CASE NOTES

ACUTE RETINAL VASCULAR PROLIFERATION*

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THIS condition is described under its usual title *retinitis proliferans* by Duke-Elder (1940), who states that it depends essentially on two factors; the presence of a haemorrhage on the inner aspect of the retina and a sufficient degree of irritation to stimulate a fibrous reaction. The aetiology is divided into three main groups:

- (A) Trauma.
- (B) Chronic infective conditions, *e.g.* syphilis, tubercle, etc.
- (C) Chronic vascular disease which has a toxic basis, *e.g.* arterio-sclerosis, nephritis, and diabetes.

Wolff (1942) recalled that a haemorrhage elsewhere in the body behaves in one of three ways:

- (a) It absorbs without leaving a trace;
- (b) it becomes invaded by vascular granulation tissues which helps rapid absorption but leaves a connective tissue scar;
- (c) it does not absorb but remains fluid and tends to form a blood cyst.

In the eye a haemorrhage may behave similarly. Fortunately, the great majority of cases comes into the first group and leaves no sequelae, whilst some of those in the third group can be treated with diathermy and drainage. It is in the second group that one of the tragedies of ophthalmology may occur, making us realize how helpless we are. A retinal haemorrhage may occur near the disc or near the periphery, breaking the internal limiting membrane of the retina and detaching the vitreous. Some of the blood will pass into the substance of the vitreous. Fibrin will then be deposited on the adjacent surfaces and vascularization will occur. This may produce a vicious circle with further haemorrhages from the new weak-walled vessels, more fibrin, irritation, and thicker bands, the contraction of which may cause detachment of the retina with further loss of vision until blindness and perhaps secondary glaucoma supervene.

Usually this sequence of events is relatively slow, but occasionally it may be extremely rapid and may progress in spite of prompt treatment of the primary cause, as is here demonstrated.

* Received for publication April 29, 1959.

Case Report

A girl aged 16 years attended the out-patient clinic on August 11, 1958, with a history that 2 weeks previously she had noticed some blurring of vision in the left eye and similar blurring of the right vision 2 or 3 days later. She complained of no other symptoms whatsoever.

Examination.—The visual acuity was 6/9 in the right eye with +3.25 D sph., +0.75 D cyl., axis 0°, and 6/9 in the left eye with +3.25 D sph. +1.25 D cyl., axis 0°. Blood was present in the vitreous of each eye giving a general foggy appearance to the whole fundus with peripheral haemorrhages and exudate in the 10 o'clock meridian of the right eye, and in the 1 o'clock meridian of the left eye.

Past History.—In April, 1957, she had had a full medical examination when joining the staff of a foreign bank. The blood pressure was recorded 118/70 mm. Hg and the visual acuity without glasses as 6/6 in each eye.

General Examination.—She was a well-built girl with regular pulse rate, 120 beats per min.

Heart: Normal size, no murmurs.

Blood Pressure: 220/160 mm. Hg. No other abnormalities.

Urine: 1017 acid, protein 50 mg. per cent., sugar nil. Deposit—moderate number of leucocytes, some organisms, and a large amount of amorphous urates. Culture: Heavy growth of *B. coli* sensitive to Furadantin + + +, Sulphamethazine + +, Sulphadiazine + +.

Blood: Hb 104 per cent., 15.4 g./100 ml.; erythrocyte sedimentation rate (Westergren) 12 mm./hr; white blood count 8,000 per c.mm.; blood urea 44 mg./100 ml.; blood sugar 75 mg./100 mg.

Wassermann Reaction and Kahn Test: Negative.

X ray of Lungs: No evidence of a pathological lesion.

Treatment.—Immediate treatment was complete rest in bed with administration of rauwiloid and inversine. An intravenous pyelogram showed the right kidney to be excreting well, but the left kidney was obscured. A retrograde pyelogram showed that the pelvis and calyces on the left side had not filled normally and appeared to be underdeveloped. This investigation was followed by abnormally severe haematuria. On August 25, 1958, the blood urea was 26 mg. per cent. and Hb 88 per cent.

On August 26, 1958, a left nephrectomy was undertaken by Mr. S. Farrant Russell. The operation and immediate convalescence were uneventful.

Pathological Report.—Renal tissue weight after removal of fat = 4 g. (Normal weight at this age, 120 g.) Cut surface shows gross abnormal scarring in a very small kidney suggestive of an old inflammatory process.

Sections of this kidney show marked fibrosis of the interstitial tissue throughout the section but without any significant obliteration of nephrons. There are some scattered conglomerates of lymphocytes but the overall picture does not suggest an old inflammatory process—the findings are more in favour of its being a congenital hypoplastic kidney (Fig. 1, opposite).

Progress.—On September 1, 1958, the blood urea was 30 mg. per cent., and 10 days later the albuminuria was absent.

After the nephrectomy hypotensive drugs were stopped, and Furadantin was stopped on September 10, 1958, when the urine was normal. The blood pressure was then 150/100 and by September 21 it was 130/88, at which level it remained approximately stabilized. In spite of this, new haemorrhages continued to appear in all the segments

FIG. 1.—Section of kidney (August 26, 1958). $\times 100$

of each fundus and new vessels made their appearance in the substance of the vitreous. Prednisolone tablets 10 mg. three times daily were commenced on October, 6 but the vascular proliferation continued relentlessly with fibrous band formation in the vitreous.

On October 21 a chemical analysis of the serum showed:

Total protein	..	..	..	..	8.0 g. per cent.
Albumin	..	..	..	..	4.8 g. per cent.
Globulin	..	..	..	..	3.2 g. per cent.
A/G Ratio	..	..	..	..	1.5:1

The electrophoretic pattern at this date is shown in Fig. 2.

FIG. 2.—Serum electrophoresis, showing slight increase in β and γ globulins (October 21, 1958).

On October 30 she was allowed to go home with strict instructions not to exert herself, and she continued the prednisolone until mid-February, 1959. The corrected visual acuity had gradually decreased to 6/36 ptly in the right eye and hand movements in the left. The peripheral fields were lost owing to retinal detachment, and arrangements were made for her registration as a partially sighted person. The fundi are shown in Figs 3 and 4 (overleaf).

On March 23, 1959, a chemical analysis of the serum showed:

Total protein	..	..	..	..	7.0 g. per cent.
Albumin	..	..	..	..	4.8 g. per cent.
Globulin	..	..	..	..	2.2 g. per cent.
A/G ratio	..	..	..	..	2.2:1

FIG. 3.—Right fundus (October 30, 1958).

FIG. 4.—Left fundus (October 30, 1958).

This electrophoretic pattern is shown in Fig. 5.

FIG. 5.—Serum electrophoresis, showing no significant abnormality (March 23, 1959).

Discussion

The details of this case are interesting from a number of angles:

- (1) The apparent rapidity with which this patient's blood pressure rose to dangerous heights.
- (2) When she was first seen, a single vessel in each eye had bled into the surrounding retina and vitreous, and fresh retinal haemorrhages appeared in spite of the prompt treatment of her hypertension. The newly-formed vitreous vessels also bled.
- (3) Retinal proliferation continued even when a possible toxic factor had been eliminated. This would tend to suggest that blood in the vitreous may itself be the irritating factor.
- (4) The fundus picture is similar to that seen in diabetic patients.

Keiding (1954) summarized his investigations thus:

- (1) The serum protein-bound carbohydrates and the serum protein fractions were studied in diabetic patients with retinitis proliferans. The serum protein-bound carbohydrates were found to be present in a higher concentration than in non-diabetics. By the method of paper electrophoresis, a definite decrease in the values for the albumin and α_1 -globulin fraction and an increase for the α_2 -globulin fraction was also found in all of the diabetics, although only those with retinitis proliferans and proteinuria showed a decrease in the total protein. In the β -globulins no essential change was seen. In the group showing both retinitis proliferans and nephropathy, the γ -globulin concentration tended to be lower than in the group with retinitis proliferans alone, but none of the groups had values distinctly different from those of non-diabetics.
- (2) It is concluded that disturbances in the protein pattern exist which particularly involve the albumin and α_2 -globulin fractions at a stage in the development of the diabetic vascular lesions where the changes cannot be accounted for by loss of protein in the urine.

The case reported is a non-diabetic and when first examined she showed retinitis proliferans and proteinuria with a normal A/G ratio. The paper electrophoresis showed a slight increase in the β and γ globulins, and 4 months after the proteinuria had been eliminated chemical analysis of the serum and paper electrophoresis showed no abnormality.

This is, of course, an isolated case, but in this patient it would appear that active retinal proliferation is not the factor affecting the result of the paper electrophoresis.

Treatment

All attempts so far have been ineffective and the process of vascular proliferation has progressed rapidly. At present a course of subconjunctival hydrocortisone 25 mg. monthly is being given according to the regime suggested by Elliot (1958) in his treatment of recurrent intra-ocular haemorrhage in young adults (Eales's disease).

Verhoeff (1948) treated small localized areas of recurrent retinal haemorrhage with early retinitis proliferans by diathermy. Guyton and Reese (1948) treated typical and atypical cases of Eales's disease associated with retinitis proliferans by radiotherapy without marked benefit. When haemorrhages continued to occur, as in diabetic cases, no improvement was noted. These lines of treatment as well as light coagulation were considered to be unsuitable for the treatment of this case.

Summary

A case of acute retinal vascular proliferation is described in detail, and the literature with regard to aetiology, investigations and treatment is briefly reviewed.

I wish to record my thanks to Mr. L. H. Savin, Mr. T. M. Tyrrell, and Mr. S. J. H. Miller for their opinions on the patient, to Dr. Peter Hansell, Mr. T. Tarrant, and Dr. K. J. Randall for help with the illustrations, and to my House-Surgeon Miss S. Creegan for her careful supervision of the records.

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