

Thesis for M. D.

Chronic Suppurative Disease of the
Nasal Air Sinuses and its Treatment.

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Chronic Suppurative Disease of the Nasal Air Sinuses and its Treatment.

Although occasional reference to Maxillary and Frontal Sinus Suppuration may be found in the older medical works, it is only within recent years that the importance of the subject has come to be fully recognised and rational measures devised for its treatment.

The scope of this thesis, however, will not permit of my entering further into historical details, and much debatable matter and descriptions of individual methods have of necessity been eliminated in the hope of presenting a concise epitome of our present knowledge of the subject and more particularly with regard to methods of treatment.

Actiology.

Dental troubles were first noted to be the cause of Acute Suppuration and for a time considered the only one, but further observation made it clear that many other conditions operated and excluding these causes Influenza is undoubtedly the most common agent in its production.

The bacillus of Influenza seems to have a special selective affinity for the upper nasal passages; the lowered vitality of the mucous membrane during or after the attack permitting the entrance of pyogenic organisms causing the suppurative process in the acute Catarrh. Normally the catarrh completely resolves, but under certain circumstances it may fail to do so and pass into the chronic suppurative state we are now considering.

These circumstances alluded to may be classed together under the head of Predisposing Causes e.g. Obstructive nasal conditions due to Septal Deflection, Enlarged Turbinates, Polypi etc or where there exists a Debilitated state of General Health. Scarlet Fever, Measles, Whooping Cough, Small-Pox and other infective diseases all act in a similar way but not so frequently.

Erysipelas and Pneumonia seem to stand in a variable causal relationship, at one time primary, and again at another time secondary, to the Sinus Affection.

Septic infection following operations upon the Turbinates and Galvano-Cautery, has been observed to cause Suppuration of the Accessory Sinuses and more particularly in those cases where Plugging has been resorted to for the arrest of Haemorrhage. Direct violence and foreign bodies may set up the condition. In the special case of the Antrum, dental causes are frequent and Suppuration has even been known to follow clumsy extraction of a tooth.

Caries or alveolar abscess affecting the 1st and 2nd molars, the 2nd Bicuspid, the 3rd Molar and 1st Bicuspid seems to be the most frequent order of liability in causing Suppuration of the cavity.

Anatomically, the reason for this is obvious, the roots of these teeth being merely separated by a thin plate of bone from the Antrum and which frequently in the case of the 1st and even 2nd molars may be absent altogether, their roots projecting freely into the cavity covered only in the living state by thin membranes.

Tubercle, Syphilis and Malignant Disease may, by inducing necrosis of the walls of the Sinuses set up chronic Suppuration from the admission of pyogenic organisms.

Atrophic Rhinitis in some cases is complicated by purulent discharge from some of the Sinuses, more especially the Maxillary and Sphenoidal.

The liability to Suppuration of these cavities is enhanced by the fact that the ostia or natural openings are, excepting in the case of the Frontal Sinus, invariably placed in the most disadvantageous position for drainage. Apropos of this Luckerkandl's observation is significant that "Relatively the Maxillary Antrum is most often affected, the Frontal least often and when all the Sinuses are involved in an acute process the latter is the first to recover." (Anat. und Path. der Nase und seiner pneumatischen Anhänge. Wien. 1880.)

Apparently, the normal means of getting rid of secretion in the Sinuses is ciliary movement and Luck has rightly drawn attention to the importance of this factor in discussing the aetiology of this condition. (Diseases of the Nose 1906. p. 268).

Suppuration damages, and when long continued irremediably destroys, the ciliated epithelium; hence the fact that these cases exhibit little or no tendency to spontaneous cure.

With regard to the Bacteriology, we find in the pus the *Staphylococcus Aureus*, *Albus* and *Streptococci* chiefly but associated with these frequently the organisms of the exciting cause e.g. *Bacillus of influenza* in influenzal cases, the *Diplococcus Pneumoniae* in Pneumonia or the *Pneumococcus of Friedlander*, the *Klebs-Löfker Bacillus* in Diphtheritic cases and even the *Bacillus Coli Comum* in patients dying of Peritonitis.

Pathology.

- (1) Pathological changes are seen chiefly in the mucous lining and underlying bone.
- (2) More remote effects result from involvement of neighbouring tissues.
- (3) Impairment of general health may occur as the result of long continued suppuration.

The living mucous membrane originally ciliated loses its cilia, becoming cubical in form, and even in parts disappears altogether - its place being taken by granulation tissue.

The bone may show irregular thickenings due to Periostitis coexisting with carious processes in other parts. Odontoma, Polypi and Cysts are frequently present. Necrosis of the inner wall of the Antrum is sometimes seen; caries of the Ethmoid frequently and of the posterior wall of the Frontal Sinus, rarely, may occur. Involvement of neighbouring tissues is seen in the formation of abscess of the Cheek or Orbit.

This may burst externally and a fistulous communication be disclosed leading down to the affected cavity.

Cerebral abscess may follow discharge of pus from a suppurating Frontal, Ethmoidal or Sphenoidal Sinus.

Meningitis, Cavernous Sinus Thrombosis and optic Neuritis have at times occurred.

Hemianopia has been observed in cases of Sphenoidal Sinus disease which have extended to the Optic Commissure (Flegg & Hay. Archiv. für Laryng. 1905 XVII p. 525).

Symptomatology.

Chronic Suppurative Disease of the air sinuses is rarely, if ever, primary in origin.

It usually follows an acute suppurative inflammation set up by one or other of the above specified causes.

Involvement of the accessory cavities may be inferred if during the progress of an acute catarrh of the nasal mucosa there occurs a sudden accession of the symptoms already present.

The stiffness of the nose suddenly becomes

intensified and the feeling of nasal fulness is markedly increased by stooping, lowering of the head and by coughing or straining.

The headache is usually supra-orbital and may be limited to the affected side.

Pain and tenderness are often present together with rise of temperature and constitutional symptoms.

After some hours or even days of suffering there is a sudden gush of matter from the nose and the symptoms are rapidly relieved.

Complete resolution may then be effected and the patient have no recurrence of the symptoms.

Occasionally however it happens that the cycle of events repeat themselves again and again until the case gradually lapses into a chronic state.

Here the symptoms are dependant on whether there is free or obstructed drainage and accordingly cases have been classified respectively into Latent and Manifest Empyema.

Symptoms of Latent Empyema.

(1) Headache — usually supra-orbital or radiate in character — may come on soon after getting up in the morning then gradually increase in severity for an hour or so until sudden discharge from the nose occurs with rapid amelioration of the symptom.

Indulgence in Alcohol, Tobacco and Fatigue markedly increases the headache which is usually most intense on the affected side.

(2) Pain and Tenderness.

The pain of acute antral disease is complained of most frequently over the Malar bone.

In chronic cases, when present at all it is usually referred to the side of the nose,

but may be radiate in character.

Superficial tenderness over the malar bone may also be present.

In Frontal Sinus Disease, the pain is usually severe and according to Hajek tenderness is invariably present on upward pressure over the inferior wall of the sinus.

Although this is not the experience of most surgeons, the symptom has when present a high localising value.

In Ethmoidal disease, pain is not usually a prominent symptom and consists of at most a dull aching between the eyes.

Tenderness can however usually be elicited by pressure over the nasal process of the Superior Maxilla or over the Lachrymal bone.

In Sphenoidal Disease pain if present is usually referred to the back of the nose or back of the head.

Acute attacks of pain associated with Vertigo or even sudden blindness during nasal suppuration is by some considered pathognomonic of Sphenoidal disease.

(3). Discharge.

The quantity varies greatly in different cases, sometimes profuse as in some cases of Acute or Frontal sinus disease and sometimes so scanty that the patient will often deny having a discharge from the nose at all.

A certain proportion may escape from the Anterior nares, but often it runs back to the post-nasal space to be finally hawked up from the Throat by the patient.

Qualitatively, it also varies, consisting of mucus, mucopus or almost pure pus and may contain caseous particles or even curdy masses.

Trickling from the Anterior Nares it may cause excoriation of the skin and passing backwards to the post-nasal space it sets up septic or catarrhal stasis of the Pharynx and Larynx.

Symptoms of Manifest Empyema.

The symptoms here are much more urgent and generally speaking resemble those of acute abscess formation.

Pain is throbbing in character and there is redness and swelling of the overlying tissues with constitutional disturbance. As a rule, the symptoms of latent empyema are also present but when there is complete obstruction to the outflow of pus there may be no sign of intra-nasal disease.

Diagnosis.

Since one or more than one sinus may be simultaneously affected accurate diagnosis is frequently difficult and in some cases even impossible; the whole extent of the mischief being revealed only when operative measures have been adopted for its removal.

Under the symptoms of Headache, Pain and Tenderness some information can usually be gleaned as to the seat of the disease, but the Discharge affords still more specific means of arriving at a true conclusion.

Pus in the Antrum:—

If on anterior Rhinoscopy pus is seen exuding from the middle meatus and being swabbed away reappears more especially when the patient's head is lowered or bent over to the opposite side, suppuration of this cavity is strongly to be suspected.

Further proof may be afforded by the test of Transillumination. In carrying out this test a certain intensity of light is absolutely necessary; lamps giving from 3-5 candle power should only be employed and since the normal translucency of the

Aurium varies a good deal the intensity of light should also be under control.

Somewhat contrary to general usage I now employ a lamp which can be used directly from the main and which gives a light of about 6. c.p.

It is tubular in shape with the carbon filament in two loops supported at each end.

Within outside this there is another bulb-shaped tube which permits of an intervening air space.

The lamp handle is fitted with a resistance switch similar to that used in ophthalmic work and by means of which the light may be easily varied.

Round the oral aperture when the lamp is placed inside the mouth a flange fits, which effectually blocks out any light escaping from the sides.

The chief difficulty hitherto experienced in using a lamp directly from the main is the heat generated and this of course increases according to the voltage of the main current.

For ordinary examination and working as I do on a 240 Volt circuit I have found this lamp quite satisfactory since it is rarely necessary to use it for diagnostic purposes longer than a few seconds.

The advantage of being able to dispense with batteries is obvious.

In applying the test the patient is taken into a well-darkened room; the lamp introduced unlighted into the patient's mouth and the resistance switch turned with the thumb until the requisite illumination is attained.

Should there be a marked difference of translucency on the two sides with loss of the supra-orbital crescent of light and absence of the subjective sense of light on one side in a patient who has no marked facial

asymmetry one would be justified in assuming the presence of pus on that side.

The absence of light sensation (Kelly's test) on the affected side is undoubtedly a delicate test but has the disadvantage of all subjective tests which require intelligence on the part of the patient.

A certain difference of translucency is seen in persons with facial asymmetry due to congenital malformations or absence of the Antrum.

The coexistence of narrow high palate and slender alveolar processes will draw attention to this condition.

Persons with dense Maxillae are also difficult to illuminate properly hence the necessity of having a sufficiently intense light.

Pus may be present in both Antra when the translucency will be equally impaired on both sides.

To clear up these doubtful cases it is necessary to have recourse to exploratory Puncture, which is done as follows.

A small trocar and cannula is thrust upwards and backwards through the inner wall of the Antrum by way of the inferior Meatus close to the attachment of the inferior Turbinate and about half an inch behind its anterior end.

On withdrawing the trocar pus escapes through the cannula and by placing the nozzle of a syringe within this the pus may be washed out through the Maxillary ostium and escape from the anterior Nares.

Puncture may also be performed through the Middle Meatus in cases, where from facial asymmetry, the Antrum is suspected to be small and more highly placed than usual.

Pus in the Ethmoidal Cells.

When pus appears continuously in the Middle Meatus and is not markedly influenced by movements of the patient's

head, Suppuration of the Antrum having been excluded we are warranted in assuming that the source of the mischief is either the anterior Ethmoidal Cells, Frontal Sinus or both together.

If the Ethmoidal cells are affected, probing the anterior end of the Middle Turbinate usually elicits great tenderness.

Pain on pressure over the Lachrymal bone is also frequently present.

Polypi and granulations in the Middle Meatus strongly indicate Ethmoidal disease.

Positive proof may be obtained by breaking down the anterior cells with a Hajek hook when pus appears if these cells are diseased.

Pus in the Frontal Sinus.

When Ethmoidal and Antral disease can be excluded pus continuously exuding from the Middle Meatus associated with attacks of intense Supra-orbital headache point to the probability of affection of the Frontal Sinus.

Pain may also be elicited by pressure upwards on the superior wall of the Sinus.

The only positive proof we have of Suppuration in this cavity is the presence of pus on external opening of the Sinus or obtained by Catheter passed into the Infundibulum through the nose.

Pus in the Sphenoidal Sinus.

The frequent presence of pus as seen by anterior Rhinoscopy in the olfactory cleft i.e. between the nasal septum and the Middle Turbinate and on the upper surface of the Middle and Superior Turbinatis as revealed by

posterior Rhinoscopy will point to the existence of this condition, and more especially if associated with symptoms referable to involvement of neighbouring structures as mentioned under Symptomatology.

When the nasal fossae are unduly wide, as e. g. in cases of atrophic Rhinitis or where the middle turbinate has been removed, pus may be seen exuding from the natural opening.

Oedema and Polypi are frequently present on the upper surface of the middle turbinate. The pus passing into the Post nasal space is apt to dry and form crusts which afterwards undergo decomposition giving a foetor to the breath.

Pus in the Posterior Ethmoidal Cells.

When pus or purulent crusts are persistently seen in the post nasal space associated with Caries or Polypus of the posterior end of the middle turbinate, this condition may be confidently affirmed.

It may exist independently, although frequently associated with Sphenoidal suppuration.

The whole extent of cell implication can only be revealed when operative measures are undertaken for its cure.

Treatment.

The indications for treatment vary according to the conditions present and severity of the symptoms; it being found frequently that more

extensive measures have to be taken than the original diagnosis seemed to indicate.

Alveolar Suppuration

Where due to carious teeth these must be extracted and an opening made into the Antrum by drilling through the Alveolus.

Plugging of the alveolar opening and daily irrigation with weak Boric lotion for some days will usually suffice in recent cases for a complete cure.

When discharge has ceased for a whole week the alveolar plug is removed and the opening allowed to close up.

In old-standing cases or where the above method has failed to stop the discharge it will be necessary to have recourse to more radical measures. When suppuration of the Antrum exists and no dental causes are discoverable the procedure indicated is Puncture through the Inferior Meatus.

The instrument recommended is similar in appearance to a Krause Trocar and Canula, but is much shorter, so that after introduction the end of the Canula projects into the Inferior Meatus just within the Anterior Nares.

It can be retained in situ for a few days during which daily irrigation with weak Boric or other mild antiseptic lotion is kept up until discharge has ceased.

Lack has devised a special form of Canula with a bulbous end which allows of longer retention.

After a week's freedom from discharge the

Canula is removed.

Several days later, an experimental puncture is performed with a small Trocar and Canula to make sure that no reaccumulation of pus has taken place.

Should indications point to small highly placed Antrum, Puncture may be done through the Middle Meatus or through the Canine Fossa. In the latter method a small incision is made at the junction of cheek and gum just above the Bicuspid teeth and the bone perforated with a drill or burr.

The Antrum is then washed out and the opening packed with strips of Iodoform gauze.

This is daily removed for irrigation and a rubber plug substituted after 3 or 4 days.

The method has the great disadvantage of making an opening into the mouth with risk of septic infection of the soft parts.

Irrigation, without Puncture, through the natural ostium as recommended still by some surgeons besides presenting difficulty, has the great disadvantage of not providing a counter opening for free drainage of the cavity.

Radical Operation.

Where suppuration persists after a fair trial of the above methods, say after three or four months it becomes necessary to have recourse to more radical measures.

The operation is also indicated where distension of the Antrum has occurred, with inflammation of the surrounding soft tissues or when Fistula Caries or foreign body is present.

Although the original Caldwell operation (New York Med. Journ. 1893. LVIII p. 526 + Med. Record 1893. April 8th) is still performed by many surgeons, the tendency now-a-days is to omit the mouth part of the operation altogether and rely solely on intra nasal procedure. The advantages gained are obvious; there is no risk of infection of the soft parts, besides, adequate inspection and treatment of the interior of the cavity can be carried out through the opening into the inferior meatus and drainage kept up for an indefinite period if desired.

In the operation now recommended, it is better as facilitating the further steps to remove the anterior end of the inferior Turbinate.

This may be done as a preliminary under Cocaine and Adrenalin or the whole operation may be done at one sitting under Ethyl Chloride or Gas-Ether Anaesthesia.

The inner wall of the Antrum is next taken away below the level of the attachment of the inferior Turbinate by strong special knives and forceps.

The cavity is now inspected, polypi and granulations if present curetted away and finally packed for 24 hours with cyanide gauze.

This is removed daily for irrigation purposes and this is kept up until all discharge has ceased.

The results are very good even in the most chronic cases and there can seldom be any need to resort to the much more heroic measures

proposed by Bonninghaus (Arch. fur. Laryng. 1897. VI p. 213)

This observer suggests opening the Antrum through the Cuneiform Fossa, removing the whole of the bony inner wall including the inferior Turbinate, curetting away the entire lining membrane and then pressing

the soft parts of the inner wall outwards to form a new lining membrane for the nasal cavity.

Ethmoidal Suppuration.

When the anterior cells are alone affected a simple operation under local anaesthesia will usually suffice. The anterior half of the middle turbinate is first removed by snare and scissors to clear the approach and the cells are opened into by a Hajek hook. The walls are then removed by Greenwald Forceps and any granulations or polypi removed by curette.

The Haemorrhage can be controlled by swabbing the part with solution of adrenalin, plugging not being resorted to unless bleeding is more than usually troublesome.

Simple cleansing of the nose with weak alkaline or boracic lotion is all the subsequent treatment required. For removal of disease in the posterior cells or where there is reason to believe that all the cells are affected it is necessary to take away the whole of the middle turbinate by Spoke-shave and then by a Meyer Curette to scrape away all the diseased tissue until smooth resistant bone is reached. As this operation is painful, it is best conducted under Ethyl Chloride or Gas Ether Anaesthesia.

The point to observe in using the Ring Curette is always to keep the cutting edge directed outwards and never upwards.

Failure to do so has produced serious and even fatal results when the Cribriform Plate has been lacerated.

The Haemorrhage is usually somewhat profuse but stops after a short time or when ice cold water

is applied to the face.

Plugging is not used unless absolutely necessary. The operation cavity usually heals in from two to three months, the lining membrane being smooth and dry.

In the event of Ethmoidal Suppuration being complicated by orbital abscess, fistula or urgent Cerebral symptoms it is better to perform the External operation.

The patient being prepared in the usual way for general anaesthesia, the eyebrow is shaved and the post nasal space packed with a large sponge to which a tape is attached leading out through the mouth.

An incision is made just below the line of the eyebrow commencing near the Supra-orbital notch and terminating downwards about $\frac{1}{4}$ " below the Inner Canthus.

The incision goes down to the bone and the periosteum is detached from the inner wall of the orbit as far back as necessary.

The bone forming the inner wall is then removed with Chisel and Forceps to expose the Ethmoidal cells and these are curetted away as far back as the Sphenoid.

Sponging enables the whole field of operations to be completely under view and after all the diseased tissue has been removed the wound is closed with sutures, excepting to permit of a large tube being passed down and brought out at the Anterior Nares.

The tube is removed daily for syringing, which is kept up until all discharge has ceased when it is removed and the wound allowed to heal up.

Frontal Sinus Suppuration.

At the present time considerable diversity of opinion exists among surgeons as to whether intra nasal or External methods should be employed for the cure of this affection.

It seems however to be generally understood that unless urgent symptoms are present calling imperatively for radical measures intra nasal treatment should be first given a trial before recommending the more serious external operation. Intra nasal treatment is simple and comparatively devoid of risk, whilst the mortality statistics of external operation and especially that of the Egston-Lee show that this factor is somewhat considerable and the operation one not to be lightly undertaken.

The object of intra nasal treatment is to clear the approach to the Infundibulum and for this purpose the anterior end of the Middle Turbinate is snared off and polypi if present removed.

After a week the patient is given N_2O or Ethyl Chloride and the anterior ethmoidal cells broken down and removed by the Ring Curette.

The approach is now cleared and irrigation of the Sinus can be carried out daily by means of a flexible Catheter introduced into the Infundibulum.

This is continued for 3 or 4 weeks when the operation wound will have healed.

Most cases will probably benefit greatly by this treatment alone and in a few complete cure may result.

When however more urgent symptoms show themselves eg Bulging of the Sinus wall, Abscess or Fistula, cerebral symptoms or where the intense headaches frequently associated with this condition totally incapacitate the patient it becomes necessary to consider the advisability of doing an external operation. When this has been decided on the surgeon has the choice of two methods, obliterative or Non-obliterative.

The former while perhaps giving more trouble in its performance undoubtedly gives better results and is usually to be preferred to the latter method unless for very special reasons are present. I do not propose to give a detailed description of the original Ogston operation later modified by Luc, but to discuss certain more recent methods which are finding favour with surgeons at the present time and which, no doubt, will ultimately replace the older and more risky methods.

1) Abbliterative Method.

The patient is prepared in the usual manner for general anaesthesia by ether or Chloroform.

The eyebrow is shaved, the skin purified and the post-nasal space packed with a large sponge with tube attached leading out through the mouth.

An incision following the line of the eyebrow parallel with and immediately below the Supra-orbital margin is made down to the bone.

The periosteum is raised from the inner part of the roof of the orbit and an opening chiselled through the bone upwards into the Sinus vertically above the Inner Canthus.

Any pus or mucus present is washed away and a probe is now passed in all directions within the Sinus to ascertain its dimensions and determine on the subsequent procedure.

If the Sinus is found to be large and deep it may be better to adopt Killian's method and leave a bridge of bone in the position of the Supra-orbital margin; otherwise this may not be necessary since the subsequent deformity is comparatively slight and can if desired be afterwards greatly improved by Paraffin Injection.

Having ascertained the extent of the Sinus, the skin incision is prolonged downwards to the Inner Canthus, and outwards as far as the extreme outer end of the Sinus as ascertained by the probe.

The inferior wall of the Sinus is then removed by Forceps and Chisel and then similarly the inner wall of the Orbit to gain access to the Infundibulum.

If the Killian method be adopted an incision is made through the periosteum just above the Supra-orbital margin and above this line the periosteum is reflected upwards until it bares the anterior wall of the Sinus. This procedure leaves a strip of periosteum attached to the bone in the position of the Supra-orbital margin and this ridge of bone is left in situ during the subsequent procedure.

The anterior wall of the Sinus is next removed with Chisel and Forceps and the whole of the nasal portion of the floor of the Sinus is cut away.

The anterior ethmoidal cells and the Infundibulum are thus freely opened up and curetted.

Finally the entire lining membrane of the cavity is completely curetted away, no crevice being unexplored.

A large rubber drainage tube is passed down the Infundibulum and brought out at the anterior Nares, the upper end of the tube being stitched to the inner angle of the wound.

The wound is cleared, the skin and periosteum sutured and allowed to fall back in contact with the posterior wall of the Sinus. An external dressing of iced boric lint soaked in boric lotion is applied and changed frequently.

The wound usually heals by first intention and the stitches can be removed on the 7th day.

The rubber tube is removed daily to permit syringing of the wound and is retained for 2 or 3 weeks or until all discharge has ceased. Nasal irrigation is practised daily.

The results of this operation are excellent; out of 67 cases collected by Turner, all except one were cured.

(C. Turner. Edin. Med. Jour. 1905 p 239.)

Non-obliterative Method.

The first steps of this operation are as previously described but no attempt is made to remove the anterior and inferior walls. The Infundibulum and anterior Ethmoidal cells are however opened up as before and any polypus or granulations carefully scraped away, care being taken to damage the mucous lining as little as possible.

A large rubber tube is passed down the Infundibulum and brought out at the Anterior Nares, being fixed at its upper end to the edges of the incision.

The after treatment is practically similar but the tube requires to be worn longer and it is recommended that later a silver one be substituted.

Walker Downie recommends a method of opening the Sinus through the anterior wall, cleansing and finally packing it with gauze.

The end of the strip of gauze is brought out at a small opening made near the inner Canthus to provide drainage, and the original wound completely closed. He reports successful cases.

(Glasgow Med. Journal May. 1899.)

Sphenoidal Sinus Suppuration.

Here again the first indication of treatment is to clear the approach to the ostium, unless as happens in cases of Atrophic Rhinitis this is already accessible.

This is done by removing the Middle Turbinate by Spokeshaw. A cannula is then passed through the ostium and irrigation daily with weak antiseptic lotion for a few days may suffice for a complete cure.

Otherwise it may be necessary to break away the anterior wall of the Sinus with a Harek hook, removing the pieces with Grimwood Forceps and any polypus or granulations within the cavity at the same time very carefully curetted away.

This can be very well carried out under Cocaine and.

Adrenaline.

It is frequently advisable to curette the posterior Ethmoidal cells, since these are usually simultaneously affected. That great care is necessary in using the curette is shown by the fact that on more than one occasion the Cavernous Sinus has been injured with the occurrence of alarming Haemorrhage. (MacDonald Diseases of the Nose 1892 p 266 Lilley. Journ of Laryng. 1903 XVIII p. 584).

The after treatment consists in irrigating the Sinus daily with mild antiseptic lotions eg Boric acid, Peroxide of Hydrogen or Cupric Sulphate 2-5% solution. The opening in the anterior wall of the Sinus must be kept open until all discharge has ceased, and to this end Hager recommends the application of the electric cautery to the edges of the wall on the eleventh day after operation if any sign of contraction be present.

When Sphenoidal disease is associated with complicated Ethmoidal suppuration the external operation recommended above for the cure of the latter affection is extended in its scope so as to embrace the Sphenoidal Sinus.

This sinus has been considered one of the easiest to treat successfully and certainly the results of treatment are remarkably good, more especially when it is considered that until recently it was believed to be quite inaccessible and wholly outside the scope of successful surgical interference.

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