globe after treatment, it may be inferred that this drug is capable of permeating the uveal tissue.

It is of importance that infection of the umbilical cord by a non-virulent organism is capable of producing panophthalmitis, and this without any general symptoms of septicaemia. Meningitis can, however, occur in infants from bacillus proteus, and this was a complication that was feared in this case.

The child is now three and a half months old, has remained in perfect health and is gaining weight steadily. No ill effects from the streptomycin treatment are apparent.

Summary

A case of panophthalmitis in a premature child following umbilical cord infection by bacillus proteus is described. An account is given of the treatment with streptomycin which is considered to have overcome the inflammation in the uveal tissue.

I am grateful to Dr. Ninian Falkiner, Master of The Rotunda, and Dr. R. Collis, Paediatrician to the hospital, for their advice and permission to publish this case. To Dr. Hinkston's invaluable assistance, and to Sister Moran who looked after the case I am greatly indebted. I am much obliged to Miss Thompson for her fine photographs, and to Dr. McCrea who kindly carried out the pathological examination.

ON MENINGEAL REACTIONS IN SYMPATHETIC OPHTHALMITIS*

BY

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IN 1934† I showed for the first time that meningeal reactions occurred in the course of sympathetic ophthalmitis, of which the interest is such as to warrant fresh emphasis. Before my paper appeared we had recognised the extra-ocular complications of sympathetic ophthalmitis, but their frequency was not very great and their description so very changeable that they were considered to be of secondary importance by most authors. However, Coppez, in his article on sympathetic ophthalmitis in the last *Traité d'ophtalmologie français*, gave them a few lines and cast doubts on

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† Contribution à l'étude de l'ophtalmie sympathique. L. Corcelle, Thèse, Bordeaux, 1939.

their nature. However, deafness, studied by Garrigou, Snellen, Rogman, de Wecker, Peters, Patry, Blatschek, Komoto, Truc, Serege, Sgrosso, and Calogero, was well understood. The importance of this complication, it is true, is variable and has escaped those authors who only studied the pathology of the disease. It should be remembered because one must suppose that the cause—allergy or infection—is susceptible of overrunning the framework of ocular pathology. On the other hand several very troublesome neurological complications have been observed.

Risley, Galezowski, Deutschmann and Mooren have reported the occurrence of convulsions. Delirium has been noted (Deutschmann, Terson, Sérége).

Colin and Duthil have published a case of severe sympathetic ophthalmitis with a spinal syndrome, pains and fibrillary contractions. The word meningitis has rarely been used. Renard, alone, has suggested it.

Snellen and Sérége have published observations where they use the term meningitis, but they did not examine the cerebro-spinal fluid of their patients.

Also my own observations were the first to allow of the affirmation of a meningeal reaction in sympathetic ophthalmitis. They appear to have received confirmation since their publication and it is actually possible to draw up a balance sheet of the new knowledge they represent and the importance of which can no longer be neglected.

Here is an account of three particularly typical cases to establish the good foundation of their existence.

Case 1. A Spanish workman, aged 63 years, sustained an accident at his work on January 28, 1933. A block of wood struck him in the region of the right orbit. He immediately complained of great pain and that he could not see with the damaged eye.

Examination showed: R.E. large hyphaema, dilated immobile pupil, lens luxated into the anterior chamber, no wound of the eye. T. -1.0. V. = P.L. L. eye, normal.

General examination disclosed renal insufficiency. Blood examination, normal. Negative serological tests for syphilis.

February 1, 1933. The lens was extracted by Snellen's scoop: slight loss of vitreous. The after-course was not satisfactory. The operation wound did not heal well; a prolapse of iris persisted in the upper part of the wound, pericorneal injection was very intense.

February 2. Hypopyon. The blind inflamed eye was enucleated on March 4, 1933, that is 33 days after the accident and 31 after the lens extraction.

Three days later the patient complained of diminution of sight in the left eye. Vision was now 1/20. Grey exudate showed in the pupil and seclusion was practically total. Tension was normal.

At the same time the patient complained of a feeling of lassitude and some shivering fits. He had no rise of temperature. The sympathetic iritis progressed in spite of all treatment.

March 22. An iridectomy was performed but the gap was soon closed by exudation. The tension was subnormal. The patient became deaf and complained of headache. Neurological examination was entirely negative and in particular he showed no sign of meningitis. Lumbar puncture was performed on April 1, *i.e.*, 24 hours after the onset of sympathetic uveitis, and gave the following results.

Cytology, 17,512 (lymphocytes).

Benzoin colloidal, normal. Albumen, 0.30: glucose, 0.75: chlorides, 7.40.

Twelve days later a fresh examination showed:

Cytology, 4,654 elements. Albumen, 0.30: glucose, 0.78: chlorides, 7.30.

On April 28, the vision was totally abolished, the eye was atrophied and the patient attempted to commit suicide.

Microscopical examination of the enucleated eye showed nodular leucocytic infiltration in the operation wound forming the "inoculation chancre" described by Redslob.

Case II. A man, aged 28 years, was wounded in the left eye on November 4, 1938, by a splinter of metal which perforated the front part of the eye.

On examination, there was a perforating scleral wound at "3 o'clock." In the wound was a small uveal prolapse and a bead of vitreous. Large hyphaema present. L.V.=0. Right eye, normal, V. 10/10.

On admission the uveal prolapse was cut off and the wound covered with a conjunctival flap. The after-course was normal, yet the eye remained blind. On January 4, 1939, it was decided to remove it, as signs of sympathetic irritation were apparent.

On January 15 the patient complained of limitation of sight in the right eye. Vision was found to be 8/10. Very intense pericorneal injection was present with precipitation on the posterior corneal surface, with posterior synechiae.

January 30. All signs increased in intensity. Vision, 1/10. Neurological examination negative. Lumbar puncture gave the following results:

Cytology, 63.3 lymphocytes: albumen, 0.50: glucose, 0.63: chlorides, 7.50.

Visual acuity improved to 10/10 on April 11. The patient considered himself cured and went back to work.

September 7, 1934. He presented signs of ocular hypertonus. T. +50. This yielded to medical treatment. Lumbar puncture gave normal figures.

Microscopical examination of the enucleated eye showed the anatomical lesions of "chancre of inoculation."

Case III. A man of 67 years of age, a healthy looking farm labourer was examined for the first time on June 27, 1946. He said that at the age of ten years he had sustained a perforating wound of the left eye. No surgical treatment had been undertaken and the globe retained merely poor perception of light. Four months before his visit to me he had received a fresh contusion of the left eye, but no perforation. Yet the globe became inflamed and painful and irido-cyclitis lasted a month. When "cured" perception of light was entirely absent.

After 3 months visual troubles began to affect the fellow eye. There was slight photophobia with vision reduced to 1/20.

Examination showed: Left eye, divergent, shrunken stump. The cornea showed deep greyish infiltration, with a number of new vessels.

The pupil was closed with old yellow exudate. There was complete seclusion with iris atrophy.

Right eye. Pericorneal inflammation. Many small precipitates on Descemet's membrane seen with the aid of the slit-lamp. Grey exudate rimmed the pupil and tied it down to the anterior lens capsule. The fundus was normal.

General examination showed nothing in particular. The examination of the nervous system was wholly negative. Lumbar puncture performed June 29, 1946, *i.e.*, 7 days after the onset of illness of the right eye, gave the following results:

"Cellule de Nageotte" 16, el 6 mm. 3, lymphocytes. Albumen, 0.60: glucose, 1.60: chlorides, 7.02. Khan and Meinicke reactions, negative.

June 29, 1946. Left eye enucleated. During the illness there was no fever.

July 7, 1946. Eight days after enucleation a second lumbar puncture was done with the following results:

"Cellule de Nageotte" 190, el mm. 3 (lymphocytes). Albumen, 0.80: glucose, 0.90: chlorides, 7.02. Blood sedimentation, 1st hour, 21 mm. Second hour, 43 mm. "Les Vernes resorcine: 17."

Between June 6 and August 8, 1946, the patient received 20 intravenous injections of sodium salicylate, of bevitine and 10 injections of staprolysat. The visual acuity was unaltered at the end of the treatment.

A third lumbar puncture was made on the 30th day of the disease and showed Cellule de Nageotte 32, el mm. 3. Albumen, 0.45: glucose, 0.45: chlorides 7.15.

At the present time the pupillary exudates are absorbed. The patient declares himself satisfied that the sight may be a little improved.

In the last three months I have seen two other cases of sympathetic ophthalmitis, the notes of which are as yet incomplete but they present meningeal reactions of the same kind. These observations have been confirmed by several authors.

In 1936 Espildora Luque found in 5 cases of sympathetic ophthalmitis a meningeal reaction traceable only through lumbar puncture.

In the first case there were 120 cells, in the second, 92, in the third, 5, in the fourth, 4, and in the last 20, but this author has not stated at what particular time the lumbar punctures were performed.

In 1945 Beauvieux and Bessière published a note of a marked meningeal reaction with 543 lymphocytes.

In 1946 Toulard reported to the Academy of Medicine four cases with meningeal reactions.

Legroux published a case with meningeal reaction of 8.8 lymphocytes on the 96th day of the disease.

Clinical Description

It is now possible to sketch the clinical picture of meningeal reactions in sympathetic ophthalmitis.

At the start there are no neurological signs. Headaches of frontal type have been stressed in some cases. (Beauvieux and Bessière, Corcelle).

Espildora Luque has described them and mentions the possibility of vomiting. He thinks that headaches are the rule in the lymphocytic meningitis of sympathetic ophthalmitis.

Redslob has emphasised their importance, but has not established a relation with the meningeal reaction. When they exist they are of frontal type and very severe.

In Beauvieux and Bessière's case they were occipital with exacerbation at night. They sometimes precede the onset of inflammation in the sympathising eye.

Deafness is frequently noticed. It does not appear always to be linked to the existence of a meningeal reaction. In six cases I have observed it thrice.

Vestibular depression, which I have previously noticed, is to be found by systematic examination but it is inconstant.

One has also to mention the existence of a rise of temperature (38°C.) of short duration. The first and third of my cases showed a brief rise of temperature with general lassitude. These symptoms are inconstant and are not sufficient to warrant the existence of a meningeal reaction. Therefore the onset of lymphocytic meningitis is indicated by lumbar puncture. This has been done in fixing the

date of the appearance of clinical signs in the sympathising eye at the end of 24 days (Corcelle, 1); 15 days (Corcelle, 2); 7 days (Corcelle, 3); 10 days (Beauvieux and Bessière); 96 days (Legroux).

One can affirm after these first results that the meningeal reaction may perhaps be regarded as contemporaneous with the appearance of clinical signs in the sympathising eye. In my 3rd case it was 166 elements on the 7th day, but by the 15th it had risen to 190 elements. By the 30th day it was 32 elements at which time the clinical signs were greatly improved. This evolution is not always calculated on that of the anatomico-ocular lesions. In Beauvieux and Bessière's case it was massive (543 elements) but yet remained at 400 elements on the 74th day of the disease, when the affection seemed healed. The total number of lymphocytes in the C.S.F. appears proportional to the intensity of the affection. Grave cases are accompanied by a marked reaction but one cannot base a prognosis on it. However, in my first case I noted 174 elements and the patient became blind. In case 3 the meningeal reaction was 190 and the patient was cured. I have since seen a case in which the meningeal reaction was 88 elements which ended in blindness. Also in the case of Espildora Luque the numbers reached were few (56 or 21 elements) but we do not know enough of the clinical course in this case. Enucleation does not by any means influence the lymphocytic meningitis. In three of my published cases excision of the exciting eye was done when lumbar puncture allowed the study of the C.S.F. Conversely, excision could not be incriminated. In my third case the existence of lymphocytic meningitis had been proved before surgical intervention. Examination of the centrifugalised deposit is not the only interesting subject for study. Chemical examination offers particulars which I wish to emphasize. The albumen is usually normal, it can, however, rise proportionally to the numbers of lymphocytes: 0.80 for 190 elements and later 0.60 166 elements. On the other hand hyperglycosis in the C.S.F. is clearer. It was raised in my 3rd case to 1 gr. 80. In the other cases it remained at a lower figure.

Serological reactions for syphilis were negative in my cases. Espildora Luque in his cases noted 3 positive reactions.

Two points are of importance to be clear about in ending this description of the meningeal reactions in sympathetic ophthalmitis. Are these reactions constant and are they specific for sympathetic ophthalmitis?

The small number of published observations comprising an examination of the C.S.F. does not allow me to answer the first question in the affirmative. I know of a case where normal C.S.F. is mentioned, but the account does not permit any indication of the day of the disease when the lumbar puncture was made. In all

the cases I have seen in ten years I have always found a meningeal reaction.

Espildora Luque has examined the C.S.F. of patients suffering from a penetrating wound of the eye without finding very important modifications of the fluid, except in one case where a reaction of 3 elements existed and also a case of iridocyclitis of the damaged eye.

What is the meaning of this meningeal lymphocytosis? One very interesting observation is that of Beauvieux and Bessière for it comprises the existence of a retinal detachment, thus approximating sympathetic ophthalmitis to the syndrome of Karada. Now we know that this latter syndrome is itself accompanied by meningeal reactions, so it is logical to make this approximation, already presented by other authors (Magitot).

In a recent report devoted to uveitis of unknown origin* we have proposed considering sympathetic ophthalmitis as a lymphocytic uveo-meningitis.

This would appear to be due to a filtering virus as yet of unknown origin. The pathological theories, bacillary or allergic should be re-examined in the light of this new semiology. We should not overlook so important a sign of other diseases due to a filterable virus such as herpes and zona which I call lymphocytic meningitis. In particular the bacillary theory appears untenable, the meningitis perfectly curable and silence being far from the usual attacks of the Koch bacillus.

The path of transmission of this agent of a probable virus nature is itself illuminated by a new light. One should consider the infection as general (Fuchs, Muller, Marchesant, Filsenthal), and striking by way of the blood stream the particularly receptive tissues: uvea, meninges, internal ear. The way of the chiasma appears little less probable from the fact that lymphocytosis is so nearly contemporaneous with the lesions of the sympathising eye, which my first observations had not allowed me to establish.

At the same time many points are still obscure in the study of the meningeal reactions of sympathetic ophthalmitis in default of a sufficient number of examinations of the C.S.F. of patients.

It is with the object of arousing interest in these new examinations that this article has been written.

* Les Uveites de cause Inconnue, Bessière et Corcelle. *Soc. d'Ophtal. du Sud Oest*, Dec. 1946.