

THE
JOURNAL OF LARYNGOLOGY
AND RHINOLOGY.

VOL. I.

SEPTEMBER, 1887.

No. 9.

**A NEW METHOD OF INHALING
NITRATE OF SILVER IN DIFFERENT
DISEASES OF THE AIR PASSAGES.**

THE application of nitrate of silver as a remedial agent in catarrhal diseases of the air passages is not only comparatively old (*Ch. Bell*, 1816), but has also proved in the hands of many specialists to be very effective. Hitherto it has been almost entirely administered in the nose, the pharynx, and the larynx, where it is possible to limit its astringent or caustic effect by direct application; attempts, however, have also been made to employ the remedy in diseases of the lower air passages, either by means of spray inhalations (*Ingals, Joseph*) or by injecting a watery solution of it through a catheter passed through the rima glottidis (*Horace Green*). It seems, however, that the application of nitrate of silver in diseases of these parts of the respiratory organs has not been widely adopted, either owing to the circumstance that it is here less therapeutically effective, or—what is more probable—that the modes of application have been imperfect.

Perhaps it will not be out of place to state at once that the method of administering nitrate of silver, which we are about to introduce to the notice of the readers of this Journal, is not based upon a fresh augmentation of the large number of apparatus for inhalation already in existence, but on a new principle and on some properties of the nitrate of silver hitherto unknown, or at least undescribed, both accidentally discovered in 1874 by a Norwegian photographer.¹ He was standing boiling a solution of silver in nitric acid, when he happened to inhale for some time the vapours which arose; now he had for a long time suffered from a very severe and obstinate chronic bronchitis, but after the first irritation of the acid vapours had passed off, he felt a pleasant warm sensation in the chest, and from that

¹ *Forhandlinger i det Norske Medicinske Selskab* i 1874, p. 226; *Bilag til Norske Magazin for Lægevidenskaben*, 1874.

moment the cough left him. He also found that by placing pieces of white paper in different parts of the room, where he boiled the solution, and afterwards exposing them to the light, they became covered with very fine black spots, a proof that nitrate of silver was suspended in the air in very fine particles. The photographer imparted his discovery to Dr. Bidekap, a distinguished physician of Christiania, who took the matter under investigation and tried the inhalations on a great number of patients with different diseases of the air passages, only altering the original experiment so that less acid vapours were developed.

Before describing the results of Dr. Bidekap's investigations, we will examine the chemical and mechanical processes that are produced by dissolving silver in boiling nitric acid. First the silver is transformed into nitrate of silver, which partially dissolves in the water; secondly, the nitric acid is decomposed into different gases, such as nitric oxide (NO), nitrous acid (N₂O₃), and nitric peroxide (NO₂), which latter two gases can be detected by their smell and colour. Thirdly, the nitrate of silver is dissipated, as proved by the fine black spots found on the white paper placed in different parts of the room, and afterwards exposed to the light. The way in which the nitrate of silver is dissipated is probably by a mechanical process, the different gases carrying with them the salt in particles so fine and light that they can even reach the under surface of the white paper, when this is placed so that the edges are free. Besides this, the evaporation of the watery solution undoubtedly carries the nitrate of silver off into the surrounding air as shown by some larger spots on the white paper.

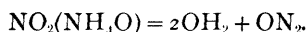
Dr. Bidekap¹ tried the inhalations on 120 patients, by letting them remain one to two hours every two to four days in the room where the vapours were produced. His results were, on the whole, exceedingly favourable and in some cases even surprising, and he strongly advocated the inhalations, especially in cases of chronic catarrh of the nose and the pharynx, in chronic laryngitis and tracheitis, without complications, such as ulcers, polypi, &c., and in chronic bronchitis, even associated with emphysema. Cases with abundant expectoration seemed to yield most to the treatment.

The results of Dr. Bidekap's investigations were not corroborated until eleven years later by Dr. J. C. Holm,² of Laurvig (Norway), who highly recommended the inhalation of nitrate of silver by a modification of the original method. To avoid the formation of the acid vapours, pure nitrate of silver was heated slowly with ammoniac

¹ *Ibid.*, 1875, p. 63.

² *Ibid.*, 1886, p. 191, and 1887, p. 39.

nitrate ; by this process the latter salt is decomposed into water and nitrous oxide (laughing gas) :



By the rapid development of the nitrous oxide the nitrate of silver is carried off in the same way as described before, and can be detected in the surrounding atmosphere by means of white paper. Dr. Holm found this method to be of great value in the treatment of simple chronic catarrh of the nose, the pharynx, the larynx, and the trachea, in cases of chronic bronchitis and of asthma, when the latter disease originated from the diseases of the upper air passages.

Further corroboration of the value of the inhalation of nitrate of silver in chronic catarrh of the respiratory organs has been quite lately published by Dr. Blomberg¹ of Christiania, and by Dr. Storch, of Copenhagen, the former author using an apparatus somewhat like the usual spray producers, but differing from them in that the atomized watery solution is highly heated before leaving the tube, so that only the dry fumes of the salt are inhaled.

According to all the above-mentioned authors the inhalation of nitrate of silver is of great value :

- (1) In cases of simple chronic catarrh of the nose, the pharynx, and the larynx ;
 - (2) In cases of simple chronic tracheitis and bronchitis ;
 - (3) In cases of emphysema when there is a considerable chronic bronchitis ; and
 - (4) In cases of asthma, when originated from disease of the upper air passages.
- (J. C. HOLM).

If we examine the above described method and its professed results more critically, the following objections may be raised. First, that the method is not new, but only a slight modification of the old well-known spray-inhalations with nitrate of silver. It must, however, be admitted that there is a considerable difference between the inhalation of a therapeutical agent dissolved in vapours of water, and the same suspended in the air in such minute and light particles as described before, for although experiments (Sales-Girons, Dumarquay, Moura-Bourouillon, &c.) have placed it beyond doubt that vapours of water *may* get far down in the bronchi by the usual spray-inhalations, still numerous clinical observations, combined with post-mortem examinations (Rammazini, Löwe, Brochmann, Graham, and others) and experiments (Knauf, Inns, and others), have shown that

¹ *Ibid.*, 1887, p. 40.

² *Hospitals-Tidende*, 1887, May 11 and 18.

solid bodies, suspended in the air in shape of dust, when inhaled reach down to the terminal ends of the bronchial tubes without any special respiratory efforts. Secondly, the objection may be raised that the effective agents set at work by the method are the gases developed, in the same way as the fumes of burnt nitrated paper act beneficially in certain forms of chronic bronchitis. The fact, however, that the same favourable results have been obtained by different investigators, using different plans of atomizing the nitrate of silver, make it doubtless that it is this remedy which acts on the mucous surfaces of the air passages. Thirdly, the method is not without risk for the patient, several times the inhalation has caused irritation of the lungs with cough and blood-streaked expectoration, and there seems even to be a danger of acute pneumonia arising from the irritation. Such cases seem, however, only to occur when the inhalations have been too prolonged (and patients are often inclined to remain too long in the inhalation room, feeling relief from the ease in breathing and expectoration), or the patients have inhaled cold air directly after the treatment. Another risk, worthy of attention, is also the possibility of producing a chronic silver poisoning, especially as some of the nitrate of silver undoubtedly reaches the stomach; this is a warning against letting patients use the inhalations themselves, or go on with the treatment too long. Finally, it seems unpractical to apply nitrate of silver to the mucous membranes of the upper air passages by means of inhalations, when the remedy can be much more effectively applied locally in solutions, powders, &c. This objection is, we think, at least for those well acquainted with the diseases of the upper air passages and their local treatment, of main importance, and will certainly considerably limit the adoption of the method by specialists.

On reviewing the advantages and disadvantages of the method of inhaling nitrate of silver, as introduced and practised by Scandinavian investigators, its great use in the treatment of chronic bronchitis and of emphysema seems so evident, and its drawbacks so slight, if but caution is observed, that it deserves a fair trial by other practitioners. As a treatment for diseases of the upper air passages, we hardly think it has any advantage over the methods previously known.

For those who should adopt the inhalations on the principles above described, we recommend the following plan as the most simple and practical. In the middle of a small room is placed, on a low table, a small Berlin crucible or evaporating pan, containing one part of nitrate of silver and three parts of ammoniac nitrate, and

under the cup is placed a spirit lamp, which heats it very slowly. The patients, who are sitting round the table, need not protect their faces, but linen or white clothing should be covered. Each inhalation ought not to last longer than thirty to forty-five minutes, and the treatment should not be extended over too lengthy a period.

H. M. (Copenhagen).

INSTRUMENTS AND THERAPEUTICS.

ALLEN, C. GLOVER (N. Y.).—**A New Snare and Ecraseur.** *Med. News*, July 16, 1887.

THIS is an original instrument, and apparently an improvement on the snares in general use. Its mechanism can only be understood by a study of the cut.

J. N. MACKENZIE.

LABBÉ, EDOUARD.—**On a Method of Treatment of Whooping-Cough.**

THE author has advocated local application of cocaine. This method does not cure the patient, but reduces the number and intensity of the attacks. At the present time Labbé recommends a treatment which is still more efficacious, and which consists of applications of an iodine solution to the entrance into the larynx. This method, employed by the author for twelve years, has always given good results.

JOAL.

STORCH, O. (Copenhagen).—**On Inhalation of Nitrate of Silver as Treatment of Different Diseases of the Air Passages.** *Hospitals-Tidende*, May 11 and 18, 1887.

GIVES a favourable report of the author's results of the above named treatment in cases of bronchitis and emphysema. (The method of inhalation described in *The Journal of Laryngology*, vol. i., No. 9, p. 321.)

WICHMANN, G. L. (Norway).—**The Use of Lactic Acid in Lupus.** *Tidsskrift for praktisk Medicin*, January 1, 1887.

THE author has successfully treated four patients with deep and large lupus-ulcers of the nose and face, by lactic acid in the following way:—The ulcers are covered with absorbent cotton soaked moderately in pure lactic acid, and over the cotton is placed oiled silk and then a bandage. If the surrounding tissue be quite normal, it is protected by grease or collodium, otherwise the acid produces blisters