

# DISEASES OF THE MAXILLARY ANTRUM, THEIR SYMPTOMS, CAUSES, AND TREATMENT.<sup>1</sup>

By ADOLPH BRONNER, M.D., M.R.C.S.,

SENIOR SURGEON TO BRADFORD EYE AND EAR HOSPITAL; LARYNGOLOGIST TO BRADFORD ROYAL INFIRMARY.

THE subject of my paper to-night—diseases of the maxillary antrum—is one in which I have for the last 15 years had a good deal of experience; and in numerous cases I have had the pleasure of working with members of your profession.

The maxillary antrum or sinus, or “antrum of Highmore,” is of pyramidal shape and is situated above the molar teeth and below the orbit. In the foetus the antrum is very small—in the fourth foetal month it is only one-third of a millimetre in size, in the fifth month it is about five millimetres—and it is round in shape. It lies high up above the unerupted teeth. It remains small up to the fifth or the sixth year, when it rapidly increases in size and alters its shape. In the seventh year it is fairly large, of pyramidal shape, and it lies lower down, just above the roots of the molar teeth. These facts are of great importance from a surgical point of view. Up to the sixth or the seventh year the antrum should be opened through the middle nasal meatus and not through the alveolus. The size and position of the antrum in adults, however, vary very much, even in the same individual. They depend on the amount of bone-absorption in the upper jaw and on the size and shape of the nares. If the nasal cavity is large it naturally encroaches on the antrum. In opening up the antrum we have to take all these facts into consideration, and the operation is not so easy and simple as some people seem to think.

Of the walls of the antrum only two, the inner and the lower, concern us this evening. The inner wall is, of course, the outer wall of the nasal cavity. It is bony, with the exception of one part which consists only of mucous membrane. This lies between the middle and lower turbinated bones. In it are situated the normal openings—the maxillary and the so-called accessory ostium. The former lies further forward and higher than the latter. The lower part of the antrum is contained in the alveolar process. It varies very much in size and position. Generally it extends down to the roots of the molars. Often these are covered only by a very thin layer of bone which frequently is pressed upwards by the tooth and in part projects into the antrum. Often there is a *thick* layer of bone between the teeth and the antrum. If the lower portion of the antrum is broad, we call the parts the “alveolar sinus” and the “palatine sinus” respectively. The lining mucous membrane of the antrum is directly continuous with that of the nose through the maxillary and accessory ostia.

The commonest disease of the antrum is the so-called empyema or purulent catarrh of the lining mucous membrane. Cases of acute empyema were very rarely met with before the recent epidemics of influenza. Since then they have been fairly common. Sometimes they follow scarlet fever. The symptoms are generally well marked—severe pain, neuralgic or throbbing, which increases on pressure or rapid movements of the head. The pain is generally intermittent and depends greatly on the amount of fluid in the antrum. When this escapes through the ostia the pain subsides, but returns again as soon as the serum or pus accumulates. The teeth are often painful, especially on pressure. This gives rise to the erroneous idea that the teeth are diseased and are the cause of the empyema. There is generally rise of temperature. The cases mostly heal spontaneously without operative interference. In the two cases which I have seen, however, I opened up the antrum at once and the distressing symptoms soon disappeared.

Chronic empyema of the antrum is extremely common. It is generally not diagnosed. In fact, in many cases the patient does not complain of any symptoms and the empyema is only discovered at the post-mortem examination. The old-fashioned idea (which I am sorry to say is still very prevalent) that empyema of the antrum gives rise to most distressing symptoms, such as distension of the cheek,

severe pain, &c., is absolutely wrong. These cases are rare and they are generally the result of a long-standing and neglected empyema. Of course, cases of syphilitic or tuberculous disease of the antrum do give rise to grave symptoms. As a matter of fact the subjective symptoms are very slight. There is often recurrent infra-orbital neuralgia or a dull aching pain in the cheek, accompanied by swelling of the soft tissues. More frequently there is pain over the nose and orbit. This fact is of great practical importance, as disease of the frontal sinus is often wrongly diagnosed. I know of several cases of empyema of the antrum which, because of the orbital pain, were diagnosed as, and treated for, frontal sinusitis. The most common complaints are neuralgia, a blocking of one nostril, unilateral “cold in the head,” a nasal discharge, or a bad smell in the nose. Often only one of these symptoms is present. I have already published<sup>2</sup> three cases of empyema of the antrum, in which a bad smell in the nose was the only symptom complained of. The discharge or the smell is more marked when the patient bends the head forward or on one side. If the accessory ostium is large and open the pus flows to the back of the nose into the throat and the patient complains of a bad taste and a dry throat. Some months ago I saw a medical man who suffered from recurrent unilateral tonsillitis and a bad smell in the nose. There was empyema of the antrum. When this was cured there was no return of the tonsillitis or of the bad smell. Often the constant irritation caused by the pus gives rise to polypi or enlargement of the middle turbinated bone. In all cases of unilateral discharge from the nose the antrum should be explored. Of course, the pus may also come from one or more of the other accessory sinuses, from the ethmoidal and sphenoidal cells or the frontal sinus. In cases of *ozæna* the antrum is often affected, and it is obviously impossible to cure the *ozæna* until the antrum has been treated. These are the cases of so-called incurable *ozæna*. The objective symptoms are also often very indefinite. Generally, there are hypertrophy or polypi of the mucous membrane of the middle nasal meatus or there is a small crust of dried muco-pus under the middle turbinated bone. When this is removed a few drops of pus escape. Often there is no crust, only pus which sometimes pulsates. This is an almost certain sign of empyema of the antrum. Of course when the antrum is empty, or the ostia are blocked, no pus can escape. In the old and some of the new text-books distension of the cheek is given as a sign of empyema of the antrum. This is absolutely wrong. These are cases of cysts and not of empyema. The inner nasal wall of the antrum sometimes bulges inwards when there is much pus and the ostia are blocked. Rarely there is distension downwards towards the hard palate. I have only seen three or four of these cases. The only way of making a reliable diagnosis is to puncture and to wash out the antrum. This is generally done with a Lichtwitz trocar. The opening is made in the lower meatus, about three centimetres behind the anterior part of the lower turbinated bone, and just under it. If made too low down the puncture is difficult and painful, as the bone is often very thick there. If cocaine or eucaine is applied a few minutes before operating, there is little or no pain. Warm sterilised water is injected through the trocar. It escapes through one of the ostia. If it is clear, of course there can be no empyema. If the ostia are blocked you must make a counter-opening or use a double trocar. As I mentioned above, the antrum is often very small or practically non-existent, and this explains why in some rare cases it cannot be found with the trocar. Out of the many cases which I have punctured with the trocar I have only been unable to find the antrum in four or five. I may add that in all cases of purulent nasal discharge (which are extremely common) and in cases of obstinate *ozæna*, I always, when possible, syringe out the antrum for diagnostic purposes. It is very difficult, often impossible, to wash out the antrum through the maxillary ostium. It is also dangerous, as there is a possibility of wounding the orbit, as in some cases the orbit lies very near to the middle meatus. Transillumination is often used to find out if the antrum is diseased. A small electric lamp is placed in the mouth, the lips are closed, and the room is darkened. The cheek and lower orbit, and often the pupil, appear of a rosy red colour. If one antrum is diseased, that side is darker than the other. We know, however, that the size of the antrum and the thickness

<sup>1</sup> A paper read before the Leeds section of the Midland Branch of the British Dental Association on March 19th, 1901.

<sup>2</sup> THE LANCET, July 17th, 1897, p. 144.

of bone, even in the same person, vary very much indeed, so that transillumination is of no very great value. Sometimes by using Politzer's bag there is an escape of pus from the antrum. But this does not happen in all cases. The so-called "hydrops" of the antrum, as described in old text-books, does not exist. These are cases of cysts. Polypi in the antrum are fairly common, as proved by post-mortem examination, but they do not always give rise to subjective symptoms. Sometimes, however, they block the ostia and prevent the passage of serum or pus and of air in and out of the antrum.

Now about cysts. These are not very common and they are mostly of dental origin. We know very little about their pathology. I had intended to discuss this matter thoroughly this evening, but I could not get the specimens I had hoped to procure, nor could I find much reliable literature on the subject. There are, roughly speaking, two kinds of dental cysts, those caused by retention of unerupted teeth and those due to inflammatory changes in the root-membrane of an already erupted tooth. In the first class the tooth is generally contained in the cyst. It is often difficult to diagnose between empyema and a cyst. A large cyst causes distension of the cheek, and on pressure you hear a peculiar crackling noise. If you inject water into the cyst, it does not pass out through the nares, as it would if injected into the antrum.

Tumours of the antrum are frequently met with. The most common is carcinoma. The first symptoms are severe pain in the cheek and nasal discharge. You generally find nasal polypi. These bleed freely on removal. If diagnosed early and if the whole of the upper jaw is removed (this is absolutely necessary) the prognosis is fairly good. I saw a well-known man of this town some seven years ago. He complained of unilateral nasal obstruction and epistaxis; there was not very much pain. On removing numerous polypi, I found a large opening into the antrum which was filled with a red soft growth. The upper jaw was removed by Mr. E. Ward, of Leeds, and the patient is still alive and occupying an important official position.

The question of causation of empyema of the antrum is still a much disputed point. Formerly it was thought that most cases were due to diseased teeth. This, however, is not the case. Anatomists maintain that the empyema is very rarely of dental and nearly always of nasal origin. Zuckerkandl, the greatest authority on the anatomy of the face, examined 300 cases of empyema of the antrum in the post-mortem room and in only one case could a direct connexion between the teeth and the empyema be found. Of course there may have been, and probably were, several cases in which an existing connexion could not be, or was not, traced at the post-mortem examination. The dental origin can be two-fold—disease of the tooth root (with or without abscess) or alveolar periostitis. We know that often the roots of the premolar or molar teeth practically touch the thin floor of the antrum, in some cases they even project into the cavity. Considering the large number of persons who suffer from diseased teeth it is very remarkable that relatively so few cases of antral disease are met with and that the direct connexion cannot be traced anatomically. We know also that after extraction of molar teeth a probe can often easily be passed into the antrum; and yet disease of the antrum following this operation is very rare.

Empyema of nasal origin can be due either to a direct extension of disease of the mucous membrane of the nares through the maxillary or accessory ostium into the antrum; (for we know that the membrane of the two cavities is directly continuous), or particles of mucus and pus or any foreign body containing micro-organisms can be blown into the antrum through the ostia, when the patient blows his nose, and set up inflammation there. In some cases (perhaps a large number) the ostia become blocked by hypertrophied mucous membrane or by a polypus. As can readily be understood this must give rise to disease of the lining membrane of the antrum. During the last 15 years I have seen many cases of empyema of the antrum. In every case I have tried to trace the origin of the disease, and only in very few have I been able to find any direct connexion with a diseased tooth or teeth.

The methods recommended for treatment of empyema of the antrum are numerous. The points to aim at are (1) to open the antrum at the lowest possible point, so as to get good drainage of the cavity, and (2) to keep this opening patent till the disease has been cured. Cases of acute empyema generally heal without surgical interference. In

chronic cases the antrum can be opened up through the middle or lower nasal meatus, the alveolar process, or the canine fossa. The middle meatus is obviously too high. Even the lower meatus is not low enough to secure proper drainage. The simplest and most effectual method is to make an opening into the antrum through the alveolus. I also always make a counter-opening through the lower meatus. The fact that in most cases one or more of the premolar or molar teeth are missing or diseased simplifies the operation. Numerous burrs and drills have been recommended for perforating the alveolar process. As the size and position of the antrum vary very much it is necessary to be very careful, as there is danger of penetrating into the nose or the orbit. The cavity should be washed out. The nature of the discharge often gives us an idea as to the extent and character of the inflammation. In many cases the operation can be performed with cocaine or eucaine (beta). I generally apply a little powdered eucaine and cocaine to the parts and then inject about 10 minims of a solution (1 per cent.) of eucaine. The latter is less liable to give rise to toxic symptoms than cocaine. The fistula readily closes up and it is in all cases absolutely necessary to keep it open for several weeks or even months, till the diseased mucous membrane of the antrum has been cured. A metal tube or solid plug should be introduced a day or two after the operation. This can be fixed on to the adjoining tooth or teeth; or if the patient wears a plate, attached to this. If a tube is used it is generally supplied with a revolving plate or a cap or plug of some kind, to prevent the entrance of food into the antrum. Personally, I do not think that it is always necessary to block the tube. Food does not readily enter in any large quantities, and if it did it would come away when the cavity was washed out. Mr. W. J. England, of Cavendish-square, London, has kindly sent me a pattern of the tube which he generally uses.

The after treatment is of great importance. In most cases the tube is removed and the treatment stopped much too soon. The cavity should be washed out from two to four times a day with a hot antiseptic solution, as long as there is any discharge; that is, until the water which passes out through the nares is quite clear and contains no pus or mucus. For at least from four to six weeks longer the tube should be kept in position and the cavity syringed out once a day. I always also use insufflations of aristol and boric acid from two to three times a day; at first in very large and then in small quantities. This shortens the treatment very much. If at the end of from four to five weeks the secretion of pus has not ceased, there will probably be a polypus in the antrum or some disease of the bone. The opening should then be enlarged so as to admit a finger and the cavity should be carefully explored. If the alveolus is not large enough it becomes necessary to make a large opening through the canine fossa. An incision is made through the mucous membrane, this is deflected and a large piece of bone is removed with the chisel. The cavity is well scraped out with a sharp spoon and plugged for several days with gauze. Many surgeons open up the antrum through the canine fossa in ordinary cases. The advantages of this method are that the pus from the antrum does not drain direct into the mouth, that there is no danger of food entering through the opening, and that the tube is easily kept in position by the lip. Personally, I prefer the alveolar method and only open up through the canine fossa when the teeth are all sound or when I think that there is a polypus or some carious bone in the antrum. When there is a cyst this should be extensively opened, the lining membrane scraped, and the cavity allowed to heal up by granulation. In large cysts we often have to excise part of the bony wall. It is remarkable how quickly the parts regain their normal shape and how little deformity remains.

Bradford.

---

**NOTIFICATION OF MEASLES.**—The Sanitary Committee of the Exeter City Council have recently inquired into the advisability of the notification of measles and have taken the opinion of the five district medical officers upon the subject. At the meeting of the city council on April 27th the committee reported that acting on the advice of four out of the five medical officers they had decided to recommend that measles be not included in the list of notifiable diseases. The recommendation was adopted by the council.