THE USE OF BISMUTH, SILVER AND MERCURY SALTS OF PENICILLIN FOR THE PROLONGATION OF PENICILLIN BLOOD LEVELS

Preliminary Report

SAMUEL MONASH, M.D.

At the present time the sodium, potassium and calcium salts of penicillin are used in therapy. These are all characterized by their solubility in water and are therefore very quickly absorbed and eliminated. Various methods of prolonging penicillin blood levels have been proposed. The one preferred is that first proposed by Romansky and Rittman (1), namely, the injection intramuscularly or subcutaneously of a suspension of calcium, sodium or potassium penicillin or, as it should be called, penicillate in a mixture of oil and beeswax.

It occurred to the writer that if a substantially insoluble compound of penicillin were injected intramuscularly or subcutaneously, a deposit of penicillin would be formed which would be completely absorbed at a much slower rate than a soluble penicillin salt, and would therefore result in a prolongation of the blood level after a single injection. It has been known that penicillin will produce insoluble salts with a number of heavy metals. They have never been used before because such metallic ions have inactivated penicillin and it was thought that this inactivation was irreversible. However, in experiments performed on a total of thirteen rabbits, I have found that when an insoluble penicillin salt is injected intramuscularly, the penicillin is reactivated in vivo and produces a prolongation of the penicillin blood level in rabbits for at least as long as 20 hours. Thus 20,000 units per kg. of sodium penicillate suspended in peanut oil gave no readable blood level after five hours, whereas 20,000 units of silver penicillate per kg. showed a blood level of .08 units per cc. at 17 hours and .03 units at 20 hours; mercury penicillate produced a blood level of .08 units at 17 hours and bismuth penicillate a level of .04 units at 20 hours.

The above salts are easily prepared by adding an aqueous solution of a soluble heavy metal salt to an aqueous solution of a soluble penicillate, such as sodium, potassium or calcium penicillate.

The advantages of the above preparations in the treatment of syphilis and gonorrhea are obvious. We have here a combination of two spirocheticidal substances which with one injection will produce therapeutically active blood levels of penicillin at least four times as long as soluble penicillates.

A more detailed report on the above and other insoluble penicillates will appear later.

REFERENCES


1475 Broadway
New York 18, N. Y.