disturbed, there is usually a marked degree of paraphasia or jargon aphasia and, it may be, complete motor aphasia, and agraphia; (3) internal speech and thought are always seriously impaired; and (4) in consequence of the extensive brain lesion the mental and intellectual faculties are in many cases more or less impaired, irrespective of the aphasic condition.

In those cases in which the word deafness and word blindness are incomplete, in which the motor speech defect (paraphasia) is only very slight, and in which the mental condition of the patient is only slightly affected, the patient might possibly be able to make a simple will, to give instructions for a simple will and to execute a simple will (as in cases of pure word deafness in which the patient has never learned to read); but such cases would require to be very carefully tested and scrutinised before the ability of the patient to make a will was admitted.

THE WILL-MAKING POWER OF PATIENTS AFFECTED WITH "TOTAL" APHASIA.

In cases of total aphasia (word deafness, word blindness, motor vocal aphasia, and agraphia), the lesion is still more extensive, and the mental disturbance still more profound. In these cases we cannot communicate with the patient and he cannot communicate with us except by means of signs (pantomime). Everyone who has had experience in examining such cases knows how extremely difficult it is to make the patient understand even the simplest questions or requests. It is obvious, therefore, that in cases of total aphasia the patient is incompetent to make a will.

It must be remembered that in many cases of aphasia improvement occurs in the course of time as the result of compensation. This is more particularly the case in young subjects, and in those cases in which the aphasia is due to embolic infarction; in which, in other words, the cerebral arteries and the brain tissues (other than the artery which is blocked by the infarction and the portion of brain tissue which has undergone softening in consequence of the infarction) are healthy.

Hence, it does not follow that because a patient affected with complete sensory or even total aphasia is unable to make a will to-day he may not be able to make a will after several months have elapsed, that is, after sufficient time has elapsed for compensation to take place.

REFERENCES.

⁹ It is probable, I think, that isolated agraphia may in some instances occur as the result of a lesion which interrupts the connecting fibres passing from the visual speech centre (left angular gyrus) to the motor writing centre. ¹⁰ According to Déjerine and Mirallié, there is always (1) some derangement of the action of the auditory speech centre, which in many cases is shown by the fact that the patient, who is quite able to understand simple questions, seems unable to grasp the meaning of long complicated spoken passages; and (2) some defect in the action of the motor speech centre. The usual defect is a slight degree of paraphasia. In some cases spontaneous speech is more markedly affected. ¹¹ *Gazette des Hôpitaux*, 1882, p. 587.

A CASE OF ABSCESS OF THE RIGHT TEMPORO-SPHENOIDAL LOBE,

ASSOCIATED WITH LEFT HEMIPLEGIA AND HEMIANÆSTHESIA DUE TO PRESSURE ON THE INTERNAL CAPSULE AND PARALYSIS OF THE RIGHT THIRD NERVE.

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RECORDS of successful operations for the relief of temporo-sphenoidal abscesses are not uncommon, but the point of special interest about the following case was the ease with which the differential diagnosis was reached. On admission, combined with the general symptoms of intracranial abscess secondary to right-sided suppurative otitis media, were those that were localising, and indeed pathognomonic of the site of the lesion.

J. B., aged 25, was admitted into the Norfolk and Norwich Hospital at 3.30 P.M., September 27th, 1896, under Mr. Donald Day. He had had right-sided otorrhoea off and on since he was 10 years of age; for the last twelve months the discharge had been worse and very offensive. About six weeks before admission he had some rather severe pain in the right ear. This ceased and then the discharge suddenly reappeared. The discharge

lasted for about a week, and no discharge has been noticed from the ear during the present illness.

Present Illness.—The present illness commenced on September 18th with pain in the right ear and sickness. The pain was of a bursting character, and spread from the ear all over the right side of the head, including the occipital region. It has been extremely severe in character, and has only been kept in check by morphine. The pain gradually increased in severity till drowsiness supervened, which has been present for two or three days. Patient has been sick at frequent intervals every day of his illness, but this symptom has moderated during the last two or three days. He was last sick on the day before admission. There has been no rigor. The drowsiness of the last two or three days has gradually deepened, so that from 5 A.M. this morning the friends state that he has been very difficult to rouse, and that from midday they have not been able to awake him at all. No weakness of the limbs or affection of sensation was complained of by the patient or noticed by the friends previous to admission. There has never been a discharge from the left ear.

September 27th. Condition on Admission.—The patient is a man aged 25, aspect pale, and he lies in bed on his back almost comatose. A strong, painful impression or loud shouting has to be used to rouse him, but he will not reply to questions, though he will grasp the hand if told to. The body is flaccid, and cerebation very slow. Pulse 60, fair size and tension; respirations 14, sometimes stertorous; temperature 98.8 in the rectum. The eyes are kept closed, but it is noticed that the left eyelids do not quite meet. When told to show the teeth he does so, and the angles of the mouth are raised about equally. When, however, he moves the face voluntarily, as, for example, when one of the limbs is sharply pinched, the right side is alone drawn up. When told to shut the eyes tightly the right eyelids are screwed up more than the left, although the left lids can be completely approximated. The right pupil is widely dilated, the left of medium size, but neither react to light. There is some external strabismus of the right eye, but the patient seems quite unable to turn the eyes from side to side. Right fundus: the veins are very large, arteries small, disc redder than natural, and edges blurred. Left: the veins are large, but not so distended as on the opposite side; the outline of the disc is clear. Tongue furred, breath foul, bowels constipated. Tongue protruded straight. There is hemiparesis on the left side, easily made out in the face, arm, and leg. In addition to the facial weakness above described, the left arm and leg are also affected. The right arm is solely used by the patient when he takes hold of anything; the left not at all. Grip on the right side is strong, on the left extremely weak, the fingers merely closing on one's own when the grip is tested. The left arm as well as the leg remain quite flaccid in bed. When told to bend the left knee he appears quite unable to do so, although repeatedly urged, but on the right side the power of flexion is strong. The knee-jerks are exaggerated on each side, the left more so than the right. No rectus clonus. There is an attempt at clonus in the right ankle (3 or 4 contractions), but well marked ankle clonus on the left side. Plantar reflexes absent. There is nearly complete left hemianæsthesia. The patient feels a pin anywhere on the right side after a second or two, but it needs a much longer time, and the pin must be stuck right into the skin for him to appreciate it on the left side, either on the trunk or limbs. As a good instance of the impaired sensibility on the left side of the body it may be noted that the conjunctival reflex on that side is very slight and ill marked as compared with that on the right. There are no fits, nor have there been any during the illness. There is a little foul pus which can be mopped out of the right tympanum, but there is no swelling or redness over the mastoid.

September 27th, 5 P.M. Operation by Mr. Day.—Under chloroform a curved incision was made behind the right ear, and the antrum was opened with the gouge and hammer. The mastoid was sclerosed. There was no pus to be found in the antrum, but to the introduced probe the walls seemed to be covered with soft granulations. The incision was then extended upwards and forwards for 2 inches and the squamous bared. A 1-inch trephine was then applied with the pin at a point 1½ inch above Reid's base line, and ½ inch behind the centre of the external auditory meatus. The dura immediately bulged into the wound after removal of the disc of bone, and did not pulsate. It seemed to the finger to be under very great tension. The dura was incised and the cortex at once bulged through the opening; a pair of sinus forceps thrust into the brain let out about an ounce of stinking pus, the first part dark brown and watery, the last creamy and yellow. The quantity, 1 ounce, is an estimate of those who saw it escape; it was not measured. An agar tube was inoculated at this time. The track went forwards and downwards, and the cavity was a large one, as when 1½ inch of the little finger was introduced, the opposite wall could not be felt. The abscess was only just under the cortex. It was flushed out with sublimate solution, 1 in 5,000, and a drainage tube 2 inches long inserted. After the abscess had been opened the brain pulsed normally. The upper part of the wound was sewn up with silk, the lower part left open, and a gauze drain put into the mastoid.

September 28th. Pulse and respiration both rose to normal last evening after the operation. This morning the patient is much better; he is rational and answers questions, but is still rather dazed. Sensation and motion on the left side of the body have improved; the knee-jerks are both present and equal. There is an attempt at ankle clonus on the left side, but not the right, three or four contractions only occurring. The power of flexion of the left knee is fair, but not nearly so strong as on the right. The pupils both react to-day, but the right is still larger than the left, though not so large as yesterday. There is still some weakness of the right third nerve, as the eye cannot be turned into the inner canthus, but easily travels into the outer.

September 30th. Dressing is changed once a day, discharge very foul. Patient is in rather a sleepy condition, but is not sick and takes food well. Had some headache last night, which was relieved by morphine. The grip of the left hand and the power in the left knee is almost as good as on the right side. The left knee-jerk is more brisk than the right, and there is still a little clonus in the left ankle; weakness of the right internal rectus continues, but the pupils are equal and of normal size.

October 6th. Patient has had pain in the right side of the head every evening of late, which has to be relieved by morphine. The tube has been gradually shortened the last few days, but it was changed for one of the original length to-day, as the sinus forceps introduced into the track let out about a couple of drachms of foul pus, there having evidently been some re-collection. Still some weakness of right internal rectus.

October 10th. Much better, no pain, knee-jerks equal, no ankle clonus. October 12th. Has been troubled with diplopia the last few days, apparently aggravated by some atropine which was dropped into the eyes. The false image is below the true, and the double vision is more in the lower than the upper half of the field of vision so far as can be made out, notwithstanding the condition of slow cerebation of the patient.

October 15th. Patient complains to-day of dimness of sight in the right eye. He cannot read ordinary newspaper print with the right eye alone, although easily with the left. Still has to have morphine at night for the headache. Tube is now 1 inch long.

October 17th. Tube left out.

October 19th. Got up to-day for the first time; diplopia less.

October 26th. Can easily read newspaper to-day with right eye alone.

November 3rd. The upper part of the wound behind the ear, originally leading into the abscess cavity, is now quite healed; the track into the antrum at the lower part, however, still discharges a little pus. The temperature has remained normal or subnormal since admission, only once exceeding 99° since his first day in hospital.

November 14th. Patient went to-day to the convalescent home quite recovered, except that there is still a little discharge behind the ear in the track leading from the antrum. The diplopia has almost gone; he only occasionally sees double on looking downwards. The left disc is normal, the right is just a little blurred at its upper and inner part, the rest of the outline is clear.

The primary diagnosis of brain abscess being made from the low temperature, slow pulse and respiration, etc., the next step was to determine its locality. The fact that the paralysis was on the opposite side to the otorrhœa at once put out of court the right lobe of the cerebellum; for in disease of the cerebellum, as is well known, paralysis occurs on the side of lesion, the explanation of which is to be found by reference to the experimental work of Luciani, Marchi, Russell, and others.

It was, then, desirable to find confirmatory evidence pointing to disease of the right temporo-sphenoidal lobe, and this was easy. Associated with the paresis was hemianæsthesia. Now, loss of sensation is quite unknown in patients with cerebellar abscess,¹ though Russell does mention some blunting of sensibility in the paretic limbs in his ablation experiments on the cerebellum.

Again, the right pupil was in a state of stabile mydriasis. This has often been recorded in large temporo-sphenoidal abscesses, and is apparently a pressure phenomenon of the third nerve. It does not occur in cerebellar lesions, and lateral deviation of the eyes, which is common in these, was not present.

The next point to consider was the mode in which the abscess was causing the paralysis. If reference is made to the accompanying schema, which is modified from one in Macewen's *Pyogenic Infective Diseases of the Brain and Spinal Cord*, it will be seen that an abscess in this situation will cause paralysis in one of two ways.

Schema showing the relation of an abscess in the temporo-sphenoidal lobe to the internal capsule.

If it exerts its paralytic influence on the cortex, as for example by a spreading meningitis, the order of the march of the paralysis will be, face first involved, then arm, and lastly leg. With cortical involvement, too, convulsions may be expected, commencing in the regions represented in the in-

flamed motor cortex, and if anæsthesia be present it would be of "cortical" type. On the other hand, if the paralytic influence of the abscess is due to pressure on the adjacent internal capsule, we should expect marked loss of sensibility, the anæsthesia not being of "cortical" type, this should come on before the motor paralysis, and the latter, in consequence of the change in the relative positions of the descending fibres in the corona radiata, would proceed in the order, first leg, then arm, and lastly face. In this last form of paralysis there would be no fits.

Now Macewen in the above-mentioned work states that no case has yet been recorded that certainly showed the paralysis was due to involvement of the internal capsule, but I think it must be admitted that this case most distinctly comes into this category, and hence is quite unique in this particular.

Although this patient was only seen late in the disease, and we were therefore not able to tell at what period in relation to motor paralysis the anæsthesia appeared, yet the following facts seem to me to quite establish this view of the case:

1. There were no fits.
2. The loss of cutaneous sensibility was very marked.
3. The paralysis of the leg was more than that of the arm, and that of the face was least of all, which is precisely what one would expect from involvement of the internal capsule.
4. The hemiparesis rapidly disappeared after evacuation of the abscess.

The diagnosis then further narrowed itself down to abscess of the temporo-sphenoidal lobe causing secondary hemiplegia and hemianæsthesia by pressure on the internal capsule, and the prognosis correspondingly improved, as it is a far graver symptom to get paralysis from cortical involvement than capsular.

The ankle clonus on the paralysed side is interesting, being apparently caused by the cutting off of the normal inhibitory action of the cortical on the spinal centres. As regards the technique of the operation, the excellent rule of first opening the mastoid antrum and then proceeding, with the information gained by the mastoid operation, was followed. From the fact that pus was not obtained from the antrum, and that no perforation was detected in its roof, it is probable that the infective process spread to the cortex through the roof of the attic, as is so often the case.

The lengthening of the mastoid incision forwards and upwards above the auricle displayed the requisite portion of the squamous extremely well. It is obviously the best practice to get at the pus by as short a route as possible, and the old directions of a few years back put the trephine opening far too posteriorly. The abscess is usually near the tegmen tympani, and as the antral-attic junction is roughly opposite the posterior wall of the bony meatus, the pin of the trephine may be placed with advantage on a vertical line extended upwards from this landmark. As the abscess track in this case led distinctly forwards as well as inwards, it would have been well if the trephine opening had been made a little farther forwards.

Macewen recommends that the pin of the trephine should be in a line with the posterior wall of the bony meatus, and three-quarters of an inch above the posterior zygomatic root.

BACTERIOLOGY.

The agar tubes inoculated at the time of the operation showed a milky growth rapidly spreading over the surface, and this had the exact appearance of that produced by the bacillus coli communis. Cover-glass preparations displaying the morphology, motility, and staining reactions of the organism confirmed this view. A subculture was forwarded to Dr. Kanthack, who very kindly undertook an exhaustive investigation into the nature of the growth. The following organisms were separated:

1. *Bacillus coli communis*.
2. An ordinary saprophyte which liquefies gelatine, is motile, forms no gas, does not stain by Gram's method, name unknown.

My best thanks are due to Dr. Kanthack for the time spent and trouble taken in undertaking this work, as it adds much to the completeness of the case. Macewen has found in his cases *Staphylococcus* and *Streptococcus pyogenes* most frequently, and it does not appear that the presence of the

bacillus coli communis has been noted in the pus of a brain abscess operated on by him, or, as far as I know, by any other surgeon.

Since the above was written I much regret to state that the case has terminated fatally.

The patient was readmitted to the hospital on November 23rd, having only been nine days at the convalescent home. He was quite well up to the evening of the 22nd, except for feeling rather faint during the previous two or three days, but there was no pain. On the 22nd violent pain began in the frontal and occipital regions associated with frequent vomiting. There was no rigor. These symptoms have continued up to the time of readmission.

November 23rd. *Present Condition.*—The patient lies in bed groaning and complaining of severe pain over the eyes and at the back of the neck. He is quite rational, and there are no paralytic symptoms. He is frequently sick. Temperature 104.2° , pulse 140. The left knee-jerk is present, the right cannot be obtained. The skin over the old trephine opening bulges a little, but pulsates. There is some purulent discharge from the lower end of the original incision.

November 24th, 11 A.M. The patient has passed a restless night, with much pain and sickness; temperature 103° , pulse 120. The skin over the trephine opening bulges still more, has ceased to pulsate, and presents on the surface a small greyish, foetid, ulcerated patch. 4 P.M. Under chloroform Mr. Day opened up the lower part of the original wound, and with the gouge enlarged the track leading into the antrum and removed the upper part of the posterior bony meatus and the outer wall of the attic. The roof of the latter cavity was found to be perforated. The original passage through the trephine opening was then reopened and about 1 drachm of stinking brown pus evacuated from the temporo-sphenoidal lobe. The cavity was syringed out as before and a tube left in, although there was considerable difficulty in retaining it in position. Another tube was placed in the mastoid and the whole wound left widely open and stuffed with gauze.

November 25th. The operation has produced no amelioration in the patient's condition. During the night he was very restless, and morphine was necessary to quiet him. After the operation the temperature rose to 105° and the pulse to 150, and he died very suddenly at 8 A.M. this morning, ceasing to breathe without any warning. It was noticed at 3 A.M. that when the face was contracted in a spasm of pain only the right side moved, also that he used the right arm much more than the left, although the power of movement was not lost in the latter.

Necropsy (twelve hours after death).—The abdominal and thoracic contents were healthy, except that the right side of the heart was over-distended with clot. On removing the dura mater the convolutions were seen to be much flattened, and the veins in the pia mater, except posteriorly, empty, and this was especially noticeable over the cortex of the right parietal lobe, which was quite white. There was no meningitis on the vertex. On removing the brain yellow lymph was seen to thickly coat its base and to pass up anteriorly along the commencement of the Sylvian fissure. It also covered the interpeduncular space, together with the pons, bulb, and adjacent parts of the under surface of the cerebellum. The cortex was adherent to the dura round the trephine opening and to the tegmen tympani, where the membrane was thickened and converted into a granulation tissue overgrowth. As the temporo-sphenoidal lobe was being detached a little watery pus escaped from its interior. In the roof of the attic and antral-attic junction were three small perforations in the bone, the largest an eighth of an inch in diameter, and it was evidently through these that the infective process had spread to the temporo-sphenoidal lobe. Around them the bone was in a condition of rarefying osteitis. The attic, antrum, and tympanum contained foul granulation tissue, and the surfaces of the bone were much inflamed. The stapes was present, but the remainder of the ossicles were only represented by the head of the malleus and adjacent portion of the incus. The lateral sinus was quite healthy, but the lateral sulcus in the immediate neighbourhood of the antrum presented a boss of porous bone half an inch across and an eighth of an inch in thickness, evidently a protective new deposit, and explaining the fact that the lateral sinus never got infected notwithstanding fifteen years of middle ear suppuration.

After hardening the brain in spirit the abscess cavity was found to occupy the posterior part of the temporo-sphenoidal lobe, and to measure 2 inches in length from above downwards and outwards, and 1 inch from side to side. The walls were collapsed, and their surfaces sloughy. In vertical sections of the brain the immediate proximity of the inner wall of the abscess to the internal capsule was very clearly seen.

REFERENCE.

¹ See cases recorded by Acland and C. Ballance, *St. Thomas's Hospital Reports*, xxiii.

THE SERUMTHERAPY OF BLOOD POISONING: A PLEA FOR EXACTITUDE IN THE USE OF ANTISTREPTOCOCCUS SERUM.

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It has often been thought by members of our profession that the ways of the worker in laboratories and of the family physician are but little likely to have much in common. This was certainly the general feeling at the time of my first initiation into hospital work, about fourteen years ago. The intervening years have, however, been crowded with events; our knowledge of the causation of infective disorders has ex-

ploded some of the pet theories of the old pathologists, and at the present time the skilled bacteriologist is applied to, not only to aid the clinician in determining the nature of an obscure or doubtful ailment, but also in many cases to furnish a remedy for the same. Specialism is looked at askance by many, but few will now be found to deny that the specialist in bacteriology has justified his existence. The small group of cases which I now report will serve well to illustrate how close should really be the relations between the treator of disease and the scientific investigator thereof, and how dependent the one is on the other:

CASE I. *Severe Erysipelas of the Head, successfully Treated with Anti-streptococcus Serum.* By ALFRED R. FRIEL, M.D., F.R.C.S.I. (Waterford).—The patient was a gentleman of good constitution and active habits, aged 61. On February 15th he presented erysipelatosus inflammation of the nose and cheek. Was very restless, and suffering great pain. Temperature was 101° , pulse 116. The inflammation rapidly extended, and there was copious formation of bullæ. On the 17th the disease was well marked. There were headache, continued high temperature, and thirst. At 11.30 A.M., 10 c.cm. of antistreptococcus serum were injected under the skin of the abdomen. A similar amount was given at 5.30. These injections were repeated during the next two days. The patient's condition rapidly improved, the subsidence of the constitutional symptoms being especially marked. Pain disappeared, temperature and pulse returned to normal, and by the 21st he was practically convalescent. Mild aperients and small doses of morphine constituted the only additional treatment applied.

Note.—Some serum from one of the bullæ was collected by Dr. Friel, and sent to me in a sealed glass tube for examination. I made a plate culture therefrom, and within a very few hours was able to report that the specimen had yielded an absolutely pure culture of streptococci. The clinical diagnosis was therefore fully confirmed by laboratory observation. Both Dr. Friel, and Dr. Atkins who saw the case with him, were convinced that the rapid recovery was attributable to the prompt use of the serum.

The following two cases I am enabled to report by the kindness of Mr. Stephen Paget, in whose experience they occurred:

CASE II. *Lymphangitis from Inoculation from a Case of Septic Peritonitis: Rapid Recovery on the Fourth Day.*—S. P. wounded his finger while operating on a case of septic peritonitis following childbirth (the initial operation was performed as a last chance, and failed to save the patient's life). On that same evening the wounded finger began to throb, and next day, about twenty-four hours after the infection, there occurred a sharp rigor, and a temperature of 103° F. Within an hour of the rigor 20 c.cm. of antistreptococcus serum were injected; this was on a Sunday evening. Subsequent injections of 10 c.cm. each were given on the Tuesday, Wednesday, Thursday, and Friday following, so that the total amount injected was 60 c.cm. A year and a half before a somewhat similar infection of the same hand had occurred, leading to a slow and tedious supuration of the axillary glands; the whole mass of these glands had then been removed by Mr. Ballance. It seemed that a man suffering from a poisoned wound of the hand, and deprived of axillary glands, ran a very special risk of general infection, so that the case was one of exceptional interest. The subsequent history of the case was, however, as follows:—For three days the temperature ran high, rising on the third day to 104° F.; on the fourth day it fell to 99° . There was no swelling of the hand or arm nor any red streaks up the arm. About the second day diffuse patches of lymphangitis appeared over the deltoid and along the anterior fold of the axilla, with some swelling below the clavicle. On the fourth day the whole attack came suddenly to an end. The lymphangitis faded, desquamated, and slowly disappeared, the temperature fell to normal, and within a week from the commencement convalescence was well advanced. This is the fourth time that this patient has had a poisoned hand from a scratch during operation or during a post-mortem examination. In each previous attack supuration occurred and healing was slow. This time, however, although the source of infection was a most virulent one, though the onset of symptoms was very rapid, and though there were no axillary glands to arrest the poison and prevent its entrance into the general circulation, yet at the end of four days the whole trouble was ended. It is difficult to escape from the conclusion that this good result was due to the prompt use of the serum, which also seems to have prevented the occurrence of the headache and feeling of intense depression which form so prominent a feature in most cases of septic infection.

CASE III. *Lymphangitis from Mixed Infection: Death.*—A man, aged 32, was admitted to hospital under Mr. Paget on January 4th, 1897. Five days before admission a small pimple was noticed on the skin of his upper lip, which he poulticed. On January 2nd the lip began to swell, and next day a little blood and pus came from the sore spot. On the day before admission he had rigors, sweating, and headache. On admission the upper lip was greatly swollen, hard, and dusky, and showed one or two minute points of supuration. It was at once incised, but no defined abscess was found. On the 5th his general condition was worse, and he complained of pain in the right side and back. Two injections of serum were given (10 c.cm. each time), and at midnight three more incisions were made, but no pus was found. On January 6th three more injections were given (10 c.cm. each), and on this day he seemed on the whole better. But on January 7th he was in every way worse—delirium, restlessness, hard infiltrating swelling over the whole side of the face, oedema of the neck. In the afternoon 10 c.cm. more serum were injected, and in the evening the lip and cheek were very freely incised, a little pus escaping from one of the incisions. Next day, January 8th, he was much worse; two injections of serum were given, one of 22 c.cm. and the other of 20 c.cm., but in the evening he began to sink. At midnight he was unconscious, bathed in sweat, pulse imperceptible, respirations 50, temperature 105.4° ; and half an hour later he died.

A bacteriological examination of the blood of this patient