few years before his death; it is somewhat different from the original instrument. Because of the convex shaped end of the rod it sinks deeper into the cornea, and therefore we needn't have more than one weight. It is called x-tonometer: the limit of normal tension 30 mm. is $x/8.5$ (5, $5/3$).

In the last 15 years we have made systematic tonometric measurements in our glaucoma patients. The pressure is determined regularly twice a day at definite times in the morning and the afternoon, at first for 3 or 4 days without miotics and afterwards with pilocarpine and sometimes eserine. The results of the measurements are recorded by curves like temperature curves, by which means the state of tension is very easily seen. The curves give us information of great practical importance; in the first place it makes a diagnosis possible at an earlier time than is possible by any other method. As you know the glaucoma pressure curve generally, especially in glaucoma simplex, has quite a characteristic form, brought about by daily variations in pressure. It is the rule that the maximal pressure occurs in the morning and the

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minimum in the evening, at any rate in glaucoma simplex. But there exists also an inverse type, especially in cases of secondary glaucoma.

Now it is of great interest for the diagnosis, that we can meet several cases of glaucoma, where the tension is at times normal, not only in the evening, but the whole pressure curve shows the presence of glaucoma, because it distinctly deviates from the normal pressure curve by exhibiting the typical variations of the glaucoma curve.

In the treatment of glaucoma the pressure curve is also of great importance. Miotics produce a fall in the curve in most cases, but it is comparatively rare for it to remain absolutely normal. The drop in the tension is not permanent and is not a normal pressure curve. The daily variations may even be more marked under the action of pilocarpine. But there are also cases where the curve falls to the normal and assumes the normal shape. We don't operate in such cases, when the patient can be under control. If on the other hand the pressure curve does not become normal with miotics, an operation is indicated.

The method of operation we now prefer in this clinic is Holth's iridencleisis with the meridional incision in the iris, and we use this method in acute as well as in chronic primary glaucoma.

The effect of the operation depends on the formation of a filtering scar, caused by a subconjunctival fistula along the enclosed iris tissue.

Holth demonstrated microscopically in Heidelberg, 1913 ("Bericht," p. 357, Fig. 1), a subconjunctival fistula after iridencleisis, performed four and one-half years before death.

With regard to the technique of operation, I think it will be better to demonstrate our proceeding on patients. I will only mention that we in most cases make the incision with the keratome; Holth recommends his stop keratome. If the anterior chamber is shallow, I prefer a subconjunctival limbal incision from outwards with the edge of a broad cataract knife of Graefe. Simultaneously is made a subconjunctival tunnel with the keratome or knife. This requires an assistant to draw the conjunctival incision down to the limbus under the following meridional iridotomy. No suture in the conjunctiva is necessary.

Important is, that we never use atropine instillation after the operation, neither massage of the eye. But regularly we instill pilocarpine the first 4 to 6 months after the operation.

In our opinion this operation of Holth is the best operative treatment in acute and chronic primary glaucoma.

Our results of iridencleisis in glaucoma simplex, 1928-1932, are published by Dr. J. C. Holst in "Acta Ophthalmologica," 1934, pp. 348-361.