A modified method for the subcutaneous use of arsenic / A.A. Herzfeld.

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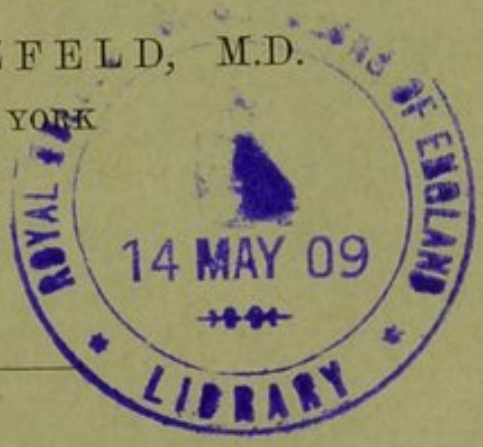

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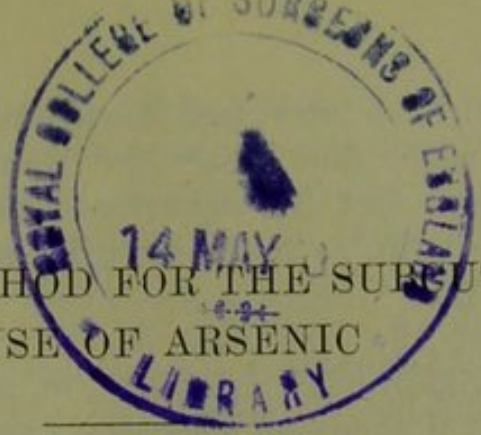

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The hypodermic use of arsenic has long ago established itself as one of the best methods of administering this drug. The subcutaneous use of this medicament is preferable in all diseases in which a long-continued arsenic medication is indicated, particularly in those cases in which we have to deal with a pathologic gastrointestinal canal. The subcutaneous use of arsenic is preferable in certain affections of the skin, as in scleroderma, lichen ruber, and in a number of diseases of the blood, as in pernicious anemia pseudoleukemia, etc. The hypodermic method has the advantages, first, that the dosage is accurate; second, that the dose is smaller than that given by mouth; third, that it does not irritate the gastrointestinal mucous membrane; and, fourth, that toxic symptoms have rarely been noticed when the inorganic salts are used.

We are indebted to Ziemssen[1] for one of the earliest and best modifications of the method of hypodermic administration of arsenic. The disadvantages of the previous methods, which mainly consisted in the simple injection of liquor potassii arsenitis (Fowler's solution), or of Pearson's solution, were the following: First, these solutions decomposed very easily; second, they were highly irritating to the subcutaneous tissue, so that in certain instances abscesses and even gangrene resulted. In order to counteract these disadvantages Ziemssen employed a 1 per cent. solution of sodium arsenite and attributes the advantage of his preparation in the fact that "it does not cause any or very slight

1. Deutsch. Arch. f. klin. Med., lvi, 124.

irritation." I have used Ziemssen's solution in a number of cases, and while the results were excellent, I have found that the injections were attended with considerable pain, so much so, that in one case the patient avowed that "the cure was worse than the disease." I attributed the irritating effects of this solution to its strong alkalinity. In order to counteract the strong alkalinity I modified Ziemssen's solution as follows:

One gram of arsenious acid and 2.25 c.c. normal soda solution are boiled in 100 c.c. of distilled water until a clear solution results. This solution is filtered and enough distilled water added to make the filtrate weigh 100 gm. This 1 per cent. solution of sodium arsenite is slightly alkaline. The solution is kept in quantities of 15 c.c. in small sterilized Florence flasks, which are closed by sterile cotton stoppers. When alkaline solutions are kept for a long time in ordinary glass bottles a slight turbidity and sediment occur, due to the action of the alkali on the glass.

I tested the alkalinity of this solution in comparison with Fowler's and Ziemssen's and I found that 5 gm. of Fowler's solution required 1.2 c.c. of normal sulphuric acid solution to neutralize the alkalinity, and 5 c.c. of Ziemssen's solution required 0.48 c.c., while my modification required 0.23 c.c. of normal sulphuric acid solution. Litmus was used as indicator.

I have employed these injections in a number of cases and found that they are nearly painless; at the most they cause a slight burning, which sensation promptly disappears. I have never seen an abscess result from an injection. The injections must be made with all aseptic precautions. After the injection an alcohol dressing is advisable in order to counteract any possible infection. I begin with an injection of 0.25 c.c. and gradually increase the strength to 1 c.c. daily (0.01 gm. sodium arsenite). In one case of pernicious anemia I injected 2 c.c. (0.02 gm. sodium arsenite) every second day, without causing any toxic symptoms. Clinically the results with the modified solutions were very gratifying. The injections are made on the upper arm or between the shoulder blades.

Despite the favorable reports in regard to the treatment of certain skin affections and syphilis by the hypodermic use of atoxyl and the cacodylates, which contain,

respectively, 37.7 per cent., 35 per cent. of pure arsenic, these organic and less poisonous combinations of arsenic have not proved nearly as efficacious as the conventional inorganic arsenic preparations in the more aggravated skin lesions, and especially in Hodgkin's disease and pernicious anemia. Another objection to the hypodermic use of the organic arsenic combinations in these diseases is found in the fact that the dose has to be a large one to be of any therapeutic use, and this circumstance frequently has caused severe arsenic intoxications with serious consequences, as the literature of the last year goes to show.

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