Remarks

ON

DRAINAGE OF BRAIN ABSCESS.*

BY

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THE general principles of treatment of abscess of the brain differ in no essential feature from those which obtain in abscesses elsewhere in the body, but the peculiar characters of the cerebral tissue, the existence of the cerebro-spinal fluid circulation, and the physical conditions of pressure within the cranial cavity create special difficulties and problems. While the primary object in dealing with these cases is the effective drainage of the abscess, yet the possibility of fatal complications following precocious or misdirected surgical measures, together with the dangers of serious damage to brain function, must be given due consideration in planning the operation.

The great variations of type which occur among cerebral abscesses, from a diffuse septic softening right down to an encapsulated mass of almost solid fibrous tissue, are apt to create confusion when treatment is being discussed, for measures clearly right for one variety may be obviously wrong for another. The frequent coexistence, especially in otitic cases, of other infective complications, meningitis, ventricular ependymitis, and sinus phlebitis, tends still further to confuse the issue.

In discussing the treatment of abscess of the brain, and especially perhaps in speaking of results, it is necessary to be quite clear as to the type of case with which we are concerned. Although the various kinds of abscess merge into one another, certain types can be recognized: (1) diffuse septic softening; (2) a pus-containing cavity with ragged wall consisting of softened brain tissue; (3) a cavity with a thin capsule consisting of young fibrous granulation tissue; (4) a cavity, perhaps small in relation to the size of the abscess, consisting of dense fibrous tissue, which may be the greater part of an inch in thickness.

In the first variety, which is not really an abscess at all, but a diffuse infective encephalitis, comparable with a cellulitis of the connective tissues, no surgical treatment is likely to be of any use, except perhaps a simple decompression.

When, however, as in the second class, this encephalitis is of a somewhat less virulent type, and necrosis with pus formation has occurred in its central part, drainage may be undertaken with some hope of success. This is a type of abscess which during the war was not infrequently encountered in the track of a shell fragment. The most intense septic reaction was apt to be found near the point of entrance, as if the most heavy microbial infection as well as the maximum devitalization of tissue existed just beneath the aperture in the skull, as indeed one would expect to be the case; in abscesses developing months or years after such wounds the same rule holds.

The third and fourth types differ chiefly in the thickness of the capsule, and naturally they merge imperceptibly into one another. At one end of the scale there is a thin capsule, varying, however, in thickness at different places, while at the other end is an almost solid mass of fibrous tissue containing perhaps but a few drops of pus. Around the thinnest-walled abscesses there is an area of oedematous brain, in which, naturally, extension may take place. By this route the ventricle may become involved.

With the very chronic thick-walled abscesses the changes in the surrounding brain may be inconspicuous and insignificant. In such cases the question of drainage scarcely arises; the proper treatment is complete enucleation, with closure of the wound. I have had five such patients, all of whom recovered. In one other similar case drainage was necessitated by the fact that, just as the mass was being delivered, a thin part of its wall gave way,

causing soiling of the wound. This patient also recovered completely.

This discussion, however, is chiefly concerned with what is perhaps the commonest type of abscess—a cavity containing some drachms, or even ounces, of pus bounded by a relatively thin capsule, which in its turn is surrounded by an area of soft oedematous brain. Most of these are of otitic origin, and are situated either in the temporal lobe or in the cerebellum. The cerebellar cases are apt to present earlier indication of their presence because of the ventricular distension to which they tend to give rise. They are therefore likely to be operated upon at an earlier stage.

It is instructive, I think, at this point to recall the very remarkable series of cases upon which Macewen bases his classical monograph (1893). In Table III the astonishing figures are given that of 19 patients operated upon 18 recovered. No wonder Macewen was able to write, cautious Scot though he was, "One might almost conclude that in uncomplicated abscess of the brain, operated upon at a fairly early period, recovery ought to be the rule." His recovery rate is, as Mr. Miles Atkinson pointed out recently (*Lancet*, March 24th, 1928), much the same as the mortality rate of many other surgeons. Not only, as he says, has no one been able to improve upon Macewen's successes, but no one has ever been able even to approach them.

A perusal of Macewen's detailed yet lucid account of his cases brings out the fact that he was dealing with one particular group—namely, the definitely encapsulated abscesses with a long history, and usually containing a large amount of pus. The average duration of the illness before operation was, in the twelve cases in which it is stated, no less than seventy days. Macewen's cases at least lend no support to any plea for precocious operation. Early operation, however, as soon as the presence of an abscess is definitely diagnosed, must be undertaken, for the risks of delay are great. The chief dangers are rupture into the ventricle, rapid onset of cerebral compression from oedema, and, in cerebellar cases especially, sudden respiratory failure.

A spreading abscess tends to make its way towards the ventricle, or rather, perhaps, the ventricle filled with fluid under pressure tends to herniate into the softened brain.

This is also true after an abscess has been imperfectly drained, and in such cases the accident, not necessarily fatal, of a communication being established between abscess and ventricle is marked by the escape of cerebro-spinal fluid from the wound.

When an abscess has been properly evacuated and drainage established the intracranial pressure falls, provided that no complication exists such as meningitis, encephalitis, or a second abscess. The appearance of a fungus cerebri means that the intracranial pressure has not been relieved. A "fungus" must be clearly distinguished from a "hernia" cerebri. The latter means a protrusion of healthy brain, still covered by pia, arachnoid, and skin, with its circulation and functions unimpaired; a fungus is a protruding mass of strangulated, necrotic, and functionless tissue indicative of unrelieved intracranial pressure.

In operating for cerebral abscess the two most important technical considerations are the route to approach and the method of drainage. Ballance has frequently called attention to the fact that with abscesses originating in bone disease, as most of them do, there is a stalk, representing the inward track of the infection, connecting bone and abscess; this should furnish the ideal route of approach. The membranes are presumably adherent at this spot, so as to seal off the subarachnoid space. In otitic cases the surgeon, during the mastoid operation, may be fortunate enough to find the stalk, and it is possible that the drainage so established may be adequate. Several of Macewen's cases at any rate were successfully treated in this manner.

Failing this, the transarachnoid route must be adopted. The bony opening need not be a large one, as the evacuation of the pus will be followed by a fall in intracranial pressure. This diminution of pressure, it must be remembered, is followed immediately by a falling away of the brain from the surface, with the consequent opening up of

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the subarachnoid space. It is therefore necessary, before evacuating the pus, to shut off the subarachnoid space by strips of gauze tucked in beneath the dura; these guarding plugs may be left *in situ* for two or three days, just as is sometimes done in the transpleural drainage of a hepatic abscess, or the transperitoneal drainage of an abdominal abscess.

The presence of a subcortical abscess is usually indicated by bulging of the brain, with pallor, broadening, and softness of the exposed convolutions. If the abscess lies deeply these characteristic appearances may be lacking. Exploration with trocar and cannula is, in my opinion, to be deprecated. The instrument may pass by the capsule, or, failing to penetrate it, may push it towards, and cause it to burst into, the ventricle. My own practice is to use a small flat seker, which passes with the least possible force through the softened brain tissue, and with which the resistance of an abscess wall can easily be felt. If by chance the instrument penetrates into a thin-walled abscess, pus at once flows out along it. The abscess having been thus located, I tie off such cortical vessels as may be necessary, and make a clean incision into the abscess with a sharp knife. The material of which the tube is made is of little importance provided it has sufficient rigidity; a rubber tube is rather too bulky for the size of its channel, but usually serves the purpose well enough. I have from time to time used tubes made of aluminium or of celluloid. Macewen employed decalcified bone tubes. Matters of greater importance concern the after-treatment. The tube, which should have been sutured to the edge of the dura or skin, must be kept clear by frequent gentle syringing, and should be retained in place for a long while, at least until all tendency for the brain to protrude has disappeared. It should be shortened only very gradually. If the brain protrudes persistently or increasingly either the abscess is insufficiently drained or some complication such as a second abscess or meningitis may be present. It is unwise, however, to interfere locally too soon, as there is always some oedema which tends to push the tube out. This period can be tided over by withdrawing fluid from time to time by lumbar puncture.

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ON

SOME DISORDERS OF THE LYMPH GLANDS.*

BY

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THE lymphatic system consists of a widespread set of vessels, most abundant in the skin, the intestine, and the connective tissues, in the course of which are aggregations of lymphoid tissue, termed lymph glands or nodes. The lymphatics take origin in the tissue spaces as capillaries. They are provided with valves, and drain into nodes arranged for the most part in groups, from which arise larger efferent vessels; these pass to one or more groups of nodes situated more deeply, and discharge ultimately into the main lymphatic channels—namely, the thoracic duct and the right lymphatic duct, which open into the origin of the innominate vein on the left and right side respectively.

In addition to the lymph nodes, lymphoid tissue is widely distributed throughout the body. The tonsils, including the pharyngeal tonsil, the thymus, and the spleen are composed almost entirely of this tissue; the alimentary tract is richly supplied with lymphoid elements, both as solitary follicles and as agminations in the lower part of the ileum (Peyer's patches), the appendix, and the colon.

The lymph nodes are collected into groups, of which the cervical, axillary, and inguinal are the principal ones near the surface of the body; more deeply, there are important collections about the trachea, in the root of the lung, in

the posterior mediastinum, in the transverse fissure of the liver, along both sides of the spine in relation to the aorta and its main branches, and in the mesentery. Over and above these are sundry collections and single nodes, the existence of which is scarcely appreciated until they are enlarged as the result of disease; examples are the epitrochlear, infraclavicular, and preauricular nodes.

It is by the lymphatics that certain substances are drained away from the tissue spaces with the help of phagocytic cells; fat is absorbed from the intestinal villi into the lacteals. The chief functions of the lymph nodes are to produce lymphocytes, and to form a barrier against infection of the more important tissues of the body. Not only microbes, but particles of soot, dust, and even neoplastic cells, are caught by this means and held back from the general circulation; no doubt many diseases of an infective nature abort at this line of defence. Lymphatic glands, then, are open to attack either by way of the lymphatics or of the blood stream.

Lymph nodes enlarge as the result of inflammation, of hyperplasia, or of infiltration by blood cells or new growth. An important series of changes, again generally associated with enlargement, is that which signifies retrogressive processes in the nodes; examples are fibrosis, caseation, the deposit of foreign substances, and abscess formation.

Lymph nodes in health are usually impalpable, and, unless the patient is unusually thin, nodes which can be definitely felt must be assumed to be pathological.

When investigating the lymphatic system of a patient in whom any enlarged nodes are found, let the first inquiry be upon an anatomical basis: in what group or groups is the enlargement present? The superficial nodes are examined systematically by careful inspection and palpation. Moderate enlargement of the cervical nodes may cause some fullness of the neck; the recognition of this feature may call attention to the presence of soft glands—as, for example, in acute leukaemia—which otherwise might escape detection. Stiffness of the neck, and perhaps torticollis, may be associated with enlarged cervical nodes; so also may a neuralgia accompanied by tenderness and hyperaesthesia of some part of the scalp or a headache which arises in the neck and spreads upwards over the vertex. In the axilla, care must be taken not to mistake fat for enlarged nodes. Sometimes superficial nodes in unusual places are to be seen or felt—for instance under the scalp, near the zygoma, and in the intercostal spaces. Of the deep groups, those within the abdomen when sufficiently enlarged may be recognized by palpation, or by signs of pressure upon neighbouring structures to which they give rise—as, for example, to jaundice with ascites when those in the transverse fissure of the liver are affected, and, be it remembered, multiple tumour formation within the abdomen is most often associated with lymphatic glands. It should also be borne in mind that an "odd" tumour within the abdomen—odd perhaps in regard to its characters or to the symptoms, or lack of them, to which it gives rise—is not seldom of lymphatic origin. An examination of the blood in such cases must always be made, lest a laparotomy be performed unwittingly in a case of, say, chronic leukaemia.

When disease of the lymph nodes has led, as in the case of tuberculosis, to caseation or to calcification, such nodes may frequently be demonstrated by x rays, and so the cause of indefinite abdominal pains, perhaps associated with more or less pyrexia, may be cleared up. Should caseous glands, as revealed by palpation and/or radiography, be situated mainly in the right iliac fossa, the portal of entry is most likely the appendix; less often it is the Fallopian tube. In either case, when associated with symptoms, laparotomy is indicated for removal of the offending structure.

Lymph glands within the thorax cannot be detected by ordinary physical examination, save when they are very considerably enlarged and coalescent. When this is so, however, they may give rise to certain physical signs. Greatly enlarged lymph nodes in the anterior mediastinum may cause a visible tumour in the neighbourhood of the sternum, with percussion dullness and signs of pressure upon veins. A similar state of things in the posterior mediastinum may yield impaired percussion resonance in

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