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ABSTRACT OF A PAPER "ON NOSE-COUGH AND THE EXISTENCE OF A SENSITIVE REFLEX AREA IN THE NASAL MUCOUS MEMBRANE."*

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The object of the thesis was to direct attention to the great frequency of cough as a symptom of nasal disease and to indicate as far as possible the manner of its production. The dependence of cough upon irritation of the external auditory meatus and pharyngo-tracheal membrane is well-known, and the terms "ear" and "laryngeal" cough have passed into current use among medical men. A similar condition, indicated by the terms "stomach" and "liver" cough, seems to be found elsewhere. The causal relationship has, however, never been demonstrated by experiment nor are the clinical data conclusive. The author had repeatedly observed that instrumental manipulation, within the nasal fossæ, induced paroxysms of coughing, which only subsided upon change of position or withdrawal of the instrument. The cough varied from a succession of short expiratory acts to convulsive paroxysms, and was only excited by contact with the deeper portions of the nostril. The author's clinical experience likewise embraced cases in which there was distressing cough without any evidence of disease or irritation in pharynx, windpipe or lungs; but there was always present in these cases either a hyperæmia or slightly swollen state chiefly affecting the turbinated bodies, or pronounced hypertrophic enlargement of those structures. Clinical study led the author to infer the existence of a sensitive area in the nose similar to those already demonstrated in the larynx and trachea, whose irritation produces a reflex act. The asthma accompanying some cases of nasal polypus, together with the author's observations on hypertrophic nasal catarrh, lent support to the inference. Experiments were instituted upon various individuals, the nasal mucous membrane being irritated by silver and

rubber probes and steel wire, over all its accessible portions. The negro is especially adapted to this treatment, the widely dilated nostril rendering artificial dilatation unnecessary.

The susceptibility to irritation was found not to be uniform—the slightest touch being sufficient in some to provoke cough, repeated irritation or long continued pressure only exciting it in others, whilst in some no reflex whatever could be obtained.

So long as the stimulation was applied to the interior of the fleshy cartilaginous nose, the result was negative; applied to the membrane over the anterior extremities of the middle and inferior turbinated bones, it was sometimes negative, sometimes resulted in a half tendency to cough or sneeze; this increased going backward until it culminated over the posterior half of the turbinated body. Irritation of the floor of the nose was negative. The act was most constantly obtained from the posterior end of the inferior turbinated bone and the septum immediately opposite. No decided results could be obtained from the upper olfactory region.

The area thus experimentally shown to be a reflex cough area is occupied by erectile tissue and it is hard to resist the conclusion that this structure is connected with the reflex act, and that this susceptibility is to a great extent intimately associated with its physiological functions whatever these may be.

The greater the congestion or inflammation, the more constant the reflex; yet the author has produced violent paroxysms of coughing, in a nose free from disease, by simply touching the posterior extremity of the inferior turbinated bone. Sometimes stoppage of the nostril and discharge of mucus was produced.

The author sums up the clinical facts in favor of the above views as follows: 1. Where reflex cough exists, the area mentioned is chiefly if not solely involved. 2. The act may be produced here at will by stimulation of the parts involved by disease. 3. It may be dissipated by local applications to, or removal of the membrane covering the diseased surface. 4. Foreign bodies, as pins, lodging here, cause cough, while they do not when impacted in other parts of the nose. 5. Polypi cause reflex phenomena only when arising from or impinging upon this area. 6. In complete atrophy of

*This paper was offered as an admission thesis to the Academy, June 5th, and was published in full in the *Am. Jour. Med. Sci.*, July 1st.



the turbinated structures, as in ozæna, cough is not present and cannot be induced by stimulation.

In regard to reflex asthma from polypi, the literature accessible to the author shows that when the position of the tumor is accurately defined it is always in the posterior portions of the nostril where it would cause irritation of the sensitive area.

The following cases were given in illustration:

CASE I.—A robust, healthy young woman of nervous temperament, came in Dec., 1881, on account of a dry, hacking cough, dyspnoea on slight exertion and occasional night-sweats, associated with feverish exacerbations in the afternoon, loss of appetite, irregular, scanty menstruation, occasionally small quantities of blood in the expectoration, and progressive deafness. These ailments were referred by her family to consumption. The heart and lung sounds were normal except a few small mucous râles. The laryngeal membrane showed no signs of inflammation but became congested during examination. Both tympanic membranes were sunken but movable; the malleus handle prominent and congested. Hearing was diminished in both ears but improved by inflation of the drum cavity. Eustachian orifices swollen and filled with mucus. The starting point of her trouble was found in the nose, which was almost completely occluded by hypertrophic thickening of the mucous membrane over middle and lower turbinated bones of both sides. Osseous structure also developed abnormally, assisting in the occlusion. Operation was advised and consented to, and the inferior hypertrophied masses were removed, by two operations at seven days interval, by means of long, narrow, sharp-toothed forceps. Hemorrhage was quite profuse but easily checked. Vapor of creasote, carbolized and astringent sprays, inflation of the middle ear with benzoate of iodine vapor, completed the treatment. Improvement immediate and after seven days all throat and chest symptoms had disappeared, nasal discharge had ceased, and she could hear ordinary conversation with ease. By the middle of Feb., 1882, a whisper was heard distinctly in both ears at twenty feet.

CASE II.—A negro man applied at the Hospital Clinic on account of severe paroxysmal cough at irregular intervals with

occasional expectoration of mucus tinged with blood. The attacks were nocturnal as well as diurnal, varying in severity with the discharge from a chronic nasal catarrh. There was no apparent cause for the cough except a hypertrophic catarrh of the nasopharynx, affecting chiefly the inferior and middle turbinated structures and septum, the mucous membrane over the inferior turbinated body being intensely hyperæmic and moderately swollen. A bent probe made to impinge on the posterior end of the lower turbinated bone, by the aid of the rhinoscope, induced an immediate and violent paroxysm of coughing identical with those of which he complained. At no other part of the nasal membrane could the attacks be provoked. Astringent solutions were applied to the congested area, and a salt and soda spray, was directed, followed by insufflation of boracic acid. After the third application there was decided improvement and in two weeks the paroxysms, together with the hyperæmia and swelling, had disappeared completely. The nasal discharge had also diminished so that no further inconvenience was experienced and the patient ceased his visits.

CASE III.—A healthy-looking girl had a short, dry cough, of several weeks' duration; most severe at time of retiring to bed. She complained of slight sore throat and dysphagia. She had never had the slightest inconvenience in the nose. Examination revealed chronic folliculitis of left tonsil, which was accordingly removed. Some days later she returned, when the sore-throat and dysphagia were gone but the cough seemed worse. The nose was examined and found free from disease except hyperæmia and puffiness over left inferior turbinated bone. Touching this lightly with a probe produced the short explosive cough to which she had been subject. The act was entirely beyond her control, and only excited by irritation of the sites named. A few applications of sedative and astringent remedies caused the cough and swelling to disappear. There was a return on the discontinuance of treatment, but a final disappearance on its resumption.

CASE IV.—A gentleman, treated six months before for catarrhal laryngitis, had a dry hacking cough and pain in the cricothyroid space, with an occasional sensation of a foreign body in the larynx, collection of mucus in nose and throat, fatigue on

using the voice (the cough and tickling were especially noticeable then). There was entire absence of any evidence of disease except swollen, intensely hyperæmic inferior turbinated bodies, discovered with the rhinoscope. They were covered with a film of mucus which also extended over the pharyngeal vault. Removing this and touching the reddened turbinated body with a probe produced pain in the larynx which caused him to grasp his throat. A paroxysm of coughing lasting nearly a minute followed immediately. Local treatment produced marked relief.

CASE V.—A physician had a sore throat of twenty years' standing, for which he had received every variety of treatment. The trouble was referred entirely to the larynx and trachea, there was nothing to point to a nasal affection. Lying on the left side caused uncontrollable paroxysms of coughing, which only subsided when he turned on the other side. He complained also of a sensation of a heavy weight in the back of the throat, more pronounced towards morning. Recently the paroxysms had become more severe and annoying. Examination revealed a chronic catarrh of the entire naso-laryngeal tract. The pharynx was granular and irritable. On the posterior extremity of the right inferior turbinated bone there was a small grayish-white hypertrophy not sufficient, however, to encroach greatly upon the inferior meatus. The middle and superior turbinated bodies of both sides, and the posterior half of the septum, were moderately hypertrophied and congested. The posterior part of the left inferior meatus was completely blocked up by a large hypertrophy of the corresponding extremity of the left inferior turbinated body. This was pronounced the *fons et origo* of the trouble, the cough being reflex and due to the hypertrophied posterior end of the left inferior turbinated body, the removal of which, it was thought, would in all probability dissipate the cough. After some delay the patient consented to this and a growth about the size of a small strawberry was removed with the snare, free bleeding encouraged with a view to evacuation of the erectile cells, and the nostril plugged with carbolized absorbent cotton. The effect of this was almost magical; cough disappeared almost entirely in a few days and he could lie on the left side with perfect comfort and freedom from cough.

CASE VI.—A middle aged gentleman came for treatment of a "bronchitis." For a number of years he had been subject to attacks of influenza, always starting as an acute coryza and ending in bronchial catarrh. The cough was always most severe when the inflammation was limited to the nose. The attacks had become more and more frequent, so that the short, dry, hacking cough was almost constantly present. On exertion he was compelled to breathe exclusively through the mouth and became readily fatigued. The dyspnoea gave him considerable anxiety. He had been previously treated for some months by a specialist with laryngeal sprays, stimulant inhalations, etc., without effect.

A few mucous râles only were discovered upon ausculting the chest. The larynx was found congested. The mucous membrane lining the posterior nares was intensely hyperæmic, both inferior turbinated bodies swollen and hypertrophied. There was a similar condition of cavernous tissue of the septum, and almost complete occlusion of the inferior meatus of the right nostril existed. Anteriorly the nasal fossæ were normal.

The cough being referred to the inflammatory engorgement of the turbinated structures, treatment was directed to that and a carbolized alkaline spray, with tar vapor, was directed. Applications of ammonio-ferric alum and zinc were made to the diseased turbinated bodies.

At first the applications produced cough, but as the congestion disappeared the cough subsided. As long as the treatment was kept up the paroxysms were held in obedience, but returned on its discontinuance. The patient declines operation.

These cases can be multiplied, nasal cough being so common in the author's experience as not to be a curiosity.

The occasional absence of nasal symptoms emphasizes the importance of examining the nasal chambers in all such cases. Clinical observation leads the author to believe that repeated irritation from nasal disease plays a not inconspicuous part in the causation of laryngeal congestion and inflammation. The physiological explanation may possibly be found in the doctrine of correlated ideas (Woakes), the reflex taking place through the vaso-dilator nerves from the superior cervical ganglion of the sympathetic. A laryngeal hyperæmia,

constantly maintained by this means, may eventuate in laryngeal catarrh (*reflex laryngitis*).

The following conclusions are deduced by the author from his researches:—

"(1). That in the nose, there exists a definite, well-defined sensitive area, whose stimulation, either through a local pathological process, or through the action of an irritant introduced from without, is capable of producing an excitation, which finds its expression in a reflex act, or in a series of reflected phenomena.

(2). That this sensitive area corresponds, in all probability, with that portion of the nasal mucous membrane, which covers the turbinated corpora cavernosa.

(3). That reflex cough is produced only by stimulation of this area, and is only exceptionally evoked when the irritant is applied to other portions of the nasal mucous membrane.

(4). That all parts of this area are not equally capable of generating the reflex act, the most sensitive spots being probably represented by that portion of the membrane which clothes the posterior extremity of the inferior turbinated body and that of the septum immediately opposite.

(5). That the tendency to reflex action varies in different individuals, and is probably dependent upon the varying degree of excitability of the erectile tissue. In some, the slightest touch is sufficient to excite it; in others, chronic hyperæmia or hypertrophy of the cavernous bodies seems to evoke it by constant irritation of the reflex centres, as occurs in similar conditions of other erectile organs, as, for example, the clitoris.

(6). That this exaggerated or disordered functional activity of the area may possibly throw some light on the physiological destiny of the erectile bodies. Among other properties which they possess, may they not act as sentinels to guard the lower air passages and pharynx against the entrance of foreign bodies, noxious exhalations and other injurious agencies to which they might otherwise be exposed?

Apart from their physiological interest, the practical importance of the above facts, in a diagnostic and therapeutic point of view, is sufficiently obvious; therein lies the explanation of many obscure cases of cough which heretofore have received no satisfactory solution, and their recognition is the key to their successful management."

