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PRACTICAL POINTS IN THE DIAGNOSIS AND TREATMENT OF OTITIC PYÆMIA.

BY DR. DUNDAS GRANT, F.R.C.S.

DIAGNOSIS.

THE diagnosis of otitic pyæmia depends on the presence of the signs of pyæmia in general, associated with acute or chronic suppurative disease in the middle ear or the bone surrounding it. When, therefore, in the course of acute or chronic suppurative inflammation of the middle ear, the patient is attacked with rigors and the temperature undergoes oscillations between elevation and depression, we may safely assume that we have to deal with otitic pyæmia in one of its forms, more especially if metastases in the joints, lungs, subcutaneous tissue, or muscles or other organs, and enlargement of the spleen, supervene. Less frequently a continuous high temperature, persisting in spite of free exit for discharge, and accompanied by rapid and intense lowering of the vital power, indicates to us that a more purely septicæmic process is in action. The causal nature of the association with the ear disease is sometimes far from obvious, and the ear disease, in presence of the severe constitutional disturbance, may be overlooked by the physician, especially if he is not accustomed to examine the ear.

The pyrexia and constitutional disturbance may be attributed to other diseases, of which the chief are *typhoid fever, malaria, acute*

rheumatism, ulcerative endocarditis, acute tuberculosis, and *meningitis.* The following are the chief points in the diagnosis of otitic pyæmia from the diseases mentioned:

Typhoid fever sometimes commences with rigors, but as a rule this is not the case. The temperature rises by means of higher, somewhat remitting steps for three or four days, never reaching 104° on the first day, and never descending to normal on any evening during the first week. As a rule, also, its onset is not sudden, although occasionally it is so. If the blood is examined, it may be found to answer to Widal's reaction. The roseola may settle the diagnosis at the end of a week. Optic neuritis or choked disc suggests otitic pyæmia rather than typhoid fever.

In *malaria* the rigors are more regular in their periodicity, and the results of quinine are generally diagnostic, while if circumstances favour the examination of the blood, the characteristic plasmodium may be discovered. In *pyæmia,* on the other hand, the examination of the blood, though usually negative, sometimes reveals the presence of streptococci in cultures.

Acute rheumatism is seldom accompanied by rigors, the temperature is more steadily high, and the number of joints affected in succession is larger.

Acute ulcerative endocarditis, which might be termed *endocarditic pyæmia,* resembles the otitic form in many respects. The metastases affect chiefly the lungs, kidneys, spleen, liver, skin, and brain, the emboli in the latter organ affecting chiefly the left hemisphere, and so producing right-sided paralyses, which rapidly pass away. The absence of ear disease is, of course, an important factor in the diagnosis.

Acute tuberculosis is sometimes characterized by the occurrence of rigors, but there is generally evidence of pulmonary involvement, and tubercle bacilli may be detected in the sputum. The attack has usually been preceded by gradual loss of health and wasting of tissue.

When the acute or chronic suppurative inflammation of the middle ear is recognised, the question may arise as to whether the sudden febrile disturbance is due to the aural disease or to some other morbid state co-incidentally associated with it. There is no reason why the sufferer from chronic otitis should not be affected with some other disease, such as typhoid fever, pulmonary tuberculosis, or acute alcoholism. The possibility of these occurrences should not, however, influence our minds too much, or deter us, when in doubt, from making the exploration on which

ultimate diagnosis and the safety of the patient's life may entirely depend.

Assuming that the disturbance of general health is attributable to the acute or chronic disease of the ear, we have to consider the diagnosis of otitic pyæmia from the other possible dangerous sequelæ, and its recognition when combined with one or more of them. Of these the chief are *extradural abscess*, *purulent meningitis*, *serous meningitis*, *cerebral* and *cerebellar abscess*.

Extradural abscess has usually a small orifice of outlet into the cavities of the middle ear, through either the roof or posterior wall, or through the lateral wall of the skull, or in both directions. When the escape is not free the patient suffers from headache, a tendency to coma, with febrile disturbance, all of which symptoms may undergo a remarkable diminution simultaneous with a flow of pus from the ear in much larger quantity than could possibly take place from the cavities in the interior of the temporal bone. When there is a perforation through the lateral wall of the skull, there is an accumulation of pus beneath the pericranium and a bulging of the scalp either above or somewhat behind the mastoid process. Pressure upon this may cause a copious flow of pus from the depths of the middle ear.

Meningitis is usually characterized by the early onset of delirium, violent headache, continuousness of high temperature, a rapidity of pulse, vomiting and obstinate constipation, with a tendency to strabismus and retraction of the head. In pyæmia, on the other hand, the temperature is, as a rule, oscillatory, although in the pure septicæmic form it may be continuous. There is frequently also diarrhœa. The symptoms described may arise either from serous or from purulent meningitis, and our chief means of diagnosis is lumbar puncture of the theca of the spinal cord.

In *abscess of the cerebrum or cerebellum* there is at the outset a rise of temperature, and possibly a rigor; but this subsides and the abscess remains latent till, after an interval, there supervene headache, slowness of cerebral action, with lowering of the rate of pulse and respiration, as well as of the temperature. There is often vomiting, the bowels are obstinately confined, and there is great emaciation. In *temporo-sphenoidal abscess* there may be diverging strabismus from pressure on the third nerve, and weakness of the arm and leg on the opposite side of the body. In *cerebellar abscess* the weakness is in the limbs of the affected side. In uncomplicated cases, therefore, the diagnosis of otitic pyæmia from either of these conditions is fairly obvious.

When otitic pyæmia, with or without thrombosis of the sinus,

is present *in combination with cerebral abscess*, the temperature is that of the pyæmia, but the pulse may be disproportionately slow. When otitic pyæmia is *combined with meningitis*, the mental disturbance is much greater than when the pyæmia exists alone, and the lumbar puncture will reveal the presence or absence of purulent meningitis. The data arrived at from the use of the ophthalmoscope are somewhat inconclusive as regards the presence of cerebral or cerebellar abscess. A dilatation of the retinal veins, with swelling of the disc, is strongly suggestive of thrombosed sinus, and when it is unilateral it indicates that the disease has extended to the cavernous sinus.

As has been said before, the crowning signs of otitic pyæmia are the occurrence of metastatic suppuration in other parts of the body, though these may be so minute as to give no physical signs.

Our diagnosis of otitic pyæmia as such being thus established with considerable probability, we have to approach the diagnosis between the *thrombotic* and the *non-thrombotic* forms.

When the condition arises as a result of a chronic suppuration of the middle ear of more than one year's standing, and especially if there is evidence of metastases in the lungs or pleura, it is practically certain that there is a thrombo-phlebitis of one or other of the sinuses. We are, however, helped by the search for local evidences of involvement of the venous channels first without, but afterwards with, operative exploration. An abnormal degree of filling of the external jugular vein would suggest that the internal jugular of the same side is obstructed; fulness above the orbit, with œdema and distension of the contents of this cavity and dilatation of the retinal veins, would indicate plugging of the cavernous sinus. Tenderness, or the presence of an elongated swelling along the internal jugular vein, would indicate inflammation of this channel, or, at least, an inflammatory condition of the superjacent lymphatic glands. Occasionally the inflamed and suppurating vein may form a fluctuating swelling. Tenderness behind the mastoid region would suggest infiltration of the condylar or vertebral veins.

When, on the other hand, it is due to an acute suppuration, and the metastases affect rather the joints or the greater circulation, there is a probability that it has not been preceded by thrombo-phlebitis of the great sinuses, and it is of the non-thrombotic form.

The diagnosis of *sapræmia* may still have to be made, because pus retained under pressure may give rise to the febrile and constitutional disturbance already described, with the exception

of a metastatic abscess formation. It is, therefore, only after the free opening of the middle ear and the cavities connected with it that we may be able to judge as to whether the symptoms are due to this condition or to an infection of the blood itself. In children the evacuation of a small quantity of pus from the middle ear, effected by paracentesis of the membrane, may suffice to remove all the febrile disturbance, and in the adult the same result sometimes follows the performance of the mastoid operation—the radical in chronic, the antral in acute cases—and we have then had to deal with sapræmia or septic intoxication from retention of pus. Should this evacuation not lead to the disappearance of the febrile symptoms, we have to deal with pyæmia; and though in the acute cases we may postpone further exploration, treating the metastases as they arise, we must in the chronic expose and explore the lateral sinus. In any case, unless the mastoid operation evacuates pus under pressure in some considerable quantity, we are not justified in abstaining from further operative exploration if the patient's symptoms are threatening. This is especially true when we are called upon to deal with a patient at a distance, though when the patient is in hospital under our continued supervision the rule admits sometimes of relaxation.

The confirmation of the diagnosis of thrombo-phlebitis cannot be carried further without *exploratory operations*, which frequently constitute the first step in the treatment of the disease.

The details of exposure of the lateral sinus vary in the hands of different operators, and must be ordered according to the nature of the case. When, during the performance of the mastoid operation, there is already an opening into the groove for the lateral sinus, this opening may be extended by means of the chisel and mallet, and the cutting or gouge forceps; but in the absence of such indications, and more especially when it is desired at the same time to explore the middle fossa of the skull, a trephine $\frac{3}{4}$ inch in diameter may be placed with its centre-pin 1 inch behind the centre of the osseous meatus and $\frac{1}{2}$ inch above its centre; the opening may be extended upwards and downwards by means of bone forceps. If one forefinger is placed on the sinus and another on the jugular vein, and no fluctuation can be conveyed from one to the other, there is absolute thrombosis somewhere between the two fingers. The condition of the contents of the sinus may then be decided by means of puncture, the part being first carefully sterilized with perchloride or biniodide of mercury, and a hypodermic syringe, also carefully sterilized, being employed. The withdrawal of pure blood offers no positive assurance of any kind,

as it does not exclude the possibility of there being a parietal thrombosis; the withdrawal of pus would indicate without doubt that the blood in the sinus had coagulated, and that the thrombus was undergoing purulent disintegration; the absence of any fluid at all would indicate that the needle had entered a thrombus which, at the perforated part, at least, had not yet broken down. If the sinus presents its natural appearance and the needle withdraws pure blood, the absence of the fluctuation before described would indicate that there remained little doubt of the presence of a thrombus in the bulb of the jugular vein, which may have become infected through the floor of the tympanum or from the lodgement in it of septic emboli which had formed in the sigmoid sinus, and we have then to deal with thrombo-phlebitis of the bulb of the jugular vein.

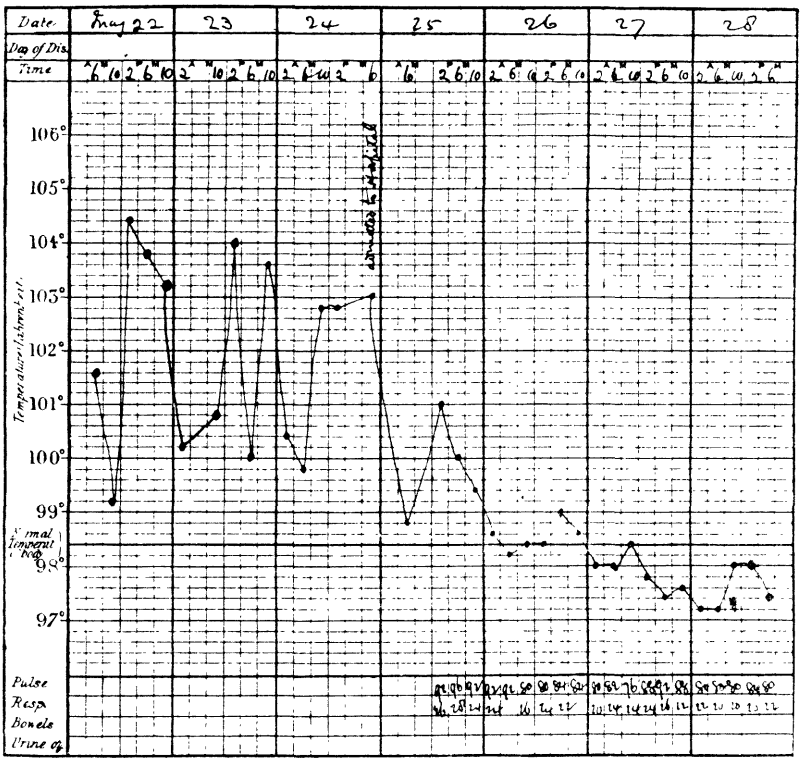
Treatment of Otitic Pyæmia.

Expectant treatment need only be mentioned to be condemned.

Non-surgical treatment may take the form of the administration of diuretics and purgatives, while, to keep up the patient's strength, especially in the pure septicæmic cases with continuous intermittent high temperature, alcoholic stimulants, quinine, ammonia and nourishing diet may be required. To counteract the toxic effect of the streptoccocus or its products, injections of antistreptococcic serum may be made; and indeed, in cases of continuous septicæmia, unrelieved by complete evacuation of all sources of infection, this is practically our only resource.

Surgical treatment takes its simplest form in free incision of the membrana tympani, and when this results in the evacuation of unmistakable pus, it may, especially in children, be all that is required, as in the following case:

Leonard R——, aged seven, was brought to me on June 1, 1900, on account of pain in the left ear, fulness of the left eyelid, simulating ptosis, and severe febrile disturbance of six days' duration. The attack had commenced with symptoms of an influenzal character. The temperature for three days before admission had oscillated between 99·2° (37·3°) and 104·4° (40·2°). On careful examination the internal organs of the body appeared to be normal, as also the fundi of the eyes; there was no splenic enlargement, and the only sign suggestive of venous obstruction was slight enlargement of the left internal jugular vein as compared with that of the right side. There was slight bulging of the posterior part of the left membrana tympani. The temperature on admission was 103° (39·4°). Paracentesis was performed, and a large drop of pure pus escaped. Next morning temperature was 98·8° (37·1°); it rose in the afternoon to 101° (38·3°), and then gradually subsided so that in two days it was subnormal. There were no further symptoms, and the patient returned home in good health. The following chart indicates the course of the pyrexia:



Then, polypi or masses of granulations or collections of broken-down desquamated epithelium in the tympanic cavities must next be removed, but in the presence of pyæmic symptoms it is not justifiable in the adult to stop short at their removal, and the petro-mastoid cavities must be opened without delay.

In acute cases the mastoid cells and antrum must be freely opened; all diseased bone and granulation tissue should be carefully but thoroughly scraped away, and it is most important that the peripheral cells should be freely exposed as far as the very apex of the mastoid process. Recrudescence of fever has often been found to be due to the persistence of a focus of pus in one of the apical cells, which has been overlooked at the first operation. This may be all that is required to bring the case to a successful termination, as in the following case:

Emily S——, aged twenty-nine. Her illness commenced suddenly, with pain in the right ear, on account of which the membrane was incised by the family doctor; the pain spread to the mastoid region, and the discharge intermitted; she became drowsy, and had several attacks of vomiting and giddiness. There was a history of discharge from both ears in childhood, but this had entirely disappeared. On the 19th the patient had a severe rigor, temperature going up to 104° (40° C.), going down next morning to 98° (36·7°), and rising in

the evening again to 106° (41·1°). There was fulness over the right mastoid; tenderness in the line of both jugular veins. These oscillations persisted, and all operation except incision of the membrane was refused until the 28th, when the mastoid antrum was opened and a small amount of granulation tissue and cheesy matter was removed. The temperature became lower, and the patient was more comfortable for six days, when a slight rise of temperature took place, but on the 18th she had a feverish attack and vomited. The wound was then reopened, and the mastoid process freely gouged open down to the apex, in case some focus of pus had been overlooked. Nothing of the kind was found, and the cause of the rise of temperature was explained by the supervention of a cutaneous erysipelas, which commenced in the parotid region and wandered round to the opposite side of the face. This subsided, and the patient rapidly recovered without further operation.

In addition to the operative treatment, the patient is kept at rest and is administered diuretics, quinine, and nourishing liquid food; antistreptococcic serum is injected if the temperature does not rapidly descend to about the normal, and metastatic abscesses are opened as they form.

In some acute cases persistence of the symptoms, in spite of this treatment, may be due to the formation of parietal thrombi in the sinus or the jugular bulb; exploration and treatment, as recommended for chronic cases, is then to be carried out, including ligature of the jugular vein, incision, evacuation, and obliteration of the sigmoid sinus.

In the performance of the mastoid operation in acute cases, great care must be taken to avoid wounding the sigmoid sinus. This accident is not so insignificant as writers have hitherto taught.

As an illustration, I may quote a case in which a surgeon wounded this vessel in the course of a radical mastoid operation; he at once arrested the hæmorrhage by means of a firm plug, which he left in position for three days; there then ensued rigors and oscillations of temperature, which had not previously been present. On the 4th day the sinus was explored, and found to be thrombosed; it was slit in both directions, and a thrombus was exposed; this was removed in its entirety in the upward direction, a tampon of iodoform gauze being introduced; in the lower direction it was not completely removed, as it appeared to consist of sound, healthy clot. When death afterwards took place, there was found a disintegrating thrombus in the upper part of the jugular vein. Three similar cases are quoted by Grunert and Zeroni in the *Archiv. für Ohrenheilkunde*, published in June, 1900 (pp. 109, 117, 118), and in them it was found necessary to ligature the jugular vein, and perform the typical sinus operation.

In *chronic* cases, if there is well-marked evidence of thrombophlebitis of the jugular vein in the neck, this may be exposed and ligatured, and possibly evacuated, before the radical operation is carried out. In the absence of such evidence we proceed at once to do the radical operation, and then expose the sigmoid sinus by a continuation backwards of the breach in the bone, and explore it as before described. If it is thrombosed, and there is evidence of puriform disintegration high up in the sinus, it may be freely

incised, and the purulent débris completely removed with a spoon. If absolutely firm, healthy occlusive clot is then reached, the cavity may be washed out with sublimate solution, dusted freely with iodoform alone or in combination with boracic acid, and lightly plugged with iodoform gauze. The lips of the cut in the sinus may be doubled in so as to assist in the obliteration of the cavity. In a case exhibited by the writer before the Otological Society of the United Kingdom this treatment was found sufficient:

The patient was a girl, aged nineteen, who was brought to the Central London Throat and Ear Hospital on June 7, 1898. She was the subject of an old-standing discharge from the middle ear, headache, vomiting, frequent rigors; the pupils were widely dilated, and the patient could hardly stand; temperature 104° (40°). Under these circumstances the radical operation was carried out without waiting for further clinical examination. On opening the mastoid antrum there was a gush of pus of such a quantity that it could not possibly have been contained in the antrum itself; it was, therefore, either from the middle fossa or the groove for the lateral sinus. On further examination there was found a carious opening leading into this groove. This was laid widely open, and pus and detritus were found escaping from a hole in the sinus itself. This opening was enlarged, and the sinus was sufficiently exposed for it to be readily made out that there was complete thrombosis in both directions. On pressing the internal jugular vein no impulse was communicated. The broken-down portions of the thrombus were cleared out by means of a spoon, and all the soft coagulum was removed in both directions until a perfectly firm organizing clot was reached; it was then considered likely that this clot would act as a thrombus, and that it might escape from infection, in view of the fact that the primary focus was so completely removed. The cavity was disinfected by means of perchloride of mercury; iodoform was dusted in, and a pledget of iodoform gauze was inserted. The patient rapidly improved, had no further rigors, and speedily became convalescent.

At the same meeting Mr. Arthur Cheatle showed a similar case of sinus thrombosis in which recovery followed an operation limited to the sinus without ligature of the jugular vein. Warnecke publishes in the *Archiv. für Ohrenheilkunde*, March 15, 1900 (pp. 197, 198), two cases of sinus thrombosis, with connective-tissue obliteration of the sigmoid sinus, occurring in Professor Lucæ's clinic in Berlin. The clinical histories are almost identical with that of the case I have just described. The most striking results of this method of treatment are those obtained by Professor Macewen, and published in his work on the "Pyogenic Diseases of the Brain and Spinal Cord" (Glasgow, 1893, p. 331). In twenty-eight cases of infective sigmoid sinus thrombosis treated without ligature of the jugular vein, he had only eight deaths.

If firm occlusive healthy clot has not been reached, or if after the above operation repeated rigors occur, it is necessary to expose the sinus to the utmost extent in both directions, scraping away the clot until a free flow of blood takes place, then obliterating the space by the introduction of iodoform gauze. Before doing this the internal jugular vein ought to be exposed and ligatured. If

the vein has undergone thrombosis, the ligature should be placed as low down in the neck as possible; the upper part of the vein should be slit up and brought out through the upper angle of the wound, its contents being removed by means of curetting or very gentle syringing. If it is not thrombosed, the ligature should be placed as high as possible, the vein being left uncut; the sigmoid sinus should be then freely cleared out, the wound irrigated with perchloride solution, dusted with iodoform, and lightly plugged with iodoform gauze, an antiseptic dressing being placed over all.

Dr. Nicoll published in the Glasgow Hospital Reports for 1899 a case in which he exposed the lateral sinus as far back as the torcular. It may also be exposed downwards to the jugular bulb, and Chipault shows how the portion of bone dipping down into the hollow of the sinus may be removed.

The following case of severe pyæmic symptoms resulting from chronic suppuration of the middle ear is illustrative of some of these points:

Amy K——, aged twenty-one, a housemaid, came under the care of Dr. Dundas Grant on May 1, 1899, on account of severe pyæmic symptoms, resulting from chronic suppuration of the left middle ear, which dated from childhood. She had been seen on April 25 by a colleague, who had found her suffering from headache, with delirium and high fever, and locally a fluctuating swelling in the mastoid region; this he incised, giving vent to a considerable quantity of pus, but as the symptoms persisted he placed her in the hospital under Dr. Grant's care for further operative treatment.

On admission she presented the appearance of extreme suffering; her complexion was of a yellowish tint, and her lips bluish; her temperature was 100·8° (38·2°), pulse 96, respiration 20; the bowels acted twice. Behind the left ear was a puffy swelling, with an incision leading down to the bone. There was no swelling or tenderness along the jugular vein.

Next day there was a moderate rigor, and the temperature ran up to 105·6° (40·9°). The radical operation was at once performed, the antrum being found full of pus, cheesy débris and granulation tissue; the removal of the bone was continued backwards till the lateral sinus was exposed; this was found to be embedded in granulations, and so hard to the feel that it was obviously thrombosed; it was slit open and found to be filled with healthy-looking clot; the dura mater in the posterior fossa bulged to an extreme degree, and a trephine was applied over the cerebellar region at some distance behind the mastoid wound, and the cerebellum was explored, but no pus escaped. It was then thought that the bulging of the dura mater might be due to pressure communicated by an abscess in the temporo-sphenoidal lobe; a trephine opening was therefore made in the squamous portion of the temporal bone, and the temporo-sphenoidal lobe was also explored with the same result, no abscess being found. It then seemed certain that the bulging must be due to some form of meningitis or internal hydrocephalus, and the wounds were closed up and dressings applied, the operator feeling that there was little probability of any good being obtained. The bulging of the cerebellum was so great that it was impossible to get it completely covered by the flaps of dura mater, and a small portion bulged between the cut edges. The dura was stitched as completely as possible; iodoform was dusted into the wound, which was lightly plugged with iodoform gauze. The temperature descended in the evening to 99·6° (37·6°).

May 3.—Patient distinctly better, though she had a disturbed night, and was sick twice; the pain in the ear was gone; there were no sweats and no rigors.

May 4.—She had a better night; no sickness and no discomfort, except a little soreness in the wound. Temperature 97·4° to 98° (36·3° to 36·7°).

May 5.—Temperature 98·8° (37·1°). On ophthalmoscopy the optic discs were found to be normal. The bowels acted twice. The dressings were unsoiled, but at 6 p.m. temperature reached 102° (38·9°). Dr. Nourse changed the dressing.

May 6.—Temperature 99·2° (37·3°), but rose in the afternoon to 102° (38·9°); had no definite rigors, but her feet had felt cold. In the evening temperature rose to 102·4° (39·1°); there was slight fœtor when the dressings were changed.

May 7.—Temperature at 2 a.m. 104·4° (40·2°); sponging with warm water was practised, and the temperature descended to 100° (37·8°), and then to 98·8° (37·1°). There was a slight shivering at 3 p.m., and a well-marked rigor at 4.30; this was followed by sweating. At 6 p.m. temperature was 105·4° (40·8°), but no pain was felt. At 9.30 p.m. chloroform was administered, and Dr. Grant carried out a further operation; he slit up the lateral sinus and scraped out the clot until blood flowed freely.

The internal jugular vein was exposed in the neck, and found full of fluid blood. It was ligatured, as also were the facial and lingual trunks; iodoform was dusted on and the dressing reapplied. The patient was extremely depressed, and 3 minims of the solution of strychnia were injected.

May 8.—Next morning the temperature was 97·2° (36·2°); the patient had been slightly sick and had not slept well, but there was little discomfort and only a slight rise of temperature to 99·8° (37·7°), and a slight shivering.

May 9.—The patient had had a bad night and felt cold, but did not shiver, about 2 a.m. At 6 a.m. temperature was 99·8° (37·7°). The wound was dressed in the afternoon and found satisfactory. There was no smell, and one stitch was removed because of the tension.

May 10.—The patient had had a very disturbed night, in spite of 25 gr. of choralimide administered at bedtime. At 10.45 on the previous night she had a shivering. The temperature rose to 102·6° (39·2°), and at 1 in the morning it reached 104·2° (40·1°); after sponging it descended to 102° (38·9°), reaching at 6 a.m. 99° (37·2°). The patient complained of some pain in the region of the left internal jugular vein. Dr. Grant removed the plug from the lateral sinus; there was no fœtor, and the temperature descended to 98° (36·7°).

May 11.—The patient had had a good night, and slept well without shivering. Temperature had not risen above 99° (37·2°). The wound was dressed in the evening, and found free from fœtor.

May 12.—Temperature was slightly subnormal.

May 13.—A continued general improvement, the tongue becoming cleaner and moister.

May 14.—No complaint except of hunger.

May 17.—Continued improvement; a stitch was removed from the dura mater in the trephine hole over the cerebellum.

May 19 *and* 20.—The dressings were changed.

May 23.—A strap was applied over the deep dressing so as to help in the approximation of the lips of the wound.

June 3.—The whole surface of the wound, except a small portion of the exposed bone, was covered with red granulations; sulphate of copper was applied to a few exuberant ones, and a moist dressing of boracic zinc was applied.

June 11.—Granulating surface getting much smaller and with very little discharge.

Complete healing followed very rapidly, and the patient is at present in good health.

Among other practical points, this case shows the necessity of removing the gauze tampon with as little delay as possible. Ballance says that it should not be left for more than twenty-four hours; it can, of course, be renewed if necessary.

In thrombosis of the cavernous sinus the best chance of recovery is afforded by free incision of the lateral sinus with ligature of the jugular vein, in the hope that the clot may be dislodged and extruded through the opening in the lateral sinus.

Should the temperature be continuously high and the vital powers undergoing rapid exhaustion, antistreptococcic serum, or even normal blood serum, may be injected. The patient's strength must be kept up by means of quinine and alcoholic stimulants.

When complicated with cerebral or cerebellar abscess, the abscess should be opened through an aperture in the bone as far as possible from the sigmoid sinus.

When complicated with meningitis, lumbar puncture may be performed. If there are pus cells or cocci in the fluid, no further operation should be attempted. In the absence of these the meningitis is probably of the serous form, and likely to subside after operation on the sinus.

Metastatic abscesses must be opened as they arise.

A PLEA FOR EARLY NAKED-EYE DIAGNOSIS AND REMOVAL OF THE ENTIRE ORGAN, WITH THE NEIGHBOURING AREA OF POSSIBLE LYMPHATIC INFECTION, IN CANCER OF THE LARYNX.*

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This is a very important subject, Mr. President, and I hope you will allow it the utmost latitude of discussion. For my own part, I shall be as concise as possible, and shall only call attention to certain phases of the question which, in view of its unsettled state, seem to me to be of most pressing and immediate importance. Leaving out of consideration the probable existence of a cancer bacillus, and the possible future detection of the disease through the blood and secretions, there remain, in the present state of our knowledge, three principal methods of diagnosis in laryngeal cancer. These are, in the order of their practical usefulness and importance:

1. The naked-eye method, or diagnosis by direct inspection, supplemented by clinical phenomena.
2. Thyrotomy.
3. The microscope.

Of the three methods, the second is often included in, and therefore ancillary to, the first.

It is impossible to exaggerate the importance of naked-eye

* Remarks made in opening the debate on "Cancer of the Larynx" at the Twenty-second Annual Congress of the American Laryngological Association, May 2, 1900.