preliminary experiments; to Miss Irene Munro for technical assistance; to the W. H. Ross Foundation (Scotland) for the Prevention of Blindness for defraying the expenses of this work; and to Imperial Chemical Industries (Pharmaceuticals), Ltd., for a generous gift of pure penicillin.

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SCLERAL DEGENERATIONS:—

A case of scleromalacia perforans*

BY

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DELHI

DEGENERATION and deficiencies of the sclera have rarely been described in detail. They occur more frequently, but they are not noted as often as would a similar corneal lesion be noted. Rones¹ in an extensive survey says that senile degenerations in the sclera are chiefly fatty infiltrations. Duke-Elder² states that fatty and hyaline degenerations are fairly common in old age. Calcification is also common as a senile degeneration and as a terminal event in post-inflammatory fibrosis. There is no reason, however, to believe that these degenerations are necessarily limited to old age, as is shown by Coats's case of amyloid degeneration in a man aged 27 years.

Graves^{3, 4, 5} first described in detail superficial deficiencies of the

* Received for publication, June 28, 1948.

sclera which were bilateral. On the mesial side of the cornea near the insertion of the internal recti are small areas of slate grey colour with sharply demarcated border, about 2 mm. by 1 mm. on an average and situated about 3 mm. away from the limbus. The optical appearance resembles a squared hole on the outer layers of the sclera and the grey colour is due to the ciliary body shining through it. There is an abrupt step-like limitation of this thin area of the sclera. He at first thought that the condition was only mesial, and developmental in origin. He revised his opinion later when such defects were noted even in the lateral side of the eyeball. Culler⁶ made an extensive study of the pathology of these defects to which he gave the name of scleral plaques. A plaque examined histologically was found to contain globules filled with granular debris lying immediately under the epithelium. At the edge of the lesion the sclera was 0.6 mm. thick, whereas in the centre it was only 0.3 mm. thick. The granular debris was entirely free from cellular structure and contained large masses of hyaline. There were no calcium deposits. Surrounding this degenerated area was a zone of about 0.5 mm. broad in which connective tissue fibres appeared to be swollen, presumably from degeneration.

Graves^{3, 4, 5} and Culler's papers clearly describe a type of scleral degeneration. It has been suggested that these lesions are areas of localized hyaline degeneration. The areas are definite and discrete, and fairly well circumscribed. The cases described by them have all been in elderly patients, average age 70 years, and most of them have not been accompanied by inflammatory signs.

Van der Hoeve⁷ described in detail another type of scleral degeneration which he named scleromalacia perforans. Duke-Elder² emphasises that perforation in this disease occurs without any dominant sign of inflammation, and that the condition may drag on for years without doing much damage or exciting many symptoms. It was considered by van der Hoeve that such perforations occurred in already degenerate or deficient areas of the sclera.

There are, however, important reasons to believe that scleromalacia perforans is essentially a separate clinical entity. It occurs in comparatively young people, who almost always give a history of rheumatoid arthritis. It is preceded by the formation of nodules on the sclera, which later on perforate to give it the appearance of a cystoid scar. The congestion round the nodule is very moderate and signs of inflammation inside the eye are seldom present. Iris or other uveal tissue may be herniated through these perforations, and epithelium is seldom broken over such areas. The whole process takes a long time, sometimes several months or over a year. These nodules are never seen in the other type of degeneration, nor are the plaques known to perforate or to occur in any other place

excepting mesial or lateral sides. The formation of these nodules has been compared to the formation of subcutaneous nodules in cases of rheumatoid arthritis. Metabolic changes are supposed to take place in the sclera resulting in the deposition of some chemical substance. Necrosis takes place in this sharply defined area, which becomes surrounded by a wall of epithelioid cells. Pus cells gradually infiltrate into this area until it becomes completely disintegrated. When perforation occurs this sequestrum is discharged, and the necrotic tissue may be replaced by a fibrous mass.

Rochat first described this condition under scleritis necroticans; van der Hoeve⁶ then studied four cases, two of his own and two of Prof. Rochat's; Verhoeff and King⁸ later collected and reviewed fourteen cases, and most of our knowledge is derived from these authors. Arkle and Ingram⁸ have subsequently described another case in a woman aged 34 years whom they observed for more than three years. It has been difficult for me to trace any other reference in the literature available here. For the last four years I and my colleagues have been on the look out for this condition in a hospital of 20,000 new outpatients a year, but we failed to detect more than one case. These facts go to show that the condition is rare, and the following case observed for four years is, therefore, worth recording:—

R.S., male, aged 24 years, attended hospital on June 5, 1942. One month previously, while cycling in a torrid sun, he felt pain on the left forehead, and since then has had dimness in the left eye.

He had several medical examinations done, the last in May, 1941, when his vision in both eyes was normal. He is of active habits and as an overseer in Government employ has to do much touring work in the sun; thinly built with a dry skin, large scar mark below the mandible on the left side; as a child he had "glands in the neck," and the mark was the scar of an operation performed by a surgeon then; no lymphadenitis now; definite history of a prolonged illness in which there was pain and swelling of the joints; no history of tuberculosis in the family. He was married at the age of fourteen and has two children, both healthy; not addicted to any intoxicant, and is a strict vegetarian. Blood W.R. negative. On examination R.V. 6/45, no abnormality; L.V. was 6/24—pupil slightly dilated and sluggish; media clear; inner and upper margin of the optic disc seemed blurred, but there was no haemorrhage either on the disc or in the fundus. Retrobulbar neuritis? Blood W.R. negative. Patient was put on potassium iodide and vitamin B internally and dionine locally. Rapid improvement followed, and by July 18, 1942, vision was 6/9 and the disc looked normal.

Shortly after that he discovered that he had a small hair-like

line of blue shade in the lower part of the eye near the cornea; this had developed between July 8, 1942, and July 18, 1942. On examination it was found that an area about 2 mm. wide extending from "4 o'clock" to "8 o'clock" on the limbus appeared to be oedematous; no vascularization, no watering; conjunctiva over the area appeared to be stretched and thinned out; vitreous clear, and fundus condition remained the same as on July 8, 1942. This raised patch, which had a soft cystic texture, grew fairly rapidly and developed a yellowish look. The surface appeared granular, and resembled a patch of xerosis. Vision went on improving till it was 6/3 on September 3, 1942. Patient was put on vitamins internally and haliverol locally. It was of interest to note that the vision had improved in spite of the growth of the patch. Tension was 18 (Schiötz).

He came again on May 19, 1943. Examined on that day his R.V. was 6/4.5 and the eye showed no abnormality. His left vision was 6/36; the patch had grown more cystic and was resembling a filtering cicatrix which one sees after a sclero-corneal trephining, except that the present bleb covered a larger area. Folds had appeared in Descemet's membrane below, radiating from the "6 o'clock" area and extending to about the middle of the cornea, and these seemed to alter with the movement of the globe. The anterior chamber was shallower in the lower portion; viewed from the upper half the media looked clear, disc margin still slightly blurred. The tension which was normal last year was now 8 (Schiötz). With +1.0 D. cyl. axis 90° vision was improved to 6/12. It was evident that the sclera had perforated underneath the bleb and the subsequent picture was due to this. He was given glasses, and intensive constitutional treatment with vitamin B complex and calcium was prescribed. Atropine and dionine were also used locally.

He was seen on April 17, 1944, by two colleagues at Lahore. One said it was "fatty degeneration of the sclera close to limbus"; the other thought that "it was a degeneration of the cornea and sclera at the limbus."

He returned again on August 1, 1946, complaining that vision was steadily deteriorating in the left eye. On examination Right Vision was 6/4.5—no abnormality noted. The left eye showed the following: V. . . . 4/60, pupil dilated and fixed (the patient had been using atropine off and on), retinoscopy $\begin{array}{r} +7.5 \\ \hline \text{c} \end{array} \begin{array}{r} 0.50 \\ +6.0 \end{array} \text{V}_{70}$ V=6/24. The cystic swelling had extended; its largest area of breadth was about 4 mm. at "7 o'clock." At "7 o'clock" there is a linear conjunctival fold, and through the thin portion is seen a

darkish area with a yellow fringe. On the inner side the fold becomes continuous with the sub-conjunctival tissue which is slightly vascularised, and is slightly raised up to the fold. The cornea in the lower portion was looking slightly flat; the folds in Descemet's membrane had increased. Pupil was circular, no posterior synechia, no "K.P."; punctate opacities of the lens could be seen in the equatorial area. Disc presented the same slightly blurred appearance as before, but finer details of the fundus could not be made out. The tension was so soft that the tonometer needle did not move. A drawing of the eye on this

FIG. 1.

occasion is given. It was obviously shrinking, and markedly contrasted with the healthy right eye.

A condition has been described in a patient aged 27, with a definite history of rheumatoid arthritis, in whose eye a small cystic swelling occurred near the limbus in July, 1942; till May, 1943, vision and tension remained normal, though the swelling appeared to extend. Then a perforation into the anterior chamber occurred, followed by a remarkable fall of tension. Although the tension remained low through four years, vision with glasses was still 6/24 in 1946. There was no history of trauma, and an implantation cyst of the sclera could be ruled out. The retrobulbar neuritis was

possibly a deficiency phenomenon and responded rapidly to vitamins, but for the scleral lesion no treatment availed. There was no sign of uveal inflammation or vascularization, and the condition was due to a degeneration of the sclera causing perforation and subsequent hypotony.

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TECHNIQUE OF IRIDENCELEISIS*

BY

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IN various papers (1 to 11), since 1931, in collaboration with our colleagues Hubin, Fanchamps, Bonhomme, Heintz, Mathieu, Roussel, Gérard, Thibert, we have maintained that iridencleisis is the best anti-glaucomatous operation. It reduces the level of intra-ocular pressure more than any other operation, it is the least mutilating, and it can be used in all types of glaucoma.

Because traumatic iris prolapse may be followed by hypertension rather than hypotension, it is important that the technical details of iridencleisis be discussed. The placement, length and direction of the scleral incision; involvement of iris and ciliary body in the scar; changes in the anterior chamber angle and Schlemm's canal; all may influence the tensional results of surgical intervention.

Inasmuch as various methods of performing iridencleisis are not

* Received for publication, June 5, 1948.