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Minor further editing by Harri Hemilä

Harri.hemila@helsinki.fi

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http://www.mv.helsinki.fi/home/hemila/VitC_pneumonia.htm

<http://www.mv.helsinki.fi/home/hemila/CP.htm> (Cochrane review)

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Contribution to the question of pneumonia treatment with vitamin C

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CONTRIBUTION TO THE QUESTION OF PNEUMONIA TREATMENT WITH VITAMIN C

Vitamin C metabolism has been subjected to more detailed investigations in recent times. The importance of this vitamin for body balance has been understood in more detail since the amount of ascorbic acid in the organs and fluids of the body and its urinary excretion have been amenable to determination. It has been found that a pronounced vitamin C deficiency exists not only in the ailments named after Skorbut and Möller-Barlow, the terminal states of a vitamin C deficiency, but also in many other disease states, such as hemorrhagic diathesis, bone diseases, dyspepsia, adrenal insufficiency, allergic conditions, intoxications, pregnancy and particularly infectious diseases. A. Hochwald, Prague, has demonstrated — especially for the so-called hyperergic diseases whose histological expression is fibrinous inflammation according to Rössle — that extra consumption and a resulting deficiency of reducing substances arises during the antigen/antibody reaction that takes place in the body, whereby leading to cell damage and the formation of histamine-like substances that are capable of triggering toxic phenomena as severe as anaphylactic shock. As a result of adequately administering such reducing substances, there has been success in preventing this effect and, hence, in favorably modifying the course of the disease. In the way in which Böger and Schröder had success in alleviating the left displacement* of blood protein substances via the long-term administration of vitamin C, Hochwald was able to arrive at the same results following the administration of high doses of ascorbic acid in animal experiments. Simultaneous alleviation of the immunization effect did not take place. Hochwald's experiments mostly extended to modifying anaphylactic shock in guinea pigs and croupous pneumonia in humans via the administration of ascorbic acid.

These investigations and the following personally observed case, likewise, predisposed us to carry out the treatment of fibrinous pneumonia with vitamin C as the sole therapeutic agent.

Despite conventional therapy with Solvochin and Cardiacis, the most severe prostration with typhous muzziness, cyanosis, high-grade dyspnea and life threatening circulatory impairment arose in the aforementioned case. The occurrence of severe nosebleeds induced us to administer vitamin C as tablets in the form of Cebion (Merck). The bleeding soon ceased, general health visibly improved and the pneumonia took a favorable course.

An additional stimulus was provided by the study by J. Gander and W. Niederberrer [sic; Niederberger] (Stans Cantonal Hospital, Switzerland) namely "Vitamin C in the treatment of pneumonia."

In our investigations of vitamin C deficiency or the urinary excretion of ascorbic acid, we made use of the miniature method that had been indicated by Jezler and Niederbeuger [sic; Niederberger] using dichlorophenolindophenol as the indicator.

We proceeded as follows from the therapeutic standpoint: we initially administered 400 or 500 mg ascorbic acid 3 times daily as an intramuscular injection up to defervescence or positive urinary

* [Translator's note: Considering the year, this probably refers to paper or starch block electrophoresis.]

excretion, and then 100 mg 3 times daily per os up to resolution of the pneumonia. Redoxon (Roche) was used in the initial investigations; Later Cebion (Merck) was exclusively used. According to data from the companies, both are the chemically pure sodium salt of l-ascorbic acid. We were not able to establish any difference in the mode of action of the two agents.

In our experience, intramuscular injection was preferred to the intravenous version, since slower absorption apparently ensures better utilization in cases of quantitatively lower excretion.

The worse tolerance of intramuscular injection of ascorbic acid described in the literature might be correlated with the earlier use of pure ascorbic acid, whereas we noted no unpleasantness apart from short-term pain soon after the injection at the injection site upon administration of the sodium salt of ascorbic acid. In regard to other medications, only expectorants and circulatory agents were administered, the latter of which proving to be necessary only to a conspicuously small extent.

Freshly passed urine was tested for ascorbic acid on each occasion prior to initiating treatment. It was not detectable even once in the cases of croupous pneumonia, and the same could also be established, incidentally, in 28 other febrile diseases. The deficit in the urine was thus not specific to croupous pneumonia. After all, it is conspicuous that the seasons of the year for the largest vitamin C deficiency coincide with the times of the most frequent pneumonic diseases.

In order to record the time of the first appearance of ascorbic acid in the urine, the ascorbic acid determination was carried out on the 1st and 2nd days of treatment, namely 3-5 h after each injection; on all the later days, only in the mornings using fresh urine.

Our investigations extended to 16 cases of pneumonia. For comparison purposes, 2 cases of bronchopneumonia and 1 case of chronic pneumonia were intentionally treated in the same way or under the same conditions. No detectable influence of ascorbic acid on the course of these latter diseases could be recorded.

In the treatment of genuine croupous pneumonia, it was found that a positive ascorbic acid balance sheet or, expressed more carefully, urinary excretion, sometimes occurred even after the 1st injection (in 5 cases after 400 mg, and in 2 cases after 500 mg); in the other cases, at least on the 2nd or 3rd day of treatment. The more severe the disease, the longer it took to offset the vitamin C deficiency at the same dosage. The longest recorded time until the appearance of ascorbic acid in the urine was observed occurred in a fatally progressing case of bronchopneumonia; it amounted to 6 days.

The drop in temperature was mostly accompanied by the first excretion. The nature of the defervescence was critical in 8 cases and lytic in 4 cases. In one case, a fever peak (up to 38.5°C) occurred once again after the initial defervescence and the changeover from intramuscular injection to peroral administration. The temperature rise exactly coincided with the negative urinary excretion of ascorbic acid, and it immediately disappeared after the administration of larger intramuscular doses of vitamin C. In lytic defervescence, the excretion of ascorbic acid preceded completely normal temperatures by several days. In the 2 bronchopneumonia and the chronic pneumonia that were utilized for comparison purposes and progressed to death, the fever existed until death; urinary excretion of ascorbic acid occurred shortly beforehand. The last-mentioned fatally progressing cases were to be regarded as desolate from the outset. We give brief medical reports below.

1. Male patient P., 50 years old. Only slight temperatures and expectoration three weeks prior to admission to the hospital; highly febrile disease 8 days prior to the start of the treatment. The patient was in extremely bad general health. Diffuse infiltrations were found in both lung fields. As a consequence of circulatory insufficiency, which could not be alleviated even by means of analeptics, death occurred on the 9th day of the treatment, i.e., on the 17th day of the disease.

2. Female patient K., 73 years old, came to us for treatment on the 5th day of the disease. She was in very bad general health. Myocardiopathy with absolute arrhythmia was present. Apart from fibrinous pneumonia of the lower left lobe together with pleuritis, multiple pneumonic foci were present in all segments of the right lung. Death in the evening of the day of admission as a result of circulatory weakness.

3. Female patient E., 26 years old, had been confined to bed for several weeks. Fever up to 40°C, allegedly for 6 days prior to admission to the hospital. On the 3rd day of treatment, death as a consequence of circulatory insufficiency. The autopsy revealed partially carneous, fibrinous pneumonia of the entire left lung, and fresh pneumonia of the lower right lobe. In the opinion of the pathologist, the process on the left side was certainly already 4 weeks old. Pronounced hypoplasia of the vascular system was also present.

The fever curves of two croupous pneumonia cases treated with ascorbic acid, are reproduced below.

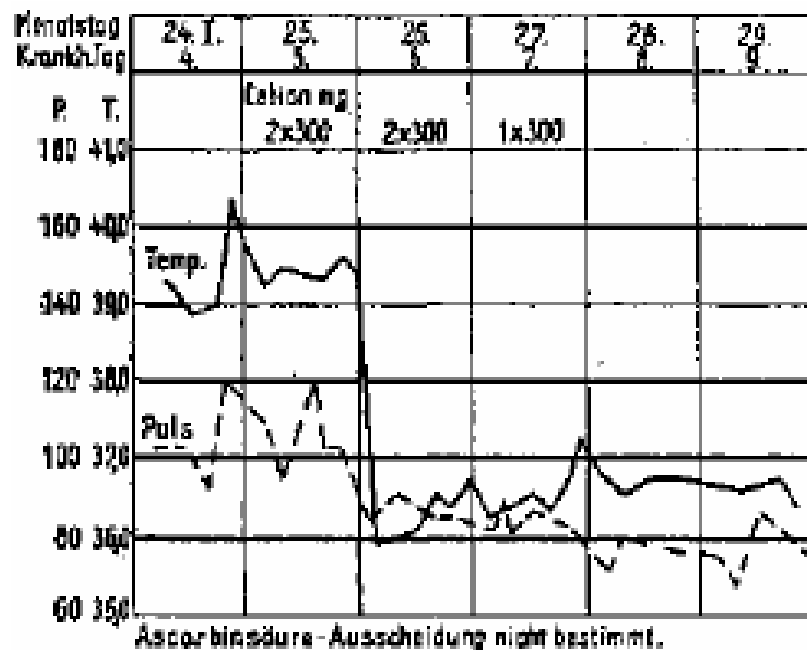


Figure 1

Figure 1 shows the critical drop in temperature on the 1st day following the Cebion treatment, although this first commenced on the 5th day of the disease. Since this was one of our first patients who was being treated in this way, the determination of ascorbic acid in the urine was not yet being carried out.

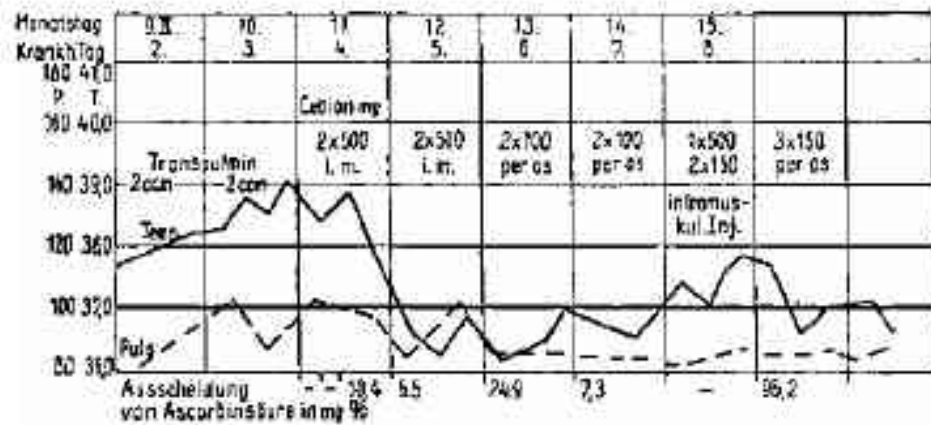


Figure 2

Figure 2 shows the course of fibrinous pneumonia in an 86-year-old female patient following treatment with Cebion. Critical defervescence took place after the appearance of ascorbic acid in the urine. When the excretion became negative again — because the need for ascorbic acid was apparently not being satisfied via per os administration — an increased temperature arose again on the 8th day of the disease and once again reverted to normal following the more adequate administration of vitamin C.

The frequently critical defervescence, which regularly arose without complications (no deliria) almost immediately after resolution of the vitamin C deficiency, is in contrast to the findings of Hochwald and Gander and Niederberger, who mostly observed lytic defervescence even in diseases that had persisted for a longer period of time.

Respiration and the subjective health (prostration, pain, inappetence, dyspnea) generally improved even after the first injection, whereby this was probably partly engendered by the decrease in temperature and certainly also partly as a result of eliminating toxic substances. The pulse rate fell at the same time as the decrease in temperature; the pulse was full and regular. The slight effect of vitamin C in terms of reducing blood pressure did not show any injurious influence on circulation. As has been stated, circulatory agents were required only to a small extent. In contrast to Hochwald, and despite timely defervescence, we were, however, unable to establish any physically or radiologically detectable acceleration of the resolution when the treatment first commenced several days after the beginning of the disease.

A conspicuous aspect in all our patients was the small amount of sputum. Expectorate was sometimes even completely absent, so that a determination of the type of pneumococci could not always be carried out. Simply because of the small number of our investigations, we should therefore like to withhold any opinion as yet in regard to the better or worse ability to influence the individual types. In the same way, for the same reason we would not yet like to go into the globulin/albumin ratios in the blood, the differential blood count and the changes in metabolic balance. Our investigations in this direction continue. An aspect that is also to be emphasized is that, among the 16 cases that were treated with ascorbic acid, absolutely no complications were observed and, particularly, no cases of the development of emphysema were observed.

Summary

Ascorbic acid treatment has a very favorable influence on the course of croupous pneumonia. Immediate suppression is mostly possible in the beginning of the disease; in treatment that commences later, critical or lytic defervescence in two to three days can also generally be achieved even when all the stages of the pneumonia were traversed. The improvement in general health (prostration, dyspnea) is most conspicuous. In contrast to the observations of Hochwald, however, a more rapid resolution of the pneumonia could then no longer be attained.

Metabolic changes due to vitamin treatment have not yet been investigated in greater detail because of the small number of our observations. In the same way, it must be left to a larger number of investigations as to whether, in already advanced stages, significantly more favorable results could not also be attained via a combination of vitamin C and chemotherapeutic agents or, above all, via serum. An aspect that is of importance is that we managed with considerably smaller doses of vitamin C than those indicated by Hochwald, whereby this is not insignificant in light of the currently continuing high price of the preparations.

References:

http://www.mv.helsinki.fi/home/hemila/CP/Bohnholzer_1937_ch.pdf

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