I must not here enter into the various physical signs indicated by percussion and auscultation. I will merely remind you that commonly one side expands imperfectly in respiration, while the heart is pushed over to the right side from the presence of fluid; and eventually, if the fluid be not absorbed, although it may at first be serous, it is apt later to become purulent. Although this is the common mode of attack, yet I wish to warn you that there are chronic cases of pleurisy in which there are no such antecedent symptoms. Perhaps there is no history of a febrile attack to be traced. We have seen in this hospital a considerable number of cases of copious pleuritic effusion in children, where no distinct history of acute pleurisy could be made out, and its progress had been so insidious that it was unsuspected. Now, supposing that the symptoms do not yield to ordinary remedies, are we justified in tapping the chest and letting out the fluid in young children? In determining this question, it must be remembered that the fluid in these cases often becomes purulent, and then there is a fresh accession of fever, the child becomes hectic, the tongue is redder, and there are probably diarrhoea and sickness. The cavity of the pleura, indeed, then becomes a large abscess, and the child is in grave peril. Two very favourable cases have occurred at an interval of twelve months in this hospital. One case has gone out recently, convalescent. I confess that for some time I viewed unfavourably the operation of paracentesis thoracis in these cases. What I had seen and read of it abroad was by no means encouraging. M. Boyer had not a single favourable result in all his cases. Dupuytren had only two successful cases out of fifty. M. Gendrin did not save one child in twenty! But a paper was published some years ago in the *Cuy's Hospital Reports*, in which much better results are recorded; thirteen out of twenty-five recovering, and in some of the fatal cases death taking place from causes apart from the operation. Dr. West has come to think that we may tap the chest more frequently, and that children are possibly lost in consequence of it not being done.

I have now seen several cases where the operation was followed with good results. Here is an example. James Busby, aged 8, was admitted into the Hospital on June 6th, 1870, with pleurisy, becoming worse and worse. He had to be propped up in bed from excessive dyspnoea, and would have sunk unless the operation had been performed. Various measures were had recourse to before the operation—such as blistering, dry cupping, etc. On the 29th of June, the symptoms were extremely urgent; and on the 13th of July, as a last resource, the pleura was tapped by Mr. Wood, at the suggestion of Dr. Playfair. Thirty-six ounces of thick pus were drawn off through a tube under water, immediately after which he breathed more easily, passed a quiet night, and next day was more comfortable than he had been for a month before. The line of dulness was moved back three-fourths of an inch nearer the median line. On the 20th of July, the pleura had filled again, and the boy was apparently as bad as ever. There was considerable bulging in front of the ribs, just below the left nipple. Mr. Wood passed a trocar through the old wound, and drew off nine ounces of pus, which gave him no relief. Next day, the dyspnoea was still greater; the bulging in front was larger, red, and tender, looking like an external abscess, and poultices were applied. On the 24th, he seemed at the point of death from dyspnoea, and the house-surgeon opened the swelling at the most prominent part with a bistoury. Eighteen ounces of pus gushed out, and for a week afterwards the discharge was very profuse, soaking the bed-clothes three or four times daily. Oedema of the feet came on; and on August 7th, both legs and thighs were much swollen, and diarrhoea set in. For this he was treated with opium, catechu, and kino unsuccessfully; and on the 19th, the diarrhoea was so excessive that all food was stopped except raw meat pounded with sugar, and a liberal allowance of brandy. The second left rib was separated from its cartilage, and could be felt moving up and down under the finger. In a few days, the diarrhoea diminished; the boy began to improve and gain flesh. On the 19th, as no discharge took place, a counter-opening was made through the back of the chest, and a drainage-tube was put through from front to back. On September 16th, a smaller tube was substituted; and on October 20th, this was altogether removed. He was then plump, walking about the ward, though still unsteadily. The left side measured 10½ inches, one inch less than the right, and was tolerably resonant; there was vesicular breathing, with some small crepitation; and the heart had resumed its normal position. On Nov. 4th, he was sent away convalescent. In reference to the narrowness of the chest in this case, it must always be expected to follow to a greater or less degree; and there is little chance of the chest regaining its entire fullness again—it probably remains always partially collapsed, although there is great tendency in nature to repair the injury. Dr. West has suggested a peculiar belt and crutch to be used after treatment in hospital to lessen this deformity, and has seen children improved by its use.

The second child on whom paracentesis thoracis was performed has just left the ward. The notes are as follows. Annie Webb, aged four years, was admitted on the 19th July, with some dulness of the left side of the chest, diarrhoea, and abdominal pain. She had cough, and was restless. The temperature was 103 deg., and the pulse 136. The cough increased; and, on the 23rd, there was dulness over the whole of the left lung, with diminished respiratory and vocal sounds. The left side was slightly larger than the right, and the spinal column was curved from the left. On the 26th, the left side was painted with iodine liniment; but, as this took off the skin, it was not repeated. On the 28th, as she was coughing much, restless, fretful, and thirsty, she was given two drachms of cod-liver oil twice daily, two ounces of wine, and an extra pint of beef-tea. Notwithstanding this treatment, the pleuritic effusion increased so much that, on the 6th August, the intercostal spaces were bulging, and the most perceptible heart-impulse was between the sternum and right nipple. On the 16th, the chest was tapped under water, and a tube inserted, through which two ounces of very thick pus flowed. Considerable quantities of pus escaped daily. On the 25th, some purulent material was coughed up, the edges of the wound sloughed, and the tube was withdrawn. On September 2nd, the pleura was syringed out with one part of tincture of iodine to five parts of water. After this, the discharge became less, and great improvement was manifest in the girl's health. On the 30th, she had lost her cough; the wound was rapidly contracting, and very little discharge of pus; the heart was in its normal position, and a considerable quantity of air could enter the left lung. The abdominal pain in this child was very likely to mislead the practitioner, and make him suspect some abdominal affection. It is well to be upon one's guard in this matter. When a child complains of pain in the lower part of the chest or upper part of the abdomen, you need not necessarily suppose that it is suffering from peritonitis or inflammation of the bowels. Examine its chest carefully, especially if it have cough. Most frequently cases of this kind turn out to be pleuritic, and not abdominal. When the chest begins to bulge on one side, there is then no doubt that there is the effusion of pleurisy. I have no doubt, gentlemen, that in this child's case tapping was a very judicious measure; and I feel certain that this operation will come to be the recognised method of treatment in such cases.

ON INTRAOCULAR MYOTOMY.*

By AUGUSTIN PRICHARD, F.R.C.S.,
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It has been my desire for some time to bring before you some of the results of this operation on the eye, the method of performing which I will presently describe. We of the elder generation in our student days were taught that the firm grey ring, about an eighth of an inch in width, joining the iris and choroid, and lying a little behind the junction of the cornea and sclerotic, was a ligament, and it was therefore called the ciliary ligament; but it was also added that some older anatomists considered it a ganglion, and others even thought it muscular. It was obvious, however, on minute dissection, without powerful microscopic aid, that it received numerous branches of the ciliary nerves, which ran forward imbedded in the grooves on the inner surface of the sclerotic; and that a few were traceable through its tissue into the iris; and also that some nervous twigs seemed to emanate from loops whose direct continuity with the ciliary nerves it was difficult to trace. These latter, I need scarcely remind you, come from the lenticular ganglion, and consist of branches of the third or motor, the nasal branch of the first division of the fifth, or the sensory parts, and the sympathetic; besides the two long ciliary nerves which leave the fifth nerve before it joins the ganglion, and enter the globe of the eye along with the others; one of these two anastomosing with one of the short ciliary twigs before it pierces the sclerotic, thus, independently of the nervous supply to the lids, conjunctiva, muscles, and other appendages of the eye, forming an extremely complex arrangement of nerves running forward to the ciliary ring. This peculiar structure is now acknowledged to be muscular, composed of non-striated fibre in the human subject, but of striated fibre in some of the lower animals; having its fibres directed principally in two sets, one circular, and the other radiating, but much intermingled; the whole forming so firm a ring that, when there is effusion within the globe of the eye, that is, inside the choroid, the sclerotic itself, dense and inelastic as it is, rather yields than this band, which forms a constricted line round the hardened globe. In those rarer cases where the whole eye, including this band, is distended with fluid, the sight is hopelessly gone.

* Read before the Bath and Bristol Branch, October 26th, 1871.

The operation to which I allude is the division through a small aperture of these muscles and the areolar tissue and nerves, which together form the so-called ligament; and it is easily performed, without much pain, and not needing chloroform. Mr. Hancock and Mr. Solomon, and some others, have written on the subject; and Mr. Solomon, who seems to have a large experience of it, lays much stress on the difference between division of the longitudinal and radiating fibres of the muscle, and advises a special way of operating, so as to ensure the division across the radiating fibres; and he brings forward some cases of much interest and success, where he has performed his operation for the cure of various defects in the accommodating power of the eye. I am not convinced of the reality of this difference, and believe that, if the whole grey body be cut through, the fibres of all kinds must be divided, and the action of the muscle modified and impeded; and, independently of any effect on the muscular and nervous elements of the organ, the dense unyielding ring can no longer afford the mechanical resistance which it has hitherto given.

Unfavourable results of the operation are extremely rare, the usual local objective consequences being an immediate effusion of blood, sometimes filling the anterior chamber, which, however, is absorbed in a day or two; a slight protrusion of the choroid or even of the hyaloid membrane; a gradual leakage of watery fluid from the chambers; and a dragging of the pupil downwards towards the opening. The other results vary according to the case.

The operation is generally performed with a cataract-knife; but I very much prefer the iris-knife, a little instrument which has undeservedly fallen into disuse. It is a knife about as wide as the blade of a cataract-needle, cutting on one edge only, with a smooth and round back, being tolerably strong for its size. The surgeon stands behind the patient, and, steadying the head and eyelids as in the extraction of cataract, with the knife pointed vertically downwards, its back being towards the globe, lets the point enter the cornea about a line from its lower margin, and pass onwards through the iris close to its ciliary border, into the space between the edge of the lens and the sclerotic; then, by pressing the edge forwards against the sclerotic, and letting the little knife partially cut its way through, the ciliary muscle must be divided. Before the instrument is quite withdrawn, it should be slightly rotated, so as to allow a free escape for the aqueous humour and any blood which may have been effused during the operation, and of any fluid that may be collected at the roots of the ciliary processes and round the ciliary ring.

The cases where this operation will be of service may be stated generally to be those where the sight is dim, the eye unusually tense and hard; in chronic recurrent iritis with effusion; in glaucoma in all stages; and in sclerotic inflammations which are accompanied with increasingly impaired vision and much circumorbital or hemicranial pain: in fact, in those cases where iridectomy is successful. And it is quite different both in a physiological and practical point of view from mere puncture of the cornea or evacuation of the aqueous humour, or tapping through the sclerotic in cases of hydrophthalmia, recommended by Wardrop and others. I am not prepared to say that this proceeding is a complete substitute in all cases for iridectomy; but it has the advantage of being quite safe and simple, and comparatively a slight operation, not requiring chloroform, and productive of little injury to the eye. It gives time for other treatment, and for iridectomy itself, should that measure be advisable. I am quite aware also that some of the highest ophthalmic authorities in London have no opinion of its efficiency; but this I make bold to put down to want of experience, from lack of faith in its merits. I believe also that, in cases where this operation proves entirely useless, iridectomy will prove useless too. I have performed the operation as I have described it a great many times, and the general result is as follows.

In one old gentleman, who was quite blind, there was suppuration of the globe; and this, the only untoward consequence I have met with, was due to the patient's imprudence. In many other cases, the result has been negative. In very many instances of progressive disease threatening the sight, the complaint has been checked and a portion of sight saved; and in many others the sight has very much improved, and freedom from pain ensured. It is worthy of remark, that I have never seen a return of glaucomatous disease in an eye thus treated; and also that it is only in bad and unpromising cases, where other treatment proved unavailing, that the operation has been performed.

I must briefly narrate to you some of these cases, in illustration of what I have described.

CASE I. *Glaucoma*.—One of the first cases in which I performed it, was in a poor woman blind for some time with one eye with what used to be called amaurosis. She was under various general and local treatment for it when the other eye became suddenly dim; and she was brought up to the Eye Dispensary almost blind a few years ago. The

pupils were dilated and fixed, but not yellow or glaucomatous in appearance; and she suffered extreme pain in the sides of the head. We tried the treatment usual in such cases—blisters, iodides, and local stimulating applications to the eye; but she grew gradually worse, and it appeared certain that nothing but operation would give her any chance, and that a very poor one. I therefore went down and performed intraocular myotomy in a little back street in the Hotwells, my friend Mr. Leonard kindly giving me his help; and there we left her, without much hope of amendment. We saw nothing of her for some weeks, when she presented herself, but so altered that I did not recognise her as the same person. She could see well; and the change in her showed the difference between the vacant look of a blind person and the active expression in the eyes of one who sees.

CASE II.—In an old lady, who was blind except that she could distinguish light from darkness, who was very old, and whose case was very chronic, the operation in both eyes resulted in the restoration of sufficient sight to enable her to go about with comparative comfort.

CASE III. *Subacute Glaucoma*.—A little weakly nervous old lady, of excessive timidity, suffered from glaucoma of the left eye, which had almost destroyed her vision when I saw her. By a sort of ruse we got her to submit to chloroform, to which she was very unsusceptible; and I then removed a piece of iris; and, finding the lens partly opaque, removed that also. She recovered the strength of the eye, but saw barely by the light. Two or three years afterwards, the right eye became similarly affected, with much pain in the head and fulness of the vessels. No treatment seemed to touch it, and neither she nor her friends would hear of any operation. At one of my visits, however, I went armed with my little knife, and, partly by stratagem and partly by force of arms, I got hold of her head and made the required puncture before she well knew what was the matter. From that time the pain in the head left her, and the eye soon became strong. The sight remains much as it was just before the operation, and she finds her way about tolerably well. I have no doubt that she would have been blind in a very few days, if the disease had continued unchecked.

CASE IV. *General Ophthalmitis*.—An old lady was advised by her medical man to put herself under my care, as his remedies had failed to relieve her of a very painful and active disease in one eye. When I first saw her, she had pus in the anterior chamber, a partly opaque and rough cornea, long standing iritis, and inflammation of the sclerotic, with intense pain in the eye and half over the head, as severe a case as we often see. I thought, however, that I could cure her by general treatment and local applications; and with tonics and other means she became much better, but in a very short time returned to Clifton as bad, if not more suffering than ever. The sight was hopelessly lost; but she suffered so much pain, that she was precluded from any enjoyment of life, and from performing her duties. I therefore determined to try this operation, and made a free puncture in the way described. She shrieked out at the time, and suffered very great pain for some hours afterwards; but went home in three or four days quite relieved, and has remained well ever since.

CASE V. *Acute Glaucoma*.—A woman, between 50 and 60 years of age, came up from the country with well marked acute glaucoma, a comparatively rare disease, generally affecting both eyes, probably gouty or rheumatic in its origin, known by enlarged fixed oval pupils of a green colour, rapid destruction of the sight, and, as far as we now know, only to be relieved by operation, and, before the date of iridectomy and intraocular myotomy, incurable. The disease had existed five weeks, and had already destroyed the sight, except that in one eye there was a faint perception of light; but this was only occasional. The eyes were very hard and prominent, but not very vascular. The lens looked hazy, and the iris was pressed against the cornea in each eye; and she suffered extreme pain in the head. Her medical attendant in the country had treated her with great activity, and had done all that leeches, blisters, mercurial and other medicines, could do; and they would have relieved her, if any internal remedies would; but the disease held its course. In this case there was every expectation that an operation would remove the pain and check the disease; but I could give her no definite hope of a restoration of the sight, which seemed to be lost. I divided the ciliary ligament freely in each eye, letting out a large quantity of fluid and some blood. She complained of much pain at the time of the operation, and for some days afterwards. On the fifth day, she became easy, and stated that she could see the light and her hand moving; and from this time she gradually and slowly mended, and, when I last saw her, she was quite free from pain, and her eyes were strong. She could see fairly with both eyes; that is, she could find her way about, and see all objects about her tolerably clearly; and the sight was still mending. The pupils had become black, but were still very large and pointed below, being drawn down at the seat of the operation.

I have chosen these five successful cases to show the occasional value of the operation in different states of the eye. I have not yet tried it in corneitis and pannus, but intend to do so. There is no claim to novelty in what I have now brought forward; for I believe that others have done the same, although the mode of performing the operation may not be identical. But I must very briefly speak of this operation in another point of view, in which I think it of much physiological and pathological interest and value, and which, to my knowledge, has not been previously noticed.

In one of my papers, on Extirpation of an Injured Eye for Sympathetic Ophthalmia of the other, I stated that, from examination of the removed eyes, I found that in a large majority of cases the sympathetic ophthalmia occurred where a cut had divided the cornea and iris, and destroyed the lens, and left a hardened and adherent capsule pressing on the ciliary ligament; and that it was the diseased action of the compressed nervous structure of this organ which, through the sympathetic and fifth nerves, led to the development of sympathetic destructive disease of the uninjured eye.

It must be admitted that the nerves passing to the grey ciliary ring control and superintend the nutrition of the anterior part of the eye, for there is no other nervous supply; and the nutrition of the eye is modified, or impaired, or improved, according to the condition of the nerves. The pressure on this ring produces blindness of an incurable kind, if of any moderately long standing without suitable treatment; and it generally leads to similar disease of the other eye; and, as the removal of a diseased eye checks the progress of complaint in the other, so I believe, and am prepared to show by some cases, that division of the muscle in an eye blind from pressure on the nerves will alter and improve the nutrition of the eye operated on, and will check the progress of disease in the other.

CASE VI. *Disordered Nutrition of the Eye altered by Operation.*—In the year 1868, I removed the left eye of a young man who was blind from injury and sympathetic ophthalmia. The remaining eye was at that time affected with the bulging and thinning of the sclerotic coat round the margin of the cornea known as "staphyloma corporis ciliaris", and he could just discern the light. This state became worse; and after a while, merely to relieve the tension and pain, I performed intraocular myotomy, and he went back to the Union, of which he was and is an inmate. When I next saw him, the eye had nearly recovered its usual size and shape; the pupil was closed, and most of the cornea opaque; but there was a firmer and healthier feel about the eye, and the staphyloma had disappeared—a circumstance which I never witnessed before; and he could still see the light. In June of last year (1870), I made an attempt to remove a portion of iris, but only succeeded in removing a portion of membrane which I considered to be the capsule of the lens. In June of this year, he was again under treatment by Mr. Leonard and myself; and we took out a piece of iris through a section in the upper part of the cornea, where alone it was clear, leaving a pupil of considerable size. This young man can now see objects around him, but not very distinctly. The case, however, is a very remarkable one, and proves that the removal of the tension of the eye and relief from the pressure on the nerves by the division of the ciliary muscle have restored the nutrition of the globe to a comparatively healthy state.

I must lastly give one or two cases to illustrate the effects of the operation on the other eye, an effect most remarkable, and at first unexpected, but perfectly true and unmistakable.

CASE VII.—In September 1870, a poor man aged 60 came under my care with the following unpromising condition. He had cataract and glaucoma of the left eye, which was hard, congested, and quite sightless; and with the right eye he could not see his way about. He could see sideways, but not straight before him; and the eye was hard and full. After trying various treatment without effect, I divided the muscle in this eye, and much fluid and some blood escaped; and he complained of much pain. Within three days, he had greatly improved, and could see objects all round him; a fortnight after the operation, he could see very much better, and the pupil was drawn down and active; and, what was most remarkable, he drew my attention to the fact that he could see the light with the old glaucomatous left eye; and, upon examination, I found it looking much more healthy; and the pupil, instead of being fixed, was moderately active. Under these circumstances, about a month afterwards I extracted the cataract, and he saw better. About six months after the first operation, he had fair sight in the right eye, in which the pupil was still drawn down; but in the left, where I had removed the cataract, there were evidences of great tension, the iris being pressed backwards by the fluid. I therefore divided the muscle in this eye also, and the patient was relieved. He can see to go about anywhere, and can see objects moderately well; and he is still under treatment.

This interesting case proves to me the following facts; viz., that

intraocular myotomy will check glaucoma in the eye operated on; that it will, by sympathetic action, relieve a similar state of the other eye; that glaucomatous tension of the eye is not removed by removal of the lens; and that the ciliary muscle may be divided with advantage in a tense eye from which a cataract has been extracted. I have been so convinced of the truth of these inferences, that I have not hesitated to advise, and very frequently to perform, this operation on a hopelessly sightless eye, in order to preserve the other.

CASE VIII.—A servant, who had lost one eye completely by recurrent iritis, which had resisted all kinds of medical and topical treatment except operation, and had left her with bulging iris, closed pupil, and hard globe, came under my care with a similar condition in a very acute form in the sound eye. Although she had suffered only a few days, her sight had become extremely dim. I used some treatment without much avail, and then divided the muscle in her sightless eye. Much fluid escaped, and the next day she pronounced herself better. She had no bad symptom; and the recently affected eye answered favourably to treatment, so that the sight was entirely restored; and now both the eyes look more healthy than they did before, and she is able to read and to follow her avocation with comfort.

CASE IX was that of a middle-aged woman nearly blind in the left eye from slowly progressing glaucomatous disease resisting all treatment. After a time, the right eye began to be similarly affected; and I then divided the muscle in the left, in which she only saw light. The anterior chamber filled with blood at once. It was absorbed in a few days, and within ten days the sight was much improved. The result has been, that she has useful although imperfect sight in the left eye, whilst the right has completely recovered itself and become perfectly strong and well.

It would be useless to multiply cases of this kind, which much resemble one another; but I think I have brought forward enough to prove the great value of this operation.

It will probably be noticed that I have said nothing about the ophthalmoscopic appearances in these cases. I only examined a small number of them, for in most the symptoms of disease and indications for the operation were obvious. It is possible that, by careful examination of the interior of the eye, we might eliminate from our list some cases in which the operation must necessarily be useless; but they would be very few. The seat of the operation is entirely out of sight under any circumstances; and the only condition which would prove that it would be no use to operate, would be evidence of incurable disease in the retina and optic nerve, independent of pressure within the globe, a comparatively rare cause of blindness. There is, however, a fair field open for careful observation in this respect.

In conclusion, for the tedium and length of my paper, which naturally has not the interest for many others that it has for me, I must ask the forbearance of my audience, and lay the whole blame on the importance of the subject.

SUCCESSFUL TREATMENT OF CHRONIC HYDROCEPHALUS.

THE case of Jane Johnson reported in the *Standard* as dying at Leigh, in Essex, on September 26th last, between eighteen and nineteen years of age, recalls to my mind a case which I attended in 1848.

Mrs. R. brought a baby, twenty-two months old, into a room where I was engaged with a difficult labour, observing, "There is no cure for this poor little object." The child had been blind six months; its head measured twenty-seven inches in circumference. The cranial bones, not having grown since its birth, were very far separated from each other. Its neck was about the thickness of three fingers, its legs of one; the abdomen was much enlarged. The mother had been told a year previously by two practitioners of much experience, that there was no cure for it. I told her that it might die at any time; but that if it lived I thought it might be cured. The treatment was commenced November 6th, 1848. It consisted of two grains each of hydrargyrum cum cretâ, powdered rhubarb, and carbonate of soda, or two grains of hydrargyrum cum cretâ and one of Dover's powder, according to the state of the bowels, with occasional carminatives. The effect was immediate; the most sanguine prognosis was more than realised. In three months, the child could run alone; at three years, he was foremost amongst his playmates, and whilst at school, the first in his class. He is now established as a watchmaker and jeweller in London, and is the support of his aged mother. Two or three years previously, my father-in-law had been consulted for a girl nine years old, who had been long blind, and whose case for two years had been considered hopeless. Similar treatment, with the addition of blisters to the head, was followed by equally happy results.

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