

was developing when the patient was last seen, one year after operation. We have noticed this tendency to Legg's disease and subsequent coxa vara in two or three of our patients. Its occurrence lends support to the view that Legg's disease is a developmental anomaly, probably caused by some interference with the blood supply to the head of the femur. It can be treated quite satisfactorily by prolonged immobilization in plaster of Paris, in extreme abduction. We attain the extreme abduction by manipulation under ether.

The high percentage of patients who refused operation is worthy of note. In a number of cases we went out of our way, through our social service department, to obtain the parents' consent. Operation in young patients can be urged with very little risk. Our only disasters occurred when we employed too severe methods in older patients. When one starts, one hates to give up. This is a mistake.

In a general way, in young patients, one can gage one's prognosis by the development of the head. If this is approximately normal, a good result may be expected. Ordinary obstructions can be overcome. We like to undertake the operation as soon as the child has been broken of the diaper. Before that time it is hardly worth while. The plaster is ruined in a few days.

The length of time the patient remains in plaster varies with the stability of the reposition between about six months and a year. In the closed operation, the hip remains in extreme abduction for three or four months, and in an attitude of modified abduction and slight reflexion for somewhat longer.

## VALUE OF CHLORIN IN THE TREATMENT OF COLDS\*

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Few announcements in recent years have occasioned more hope in the minds of the medical profession and the laity than did the report on chlorin as a therapeutic agent in certain respiratory diseases made by Vedder and Sawyer<sup>1</sup> about a year ago. Although usually considered trivial, acute colds cause more disability and loss of time from work and school than the more serious diseases.

Recently, Dr. Taylor-Jones<sup>2</sup> reported that more than one fourth of the absences of 3 A grade children in Washington were due to "common colds," and Dr. Collins,<sup>3</sup> in the study of morbidity among school children in Hagerstown, Md., found that about one third of the cases of illness in school children are due to colds, and that in a school year of 180 days the average amount of time lost per child on account of colds was 1.86 days. At the University of Minnesota, during the winter months, we find that from one fifth to one third of the calls made at the dispensary of the Students' Health Service are on account of colds. Other universities, as well as industrial organizations, probably have very similar rates.

\* Read before the Minnesota State Medical Association, April 28, 1925.

\* From the Students' Health Service and the Department of Preventive Medicine and Public Health, University of Minnesota.

1. Vedder, E. B., and Sawyer, H. P.: Chlorin as a Therapeutic Agent in Certain Respiratory Diseases, *J. A. M. A.* **82**: 764 (March 8) 1924; *The Treatment of Certain Respiratory Diseases by Chlorin*, *ibid.* **84**: 361 (Jan. 31) 1925.

2. Taylor-Jones, Louise: Causes of Absence in One Grade of Fifteen Public Schools in Washington, D. C., *Pub. Health Rep.* **39**: 2345 (Sept. 12) 1924.

3. Collins, S. D.: Morbidity Among School Children in Hagerstown, Md., *Pub. Health Rep.* **39**: 2391 (Sept. 19) 1924.

Acute respiratory infections universally form the biggest problem with which health services have to deal; so, when Vedder's report appeared, we at once got in touch with him and with the Wallace and Tiernan Company which supplied the equipment that he used. This company kindly offered to send us an equipment similar to Vedder's which we could use for experimental purposes. We hoped to procure further evidence as to the value of this treatment, and believed that we had unusual opportunities for so doing, because in the student body we have a large, intelligent and cooperative group, which every year is affected with many acute respiratory infections.

### APPARATUS USED

For the giving of the chlorin treatments, a small room, 10 by 8 by 8½ feet, was used. The walls and ceiling were given several coats of paint to prevent absorption of the gas. The chief part of the apparatus was a motor driven air blower, which, through a hole in the wall, blew warm air from a corridor into the room. A venturi tube measured the volume of air passing through the blower. The chlorin gas was contained in a cylinder, and, after passing through a siphon meter, was mixed with the air as it passed through the blower. Knowing the volume of gas discharged with each pulsation of the siphon meter and the volume of air passing through the blower, it was possible to calculate the rate at which the siphon meter should discharge, to give any desired concentration of chlorin in the atmosphere of the room. The siphon meter used had a capacity of 11.3 c.c., at 7 pulsations per minute. The pump was operated at a rate of 500 or 600 cubic feet of air per minute. At 500 cubic feet, the siphon meter had to discharge once every nine seconds to give a concentration of 0.015 mg. of chlorin per liter of air, and once every eight seconds to give a concentration of 0.0175 mg. The timing was done with a stop-watch, and the concentration kept between 0.015 and 0.0175 mg. per liter. A quantitative analysis made of the air during operation showed that the actual amount of chlorin in the air varied less than 5 per cent. from the calculated concentration.

While treatments were being given, a small window at the opposite side of the room from the air blower was opened to permit the escape of air. The room had a capacity of about 680 cubic feet, so that, with the blower operating at the rate of 500 cubic feet per minute, the air in the room was completely changed in less than a minute and a half. Tests made with matches and with cigaret smoke showed that there was no stagnation of air at any part of the room. Not more than eight students were allowed in the room for treatment at one time, although, with the rapid change of air, a larger number doubtless could have been treated without materially affecting the concentration of the gas.

### METHODS OF TREATMENT AND REPORTING

The Students' Health Service maintains a dispensary to which students may come for medical advice and treatment. When the chlorin treatments were well established and the collection of data begun, the following bulletin was sent to the physicians on the staff:

Inasmuch as the Students' Health Service is prepared to give the chlorin treatment of colds a thorough trial, physicians who see students with colds are requested to observe the following procedure:

1. Classify each acute respiratory infection according to the portion of the respiratory tract involved; e. g., acute rhinitis,

tonsillitis, pharyngitis, laryngitis, tracheitis, bronchitis or any combination of these.

2. Note on the dispensary record the number of days that the cold existed before the student reported.

3. In order to have a satisfactory control series, select for the chlorin treatment alternate cases of those who request health service care. In case a student specifically requests the chlorin treatment, he should be permitted to take it, and the next case given other treatment as a control.

4. Students who are to receive the chlorin treatment should have, in addition, any other medication which seems indicated.

5. Results cannot be expected from the chlorin if the paranasal sinuses or the crypts of the tonsils are infected, so such cases should not be referred for chlorin treatment.

6. If there is any history of asthma, the student should not be given the chlorin treatments.

At the chlorin room, a record of all treatments was kept by a nurse. This included the patient's name, the diagnosis, the day of the disease and the number of treatments. The treatment given was one hour in duration, except when the chlorin seemed to cause

dition, of course, is subject to considerable variation and inaccurate, but in a large series the error due to individual differences would be reduced to a minimum; and certainly two large series should be comparable.

#### CONTROL SERIES

Each day, the clerk who had charge of indexing diagnoses chose at random, from the names of the students who received medical treatment for colds, a number of names that corresponded to the number given chlorin treatments on that particular day. To these students, the same card was mailed as to those who were given chlorin treatments.

The medical treatment given to this control series was not in any sense uniform. Some received laxatives, some antipyretics, some rhinitis or coryza tablets, some cough mixtures, some gargles, some inhalations, some nasal oil, some various combinations of these and some nothing.

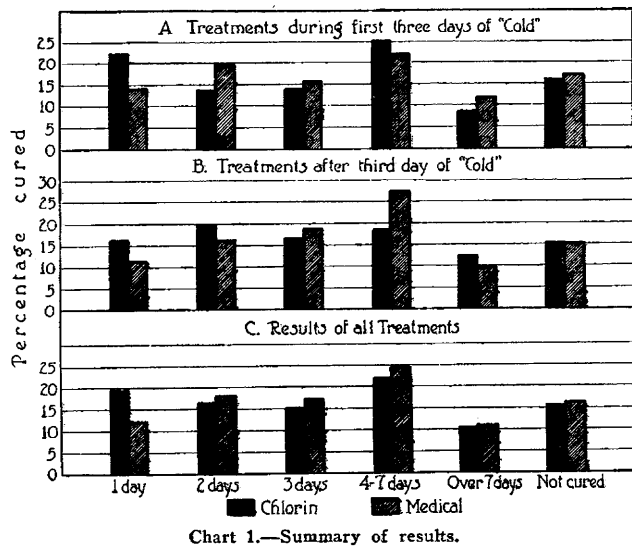
#### RESULTS

All report cards that were satisfactorily filled out were tabulated according to diagnosis, treatment, age of cold when treated, and length of time before recovery. In the series studied, 425 students were given chlorin treatment, and 392 given medical treatment or no treatment. The percentages of patients cured with chlorin in one to three days and one to seven days differ but little from the percentages who recovered in the same time under medical treatment. Separate tabulations were made of the results obtained during the fall months October, November and December, and the winter months January, February and March, but the variations were of minor importance and inconstant.

A summary of the results of the chlorin and the medical treatments, irrespective of the diagnoses, are shown graphically in Chart 1. Of the total that were treated with chlorin, 51.4 per cent. reported themselves cured within three days, while 47.9 per cent. of those given medical treatment recovered in the same time, showing practically no difference. There was still less difference between the percentages that recovered under chlorin and medical treatments during the first week, 73.3 and 72.6 per cent., respectively.

However, the percentage of cures within the first day is consistently higher with chlorin than with medical treatment. The difference is most marked if the colds are treated within the first three days, but the percentage of cures with chlorin is also higher for colds treated after the third day, and for the total number treated. The beneficial effects of chlorin evidently are experienced within the first day after the treatment, because each day after the first the percentage of recoveries is higher from medical treatment than from chlorin. This, of course, is not surprising, because the effect of the chlorin gas on the tissues is local and temporary.

*Various Types of Colds.*—The classification of colds according to the part of the respiratory tract involved needs no explanation. No such classification, of course, is accurate, because a cold may be a rhinitis today, a rhinitis and pharyngitis tomorrow, and a tracheitis and bronchitis a few days later; but some of these infections tend to remain more or less localized in one part of the respiratory tract. Cures could be attributed to chlorin only if they occurred within the first day after treatment; consequently, only the percentages cured in one day need to be compared. The results are better in cases of rhinitis than in any other type of cold. This is true of the cases treated during the first three days,



severe irritation. On the wall of the treatment room, the following notice was posted:

In order to get good results from the chlorin treatment, it is frequently necessary to take two or three treatments on successive days; so, if your cold is not cured after one treatment, return for more.

Please note the effect which this treatment has upon your cold and report this to us on a card which will be mailed to you in about a week.

At the end of a week, a card containing the following information and questions was mailed to each student:

The Students' Health Service is making a study of the effect of the various forms of treatment on colds. Our records show that you have recently been afflicted with a cold: hence you are requested to assist us in this study by filling out this card and returning it through the university mail.

1. What was the duration of the cold in days before treatment?

2. What was the duration of the cold in days after treatment?

3. In your opinion was the treatment beneficial?\*

No examination was made of the patients subsequent to the treatment, because there are no definite objective criteria by which one can judge whether a cold has improved or not. The patient's opinion about his con-

\* The third question was included only on the cards sent out after Jan. 1, 1925.

those treated after the third day and the total treated. The control series shows that, with medical treatment, the largest percentage of recoveries in one day occurred in the acute respiratory infections not limited to one area.

*Results of Treatment at Various Stages of the Disease.*—Every one who has advocated the use of chlorin in the treatment of colds has advised that the earlier the treatments are given the better the results obtained. Chart 2 illustrates the percentage of cures in one day. It is evident that we obtained the largest percentage of cures with chlorin when the treatments were given on the second or third day of the disease.

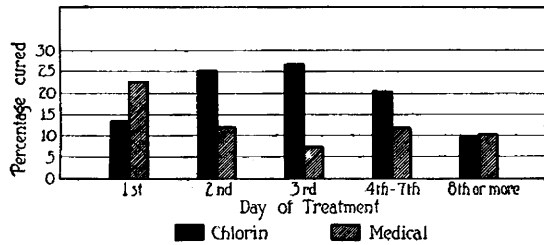


Chart 2.—Results according to day of treatment.

Medical treatment, on the other hand, gave the largest percentage of recoveries in one day when the treatment was given on the first day of the disease, the total cures in one day, however, were greater with the chlorin than with medical treatments.

*Multiple Treatments.*—The percentage of students who are cured by two or more treatments varies but little from the percentage cured with one treatment.

*Patient's Opinions of the Treatment.*—The question asking the patient's opinion as to the value of the treatment was included only during the latter months of the study, so the number of replies is relatively small, 133 students who had chlorin, and 153 students who had medical treatment replying to this question. Many students expressed themselves enthusiastically in favor of the chlorin treatment, but a large percentage of students also felt that they were benefited by medical treatments.

*Whooping Cough.*—During the summer of 1924, when the university was not in session, eight cases of whooping cough, six in children and two in adults, were treated. From six to twelve treatments of an hour each were given on successive days. One adult and four children were reported as definitely improved, the paroxysms of coughing and vomiting decreasing in frequency and severity. The effect on one adult and one child was doubtful, and one child was reported as unimproved. This series, although somewhat interesting, is too small to be of value, particularly as there were no controls.

*Diphtheria Carrier.*—One convalescent carrier of diphtheria bacilli was given three treatments on successive days, but the cultures remained positive.

*Ill Effects of the Treatments.*—In our experience, demonstrable ill effects from the chlorin treatments have been negligible. Many of the patients experienced some irritation of the throat for several hours after the treatment, but this effect was only temporary. A few reported that the chlorin caused headaches, coughs or sleepiness which lasted from several hours to several days. However, since we know that colds in themselves may cause all these symptoms, it is doubtful whether the chlorin should be blamed in these cases. Four patients who were subject to asthma insisted on trying

the chlorin treatment in spite of advice against it. In each instance, an acute attack of asthma followed. One patient who had chronic bronchitis, but gave no history of asthma, was confined to bed for several days with an acute attack of asthma as the result of one hour's treatment. This patient, of course, should not have been allowed to take the chlorin treatment.

COMMENT

The treatment of colds is a subject on which medical literature contains a host of diametrically opposed opinions. Some authors recommend complete rest;<sup>5</sup> others recommend exercise;<sup>6</sup> some advocate the giving of cathartics;<sup>7</sup> others do not;<sup>8</sup> some attempt to stimulate secretions of the nose and throat from the beginning of the cold;<sup>9</sup> others to dry them up;<sup>8</sup> some believe vaccines will prevent colds; others doubt their value; and so on. In reviewing the writings on this subject, however, one is impressed with the few tabulations of results and the almost complete absence of comparisons with control cases. Sholly and Park<sup>9</sup> compared the incidence of colds over a period of six months in a large group of persons who were given "cold vaccines" with the incidence in an untreated group. Their findings were that colds were more frequent in the vaccinated than in the unvaccinated group. Macdonald<sup>10</sup> recently compared the results of treatment with and without cathartics in a small series of persons with acute colds. He found that the disability of persons who had been given cathartics was longer than the disability of those who had not. These few reports illustrate the necessity of having a control series in any study of the treatment of colds.

The method of administering the chlorin in this series of treatments was such as to assure a definite and constant concentration of chlorin in the room, and unquestionably we had a more accurate and constant concentration than could be obtained with any of the various types of apparatus on the market, from which at first a calculated amount of chlorin is liberated into a closed room, and then smaller amounts liberated in thirty or forty-five minutes to make up for the amount lost in that time.

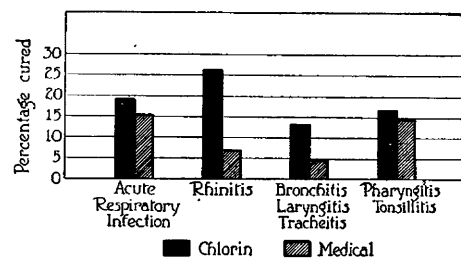


Chart 3.—Cures in one day of various types of colds when treated during the first week.

The medical treatments given to the students in this series were chiefly symptomatic, and we have no evidence that just as large a percentage would not have recovered in the same time without any treatment whatever. In fact, in this series so many different kinds of

5. Fantus, Bernard: Therapy of Catarrhal Fevers, J. A. M. A. 75: 1694 (Dec. 18) 1920.  
 6. Heath, O.: Natural Cure of the Common Cold, Lancet 1: 688 (April 8) 1922.  
 7. Osborne, O. T.: The Etiology and Treatment of Colds, New York M. J. 109: 529 (March 29) 1919. Cecil, R. L.: Common Cold, Its Prevention and Treatment, M. Clin. N. Am. 8: 103 (July) 1924.  
 8. Osborne (Footnote 7).  
 9. Von Sholly, A. I., and Park, W. H.: Report on the Prophylactic Vaccination of 1,536 Persons Against Acute Respiratory Diseases in 1919-1920, J. Immunol. 6: 103 (Jan.) 1921.  
 10. Macdonald, Hugh: Catharsis in the Treatment of Colds, J. A. M. A. 80: 1375 (May 12) 1923.

treatment were used that it certainly is more accurate to speak of the recoveries under medical treatment than of the cures from the treatments. Likewise, of course, many of those who took the chlorin treatments probably recovered rather than were cured.

The results that we obtained are not so good as we had hoped they would be, but they are not completely disappointing and certainly not so absolutely negative as those reported by Harris<sup>11</sup> of the New York City Department of Health. It appears from the tabulations we made that the beneficial results from chlorin are limited to the first twenty-four hours after the treatment, so our comparison should be between the percentage of recoveries in one day with the chlorin treatment and the percentage in one day with medical treatment. In the group as a whole, we find 19.5 per cent. recovered in one day with chlorin, and 12.5 per cent. recovered in one day with medical treatment, more than half again as many recoveries in one day with chlorin as with medical treatment. Of the patients with rhinitis, the type of cold with which we obtained the best results, we find 23.6 per cent. recovered in one day with chlorin, and 6.7 per cent. recovered in one day with medical treatment, three and a half times as many with chlorin as with medical treatment. In the acute colds, that is, those treated during the first week, immediate recoveries are persistently and definitely more frequent with the chlorin than with the medical treatments (Chart 3).

It is difficult to compare our results with those of Vedder<sup>1</sup> or of Gilchrist,<sup>12</sup> because they do not state in what length of time patients were considered as cured; e. g., Vedder reports that of his total series 71.4 per cent. were cured, 23.4 per cent. improved and 5 per cent. unimproved. If "cured" means within one day, our results are much lower than his; but, if "cured" means within a week, our figure of 73.3 per cent. is very close to his; of course, one should keep in mind the fact that we found 72.6 per cent. recovered within the same period under medical treatment.

The observations that during the influenza epidemic the soldiers working in chlorin plants did not get influenza is very significant. It is, however, much easier to believe that daily exposure to chlorin would destroy infective organisms on the surface of the mucous membrane of the nose and throat than it is to understand how exposing the surface of the membrane to chlorin gas would destroy organisms after invasion has taken place. Of course, it may be that in colds no actual invasion of the mucous membrane takes place; in that case, it seems that we might hope to effect cures by such treatments.

Since the results in this series have been at least encouraging, the treatments and observations will be continued.

#### SUMMARY

1. Most opinions as to the value of the various forms of treatment for colds have been made without careful analyses of results and comparisons with control series.

2. In this study, the results of the chlorin treatment of 425 students with colds are compared to the results of the medical treatment of 392 students.

11. Harris, L. I.: Report on Study of Chlorin Gas as a Therapeutic Agent in Respiratory Diseases, Bull. New York Dept. Health **14**: 217 (Oct.) 1924.

12. Gilchrist, H. L.: Chlorine Gas: Its Uses One Hundred Years Ago, Its Uses Today as a Therapeutic Agent in Certain Respiratory Diseases, with Report of Nine Hundred Cases, Wisconsin M. J. **23**: 234 (Oct.) 1924.

3. It seems that the beneficial effects from the chlorin treatment are all experienced within the first day after the treatment.

4. The percentage of patients who recover within one day with the chlorin treatment is definitely higher than with the medical treatments; 19.5 per cent. of those having chlorin and 12.5 per cent. of those having medical treatments recovering in one day. Of the group with acute rhinitis, 23.6 per cent. of the ones treated with chlorin and 6.7 per cent. of those with medical treatment recovered within one day.

5. Of the entire series, 51.4 per cent. of those treated with chlorin and 47.9 per cent. of those given medical treatment recovered in three days; while 73.3 per cent. of those treated with chlorin and 72.6 per cent. of those with medical treatment recovered within a week.

6. The large percentage of recoveries within three days and seven days under such a variety of medical treatments is evidence only of the self limited character and short duration of most colds.

7. The chlorin treatment apparently was more beneficial in acute rhinitis than in any other type of acute cold.

8. The largest percentages of good results with the chlorin treatment were obtained when the patients were treated on the second or third day of the disease.

9. Ill effects that could be definitely ascribed to the chlorin treatment occurred only in persons subject to asthma.

10. The results of the treatment of whooping cough were somewhat encouraging, but not conclusive.

## Clinical Notes, Suggestions and New Instruments

### EPIDERMOID CYST OF CERVIX UTERI

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No instance of a cyst of this nature occurring in the cervix has been found in a survey of the literature or in the standard texts of gynecology. Geller<sup>1</sup> reports a number of atypical epithelial growths on the cervix, but they are all either polypoid or solid tumors of possible malignant character. Wharton,<sup>2</sup> in 1921, reported several cases of rare tumors of the cervix, including condyloma and granuloma, but none of cystic nature. The origin of the epidermoid cyst reported here may bear an embryologic relation to Meyer's<sup>3</sup> "pavement epithelium nodules" found in the uterine mucosa, although he records no cystic development arising from these nodules.

The cyst here described is apparently entirely unrelated to the usual type of cyst found in this location, the nabothian or retention cyst, and affords, in my experience, a rare pathologic picture.

#### REPORT OF CASE

Miss G., aged 31, a schoolteacher, July 7, 1923, complained of leukorrhea of about one year's standing, and more recent pain on defecation. For the past year she had been under medical treatment for the leukorrhea, without benefit, but had had no local treatment or examination. Her family and past history were without bearing on the case.

On examination, the hymen would not permit the passage of a speculum, but digital examination showed the presence of a tumor the size of a walnut, on the right side of the cervix, extending into the right vaginal fornix, and of a cystic

1. Geller, F. C.: Atypical Epithelial Growths on Cervix Uteri, Zentralbl. f. Gynäk. **47**: 406 (March 10) 1923.

2. Wharton, L. R.: Rare Tumors of Cervix of Uterus of Inflammatory Origin, Surg., Gynec. & Obst. **33**: 145 (Aug.) 1921.

3. Meyer, R.: Pavement Epithelium Nodules in Hyperplastic Glands of Corpus Mucosa of Uterus, Arch. f. Gynäk. **115**: 394 (Nov.) 1921.