

time endeavoured to reduce my mental notes to words, I had made no serious attempt to investigate the physical state. I had, however, long puzzled over an observation of Mr. Mills on the subject of heart failure during the operation of division of the *internal rectus* in cases of strabismus—i.e., in hypermetropes; and when a case of cardiac irregularity, due apparently to an error of refraction, was narrated to me by Dr. Batten of Gloucester, and corresponded closely with similar cases of my own, I determined to endeavour to work out what was the connexion between cardiac irregularity and hypermetropia, and from this I was led on to the larger subject—namely, the relation of the eye to the cardio-vascular system.

As the result of my observations I have come to the following conclusions:—

I. First, as regards the peculiarities of what I will for the present term the hypermetropic circulation.

1. *In the young.*—Under this head I include all those not fully developed, and I consider this period of longer duration in the hypermetrope, who, to my mind, reaches his full development later than the myope. (a) *The pulse* is a quick one, and is easily accelerated by any cause, and varies rapidly; but the pulse-rate does not vary so much with the degree of hypermetropia as with the amount of accommodation. Thus, with latent hypermetropia I expect a quicker pulse-rate than with a high degree of manifest hypermetropia. The pulse is soft and compressible, not easily counted, and the tension is generally low. But in high degrees of hypermetropia with bad vision the pulse is often markedly slow. (b) *The heart*, in the few cases in which I have attempted to take measurements—which I have done by measuring the distance of the apex beat and the nipple from the middle line of the sternum—is, I consider, a small one; but this is not constant, as in some cases the heart appears dilated, and the apex displaced outwards. (c) *The heart sounds* are generally regular, but with more or less marked accentuation of the first sound. In a certain number, I note a rhythm varying with the respiration, and murmurs of a variable and functional character occur. I have also noted loud apical systolic murmurs with more than average frequency. The heart symptoms, in fact, closely resemble those noted in chorea.

2. *The young adult* with hypermetropia is not a frequent patient for refractive purposes, but I consider him more liable to local inflammatory disease than the emmetrope, and still more so than the myope.

3. In the *middle-aged and old* hypermetrope, I notice, as Dr. Brunton has noted, the failure of *optical* accommodation taking place at the same time as the failure of the *vascular* accommodation, and hence flushings, giddiness, noises in the ears, &c. I note in addition marked cardiac irregularity and intermission, in some cases disappearing with the use of glasses. Dr. Broadbent has mentioned high tension pulse with glaucoma, and I am inclined to associate it with hypermetropia in the old.

(To be concluded.)

FOUR CASES OF TUBERCULAR MENINGITIS IN WHICH PARACENTESIS OF THE THECA VERTEBRALIS WAS PERFORMED FOR THE RELIEF OF FLUID PRESSURE.

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IN many fatal cases of tubercular meningitis coma supervenes with great rapidity and with all the signs of cerebral pressure, whilst after death little can be found besides an excess of cerebro-spinal fluid, often at a considerable positive pressure, to account for the symptoms and fatal issue. The possibility of recovery in this class of cases, where there is commonly little development of tubercle, together with the feasibility of draining away the fluid continuously by the theca vertebralis, suggested this mode of procedure.

The first case in which the method was tried was in February, 1889, in a boy, G. L.—, aged three years, who had manifested the usual symptoms, and became comatose on the eighth day. On the next he developed Cheyne-

Stokes respiration, became cyanosed and unable to swallow. A consultation was held, and it was decided to endeavour to relieve the pressure which was apparently answerable for the coma. No anæsthetic was needed; the child was supported in a sitting posture, a tiny incision was made in the skin beside the spine of the second lumbar vertebra, and a Southey's tube and trocar inserted till the point impinged against the lamina; the point was then directed slightly downwards and was pushed through the ligamentum subflavum and theca with an inclination towards the middle line. Clear fluid at once welled up into the tube on withdrawing the trocar, a fine indiarubber tube was arranged for continuous drainage, and the child put back to bed. During the next twenty-four hours four drachms of fluid were collected, besides what escaped along the cannula in the wound; the breathing became regular, the colour good, and the child swallowed some milk. Unfortunately the improvement was not maintained, the fluid ceased to escape, and the case proved fatal. The necropsy showed a considerable amount of tubercle at the base, with some opaque lymph, but no excess of fluid. It was not possible to discover the prick in the theca, and no evidence existed of any damage to the cauda equina. The fluid collected had a specific gravity of 1006, and contained only a trace of albumen.

The second case was that of J. L.—, admitted to the Middlesex Hospital on Feb. 12th, 1890, under the care of Dr. Cayley. The patient, a girl aged eleven, had pertussis two years previously, and since that had suffered from ear-ache, sometimes with discharge. She had been ailing for nine days with headache, anorexia, and latterly vomiting. There had also been photophobia and delirium. After admission the patient remained drowsy, tache cérébrale was noted, and she vomited at intervals, and flushed occasionally. On Feb. 21st Mr. Hulke cut down on the second lumbar vertebra, removed the spine and right lamina, and punctured the theca with a fine knife. Clear fluid escaped with some force, a drainage-tube was inserted in the vertebral canal, and the wound dressed antiseptically. On the following day the temperature had dropped from 102° to normal. The patient could be roused, and took liquid food well. The dressings were saturated with moisture and had to be changed. On the 23rd there was less escape of fluid, and on the 24th the dressings were nearly dry, and there was an increase of drowsiness, with development of squint. Death occurred from coma at 3 A.M. on the 25th, three days and a half after the operation. The necropsy showed that the aperture in the theca had closed, and when the membrane was incised the contained fluid spurted out in quantity; very little tubercle could be discovered.

The third case was a boy, B. V.—, aged two years and four months, admitted under Dr. Coupland, after a week's illness, with headache and vomiting. There had also been a slight fit and tendency to squint. On June 15th, two days after admission, respiration became irregular and there was some twitching of the arms. On the 21st drowsiness had deepened into coma, temperature 102.4°, pupils dilated and not reacting to light. Pressure symptoms being urgent, Mr. Pearce Gould cut down upon and divided the laminae of the first lumbar vertebra. The theca was fully exposed and incised, some drachms of fluid escaped, the flow being increased with each expiration. A small drainage-tube was inserted in the subdural space and the margins of the theca attached to the sides of the wound. It was noted during the operation that as soon as the fluid was liberated the pupils, formerly dilated and inactive, contracted and regained their reflex activity at once. Twelve drachms of clear alkaline fluid were obtained, having a specific gravity of 1004, containing a large quantity of chlorides, but giving no reaction to tests for albumen or sugar, though a red-brown deposit in Fehling's solution occurred on standing. Subsequently the temperature rose to 104.8, the pulse became rapid and weak, and the child died five hours after the operation.

The fourth case, a girl aged thirteen months, was admitted under Dr. Cayley on April 13th, 1891. She had been ailing for a fortnight, but four days previously had been taken with convulsions, and there was a thin discharge from the right ear. On admission the child was semi-conscious, breathing irregularly, and with a pulse of 160. The fontanelle was rather sunken, and tache cérébrale readily obtainable. On April 15th convulsions occurred, and there was retraction of the head.

At 2.45 a Southey's tube was introduced into the theca

vertebralis between two lumbar spines, and four ounces of cerebro-spinal fluid were withdrawn, the last two ounces being bloodstained. The fontanelle sunk in. Death occurred at 5.30. The fluid was alkaline, loaded with chlorides. It gave no reaction to tests for albumen or sugar, and had a specific gravity of 1006. The necropsy showed acute general tuberculosis, especially marked in the lungs. The prick in the theca could not be found, but there was slight blood extravasation on its outer surface. The cauda equina was unhurt. Though none of these cases were ultimately successful, no harm in any one resulted from interference. In some there was temporary relief of symptoms, and the necropsy in each case showed ample reason for the fatal termination, either in general tuberculosis or failure in maintaining the drainage. It is much to be regretted that the aperture was allowed to close in the second case, which promised well till pressure was renewed by reaccumulation of fluid. Further experience will no doubt enable a better selection of cases to be made, and the treatment to be carried out more effectually.

A RARE FORM OF HYDATID OF THE LIVER TREATED BY THE CAUTERY.

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THE following case of abdominal tumour presents so many remarkable and unusual features that I venture to give its history in some detail. The patient is a young, spare man, aged twenty-four, who had always enjoyed good health up to the time that he presented himself to me in December last. For the previous six months, although he was conscious of an enlargement in the abdomen, he was in every way well, carrying on his ordinary occupation, that of a draper's assistant, without any inconvenience. He first noticed that he was getting stout; this gave him no uneasiness, however, and the tumour would probably have been allowed to grow had he not been attacked with severe abdominal pain about a week before he came to me. He has always been a steady man and very abstemious. There is no history of previous illness or of syphilis. He belongs to a consumptive family, two of his brothers having died of phthisis. The pain for which he consulted me was felt mostly over the region of the left hypochondrium and was severe, keeping him awake at nights. It usually lasted for some hours and then left him. In the intervals he was perfectly well. Physical examination showed his organs to be quite healthy, and with the exception of slight inspiratory dyspnoea, caused by the upper limit of the tumour preventing the descent of the lung, I could find nothing abnormal. His urine was healthy, his appetite good, and his bowels regular. The tumour in the abdomen was very extensive, and, the patient being a thin subject, its outlines were well defined. It occupied a large area, extending on the right side as low as to within an inch of the crest of the ilium. From this point it stretched obliquely across the abdomen to the left hypochondrium, disappearing behind the left lower ribs, which were pushed forward considerably. In this course the tumour crossed two inches below the umbilicus. On the left side in front it extended as high as the fourth rib, the heart's apex beating in the third intercostal space a little to the left of the sternum. On the right side in front it was continuous with the liver dulness. Behind on the right side the ribs were more prominent than on the left, and there was dulness from the angle of the scapula downwards to within an inch of the crest of the ilium. On the left side behind there was no dulness, and the respiratory murmur was normal. The parts then rendered most prominent by the tumour corresponded to the ribs behind on the right side below the angle of the scapula and the left lower ribs in front. The lower limit of the tumour in front presented to the touch a well-defined margin, which felt like the rounded border of the liver. There was transmitted pulsation over the front of the tumour. The surface was smooth, but not equally resistant, the parts of the tumour to the left of the umbilicus being firmer and more resistant than those to the right. Auscultation revealed no friction sound, and there was no fluctuation at any part. The tumour did not descend with inspiration. The greatest circumferential measure-

ment was a line crossing immediately below the xiphoid cartilage—viz., thirty-five inches.

From the above it will have been gathered that the bulk of the tumour occupied the right side in front and behind. During the time previously to the operation that the patient was under my care the pain was very severe, and was evidently undermining his health. He became very prostrate, and was entirely confined to his bed, any movement giving him great pain. This was always referred to a region over the left lower ribs in front. From the above history I suspected hydatids, and Dr. Wardrop Griffith, who kindly saw the case for me, was also of this opinion. An exploratory needle was introduced and some clear fluid drawn off; this on examination gave a specific gravity of 1007 and an abundance of chloride of sodium. There was no albumen or bile. Unfortunately, no hooklets could be found. On January 4th, after a needle had been passed and fluid drawn off, I made an incision about four inches long from the xiphoid cartilage downwards. After exposing the tumour and isolating the peritoneal cavity with sponges, I incised the cyst wall to the length of the abdominal incision; several ounces of clear, limpid fluid escaped. The walls of the cyst were quite an inch in thickness and of cartilaginous hardness. The size of the cyst was about that of a "closed hand," and quite free from any communication with the rest of the tumour. It was somewhat irregular in shape, and was lined by a smooth membrane. Its walls were everywhere hard and resistant, and the surface somewhat reticulated. There was considerable hæmorrhage from the thick walls of the cyst, which it was found impossible to check, and it could only be controlled by sponges. I then examined the tumour with my hand in the peritoneal cavity. The sharp anterior edge of the liver could be easily felt, and rising from its upper surface immediately above this a smooth, globular, extremely hard mass extended over all parts within reach of the hand. In the hope of establishing a communication with other cysts, I pushed a curved rectal trocar through the right wall of the cyst in a direction downwards and outwards, and drew off several ounces of clear fluid. The patient was so collapsed from loss of blood at this stage that it was thought advisable to conclude the operation. The peritoneal cavity was well washed out, and the cyst wall stitched to the abdomen. Very severe shock followed the operation, and he subsequently had a sharp attack of peritonitis, which, however, subsided in the course of a week.

On Jan. 14th his temperature rose to 103°, and he complained of great pain; this, however, subsided under treatment, and the improvement continued until the 17th, when the pain and increased fever again recurred. As I considered that his symptoms pointed probably to suppuration in the cysts caused by septic infection through the opening made in the previous operation by the trocar, and which had now almost closed, I reopened the channel with a large trocar, letting out a quantity of pus, and then forcibly dilated the passage with forceps. I could now pass my finger into a cyst in all respects resembling the one first described, only smaller—that is to say, it had the same hard resisting walls, a smooth lining membrane, and a reticulated surface, and, with the exception of variations in size, this description will apply to all cysts opened up during the progress of the case. There was an immediate relief to all his symptoms, the pain completely subsiding and his temperature falling considerably; the improvement was only temporary, however, for in a few days all his symptoms recurred and gradually increased. On the 27th they became very urgent, his temperature was 105°, and his pulse very feeble and rapid. The pain was very severe and the prostration extreme. I determined therefore, if possible, to open up a communication through all parts of the tumour, and for this purpose I used the benzoline cautery. With the finger of my left hand passed through the trocar opening into the cyst previously opened up, and with my other hand on the surface of the tumour externally, I was able to form some conception of the amount of tumour intervening between my two hands. With the knowledge thus gained, I passed the cautery through the cyst wall in a direction downwards and outwards towards the right lumbar region, and opened up a large cyst exactly similar in character to the others described. A large amount of pus escaped. Adopting the same precautions as in the above, I now turned the cautery somewhat backwards, and opened up another large cyst from the floor of the last, pus also escaping from this. I then withdrew the cautery and