

NOTES ON THE EXTRACTION OF CATARACT.¹

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THE routine operation for the extraction of cataract has not yet been generally agreed upon, and adherents of one or other of the well-recognised methods still claim the superiority of their own choice above all others. The discussion of the subject is rendered difficult to some extent by the paucity of statistics as to ultimate results in long series of cases, and in this connexion it will probably be a disappointment to many that a record of 200 or 300 consecutive cases is not forthcoming even from the vast number operated on by Lieutenant-Colonel H. Smith, who states that he has extracted over 20,000. It is, however, well known that the difficulty of obtaining statistics in India is extremely great, owing to the impossibility of tracing old patients.

The operation for the extraction of the cataractous lens in its capsule as performed by Lieutenant-Colonel Smith has aroused such widespread interest, and the publication of his book will probably lead so many ophthalmic surgeons to try his operation, and so many patients to inquire about it, that it may not be out of place to review the various methods of operation now commonly practised, to attempt to appraise their individual merits or demerits, and finally, to hazard an opinion as to whether the older operations for the extraction of cataract have been found wanting.

It is the opinion of the writer that no single operation is equally suitable for all cases, but that various features, all of which may have an important bearing on the choice of operation, have to be considered. The possible complications and sequelæ of the various operations have to be kept in mind, together with the reasons for which the operation was undertaken; and last, but by no means least, the character of the cataract itself. It has long been recognised that success does not follow equally all operations for the extraction of cataract, however uniformly and skilfully they have been performed; and as the ultimate result of an extraction will depend upon the presence or absence of various important sequelæ, it will be probably more profitable to consider these first, and the various methods of operation later.

Complications following the Extraction of Cataract.

1. *Adhesions of the lens capsule to the extraction scar.*—Mr. Treacher Collins has shown that the irido-cyclitis, sympathetic ophthalmia, and glaucoma which may follow an operation for extraction are often due to the entanglement of the lens capsule in the wound or adhesion to the posterior surface of the cornea. The entangled capsule acts as a foreign body and produces the same inflammation that would follow the implantation of an eyelash or a fibre of cotton-wool. It may also cause inflammation by dragging on the ciliary processes, or glaucoma by dragging the iris forward and narrowing the anterior chamber.

2. *Capsular opacities.*—It is generally agreed that from 30 to 50 per cent. of all cataract operations require a subsequent needling for capsular opacity. Mr. Higgens, in his series of 130 consecutive cataract extractions, notes that he needled 57 out of the 130, some of them more than once, and this may be taken as a fair example of ordinary practice. As a rule the presence of opaque lens matter between the two layers of the lens capsule does not seem to cause any irritation, but a needling operation should be unnecessary in the ideal operation, and if it can be avoided so much the better. It is, of course, well known that the presence of any considerable amount of soft material left behind in the anterior chamber after extraction of the lens occasionally causes iritis, and a very dense fibrous opacity may result. Cases of glaucoma after needling are usually due to previous adhesions

of the lens capsule in the wound. The operation of needling has also the disadvantage of breaking down the separation between the aqueous and vitreous. The latter becomes more fluid, and any subsequent operation on the eye is rendered much more hazardous.

3. *Loss of vitreous.*—Loss of vitreous during an operation for extraction, provided that the amount lost is not excessive and that septic infection is avoided, does not seem prejudicial to the ultimate visual results. It is also generally agreed that the effects, if any, are less pronounced when the vitreous is diseased or abnormally fluid than when it is sound.

In the appendix by Captain Lister to Lieutenant-Colonel Smith's book an account is given of a research into 90 cases where loss of vitreous occurred during the operation for extraction of the lens in its capsule. The average length of time which had elapsed since the operation was over three years. No detachment of the retina had occurred in any case, and a large majority of the cases had 6/6 vision or better. A very similar result was obtained last year as the result of a research into some cases under my care at Guy's Hospital in which vitreous had been lost. No untoward results were observed even though several years had elapsed since the operation had been performed. The vitreous, however, is a more stable and satisfactory medium than the aqueous, and if equal visual acuity can be obtained without loss of vitreous it is much more satisfactory. In this connexion it is of interest to note that vitreous was not lost in a single case of Mr. Higgens's sequence of 130.

4. *Prolapse of the iris.*—This occasionally occurs after extraction without iridectomy, most often in those cases in which the nucleus of the lens was small and there was considerable soft material, some of which was left behind the upper part of the iris. The swelling of soft matter due to absorption of the aqueous appears to be a considerable factor in the causation of prolapse. Mr. Higgens found it necessary to remove a prolapse in five cases out of 83 operations without iridectomy, and iridectomy at a later date was required in two more. He states, however, that he leaves small prolapses alone, and it is also the writer's experience that these, provided they do not cause too much eccentricity of the pupil, are best left untouched, and that they do not cause any subsequent inflammation. A large conjunctival flap made at the time of the corneal section is very useful in preventing subsequent prolapse of the iris, as the rapid healing of the conjunctiva prevents any gaping of the cornea and escape of aqueous.

Variations in the Structure of the Cataract.

As has been said above, all mature cataracts are not similar in structure, and it is a great advantage to be able to tell from the appearance of a cataract before operating if it is likely to have a large or a small nucleus, and if consequently there will be little or much cortical soft material. It is well known that amber-coloured cataracts, which in extreme cases are called "black" cataracts, are not really cataracts in the ordinary sense of the word, but are due to a general sclerosis of the lens with no differentiation between cortex and nucleus. They seldom become completely opaque, and never appear white in the pupil, but rather dark grey or brown, and on ophthalmoscopic examination show little definite opacity. As a result the vision never diminishes to bare perception and projection of light, though it may become too deficient for reading and writing. Experience shows that these lenses always shell out extremely easily from the capsule, even when apparently quite immature, and leave little or no soft material behind. The same characteristics may be noticed in those nuclear cataracts which appear whitish, opaque, and almost foamy in the centre, resembling in some degree ice containing small air-bubbles.

Mr. Higgens notes that cataracts with milky or pearly nuclei and striæ scattered plentifully in the cortex, much of which may remain transparent, come away easily, and though immature do not need iridectomy. On the other hand, cataracts which are entirely opaque and very white, though not necessarily hypermature, often consist of a very small nucleus and a large amount of soft material, and Mr. Higgens also notes that in all cases where there is a yellowish nucleus and a cloudy cortex without any definite striæ, that kind of opacity which always appears to be facing one whichever way the eye is looked into, which is ill-defined, and

¹ The writer has referred in this article to the following publications, which should be read by all who are interested in the subject:—The Treatment of Cataract, by Lieutenant-Colonel Henry Smith, I.M.S., Calcutta: Thacker, Spink and Co., 1910. Lieutenant-Colonel Smith's Operations in Bombay, by P. P. Kilkelly, M.B., Major, I.M.S., Indian Medical Gazette, May, 1910. Notes on 130 Consecutive Extractions of Cataract without a Failure, by Charles Higgens, F.R.C.S., THE LANCET, April 13th, 1907. Capsular Complications after Cataract Extraction, by E. Treacher Collins, F.R.C.S., Royal London Ophthalmic Hospital Reports, vol. xvi., part iii.

surrounded by a more or less distinct red reflex, the cortex is always sticky and difficult to get away.

With the above considerations in mind it is easier to review the various operations for the extraction of cataract.

Operations for the Extraction of Cataract.

1. *Simple extraction without iridectomy.*—If this operation is successful it is far and away the best both from the point of view of appearance and of visual efficiency. The central mobile circular pupil matches that of the other eye, and after the lapse of a week or two it takes an expert to discover which eye has been operated on. It is of special advantage for those who have prominent eyes, and in whom the upper lid does not cover the upper part of the iris, and as a result an iridectomy would be very apparent. It is the operation to be performed where the extraction is undertaken for the sake of appearances, whether from a social point of view or from the economic necessity of a wage-earner to avoid the disability incurred by the presence of a unilateral cataract, or of an obvious iridectomy. It is also my experience that patients having had both eyes operated on, one with iridectomy and the other without, find that eye most useful which has the complete circular pupil even though the visual acuity of the two as tested by Snellen's types may be equal.

The absence of glare in bright lights and the better definition obtained by the smaller pupillary aperture make the eye more efficient for all purposes and under all conditions. It is extremely rare to get any involvement of the capsule in the wound after the operation, as the iris draws all tags of capsule back to the centre and away from the corneal section, and for the same reason loss of vitreous is less likely to occur than when iridectomy has been performed. A further advantage of the simple extraction is that it requires the minimum interference with the eye, and can be done with the fewest instruments.

Having learnt the technique of the operation from Mr. Higgins, the writer follows his methods as described in his paper. No speculum is required, and the necessary fixation can be obtained by passing a stitch through the conjunctiva below the cornea and getting an assistant to hold it down on the cheek. If the knife is properly sharp it may be passed through the anterior chamber from side to side without moving the eye; no forceps are required for fixation and the eye can be steadied on the edge of the knife while the section is being made. The lens is expressed by the two thumbs, one operating upon the lower part of the globe through the lid and the other making counter-pressure on the upper part of the globe. The iris usually returns at once, but if necessary can be replaced with a repositor. Should it show any tendency to prolapse an iridectomy can be done subsequently to the extraction instead of before. Thus the only instruments really required in many cases are a Graefe's knife and a capsule hook, and the latter *can* be dispensed with if the capsule is opened with the point of the knife as it passes through the anterior chamber, a manoeuvre I first saw performed by Mr. Stanford Morton at the Royal London Ophthalmic Hospital.

The only disadvantages of this operation are, the comparative difficulty of removing soft material which may get up under the upper margin of the iris, the danger of prolapse and the subsequent formation of a web. But these sequelæ may be avoided by selecting for the operation only those cases of cataract mentioned above, which have very little soft material and a large nucleus.

2. *Extraction with iridectomy.*—The iridectomy may be performed either as a preliminary operation or at the same time as the extraction. The former course has the advantage of giving the operator some idea of the behaviour of his patient before he attempts the more serious task of removing the lens, but it has the disadvantage that the iridectomy wound cannot be subsequently anæsthetised with cocaine, and the corneal section at the second operation may be painful. It is more usual therefore to perform the iridectomy at the same time as the extraction.

The advantages of iridectomy are that the soft material is more easily evacuated than in the simple extraction without iridectomy, and that there is no danger of a subsequent prolapse of the iris.

The disadvantages are that prolapse of vitreous is more likely to occur during the operation, and that the lens capsule, unless carefully replaced, may become incarcerated in the wound. In order to obviate this complication Mr.

Treacher Collins devised his method of removing the anterior lens capsule with forceps instead of tearing it with the sharp hook. He says:—

As a result of his experience the writer thinks it best after a small iridectomy has been performed to introduce the capsule forceps closed, to a position opposite the centre of the lens, then to allow the blades to separate to an appropriate extent, and while separate, to depress them slightly backwards so that their teeth penetrate the capsule. At the forceps being again closed the capsule can often be seen to ruck up on the surface of the lens and a slight, lateral, side to side movement should then be made before withdrawing them from the eye. This lateral, side to side movement serves to detach the anterior capsule and to prevent the withdrawal of the lens in its capsule, which may occur if a pull outwards is at once made.

The advantage of this procedure is not only that no anterior capsule is left to become entangled in the wound, but also that the aqueous obtains free access to any soft material that may be left behind, and a web is much less frequent than in cases where the capsule has been merely lacerated.

Mr. Treacher Collins notes that of 200 cases operated on by him in this manner subsequent records of 145 were obtained, and that 51, or 25 per cent., obtained 6/6, or 6/6 partly, without needling. This percentage of normal vision with one operation is certainly much higher than that recorded by any other method of extraction, excluding Smith's operation. It must be remembered, however, that needling may be ultimately required, even though the anterior lens capsule has been removed, not by reason of the existence of an opaque web, but because the posterior capsule may, though transparent, become wrinkled and prevent the formation of a well-defined image. After an iridectomy the pupillary aperture is large, and though the upward iridectomy is hidden by the upper lid, there is no doubt that patients suffer considerably from glare in bright lights.

3. *Extraction of the lens in the capsule.*—The operation for the extraction of the cataractous lens in its capsule has in recent years received such powerful advocacy from Lieutenant-Colonel Smith of Jullundur, and he has made such important modifications in its technique that it now goes by his name, though of course it has been frequently performed previously, both intentionally and unintentionally. Space will not permit here of giving a detailed description of the operation, but everyone who is interested in ophthalmic surgery should read his book, which is amply illustrated, and in which the *pros* and *cons* of the various operations for cataract are dealt with at great length.

Briefly it may be stated that in Smith's operation, after an iridectomy, the lens is expressed bodily in its capsule. The rupture of the suspensory ligament is accomplished by pressure with a blunt hook on the lower part of the cornea, the lens in its capsule dislocating first in the wound. Escape of vitreous from the gaping of the wound is obviated as far as possible by making the patient look up instead of down during the expression of the lens, the upper eyelid being lifted from the globe by a hook.

The advantages claimed for this operation are that it is quite as safe as the ordinary method of extraction, and that all subsequent operations for after-cataract and all capsular complications are avoided by the bodily removal of the lens capsule, and that escape of vitreous, which, it is generally agreed, is not infrequent, has no detrimental effect upon the subsequent vision.

The operation is recommended by Lieutenant-Colonel Smith both for mature and immature cataract, but in his advocacy for its adoption for immature cataract he dismisses all methods of artificially ripening the unripe lens with very brief consideration. In discussing trituration, or iridectomy with massage through the cornea, he says: "In my observation it has no influence on the immature cataract if the massage be done with a justifiable degree of pressure, that is pressure which will not dislocate the lens." With this statement the writer must entirely disagree. He is constantly trituring lenses in hospital practice and can assert that it is a matter of common experience that trituration of the lens through the cornea usually produces complete opacity of the lens in from three to four weeks. The writer has never dislocated the lens, and vitreous has never been lost at the subsequent extraction.

Trituration has also the advantage that the soft cortical material which is found at the extraction is never sticky and can be easily and completely expressed with the nucleus by gentle pressure on the cornea. Subsequent capsular opacities are infrequent. The only objection which has been

raised against trituration is that in unscrupulous hands it may lead to malpractice, as at the preliminary operation it is very easy to give a patient a cataract even if one was not present beforehand.

Immature cataracts can also be extracted with safety after removal of the anterior lens capsule with forceps by the method adopted by Mr. Treacher Collins. The aqueous has free access to the lens material left behind, and it is soon absorbed.

It wants to be thoroughly understood, therefore, by all those who are suffering from immature cataract that it is not necessary in these days to wait until a slowly growing cataract matures, whether an extraction of the capsule or an ordinary extraction is proposed. The sole criterion is the amount of vision and its importance to the patient. Directly vision has failed in both eyes so that the patient cannot read or write with comfort an extraction can be undertaken with safety.

In dealing with mature cataract also Lieutenant-Colonel Smith is an ardent advocate of his method as the best operation for senile cataract under all conditions, and he certainly has had a vast experience, and ought to speak with authority. Some Indian ophthalmic surgeons, however, who have had some opportunity of seeing more of his work than oculists at home, are not in agreement with him, notably Major Kilkelly of Bombay. At Major Kilkelly's invitation, Lieutenant-Colonel Smith performed 23 cataract operations at the Sir Cowasjee Jehangir Hospital, Bombay, in February, 1909. The results of these operations are detailed in the *Indian Medical Gazette* for May, 1910, and show that of the 23 cases incarceration of the iris occurred in 5, capsule tags in the wound in 4, vitreous opacity in 9, and iritis in 7. The visual results cannot compare with those obtained by Mr. Higgins or Mr. Treacher Collins, and Major Kilkelly himself says that he has performed some 600 extractions of the capsule, but that he has given up the operation as a routine procedure, being convinced that the best interests of the patient would not be considered if it were done, except in very exceptional cases. Major Kilkelly remarks with reference to Lieutenant-Colonel Smith's series that for the extraction of the lens in the capsule it seemed in some of the cases at least that the pressure necessary was excessive. Many lenses shelled out with the utmost ease; in others it was only the undoubted determination of the operator which brought about the desired result and caused a rupture of the capsule or escape of vitreous.

In the same number of the *Indian Medical Gazette* there is also an article on Smith's operation which reviews a number of publications dealing with the operation, and the opinions of the various writers appear to be divided, several being still unconvinced of the safety of the operation.

Ultimate Vision.

It may be of interest to survey the ultimate visual results as recorded in the papers which have been mentioned in this article. Out of 115 cases of Mr. Higgins's 130 who were not precluded from good vision by previous iritis, choroiditis, or other diseased conditions, 8 obtained 6/6; 33, 6/9; 39, 6/12; 24, 6/18; 7, 6/24; 3, 6/30; none, 6/60; and 1 < 6/60.

Mr. Treacher Collins gives no particulars as to the vision of all his cases, but notes that 25 per cent. got 6/6 without needling.

As has been said above, Lieutenant-Colonel Smith gives no statistics as to vision in any series of his own cases, but Captain Lister gives the visual results of 61 cases of loss of vitreous: 6/3 in 4, 6/3·5 in 6, 6/4 in 4, 6/4·5 in 5, 6/5 in 4, 6/6 in 33, 6/8 in 2, 6/9 in 3. Captain Lister makes the note that in India, owing, he thinks, to the better light and clearer atmosphere, patients who come to him for examination usually read a line or two more of Snellen's test types than they do in England. He finds that very many British soldiers read 6/3·5 quite easily.

On the other hand, the visual results of the 23 cases operated on by Lieutenant-Colonel Smith for Major Kilkelly in Bombay show a very different result. One case only got 6/15; 2, 6/20; 7, 6/30; 3, 6/40; 4, 6/60; and 6 less than 6/60. It will be seen, therefore, that even though by Smith's operation some extremely good results may be obtained one may also get some very poor ones.

It appears, therefore, that the extraction of the lens in its capsule is not yet being universally adopted as a routine

operation for the extraction of cataract, and that it has been tried and rejected by many skilful operators as being too risky, and in view of the other facts quoted here it cannot be said that the results of extraction of cataract performed in the old way are unsatisfactory. It is the writer's own experience that nearly every ophthalmic surgeon of his acquaintance to whom he has put the question has replied that if he were going to have an extraction performed on himself he would not select extraction in the capsule, but would be content with the ordinary extraction, with or without iridectomy.

It has been the writer's object in this article to show that in his opinion no single operation can be adopted for all cases as a matter of routine. In selected cases a simple extraction without iridectomy is undoubtedly the best. In cases where there is likely to be much soft material removal of the anterior lens capsule with forceps will give extraordinarily good results, and it is evident that in skilled hands the older methods of extraction of cataract are quite as efficient as, and probably safer than, extraction in the capsule. Time alone will show whether the latter operation will be generally adopted or whether its success depends alone on the peculiar dexterity of Lieutenant-Colonel Smith himself.

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THE APPENDIX, ITS RELATION TO THE CAUSATION AND SURGICAL TREATMENT OF AFFECTIONS OF THE ADNEXA.¹

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THE object here is briefly to review, alike from the pathological, clinical, and operative standpoints, the influence which our present knowledge exerts on the diagnosis and operative treatment of appendical complications in affections of the female genitalia. The importance of the subject is illustrated by such cases, amongst others, as the following:—In a child, aged 10, an appendical abscess with the appendix found adherent to the pelvic floor; in a child, aged 11, the inflamed and diseased appendix adherent to the ovary; pyosalpinx with a long appendix adherent to a diverticulum of the bowel at the left side; an adnexal lesion in which the rudimentary appendix, reduced to a thin cord, was constricting the bowel; a case in which the cystic ovary, tube, and appendix, with concretions, were matted together; a retro-cæcal abscess with slough of the appendix (only discovered post mortem) following curettage and resection of cystic ovaries, performed for menorrhagia and dysmenorrhœa associated with endometritis, without any history or suspicion of appendicitis; some cases in which subsequent appendectomies had to be performed after cœliotomy for adnexal disease.

There is the interesting question of the course of the inflammation from ovary to appendix, or *vice versa*. The "appendiculo-ovarian" ligament, first described by Clado, is by some authorities (as, for example, Treub, Dutilh, Olshausen, Krönig, and Döderlein) accepted as the track by which the infection travels. This ligament (springing from the "infundibulo-pelvic ligament"), according to these and other gynecologists, contains nerves, vessels, and lymphatics. Parametritic disease may extend along it to the cellular tissue between the mesentery of the cæcum and the iliac mesentery of the appendix, or in the opposite direction, the primary condition (according to Krönig) being a chronic adhesive appendicitis. This leads to suppurative processes which extend along the lymph tracts, or there may be a direct rupture from the one structure into the other. Hartmann (Paris), who has discussed this question exhaustively, believes, on the other hand, that this ligament is simply a fold of peritoneum passing behind the meso-ovarian and does not form any vascular or lymphatic link between the ovary and appendix. He (Professor Hartmann), with others, accounts for the spread of the inflammation either by direct contact of the diseased structures one with the other

¹ Abstract of a valedictory address to the Obstetrical and Gynecological Section of the Royal Society of Medicine.