ETHMOIDITIS AND SPHENOIDITIS IN RELATION TO EYE DISTURBANCE; REPORT OF THREE CASES.

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Through the studies of Hajek, Loeb, Skillern, Sluder, Schaeffer and others, progress has been made in our knowledge of the relationship between certain ocular conditions and diseases of the nasal passages, and their accessory sinuses. In some cases pus is present in the sinuses, and in others, there is hyperplasia of the mucous membrane. Inasmuch as in discussion of this subject, we hear protests against too much intranasal surgery for relief of visual disturbance, it would seem that case reports would be of value.

In his book, "Headache of Nasal Origin,"¹ Sluder reports cases where nasal operations were necessary, but at no time was there pus present in the nose, nor did the trans-illumination or X-ray examination show clouding of the sinuses. These were cases of hyperplastic sphenoiditis and ethmoiditis.

Hyperplasia² has been defined by Vail as a rarefying osteitis associated with inflammatory swelling and fibrous thickening of the mucous membrane lining the accessory sinuses.

It is brought about according to Delafield and Prudden by long continued hyperemia.

The symptoms³ are caused by the inflammatory process extending through or transmitting its toxins through the thin bony walls to the adjacent nerve trunks. (Dr. Sluder proved that cocaine readily passes from the sphenoid sinus to the nerve trunks.) Probably the most serious factor is the bone change in the hyperplastic process, with or without periostitis.

Dr. Jonathan Wright believes that some of the pain in these cases must be due to a periostitis in the nasal fossa, just as such a lesion on the shaft of the tibia causes pain. Hyperplastic disease of the nose and sinuses involves not only the bone but the soft parts covering them.

Although the hyperplasia may involve only a small portion of the mucous membrane lining the sinuses, it will be readily understood that even a very small involvement may be disastrous according to its position; for example, if localized about the optic canal, it may cause impairment of vision without other symptoms; if localized in

the lower aspect of the sinus, it may cause a maxillary neuralgia, or, if on the floor, it may give rise to Vidian neuralgia of any grade. The term Vidian neuralgia expresses pain in the ear, mastoid, occiput, neck, shoulder-blade, shoulder, arm, forearm and hand.

In the cases of hyperplastic ethmoiditis and sphenoiditis, the process is rarely unilateral. Symptoms, however, are generally more marked on one side than on the other, due to a deflected septum usually in the ethmoidal region. The middle turbinal on the opposite side is hypertrophied and fills the concavity formed by the deflected septum. There is some increase in redness, with more or less thickening of the mucous membrane.

Hyperplastic changes in the sphenoidal region are of great importance on account of the intimate relation of the many nerve trunks in the region of the body of the sphenoid.

In a recent article, Dr. Harvey Cushing says: "There can be no doubt but that suppurative or hyperplastic inflammation of the ethmoidal or of the sphenoidal cells may in certain cases lead to inflammatory changes of adjacent nerves." Inflammatory processes may affect the optic nerve in such a way as to produce reddening and infection of the eyes.

A scant, serous secretion usually accompanies a hyperplasia of the ethmoid and sphenoid sinuses,, although in some cases no secretion of any kind is present. In the suppurative cases, of course, pus is present and diagnosis easy, but in the hyperplastic cases, the macroscopic changes are often so slight that diagnosis is difficult.

We operate in both types of cases to secure ventilation and drainage, ventilation of the sinuses being quite as important as drainage.

The following case is one of hyperplastic ethmoiditis and sphenoiditis causing serious eye involvement without any secretion in the nares:

Case I. Mrs. G., age 43, came to the eye clinic of Dr. Mary Buchanan at the Woman's Medical College Hospital, March 15, 1921, complaining of frontal and occipital headache with failing vision, which was rapidly becoming worse. Dr. Buchanan's examination disclosed the following: The patient has never worn glasses; externally, the eyes look normal, full movements in all directions; vision O. D. 5/30 and O. S. 5/5, media clear. The right field was cut down to fixation, O. S. for form and color was cut down to within ten degrees. The right disc was pale, edges blurred, showing there had been a marked inflammation of the optic nerve, which was becom-

ing atrophic. The left optic nerve had an unhealthy appearance, although it could be outlined distinctly. Fields No. 1.

Dr. Buchanan thought the eye condition was due to some sinus trouble, and referred the patient to the Nose and Throat Clinic, insisting that blindness would result unless the pressure on the optic nerve was relieved at once.

We obtained the following history: The patient had always been healthy until the menopause three years ago, when she first noticed frontal headache present in the morning, gradually disappearing after she had been up for a few hours. A few months later pain appeared in the occipital region. There was no pus or discharge from the nose, but the patient said she had a feeling of tightness and discomfort over the bridge of the nose and in the eyes. Later, the patient had trouble with her eyes. She described it as "shadows" interfering with her sight. The trouble first appeared in her right eye, later in the left in lesser degree. The Waserman test was negative. An X-ray was taken of the orbits and sinuses showing cloudiness of the sphenoids and ethmoids.

Nose and Throat examination: Teeth in good condition. Faucial tonsils small and embedded. The septum deviated to the right, especially in the ethmoidal region; there was considerable pressure between the septum and the right middle turbinal; the left middle turbinal was hypertrophied, filling the concavity formed by the deviated septum. We could not see the sphenoidal region because of the obstruction in the upper portion of the nose. No pus was present in the nares.

Realizing the serious condition of her eyes, we decided to operate the following day, and we thought it advisable to have the patient sign a paper releasing us from any blame if the sight was not improved by the operation, or in the event of her becoming blind. Dr. Buchanan feared the right optic nerve was so affected that the operation might not help that eye, but expected to save the sight of her left eye. The patient was suffering intensely with frontal and occipital headache, and was mentally depressed on account of her failing vision.

March 15, 1921, we did a submucous resection, removed both middle turbinals, exenterated the ethmoidal cells on both sides, and opened both sphenoid sinuses.

A local anesthetic was used, consisting of equal parts of 4 per cent cocain and adrenalin solution. The patient stood the operation very well.

The following day there was considerable swelling around the right eye, due to emphysema. The patient did not complain of much pain, and was fairly comfortable. Twenty-four hours after the operation, she said she could see better with the left eye and objects did not seem blurred, as they did previous to the operation.

One week after the operation, the right field had increased to almost twenty degrees in the upper half and to ten degrees in the lower. The left had increased to twenty degrees in all directions. Vision had increased, O. D. 5/15, and O. S. 5/5.

The swelling of the right eye decreased; her headaches, occipital pain and distress in her eyes gradually disappeared. Fields No. 2.

When I examined her May 15, 1921, she was free from pain, nares clear, and her vision was gradually improving. Fields No. 3.

In the next case which I will report, pus was present in the left frontal sinus and ethmoidal cells, causing serious trouble with his only good eye, the left had always been poor.

Case 2. Mr. B., age 31, a student at Temple College, was referred by Dr. Mary B. Thornton to Dr. Mary Buchanan on account of trouble with his eyes. After examining the patient, Dr. Buchanan referred him to me, diagnosing the condition as a deep keratitis in the right eye, probably due to some sinus trouble. The patient's vision became blurred, he was in great distress, as it interfered with his studies. He wore dark glasses; his eyes showed congestion and lacrimation, and he said his vision had been failing for several weeks. R. E. 5/9, L. E. 1½/60; vision became rapidly worse. He had pain in the frontal region on both sides, much worse on the left, but no pain in his eyes. He had not worried about the frontal pain, but he feared he was going blind.

On examining the nares, I found the septum deflected to the left in the ethmoidal region, pus was present in the middle meatus. There was considerable pressure between the septum and the middle turbinal, interfering with the normal drainage of the frontal sinus and ethmoidal cells. Right naris was free, no pus present. Dr. Buchanan reported that the eyes were in such a serious condition that an immediate intranasal operation was necessary. I, therefore operated the following day, straightened the septum, removed the anterior end of the left middle turbinal and opened the anterior ethmoidal cells.

A great deal of pus discharged for several days following the operation. The patient received atropin sulphate gr., 1/200 every four hours, until the pus gradually diminished and finally disap-

peared. Three days after the operation the patient was again examined by Dr. Buchanan, who reported that the eye condition was decidedly better and the patient continued to improve rapidly.

April 18, 1921, I again saw the patient. He is finishing his course at Temple College and has no trouble with his eyes if he uses them with ordinary care. The pain over the frontal region has entirely disappeared and the nares are free from pus.

I asked him how soon after the operation he noticed improvement. He replied: "It may be imagination, but I thought my eyes felt better the day following." He is entirely relieved of his frontal headache and his vision is good.

The third case which I will report is one of exophthalmos, caused by empyema of the ethmoidal and sphenoidal sinuses, both sides being involved. According to the American Encyclopedia of Ophthalmology, exophthalmos is a symptom of some underlying condition, local or general.

Among the etiological factors, we have extension from affections of the paranasal sinuses. Although this is the first case I have seen, in searching the literature, I find there are a number of cases on record in which exophthalmos was caused by some pathological nose, throat or ear condition.

Hack⁶ has reported a case in which a girl of seventeen years had exophthalmos since childhood. Examination revealed a marked hyperplasia of the erectile tissue of the inferior turbinals. They were cauterized, and the following day the exophthalmos had disappeared; also the nervous cardiac palpitation, and the size of the thyroid diminished, and a slight myopia, which had been present before the nasal operation, disappeared.

The exophthalmos had preceded all the other signs of Graves' disease for some years, and Hack thought the excitation of certain portions of the peripheral sympathetic of the swollen tissue of the nose had occasioned the other symptoms, all being, according to him, of the nature of a reflex neurosis.

He attributed the exophthalmos to hyperemia of the orbital vessels caused by reflex dilation of their walls, and to marked turgescence of the retrobulbar fat, which he said Michel had already referred to as cavernous tissue.

Cases are reported⁷ in which exophthalmos was due to disease of the post-ethmoidal cells, one which was due to right suppurative otitis media, another in which a case of exophthalmos and third

nerve palsy, followed the exenteration of the right ethmoid labyrinth which was full of pus.

Other cases are reported in which the exophthalmos had originated from inflammation of the orbital tissue, transmitted from inflammation in the nose caused by maxillary sinusitis. Also, two cases in which the removal of the anterior end of the middle turbinal, allowing drainage of the inflamed frontal sinus, cured an existing exophthalmos.

Dr. Hurd in *THE LARYNGOSCOPE*, May, 1920, reported a case of enlargement of the sella tucica, in which exophthalmos was present.

The following is a case which I reported at the Philadelphia Laryngological Society, March, 1921.

Mrs. H., age 48 years, was referred to the College Hospital by Dr. Weeks-Metzer of Riverside, N. J., June 18, 1920. The history disclosed that the patient had been well until December, 1918, when she suffered for several weeks with rheumatism. She recovered, and continued well for several months. On April 15, 1919, she awoke with severe pain in her head and eyes, worse over the left eye. The morning following, the left eye was bulging to such an extent that the upper lid could not be seen. She was unable to wear her glasses on account of the marked exophthalmos, and she said she was blind in the left eye.

The following day, the patient went to an eye specialist, who sent her to a hospital where she was examined in the eye clinic and vised to have her left eye enucleated. She did not accept the advice given and was without treatment for several months.

Four weeks following the attack on the left eye, May, 1919, the right eye began to pain and bulge, but never so much as the left. When she felt something dropping in the back of her throat, the eyes were less painful.

On admission to the Woman's College Hospital, fourteen weeks after the original attack, there was marked exaphthalmos of both eyes, the left worse than the right. Vision in both eyes poor, the left being much worse than the right. She was unable to close her eyes, suffering intensely with pain in them, and with frontal and occipital headache.

She was admitted to the Medical Department and examined by Dr. Frances C. Van Gasken who found the following condition present: The thyroid gland was not enlarged. Temperature varied from 98°-100°. Pulse 74-90. Blood pressure, systolic 112, diastolic 84. The Wasserman was negative.

She was referred to the Nose and Throat Department, where she was examined by Dr. Margaret Butler who made the following report: Nasal chambers free in the respiratory portion. Septum deflected to the left causing firm pressure in the ethmoidal region. Right middle turbinal presses on the septum. Mucous membrane normal in appearance.

Full upper denture. The few teeth present are in bad condition. Fauces free. Abundant purulent secretion in the naso-pharynx. Posterior ends of turbinals enlarged. Exploration of sphenoid and pituitary regions advised.

Transillumination showed the frontal and maxillary sinuses clear; X-ray examination showed the ethmoid and sphenoid sinuses cloudy.

She was referred to the Dental Department where she had immediate treatment.

Eyes examined by Dr. Mary Buchanan. Exophthalmos of both eyes, the left being much more prominent than the right.

Two opacities on the right cornea from ulcers about three months previous. Injection of palpebral and bulbar conjunctivae. Media clear. Discs well defined. No gross lesions in fundus. Fields cut on temporal side, left being cut to 30 degrees and right from 40-60 degrees. Both fields also cut a little to nasal side. Fields No. 4.

The patient was suffering intensely and she was referred back to me and we decided to operate.

On examination, I found the condition to be the same as that reported by Dr. Butler, July 1, 1920. I did a submucous resection, removed the left middle turbinal, exenterated the ethmoid cells and opened the sphenoid on the same side. Pus drained from the ethmoidal cells and the sphenoid.

The patient had suffered so much and was so anxious for relief that she endured the operation very well, but I thought it advisable not to open the right sphenoid and ethmoid cells at this time.

The following day, the patient was sure she was much better, the exophthalmos was less in both eyes, especially in the left. Patient had much less pain than previous to the operation. It was not necessary to give morphin, but we gave atropin sulphate gr., 1/200 every four hours, unless the mucous membranes were too dry, then we lengthened the interval between doses. The atropin helped to dry the secretion, also to lessen the swelling of the mucous membranes.

Four weeks later, I removed the right middle turbinal, exenterated the ethmoidal cells and opened the sphenoid on that side.

Pus was present here also, although not so abundant as on the left side.

After the second operation, there was continued improvement in the exophthalmos. She was able to close both eyes, and the vision continued to improve. Later, we used suction which was helpful.

When I last examined the patient, May 5, 1921, I found only slight exophthalmos. She could wear her glasses without discomfort. No pus in either nares, and she was cured of the intense pain she suffered before her operations. Fields were normal.

CONCLUSIONS.

All three cases above reported had serious eye conditions, due to sinus trouble, and the relief following the opening of the sinuses was remarkable. In the first case, one of hyperplasia involving both sides, an intranasal operation entirely cured her frontal and occipital headache, and greatly improved her vision.

The second case was one of unilateral, suppurative, frontal and ethmoidal sinusitis. The case was cured by intranasal operation, which allowed drainage of the pus present in the diseased sinuses.

The third case was one of double suppurative ethmoidal and sphenoidal sinusitis, causing extensive exophthalmos. This case was relieved of the intense pain which she had suffered previous to her operations, her vision improved, her fields from being very much cut are normal, and her exophthalmos is decidedly less.

BIBLIOGRAPHY.

1. SLUDER: "Headache and Eye Disorders of Nasal Origin."
2. WHITE, LEON H.: LARYNGOSCOPE, Sept., 1920, "The Diagnosis of Accessory Sinus Disease, Causing Loss of Vision."
3. SLUDER: "Headache and Eye Disturbance of Nasal Origin."
4. SLUDER: "Headache and Eye Disturbance of Nasal Origin."
5. CUSHING: J. A. M. A., June 24, 1920.
6. Encyclopedia of Ophthalmology.
7. Encyclopedia of Ophthalmology.

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