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*General Secretary for India and the East,*

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### Original Communications.

#### ANTISEPTICS IN OPHTHALMIC SURGERY.

By J. O'BRIEN, M.A., M.D., F.R.C.S.E.

HAVING derived a large and almost unexpected amount of benefit from the use of antiseptics in my own ophthalmic practice, it strikes me that a short paper giving definite directions on this subject would probably be useful, especially to Assistant-Surgeons and others who have not had an opportunity of observing the practice in large ophthalmic hospitals in late years. During my furlough in 1886-87, most of which I spent in London, I devoted special attention to this subject, and attentively observed the practice of some of the best English Ophthalmic Surgeons. Among these I may mention Mr. Tweedy of University College Hospital, and Mr. Lang of the Middlesex Hospital, both of whom are also Surgeons of the Royal Ophthalmic Hospital, Moorfields. These gentlemen kindly allowed me, for the sake of practical work, to serve among their clinical assistants for some months. At Moorfields also one has an opportunity of observing the practice of Messrs. Lawson, Nettleship, Couper and Gunn. In this hospital there is a vast amount of clinical material available for the exemplification of every possible disease of the eye; and the size of the hospital and the courtesy of the Surgeons afford every facility to a diligent student. During the season, also, there are night classes on refraction, the use of the ophthalmoscope, and diseases of the fundus, which one may attend for a small fee; and as the lectures are entirely practical and illustrated by the actual ophthalmoscopic examination of patients, a student has ample opportunities for becoming well acquainted with the use of the ophthalmoscope both by the old indirect method, and by the recently perfected direct method of examination. The direct method is infinitely superior to the other, both for the estimation of errors of refraction and owing to its higher magnifying power, for the detection of the finer changes in the fundus. Many lesions that would altogether escape notice by the indirect are at once detected by the direct method of examination, and a further advantage of this method is that after some practice dilatation of the pupil becomes unnecessary. I may here remark 'en passant'

that the Leibrich's ophthalmoscope, which is to be found in most government stores and dispensaries in India, is now-a-days an antiquated instrument rarely to be seen in the hands of Ophthalmic Surgeons. One is tremendously handicapped when he has only it to work with. For my own part I find it most difficult to examine the eye satisfactorily with it, and I would recommend any one requiring a really good ophthalmoscope to get Morton's or Couper's. Morton's is a very handy and useful instrument and fulfils almost every requirement. The cost is about £3-10. It can be procured from Messrs. Pickard and Curry, 195, Great Portland St., London, W. At the night classes at Moorfield's typical examples of all the more common and important disease of the fundus are presented for examination and diagnosis by the members of the class. In fact, considering the opportunities afforded by this hospital, and the large amount of information to be acquired in it, I could never see any great necessity for journeying abroad to Paris or Vienna for the purpose of completing one's ophthalmic studies.

From the foregoing it will be gathered that in the instructions which I give for the use of antiseptics in ophthalmic practice, I do not propose to put forward any views or discoveries of my own, but merely to relate the results of my observations at home coupled with some remarks on my subsequent experience in this country.

In the Burdwan Municipal Hospital, with which I have been connected off and on for the past 5 or 6 years, eye-work may be said to have been decidedly unsatisfactory before the introduction of antiseptics. Several surgeons have acted as superintendents of the hospital during this period, and some have performed cataract and other eye operations, but the results have not been such as to encourage either themselves or their patients. The last case I operated on myself before I left the station in 1886, an uncomplicated operation on a perfectly ripe cataract, showed signs of infection of the incision on the second day, and the eye was ultimately lost from general suppuration with great pain and suffering to the patient, an old woman, who refused to allow me to do the only thing possible under the circumstances, viz., to excise the globe. The result of this operation discouraged myself, and, I need hardly say, did not tend to raise the reputation of the institution for ophthalmic work.

In this small hospital (40 beds) we have no separate wards for eye cases, hence the liability of the incision to get infected if not carefully treated. The hospital, like all the municipal dispensaries in Bengal, is a lazaretto as well as a surgical institution, and we have to admit all kinds of cases, pilgrims dying of dysentery, lepers, and the thousand and one suppurative

disorders that form a large proportion of the surgical cases in this province. Fortunately, there is a separate out-building for bad cases of dysentery; lepers also are accommodated in a small room detached from the main building, but all other cases are received into the general wards, and at the present moment I have in the same wards with my eye cases two cases of empyœma, which are being drained, a case of extensive wounds of the neck, and a week or two ago there were 3 or 4 amputations of the hand, an abscess of the liver, an iliac abscess, &c., mixed up with the patients who had been operated upon for cataract. However, with the diligent use of antiseptics in all surgical cases, we have banished sloughing and suppuration and changed the unfavorable record of the hospital for ophthalmic work. Since my return from furlough, practically from 1st January 1888 up to 30th April of the present year, I have performed 111 operations for cataract and 23 iridectomies for glaucoma, artificial pupil, &c.; besides numerous cases of paracentesis of the anterior chamber with the loss of only a single eye from suppuration, and in this case the patient was himself to blame, as he opened his bandages on the second day, and the eye was further disturbed by vomiting set up by the use of some forbidden and indigestible food.

Of the 111 cataract operations 54 were performed in the first quarter of 1889, *viz.*, 52 by extraction of the lens, and 2 by needling and solution, and all have done well save 3. In two vision was practically destroyed by consecutive iritis and occlusion of the pupil. Both of these were monocular individuals, the other eye having been lost by a previous couching operation performed by a *mâl*. The vitreous was fluid in both cases, and the iris diseased in one, so that success was hardly to be expected. In the third case the vitreous which was rather fluid was ruptured, while attempting to express the lens through a peripheral opening in the iris. The iris fell across the blade of the knife during section of the cornea. An oval peripheral buttonhole resulted, which I enlarged and then attempted, after Bell Taylor's method, to extract the lens through it. The result was not a success. The vitreous ruptured and the lens had to be extracted with a spoon. Some soft lens matter and shreds of capsule remained to block the pupil, and a mild attack of iritis ensued. I hope in the cold weather to improve this eye up to useful vision by a needling operation.

All the cases were unselected and many of the cataracts were immature. I operated upon almost every individual who came with cataract to the hospital. Only a few immature cases in youngish persons, say below 55, were postponed to another day. In fact, so rapidly does the eye recover after operation when dealt with asepti-

cally that, given a fairly healthy eye, one need not entertain the slightest doubt about success, and, barring the possible supervention of iritis, it will be found that a cut through the tunics of the eye will heal quite as readily and with as little trouble as a cut of equal length in any part of the body. As a rule, I find the incision, which I generally make sclero-corneal with a small conjunctival flap, firmly united by first intention when the bandage is opened for the first time on the 3rd or 4th day. The patient is then provided with a shade, so that in most cases only one dressing is required. In weak eyes, or when for any reason the incision has been made corneal, and in cases in which iritis or hyphœma occurs, 2 or 3 dressings may be necessary. There is one objection to the early removal of the bandages when there is not a suitable eye-ward with shaded windows, *viz.*, the risk of premature exposure of the eye to a powerful light by an ignorant patient. This has occurred in a few instances among my patients with the result of increased congestion or even hyphœma from the stimulus of light. However, the consequences are not serious, and re-application of the pad for a few days will cause absorption of the blood, should any be effused. Patients should be cautioned against this danger if the bandage is removed on the 3rd or 4th day.

Efficient antiseptic dressings are somewhat expensive, inasmuch as they have to be imported from England, but when we consider the small number of dressings required, and the rapidity with which they enable patients to be discharged from the hospital, it will be seen that they quickly recoup the initial cost. Besides, owing to the certain success which they enable us to achieve, they establish the reputation of a hospital, and thus become the means of rescuing numbers of people from the incurable blindness which is so frequently inflicted upon them in this country by the unskillfully performed couching operations of ignorant Native quacks.

In the accompanying table I show the number of cataract operations performed in the Burdwan hospital with the results for the past five years and for the first four months of 1889. Antiseptics were introduced in January 1888.

YEAR.	Number of operation, for cataract.	RESULT.			Percentage of successful cases.
		Good or fair vision.	Vision lost from iritis &c.	Eye lost.	
1884 ...	7	5	...	2	71
1885 ...	4	2	...	2	50
1886 ...	8	7	...	1	87
1887 ...	2	...	1	1	Nil
1888 ...	57*	52	4	1	91
4 months 1889	54†	51	3	0	94

\* Includes six cases of solution of the lens.

† Includes two cases of ditto.

This table speaks for itself and shows very clearly the advantages to be derived from the strict observance of antiseptic precautions both in the larger number of patients presenting themselves for operation and in the high percentage of success obtained.

From the "Notes on the annual statements of the charitable dispensaries under the Bengal Government," recently published by the Inspector-General of Civil Hospitals, for 1887, I gather that there is much room for improvement in ophthalmic surgery in this province, and I have no doubt this improvement will be contributed to materially if antiseptics are more generally employed. For instance, in that year the total number of cases of cataract treated in the dispensaries of Bengal was 283, *viz.*, 275 by extraction and 8 by solution of the lens. Of the 275 extractions only 182 or 66 per cent. are reported as cured, 17 were relieved, which probably means that the incisions healed, but that vision was defective, 44 or 16 per cent. were discharged otherwise, most of the eyes no doubt lost by suppuration, 2 died, and 30 remained under treatment at the end of the year. The deaths were doubtless due to some intercurrent disease. Granting that the 30 cases remaining were all cured, that is, recovered with good vision, the result would still be extremely poor, *viz.*, 77 per cent. of successful cases, a figure that takes us back to the days before Lister when so many eyes were lost from suppuration. This figure in fact means that one eye out of every four operated upon was either rendered blind or totally lost by suppuration. With careful antiseptic precautions a loss of 1 eye in 20, *i.e.*, presuming the eyes to be fairly healthy, might be regarded as a high proportion. Speaking on this point in the address which he delivered in the section of ophthalmology at the last meeting of the British Medical Association (see British Medical Journal, November 24th, 1888) Mr. Brudenel Carter remarks, "Operators whose experience goes back for only fifteen or twenty years can hardly realise that thirty or thirty-five years ago 15 per cent. of all eyes operated upon were totally lost by general suppuration which usually commenced on the second day as iritis or by sloughing of the cornea. No doubt the iritis, although then commonly attributed to bruising, was frequently septic, and would not now-a-days be permitted to occur." The state of things that existed in England 35 years ago would appear to prevail at present in Bengal. Antiseptics, though usually employed in some form in general surgery, would seem to be neglected in ophthalmic work. Indeed, suitable antiseptic dressings are to be found in few hospitals or dispensaries with which I am acquainted.

Of the 8 cases treated by solution of the lens, only 4 or 50 per cent. are returned as cured, 3

were relieved, which probably means that the patients left the hospital before the solution was complete, and 1 was discharged otherwise. These statistics are incomplete. It would be interesting to know what is meant by "relieved" and "otherwise" in every case of operation for cataract. The form of return which is suitable for general surgery might with advantage be altered for eye cases. It would be desirable to indicate roughly the amount of vision obtained, above all, it would be highly instructive to show the number of eyes annually lost by suppuration after operations for cataract.

Before proceeding to our subject proper, it may be well to say a few words about the manner of operation. In the first place local anæsthesia is always procured by means of cocaine. The form of incision that is almost invariably practised at Moorfields is the sclero corneal upwards in the usual modified linear method, and this I have adopted myself. I always aim at making a small conjunctival flap 2 or 3 mm. in length, as I find that cases in which this is done heal much more quickly than cases in which there is no flap. The flap can be turned over on the cornea like an apron during the remaining steps of the operation.

The iridectomy comes next. I found it the invariable practice at Moorfields to make a free iridectomy. The object aimed at is to provide what is known as "a keyhole pupil." This is very readily done with a little practice. It is not necessary to fix the eye when making the iridectomy, save in the case of very nervous patients. This form of iridectomy is thus described by Juler in his book on Ophthalmic science and practice: "The iris is now to be seized with iris forceps near its pupillary edge, and drawn just outside one angle of the wound; whilst slight traction is made on it in this position, a snip is made through its outer part with iris scissors, the portion of the iris held in the forceps is then gently drawn across to the other angle of the wound, and the excision completed as near to the periphery as possible." There is so little to be gained and so much risked in the attempt to extract the lens without an iridectomy, that, for my own part, I rarely feel justified in making the attempt though often inclined to do so. Many ophthalmic surgeons, I am aware, extract now-a-days without an iridectomy; still during the whole 12 months that I worked at Moorfields, in which time some hundreds of cataract operations were performed, I never saw a single case done without an iridectomy. Even granting that better vision can be obtained without cutting the iris, it will still be conceded, especially when we consider the class of patients who come to a mofussil dispensary for operation, that it is better to provide them of a certainty with vision equalling  $\frac{1}{12}$  or  $\frac{1}{18}$  than to risk a good deal in endeavoring to give them  $\frac{1}{6}$ . For

an interesting discussion on this subject I would refer my readers to the address of Mr. Brudenel Carter referred to above. In this address he states that for the past 16 years he has "never performed extraction without an iridectomy."

Coming next to the extraction of the lens, I incise the capsule in the manner first recommended, I believe, by Knapp and now invariably practised by Mr. Tweedy, *viz.*, instead of lacerating it with a pricker, I cut it carefully with the Graefe's knife close to the periphery of the lens, as it lies just beneath the external incision. In this way the capsule is formed into a pocket out of which the lens is squeezed in the usual way. Should a little soft matter happen to be left in the capsule after the evacuation of the lens, despite our efforts to remove it, it is perfectly harmless and may remain to be dealt with by the aqueous which slowly dissolves it or, if after the lapse of a few months it causes any serious impediment to vision, it can be treated subsequently and perfectly safely by needling. That but little trouble is caused in this way or from opacities or wrinkling of the capsule itself, is sufficiently proved by the fact that during the past 16 months I have had to needle for opacities of the capsule only some half a dozen times. Having extracted the lens, all that remains to be done is to make, so to say, the toilet of the incisions, and the care bestowed upon this will be amply repaid by the subsequent rapid healing of the incisions. Soft lens matter, blood, &c., should be removed from the anterior chamber as far as possible, and for this purpose the aqueous may be allowed to reaccumulate once or twice, if necessary. The ends of the iris are then to be carefully replaced with the tortoise-shell spatula made for this purpose by Weiss & Co., the incision examined with a 3<sup>d</sup> lens to see that the edges are clean, and that no tags of iris or soft matter are left between them, the flap of conjunctiva accurately smoothed into its place, clots removed from the conjunctival sac, a drop of atropine instilled, and the lids gently closed.

So far for the operation; the application of antiseptics has now to be considered. In the first place, the strictest cleanliness must be observed. The Surgeon's hands must be scrupulously clean. He cannot be too particular on this point. If absolute cleanliness of hands, instruments and dressings could be secured, antiseptics of any kind would be unnecessary. The best possible results are obtained, as we know, in abdominal surgery by Mr. Bantock and others without the use of any form of antiseptic other than scrupulous cleanliness. However, as perfect cleanliness of instruments and dressings is hardly attainable in this country without their use, I think we must grant that they are indispensable.

With regard then to the Surgeon's hands, he should be careful not to soil them with other operations before proceeding to his eye cases. Open-

ing abscesses, removing sequestra of bone or dealing with cases of any kind in which suppuration occurs, should be postponed until the eye cases are finished for the day. To operate for cataract after making or assisting at a *post mortem* would be risky in the extreme.

Next, the instruments should be above suspicion. In large ophthalmic hospitals in England the instruments are in charge of a House Surgeon, and he is assisted by trained nurses. In the mofussil hospitals in Bengal, where an overworked compounder or dresser on 10 or 12 rupees a month, and largely occupied with the dressing of septic wounds, ulcers, &c., is supposed to keep the instruments clean, a surgeon's only hope of securing their purity, as far at least as the eye instruments are concerned, lies in keeping them in his own hands and cleaning them himself. This is troublesome, but I do not see how else he can depend upon their cleanliness. In Burdwan I keep the eye instruments (most of them my own) in my own possession, and I carefully clean them before and after operations in a 5 per cent. carbolic solution. During the operation they are placed in a tray (an ordinary soup plate answers well for this purpose) immersed in a solution of this strength and when required for use they are dipped, each instrument in turn, in the boric acid solution, which is kept in a tumbler close at hand. Immersion of the steel instruments for any length of time in the boric solution is injurious as it corrodes the metal.

Lastly, we arrive at the consideration of the antiseptic dressings and appliances. The articles required are—

- (1) A 5 per cent. solution of carbolic acid for the instruments.
- (2) Boric acid solution 10 grs. to 1 oz.
- (3) Lister's protective.
- (4) Iodoform.
- (5) Sal alembroth wool.
- (6) Sal alembroth gauze.

The boric solution should be prepared with boiling water, the sediment allowed to settle, and the clear fluid kept for use in a stoppered bottle. The lids, brow, and skin round the eye should be washed with this solution before the instillation of cocaine. The cocaine solution might also be advantageously prepared with water that has been boiled and allowed to cool. As this solution deteriorates rapidly from fungoid growths, it is advisable to prepare only a small quantity at a time. Here we prepare one drachm of the solution as required, dissolving 2 grs. of the alkaloid in this quantity of water. Our poverty enforces economy. During the operation a tumblerful of the boric acid solution, rendered tepid by the admixture of a little boiling water, is kept at hand for the immersion of the instruments and for washing out the conjunctival sac after the introduction of the specu-

lum. This can be done either with a syphon tube or an eye syringe, or, as I do it here, with a small pledget of sal alembroth wool used instead of a sponge.

After irrigating the sac and removing all visible particles of mucus, &c., from canthi and edges of the lids, the operation is performed. During the operation blood can be removed from the conjunctiva and from the edges of the incision, also soft lens matter, with the small pledget of wool squeezed out of the boric solution. I find the pledget of sal alembroth wool, which can be thrown away after each operation, much better than a sponge, which is liable to contamination despite our best efforts to the contrary. By using a pledget of clean wool for each operation, all risk from this source is avoided.

When the operation has been finished and all superfluous fluid sponged away with the pledget of wool, the palpebral aperture should be covered with small strip of Lister's protective about  $1\frac{1}{2}'' + \frac{1}{2}''$  laid upon the closed lids. This strip should be immersed for a few moments in the carbolic solution, and passed through the boric solution before being laid upon the lids. Over this a thick soft pad of sal alembroth wool enveloped in the sal alembroth gauze and lightly sprinkled with iodoform is laid. A similar pad, but without the protective and iodoform, is laid upon the other eye, and the bandage applied in the usual way.

Some surgeons do not use the protective, but merely apply the pads with or without iodoform; others smear the lids with boric ointment before applying the pads. Mr. Tweedy introduced the protective at Moorfields, and I have found it so useful that I always employ it. It prevents the lids from gumming, and it saves the eye from possible irritation by particles of iodoform, or by the pad itself, which, when it has been applied for two or three days, gets covered with a small crust of dried secretion, which sticks firmly to the lids. All irritation of this kind is prevented by the strip of protective, which lies closely upon the lids and keeps them moist and pliant.

The pads need not be removed until the 4th morning, unless profuse lacrymation, indicated by discharge of the colour of the pad, or pain, or other untoward symptom, arises. The incision will then, especially if a conjunctival flap has been made, be found firmly united by first intention. In many cases I have experienced some difficulty in detecting the line of the incision, even with a magnifying glass, on the 4th morning. In favourable cases a shade may then be substituted for the pad, and atropine instilled for a few days to prevent adhesions of the iris to the capsule, at the end of which time the patient can be safely discharged. Should there be pain or profuse lacrymation,

it would be well to change the pads on the 3rd morning, but when this is done, it is best not to open the eye, unless absolutely necessary. It will suffice to wash the lids with the boric solution, and apply fresh pads for a couple of days. The eye can be examined again on the 5th morning, when it will usually be found that the pad may be dispensed with and the shade substituted for it. In a very small number of cases a third pad may be necessary.

In this hospital I dress all the eye cases myself. I think it safest for the first four or five days at least to keep the dressing of cases that have been operated upon in my own hands. A good dresser could very easily be taught to do what is required; still it appears to me, if one desires absolute security from septic influences, that he should keep the matter in his own hands, at any rate for the first few days.

In conclusion, it may be advisable to say a few words about the cost of the dressings. The sal alembroth, which is a kind of sublimate wool, the gauze, and Lister's green protective, can be obtained at a very moderate price from the manufacturers, Messrs. Macfarlan & Co., 71 Coleman Street, London, E. C. Twelve or fifteen pounds of the wool and 50 yards of the gauze would suffice for a year for a hospital, in which over 100 cataract operations were performed. The wool costs 1s. 9d. per lb, the gauze 2d. per yard, the protective 1s. 6d. per yard. A couple of yards of the latter would be sufficient if used only for eye cases. Thus for something less than 50 rupees, including carriage, a year's supply of these valuable antiseptic dressings can be obtained.

4th May 1889.

#### ENTERIC FEVER LESIONS IN DOGS.

*A Contribution towards the Investigation of the Prevalence of Enteric Fever in Cantonments.*

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THIS article is written with a view to point out a direction in which further investigation might be made, in order to attempt the solution of the question of the continued prevalence of Enteric fever in cantonments. The work begun has, through the devolving of certain duties on the writer, been left unfinished; he is anxious, however, that those whose opportunities admit of it, do push the enquiry towards final solution.

Stationed at Sialkot during the past cold weather, it was noticed that there was a heavy mortality among dogs of European breeds; that lung and bowel complaints prevailed, with here and there a case of rabies. A series of *post-mortem* examinations on healthy dogs and dogs dying of disease were begun, resulting in the finding of *Enteric fever lesions* in the intestines.