EXPERIENCES WITH THE LINDNER-GUIST OPERATION*†

BY

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IN dedicating this article to Professor Karl Lindner in honour of his 70th birthday, the author acknowledges a debt which he among many ophthalmic surgeons—and their patients—owes to this pioneer of the surgery of retinal detachment; a debt which, unlike other debts, must rejoice the creditor in the knowledge that it will ever grow and ever remain unpaid.

Particular reference is made to Lindner's contribution to retinal surgery, because it is with methods of treatment of retinal detachment associated with the names of Lindner and Guist, that the author has concerned himself in recent years, and it was thought appropriate that his experiences with these methods should form the subject of this article. Though any interest it may have lies, to a great extent, in the modifications, which are described, of the original technique, there has been no change of principle. Furthermore, these same modifications, which the author once thought were original, have, in fact, been largely anticipated by Lindner himself.

The great majority of retinal detachments are treated by the diathermy operation, the direct descendant of Gonin's ignipuncture. That this has its limitations, however, even in the most expert hands, is shown by the recent widespread renewal of interest in scleral resection, the revival and rationalization of which, in 1933, we owe to Lindner (1933a). Many articles on this operation have appeared in the literature of the past few years describing variations in technique and the results thereof (*e.g.* Pischel, 1945; Leopold, 1945; Vail, 1946; Lindner, 1949; Weve, 1951; Shapland, 1951; Philps, 1951; Lister, 1951). Another alternative or auxiliary to diathermy is the Lindner-Guist operation (Guist, 1931, 1933; Lindner, 1931, 1932a, b, 1933b), and it is with this that this article is concerned.

As is well known, the Lindner-Guist operation in its original form consists in surrounding the area of the retinal tear with a series of trephine holes in the sclera and applying caustic potash to the exposed choroid. In the early 1930s it was practised by a number of surgeons (Black, 1932; McKeown, 1933; King, 1933; Terrien, Veil, and Dollfus, 1933; Rieger, 1933; Shapland, 1934; Dunnington and Macnie, 1935—all quoted from Duke-Elder, 1940), but certain disadvantages have severely limited its popularity. First is the difficulty of trephining further back than about 16 mm. on the temporal side of the globe and 12-14 mm. in other segments. Second is the risk of in-

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† Dedicated to Professor Lindner on the occasion of his 70th birthday.

advertently puncturing the choroid before all the trephinings have been completed. The consequent loss of sub-retinal fluid and softening of the eye make it almost impossible to continue with the operation. Arruga (1936) designed little screw-in plugs to meet this complication, and Lindner (1932 1933b) reduced the number of trephinings by placing them further apart, separating the choroid from the sclera between the holes with a spatula, and injecting potash along the tunnels so made. The method has, however, a third drawback, in that it is time-consuming and difficult; Lindner himself is quoted by Gonin (1934) as describing the operation as *la plus fatigante et la plus difficile de notre spécialité*. Nevertheless, there are cases in which it is the operation of choice, either alone or in combination with scleral resection, and it is hoped that the following account of an experimental series of cases will show that it can be made a reasonably simple operation.

The first case in this series was one in which apparent closure of a temporal tear by diathermy was followed by secondary tears at the edge of the scar. The classical Lindner-Guist technique was employed, a barrage of trephine holes being placed so as to enclose the affected area. This was successful, and the retina is still in place 5 years later.

The next case was one of detachment in an amblyopic eye; it was thought justifiable to experiment with a variation on Lindner's undermining method in an attempt to avoid some of the difficulty and fatigue. A single trephine hole was therefore made just anterior to the site of the tear which had been localized by a single pilot diathermy application. Three per cent. potash was injected through the trephine hole into the supra-choroidal space over the area of the tear. The immediate reaction was violent and subsequently the choroid over the area of injection became largely atrophic. In spite of this the retina went back into place, where it has remained. It is noteworthy that it did not develop secondary tears as it would probably have done with an equally violent diathermy reaction (Fig. 1a and b, and Fig. 2, opposite).

FIG. 1(a).—Diagram of detachment, Case 1.

FIG. 1(b).—Modified Lindner-Guist operation, Case 1.

FIG. 2.—Case 1.

It is to be noted that a somewhat similar method is quoted by Shapland (1934) as having been employed by Foster Moore. He used phenol instead of potash and spread it over the choroid with a spatula.

Since the injection method lacked control of the area of choroid treated, a different method was employed in the next case, that of a single tear in an elderly myope. A -shaped incision was made in the overlying sclera, the resulting flaps were turned back to expose a triangular area of choroid, and this was painted with 3 per cent. potash before evacuating the sub-retinal fluid (Fig. 3). Although there was slight loss of vitreous the retina went back and was still in place 18 months later.

FIG. 3.—Diagrams illustrating trapdoor modification of Lindner-Guist operation, Case 2.

Both the injection and flap techniques have since been used either alone or in combination with scleral resection. Two examples of the combined method may be cited :

In the first case previous diathermy had been unsuccessful and an open tear in the upper temporal quadrant was surrounded by an area of atrophic, cobweb-like detached retina on which it seemed hopeless to repeat diathermy. A penetrating scleral resection was made to "bracket" the affected quadrant. Opposite the region of atrophic retina the choroid posterior to the resection was separated from the sclera with an iris repositor and 1.5 per cent. potash

was injected over this area. The retina was still in place 2 years later (Figs 4 and 5).

FIG. 4(a).—Detachment prior to resection, Case 3.

FIG. 4(b).—Area of resection, Case 3.

In the second case that of a high myope, diathermy had failed to close a tear of the equator in the lower temporal quadrant. A full-thickness resection was made covering the outer half of the globe. Opposite the site of the tear a centrally directed 6—8 mm. radial incision was made in the sclera, and the choroid thus exposed, covering the site of the tear, was painted with 3 per cent. potash. The retina is still in place 18 months after the operation and corrected vision is 6/36 (Figs 6 and 7 opposite).

FIG. 5—Case 3.

Full-thickness scleral resection itself, when combined with potash, acts almost certainly, at least in part, as a modified form of the Lindner-Guist operation. It may, in fact, be used on the principle advanced by Lindner (1931 ; 1932b) as an important feature of the original method to barrage off an unhealthy area of retina in which mere repetition of previous operations seems doomed to failure. Fig. 5 illustrates the case of a high myope in which diathermy followed by a "flap" potash operation had only been partially successful. It can be seen that there is still an area of shallow detachment nasal to the reaction and this was increasing. A penetrating scleral resection, combined with

FIG. 6.—Case 4.

FIG. 7.—Case 4.

FIG. 8(a).—Case 5. Diagram of detachment.

FIG. 8(b).—Case 5. Diagram of scleral resection and "flap" Lindner-Guist operation.

FIG. 9.—Area of resection not included. Case 5.

3 per cent. potash applications, was placed 18 mm. from the limbus and central to the original reaction. A satisfactory result has been maintained for a year (Fig. 9).

Three failures are worth mentioning:

(i) A "flap" operation missed the tear owing to faulty localization. The tear was closed subsequently by diathermy. In the series under review potash was used instead of diathermy in several straightforward cases merely for the sake of improving technique.

(ii) Two large rents were treated by the "flap" method. Although there appeared to be adequate and well-

localized reaction, one of the tears was not closed and further tears led to total detachment.

(iii) In this case a method employed by Lindner (1932a ; 1933b) with some success for treating holes at or near the macula was used in a modified form. A flap of sclera was raised over the macula so as to give access to the choroid in this region. The posterior ciliary arteries were encountered and damage to at least one of these led to severe intra-ocular haemorrhage. The eye, though it survived, was ultimately useless.

(iv) Scleral resection combined with potash application failed in two cases of simple retinal dialysis though theoretically it should be suitable.

The only complication of any frequency to be feared in these operations is intra-ocular haemorrhage. This only seems likely if severe choroidal bleeding has occurred during the operation. For this reason *venae vorticosae* and their tributaries must be given as wide a berth as possible. Otherwise, apart from moderate orbital tissue reaction which occurs when potash has been used extensively, convalescence is surprisingly peaceful. No case of infection has yet been encountered.

In conclusion, the following principles of application of the chemical method and points in its technique are put forward :

(1) The chemical method of coagulation is preferable to diathermy in cases where the retina appears to be too atrophic to stand the relatively destructive and shrinking effect of the latter, and in cases in which it has already failed. Lindner (1931) states that the chemical method does not cause shrinkage of the retina and therefore has less tendency to produce secondary tears. He also recommends it for tears at or near the macula.

(2) The "flap" and injection techniques, although technically more difficult and lengthy than diathermy, are more simple and speedy than are trephine technique.

(3) The injection method is suggested as being the more suitable if a wide area has to be covered. In order to control the amount injected—a minimum of one or two is all that is necessary at one point—and to avoid damage to the choroid during injection, the author uses the apparatus shown in Fig. 10.

FIG. 10.—Apparatus for potash injection.

The syringe holder* is self-explanatory. The fine lacrimal cannula† (gold) is fused inside the concavity of a gold lens curette. It is inserted with the convexity towards the choroid. Two per cent. potash is probably the optimum strength, though Lindner (1932a) recommends 1/100 ml. 6 per cent. potash.

* Made by the Institute of Ophthalmology workshop.

† Made by Theodore Hamblin Ltd.

(4) The "flap" method is preferable when only a comparatively small area of choroid has to be treated. Three per cent. potash appears to give an adequate reaction. When opening up the sclera the placing of the sutures (3/0 silk on Grieshaber 82/7 needles) should follow close behind the making of the incisions so that they can be pulled up and tied as soon as the choroid has been painted and punctured. In this way vitreous loss is best avoided.

(5) For drainage of sub-retinal fluid, puncture of the exposed choroid is preferred to cautery puncture through some other part of the sclera. There is risk of vitreous loss and retinal rupture through the latter once the sub-retinal fluid has drained away.

The author's results in unselected cases submitted to diathermy, scleral resection, and the Lindner-Guist operation (in the classical and modified forms) between July, 1947, and July, 1952 are tabulated below:

Operation							Cured	Failed
Diathermy ..	..	..	..	..	..	..	28	29
Scleral Resection*	..	..	..	..	..	..	8	26
Lindner-Guist†	..	..	..	..	..	..	12	7
Total Cases ..							48	54
Total excluding Scleral Resection ..							40	34

*Cases in which scleral resection only was done without an additional injection or "flap" operation.
†Including eight cases in which scleral resection was done with an additional injection or "flap" operation, or in which the resection was primarily a barrage operation.

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LEAGUE AGAINST TRACHOMA

CHAUVIN-BLACHE BURSARY

IN 1954 the League against Trachoma will award for the second time a Bursary amounting to 200.000 *fr.* to a candidate appointed by competition under proper qualifications, which will enable him to keep a 3 months term in one or two of the French Schools of Trachomatology in North Africa. (Algiers, Prof. Toulant; Rabat-Salé, Dr. Pagès; Tunis, Dr. Roger Nataf).

The holder of the Bursary will be appointed at the General Meeting of the League against Trachoma which is to be held in Paris during the 1954 Congress of the Société française d'Ophtalmologie. Full details may be had from the Secretary General, Dr. Jean Sédan, 94, Rue Sylvabelle, Marseilles, France.

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THIS Congress, an announcement of which appeared in the February issue of this Journal, has been postponed indefinitely.

HONOURS

MR. L. H. SAVIN, M.D., M.S., F.R.C.S., has been elected a Fellow of King's College, University of London.

CORRIGENDUM

It is regretted that in the article entitled "Experiences with the Lindner-Guist Operation" by Mr. A. Lister, which appeared in the *British Journal of Ophthalmology*, 1953, 37, 305, Figures 6, 7, 8, and 9 on p. 309 were incorrectly numbered.

For Fig. 6, Case 4, read Fig. 8, Case 5.
For Fig. 7, Case 4, read Fig. 9, Case 5.
For Fig. 8a, Case 5, read Fig. 6a, Case 4.
For Fig. 8b, Case 5, read Fig. 6b, Case 4.
For Fig. 9, Case 5, read Fig. 7, Case 4.