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Editorial

Streptomycin

THERE is good evidence from the papers appearing in this symposium to support the statement that streptomycin is an extremely valuable anti-infective agent in the treatment of many infections that are resistant to either the sulfonamides or to penicillin. Thus, streptomycin has taken its place along with the sulfonamides and penicillin as a potent and valuable chemotherapeutic agent. Its effect in tularemia is unquestioned and in many cases dramatic. The results reported by Foshay are extremely impressive and carry great weight. The statement that "there is uniform agreement that streptomycin is an extremely effective therapeutic agent in tularemia" is supported by the data and by a wide experience with the treatment of this disease with other methods. It is noteworthy that highly satisfactory results can be obtained with a total dosage schedule of 2 to 3 Gm. given over a period of four to six days.

Dr. Alexander gives us precise information concerning the position of streptomycin in the treatment of *H. influenzae meningitis*. Her broad experience with the use of various methods of treatment in this disorder suggest that streptomycin should be used alone only in mild or moderately severe cases. The criteria for the use of various forms of combined therapy such as streptomycin alone, or sulfadiazine and antiserum, or the combined use of sulfadiazine with either streptomycin or Type B *H. influenzae*

antiserum are spelled out very clearly in the paper.

That streptomycin has a small but definite place in the treatment of bacterial endocarditis is emphasized by Hunter. The patients with gram-negative bacillary infections who have an organism that is sensitive to streptomycin should all receive treatment. Also, those patients with penicillin-resistant, streptomycin-sensitive organisms that fall into the gram-positive group should be treated intensively.

The position of streptomycin in the treatment of urinary tract infections has been defined by Hewitt and for wounds and peritonitis by Howes and Zintel, respectively. All these studies demonstrate that streptomycin plays a definite part in controlling these complicated infections.

The review of the present status of streptomycin treatment in tuberculosis by Hinshaw, Pyle and Feldman serves to stress once again the importance of studying this infection further and with greater intensity. One cannot help but be impressed with the positive effects of chemotherapy in these various tuberculous infections. When the statement that "streptomycin is the most effective antibacterial agent known for tuberculosis" is combined with another, "experience with this antibiotic agent has proved that tuberculosis is a disease amenable to antibacterial therapy," there are good grounds for believing that great strides will be made in developing new methods for

treating one of the most important infections in man.

The results reported by Finch in acute brucellosis strongly suggest that the treatment of these patients should be carried out over a period of at least three to four weeks with 2 to 3 Gm. of streptomycin a day. It is a striking fact that in this disease, as well as in enteric infections due to *E. typhosa* and salmonella strains, the results of treatment with streptomycin have not been dramatic or impressive. It is far from clear why typhoid bacilli that are sensitive to streptomycin *in vitro* cannot be destroyed in the body when concentrations of the antibiotic are obtained in body fluids that are higher than is necessary to kill the organisms *in vitro*. It would be of great importance if we knew the mechanism of this phenomenon.

It has been pointed out that one of the limiting factors in using streptomycin is the rapid development of so-called bacterial resistance. The mechanism by which this resistance develops is not wholly understood. Perhaps one of the reasons for our lack of understanding of this phenomenon is that we are almost wholly ignorant of the mode of action of streptomycin on bacteria. It is not too much to expect that more information concerning the mode of action of streptomycin might assist one in understanding this problem of bacterial resistance and provide us with ways and means of preventing its development.

The toxic reactions as summarized by

McDermott and the tests for bacterial sensitivity and methods of streptomycin determination in body fluids by Herrell and Heilman point to a number of the important practical features in the management of patients who are receiving streptomycin.

It seems plain from McDermott's studies that reactions from streptomycin follow the use of highly purified material as well as material containing not more than 50 to 60 per cent streptomycin. Also, it is clear that the larger the daily dose and the longer the treatment the higher the incidence of reactions. McDermott makes the point that toxicity cannot be considered apart from the diseases for which the drug is used. On a basis of his studies, it is stated that 3 Gm. a day represents the maximum limit of a safe dose. On the whole, however, it can be stated that the toxicity is sufficiently low to justify the use of this drug in all serious or potentially serious infections due to penicillin-resistant, streptomycin-sensitive organisms.

It can be said that streptomycin is another antibiotic agent that is extremely valuable and effective in controlling many infections that were uninfluenced by any other existing chemotherapeutic agent. Its discovery and application shows what can be accomplished in a group of extremely stubborn infections. It is to be hoped that our knowledge of its usefulness will be extended still further in the future.

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