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To cite this article: Irving Wilson Voorhees (1922) Chronic infections of the lower airways, Acta Oto-Laryngologica, 4:1, 463-470, DOI: [10.3109/00016482209129699](https://doi.org/10.3109/00016482209129699)

To link to this article: <http://dx.doi.org/10.3109/00016482209129699>

Published online: 08 Jul 2009.

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Chronic infections of the lower airways.

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Any person who has more than a passing interest in respiratory diseases must have been impressed in an increasing degree by the large number of so-called chronic conditions of the larynx, trachea, and lungs which are met with not only in daily clinical experience, but outside of the consultation room and hospital ward. Many cases at one time acute, are now chronic because of neglect or improper or unskillful treatment and have gone on to such marked pathological change that they go about seeking relief where none is found and become the bane of many a practitioner.

It should be understood that I am speaking here of infectious processes only and not of conditions the result of tumor, such as aneurysm, or the chronic passive congestion of valvular heart disease, or structural changes found in such incurable entities as emphysema and advanced tuberculosis.

There is undoubtedly a rather large group of patients who are suffering from an unrecognized infection of the respiratory mucous membrane, not merely a surface infection, but an infection where the bacteria live, thrive, and grow deep down in the submucosa, causing there, in time, abundant connective tissue proliferation and complete functional change. Such patients are, in the light of present day knowledge, carriers of certain types of micro-organisms attenuated in virulence, to be sure, but culturable on satisfactory

media, again becoming lethal when used experimentally. It is remarkable how resistant the body becomes to the ulterior effects of such a chronic infective process, and even a superadded acute infection such as that caused by the pneumococcus does not always destroy the life of the patient, contrary to what might be expected. Many such cases recover from the acute process only to have for the remainder of their lives the annoying symptoms of an old chronic condition.

Our profession at large has been slow to learn the nature of infection of the respiratory mucous membrane save in pneumonia and tuberculosis which have been studied assiduously. A sputum is sent to a health laboratory for examination, the specimen is reported as containing or not containing the tubercle bacillus although it may have swarmed with myriads of other organisms which are regarded as simply incidental — a »mixed infection», if anything is said about it at all. The pneumococcus, for instance, is recognized as a potent enemy, but it is only within a very short time and as a result of academic rather than actual clinical interest at the Rockefeller Institute that the pneumococci have been classified into four distinct groups according to their virulence and prognostic importance. It is now known that every case of pneumonia falls under one of the four headings according to what the laboratory specialist has to say about the sputum; and, consequently, we have had placed in our hands a specific serum for each type according to the identity of the enemy we are fighting. Work of this kind is not only far-reaching but epoch-making in that it gives us a wider acquaintance with our bacterial enemies, and affords a constructive plan of battle out of which we have greater reason to expect victory than ever before.

Without meaning to offer any drastic criticism it is only fair to say that no class of disease is more unskillfully treated by the average medical man than infections of the lower respiratory tract, and especially so if they be chronic. Fortunately the acute cases have a remarkable tendency to recover whether they be accorded all, any, or no treatment whatever, and it is undoubtedly due to this fact that the family practitioner makes light of a simple »cold» and considers his duty well performed if he prescribes almost anything that comes to mind just to make the patient feel that

something is being done. This is, in the last analysis, the fault not of the doctor but of medical teaching. In all diseases of the lower respiratory tract *indirect* treatment has ever been the rule. Too much attention has been paid to the bowels, the liver and kidneys, to the temperature, pulse and respiration, to calomel, squills, ammonium chloride, ipecac, rhinitis tablets and the compound tincture of benzoin; and not enough attention, may one say no attention at all, to the microorganisms causing the difficulty and how they may be combated.

It has not been emphasized that cough medicines do not cure but only increase or diminish the secretions and stop the tickling through the beneficial action of some paralyzant such as heroin, which constipates and may set the stage for the entrance of that arch villain, Opium, who has probably destroyed more lives than he has ever saved.

A primary requisite is to have the hearty cooperation of a skilled laboratory worker, preferably an able bacteriologist, who must be interested in the clinical side of his work as well as in the test tube and microscope. In every case the sputum should be obtained, and cultures taken from the nose and throat if secretion is available. It should be a standing order that the culture is to be saved with the purpose of making a vaccine if this be deemed necessary.

The organisms most commonly found are some member of the streptococcus or staphylococcus family, the pneumococcus and the micrococcus catarrhalis. Some attempt should be made to determine the site of bacterial growth. Not infrequently the voice is normal and the larynx looks healthy, but just below the vocal cords the mucous membrane looks swollen and red and the tracheal rings cannot be counted. This, of course, means that a tracheitis is present and the patient when asked where he feels the tickling will point to the episternal notch, to the area »directly behind the collar button«. Plaques of mucopus, mucus, and blood streaks are often seen, especially when the streptococcus mucosus is present. A continuous desire to scrape the throat indicates the presences of mucus on the vocal cords, and not infrequently the patient cannot speak distinctly until this mucus is shaken off by the scraping or »hemming» process.

In chronic tracheitis one often finds the mucous membrane over both true and false cords covered with crusts. The interarytenoid area is usually so covered. There is a dry, hard cough which becomes easier when the crusts soften and can be coughed out. The secretion in all of these cases is very viscid in character owing to an excess of mucin, consequently when dried it becomes very firmly attached to the epithelium and on coming away leaves a raw, bleeding, eroded surface. The voice is very husky, and at times there is aphonia. Owing to increased connective tissue proliferation, the mucous glands are few in number and function abnormally so that the mucous membrane surface looks dry and glazed. Such a condition may be limited to the trachea or may extend downward into the larger bronchi. In one case, upon examination of the right superior bronchus with the bronchoscope we entered a small abscess cavity which had apparently been encapsulated. Culture showed a staphylococcus organism.

In those cases of so-called chronic bronchitis with copious, fetid discharge, one must always keep in mind the possibility of a foreign body in a bronchus. One such patient, the son of the president of a great mercantile company, had been the rounds in Europe before the great war, and a diagnosis of pulmonary tuberculosis had been made by several eminent physicians. An X ray plate showed an encysted collar button far down in the right bronchus which had been there for about eleven years. This was successfully removed by Dr. Chevalier Jackson, then of Pittsburgh, and the patient recovered, although it required several months for all of the active symptoms to subside. This is by no means unique, as several bronchoscopists have reported similar experiences.

The method of procedure in all cases is as follows: A careful history, especially as to how the condition began; its probable origin; whether following pneumonia, grippe, etc.; question of associated disease, heart, kidneys; duration; local symptoms; character of cough, worse at night or when lying down; what periods of ease if any; effect of climatic or barometric factors; amount, character, odor, color, and consistency of sputum; and the kinds of treatment that have been already employed.

In the local examination the nose and nasopharynx must be

studied for obstruction and the presence of pus. Occasionally the patient complains of coughing and gagging, which we find to be the result of a chronic nasal sinus disease with postnasal discharge and dried secretion which gets down into the hypopharynx, drags on the epiglottis and rima glottidis, and sets up severe spasms of choking until the offending discharge is loosened and spit out. The larynx and trachea must be studied with the laryngeal mirror, and it is often necessary to cocaine quite thoroughly with ten or twenty per cent. cocaine before we can get a view of the region below the cords¹. In case this indirect method fails, we can proceed with the direct speculum and inspect the trachea and bronchi by bronchoscopic methods. In every case a specimen of secretion must be secured, either during the examination or when the patient coughs it out. This is cultured and carefully gone over by the laboratory man who furnishes a full report of the bacterial flora.

X ray examination of the nasal sinuses, and of the chest may be essential in a given case, and a Wassermann may throw surprising light on a baffling problem.

Physical signs afford some help as to the location of the lesion — that is, which lung and what part of the lung is affected. In our experience however, physical signs, even when determined and recorded by an expert examiner, are not of nearly so much value as the X ray, although this latter is also capable of being misread.

Naturally the entire question of treatment resolves itself into two factors: the improvement of the patient's general resistance, and the destruction of the bacterial parasite. The former has been the chief weapon of the lung specialist these many years, and is too well known to need mention here. A newer phase of treatment which does require special mention is the use of vaccines. These have proved so successful in my hands in increasing the general bodily resistance that it is surprising how many men seem opposed to their use. Where disappointment is experienced, there must be something in the way the vaccines are made which affects their efficiency. Personally, I use autogenous vaccines whenever possible.

¹ In a recent communication Dr. Chevalier Jackson writes that he no longer finds it necessary to anesthetize directly down into the larynx but that good insensibility can be obtained by applying the local anesthetic to the supra-laryngeal region, so that the superior laryngeal nerves will be acted upon.

Dr. T. S. Schlauch, of New York City, has made these for me for some years and I cannot testify too strongly to their value. This excellence probably lies in the fact that he does not destroy the bacteria by heat in making the vaccine, but uses cresol or a very mild carbolic solution. Heating is capable of exerting some lipid change which renders the vaccine inert or at least ineffectual, and it is entirely unnecessary. The vaccine is counted as 500 million in one cubic centimetre. We begin with fifty million in most cases and wait for the reaction, both local and general, to subside before giving another dose. Quite often one can increase a half c. c. at each dose. Whenever a too marked or violent reaction is obtained we usually discontinue vaccine treatment temporarily and watch for recurrence of old symptoms or absence of them as the case may be. A vaccine does two very helpful things, it increases the appetite and makes the patient sleepy, and is therefore a better tonic than most of the commonly used drug combinations.

If a drug combination seems desirable, the French ampoules of Clin & Cie. (No. 627) are excellent. These contain glycerophosphates of iron and soda, arseniate of soda, and sulphate of strychnine. One of these sterile ampoules is used hypodermatically twice a week, rarely three times. After the third dose the patient will often say that he feels much improved.

As for the destruction of the microorganisms by direct treatment, this is a matter which has been sadly neglected. Even the nose and throat specialist has not always made the most of his opportunities in applying bactericidal medication, chiefly because most agents have acted severely on the normal body cells as well as on the bacteria, and thus the patient has been made worse instead of better. Silver nitrate has been the old standby, and when judiciously used it is very helpful. It should not be swabbed into the larynx with an applicator as that method is very disagreeable, and by bruising the soft tissues may engender a reaction which does more harm than good. With a De Vilbiss¹ atomizer (No. 52) it can be sprayed directly into the trachea, or if it is desirable to reach the bronchi it can be dropped in with a laryngeal syringe. A two per cent. solution is sufficiently strong,

¹ These are made by the De Vilbiss Mfg. Co., Toledo, Ohio.

about five minims at each instillation. Recently a proprietary combination known as *collene* has been put on the market and has the merit of being a »colloidal silver in permanent suspension» and does not stain handkerchiefs, towels or clothing. Occasionally where direct medication of a given bronchus has been desirable, we have passed the bronchoscope under local anesthesia and have instilled our antiseptic through a soft rubber catheter passed through the lumen of the bronchoscopic tube.

The silver preparations are especially helpful where one has to do with crusting, for they increase all secretions to a marked degree, render them less viscid, and by stimulating the mucous glands help to remove from the submucosa great masses of bacteria which have been intrenched there.

Much is to be looked for from the dichloramine-T of C a r r e l-
D a k i n. This is now made up with an oily base known as Chlorco-
sane and is fairly stable as compared with the earlier solutions
which were readily spoiled by contamination and decomposed
by light and had to be made up fresh every day. Either a one per
cent. or a two per cent. solution may be used in the trachea and
bronchi by instillation or spraying. It should not be used on nor-
mal mucous membrane in the nose as a violent reaction is induced
which may last several days. In beginning treatment of those
cases where there is much discharge or crusting it is better to use
a silver preparation for a few days, and then change to dichlor-
amine-T when one can be sure that this agent will come directly
into contact with the infected surface.

One reason why treatment of this class of patients has failed
in the past is because neither patient nor doctor has realized the
importance of persistent and repeated applications of bactericidal
agents. Inhalations such as the compound tincture of benzoin,
while of value in certain acute cases, are not usually concentrated
enough in action and not frequently enough applied. Bacteria
grow at an enormous rate on the lower respiratory mucous mem-
brane where heat, moisture, and absence of direct sunlight make
cultural conditions ideal; therefore, ammunition must not be
frugally used, but a nearly continuous barrage fire must be main-
tained to win the battle against such overwhelming propagation.
It is useless to administer treatment by direct instillation and

tell the patient to »come back the day after tomorrow», for by that time the effect of the bactericide has long since been lost. These patients must be treated at least once every day. In private practice the effect is so marked that patients do not at all object to coming in morning and evening and thus shorten the time of convalescence very markedly. Twice a day is the rule in all severe, chronic cases and in all of the acute ones with active symptoms or tendency to complications in the ears and sinuses. The gratitude of these sufferers more than repays the physician for the time and patience he is obliged to give to them.

Conclusions.—From an intimate and intensive study of a number of cases of chronic, chiefly pyogenic, infections of the larynx, trachea, and bronchi, both in hospital and private practice, it would seem that such infections are seldom diagnosed in the acute stage. Questioned as to previous treatment, nearly all of these patients said that they had taken much medicine by mouth without seeing any permanent benefit, and that the activities of the physicians whom they had consulted were limited to chest examination, sputum tests, and a negative report as to the presence of pulmonary tuberculosis. In many cases, the patients had been carefully advised as to diet, fresh air, exercise, etc., but very few had received any kind of local treatment other than inhalations to be carried out at home, and an occasional swabbing of the pharynx and larynx with a silver or iodine preparation.

In the light of such evidence it would seem wise for those who make a specialty of throat and lung disease to enlighten the profession as to the method of procedure in the diagnosis and treatment of cases manifesting chronic hoarseness and disturbing cough. Especial emphasis should be placed upon the importance of systematic and thorough treatment in all acute respiratory infections with a view to decreasing the number of chronic cases now so frequently seen in all branches of medical practice.