

## Prophylaxis in the Venereal Diseases

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With the world-wide rise in both gonorrhea and syphilis in the face of the existence of specific curative measures and of demonstrated highly successful public health programs, and in spite of experience with and success in the use of prophylaxis, particularly under conditions of social stress in two world wars, it seems appropriate to assess again the role of prophylaxis as one of the elements of venereal disease control measures that must be considered in planning for future programs to deal with the problem. The concept of prophylaxis dates back to the sixteenth century when Fallopio<sup>7</sup> wrote of the use of the sheath (condom) to protect mechanically against syphilis. He reported that he invented it to protect against syphilis and tried it on 1100 men. Further history of the use of the condom as a prophylactic agent in addition to its contraceptive use is not easily documented. Today the value of the condom as a prophylactic is still being debated. However, the condom has been an important element in highly successful military health programs in both the First and Second World Wars. It appears today that the public's perception of the purpose of the condom is changing. In the United States, for instance, it has increasingly been considered primarily as a contraceptive agent rather than a prophylactic. This has been documented by Utidjian and Hingson.<sup>9, 20</sup> Studies of its manufacture and distribution throughout the world as reported by Sollins and Belsky suggest that there is little present prospect for increased production of the condom throughout the world.<sup>18</sup> As a consequence, little more reliance can be placed upon it under present circumstances as a contributor to prophylactic efforts.

In 1882, Credé reported on the value of silver nitrate solution instilled into the eyes of the newborn as a prophylactic measure against gonorrheal ophthalmia neonatorum, then the leading cause of blindness. The experience is reviewed in the recent memorial article by Velhagen.<sup>20</sup>

Silver preparations of various kinds, both organic and inorganic, were then investigated and a number of different compounds were found valuable not only for this purpose but also for both the prevention and treatment of genital gonorrheal infections.

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By 1904 Metchnikoff and Roux,<sup>12</sup> through human and animal experimentation, had established the value of 33 per cent calomel as prophylaxis against syphilis. Thus, the first tools for the control of the transmission of syphilis and gonorrhoea were identified shortly after the so-called Bacteriologic Era ushered in by the discoveries of Pasteur. The surge of investigations accompanying these discoveries led to the identification of etiologic agents, to the study of chemical and immunologic methods of cure and prevention, and to the development of experimental methodology. Use of this knowledge was of great value in public health programs for control of gonorrhoeal ophthalmia neonatorum, and VD control efforts in general.

The concern with venereal disease prophylaxis until now has appeared to be greatest in time of war. It would seem, however, in analysis of the existing pattern of gonorrhoeal infection within the United States alone, that the economics of therapeutic programs, as presently conducted, coupled with the difficulties of securing professional staffing for public health control programs, clearly indicate the need to involve the individual at risk by furnishing him with the motivation to protect himself.

A record of World War I experience might be of interest and significance. A quote from Stokes' monumental text on syphilis states:<sup>18</sup>

A classical example is Walker's experience at St. Nazaire in World War I, when an incidence rate of 625 per thousand per month was reduced in three months to 110 per thousand by the compulsory application of prophylaxis to all men returning from leave, whether admitting exposure or not. Further application of prophylaxis, and more efficient guards around the camp, reduce the incidence to 35 per thousand. Estimates of the efficiency of station prophylaxis based largely on World War I experience, include such figures as 1.3 per cent failure in 242,000 treatments; one infection in 37 exposures without prophylaxis as against one infection in 274 exposures when prophylaxis was taken.

As reported by Stokes<sup>19</sup> and in *Preventive Medicine in World War II*,<sup>11</sup> various silver preparations were used. Perhaps the most commonly used preparation in the "pro stations" was a 2 per cent solution of strong silver protein. At one time a preparation was distributed for individual use which included a 4 gm. tube of 0.25 per cent silver nitrate jelly. For protection against syphilis the standard preparation was 33 per cent calomel ointment, as originally described by Metchnikoff and Roux.

In the Second World War prophylaxis had again become an important element of the venereal disease control program. By this time the sulfonamides had become available, and various derivatives were incorporated into topical preparations for protection against gonorrhoea. It is important to keep in mind that all of the topical preparations used for protection of the male were used after contact, and required application to the urethra, the glans and shaft of the penis, and to the surrounding pubic area. Urination after contact and washing with soap and water prior to application were also recommended. Even within military conditions of life, supported by "pro stations," adherence to such procedures was frequently less than optimal. Nonetheless, evidence points to the worth of the procedures as reported in *Preventive Medicine in World War II*.<sup>11</sup>

With the advent of sulfonamides, and later, antibiotics, it was possible to practice systemic prophylaxis against gonorrhoea and syphilis, and a large body of experience exists to demonstrate its effectiveness. The recent work of Smartt and Lighter<sup>15</sup> is of interest. In certain patient populations the results are very good.

There are, however, several problems to be considered in the use of systemic prophylaxis on a large scale, as in routine public health practice: first, the need of medical prescription for and medical monitoring of patients given antibiotics or chemotherapeutic agents; second, the development of increasing drug resistance by the pathogens; and third, the risk of toxic reaction in the patient. This problem is well illustrated in the findings of Newmann and Balcker.<sup>13</sup>

From the studies of Arnold and Mahoney, both in the laboratory and in selected population groups, it was determined that a wash with a solution of 0.1 per cent Mapharsen and 1 per cent sodium lauryl sulfate has prophylactic value against both syphilis and gonorrhoea at least equal to that of previously used topical preparations. The advantage was found in the simplicity and ease of application and in the acceptance of the preparation as fitting into the pattern of washing after contact.

Based upon Arnold's studies in the male,<sup>1</sup> Funes and Aguilar demonstrated the value of the Orvus-Mapharsen at the level of 0.01 per cent Mapharsen and 0.1 per cent sodium lauryl sulfate as a post contact douche in a carefully controlled study in prostitutes.<sup>8</sup>

Study of the efficacy of prophylactic agents is complicated by the lack of a satisfactory, inexpensive, and readily available experimental animal for gonorrhoea. For syphilis the rabbit has proven to be a very useful model, as summarized by Arnold and Cutler<sup>3</sup> and by Arnold and Mahoney.<sup>4</sup>

Since 1950 very little investigative work has been done on prophylaxis. Efforts at control have been directed toward case finding and treatment. From the data available in the United States and Scandinavian countries it appears that the manufacture of condoms has not kept pace with the rate of growth of the age segment of the population at highest risk of gonorrhoea; so that even if the condom were used primarily for prophylaxis, the extent of use for this purpose would be declining. But of perhaps greater significance is the fact that certain epidemiologic data from European studies suggest that the decline in the relative proportion of usage of vaginal contraceptives in favor of oral contraceptives and intrauterine devices has removed another chemical barrier to venereal disease transmission. This is discussed in reports from the International Union against Venereal Disease and the Treponematoses<sup>10</sup> and by Catterall.<sup>5</sup>

It would appear from review of the experience with prophylaxis, whether against gonorrhoeal ophthalmia neonatorum or against sexually transmitted disease, that past successes have been based upon public awareness of seriousness of a disease, medical and public health concern with the problem, and finally a carefully planned and well executed total public-health approach. The experience of both the military and civilian population in the United States indicates that this approach can succeed.

An important element has been the matter of motivation. However, the motivation, health education, and promotion of the use of prophylaxis was much simpler in the military than in civilian populations. One of the important factors in the success of the prophylaxis-motivation program was that it was possible in the pre-penicillin period to instill a healthy respect for the personal consequences of lack of self-protection resulting in disease and concurrent pain, discomfort, and long-term ill effects which brought about a fair measure of cooperation on the part of the individual at risk. It is, of course, necessary to recognize that there were many prophylactic failures and that factors, such as drunkenness and conditions under which contacts often took place, worked against the effective use of prophylaxis. However, the experience in the military, as borne out by the infection rates, and in certain civilian populations, in which the same was found true, indicates that prophylaxis can contribute significantly to the lowering of infection rates.

In a similar vein the experience with prostitutes, such as the studies carried out by Funes and Aguilar<sup>8</sup> and Porter, Witcher, and Knoblock,<sup>14</sup> indicate that prostitutes can also be taught and motivated to use prophylaxis with resultant lowering of risk of infection.

The programs of case finding and treatment in venereal disease control efforts, which have been brought to a high degree of effectiveness during the past 20 years, cannot be allowed to lapse but rather should be stepped up. Although there are possibilities for the development of immunizing agents against the venereal disease, the prospects for immediate, large-scale application are not hopeful. The present increase in gonorrhea in the United States, as well as in other parts of the world, thus suggests the immediate need of utilizing once again, as an additional element of the VD control effort, the techniques of prevention, such as chemical prophylaxis and increased attention to the condom. With the shortage of health manpower in the United States, with the present professional lack of interest in venereal disease contributing to the current difficulty in staffing even the existing venereal disease programs and clinics in the United States because of both budgetary and professional manpower shortages, and with far greater problems of a similar nature found elsewhere in the world, particularly in the developing nations, it becomes obvious that there can be no hope of any widespread and productive effort directed toward stemming the world-wide venereal epidemic through treatment alone or even through the increased utilization of the standard epidemiologic practices. It becomes necessary to look for other techniques which can be added to those presently used in public health programs.

In view of the fact that it is desirable to prevent unwanted pregnancy as well as the transmission of venereal diseases, it would seem highly desirable to consider once again the development of a prophylactic cum contraceptive measures which could be readily available to the promiscuous individual without requiring medical prescription and which would simply require motivation of the patient. The motivational campaign could be carried out through all of the methods of public information and health education which have proved so successful in the two world wars.

With the availability of the condom, with the hope for availability of preparations which are both prophylactic and contraceptive and which do not require medical intervention, such as a number of existing vaginal contraceptives, it is conceivable that there could and would be a real value in the addition once again of prophylactic measures as an element of the nationwide approach to the venereal disease problem. Such a study is now under way,\* as reported by Arnold and Cutler,<sup>2</sup> Cutler et al.,<sup>6</sup> and Singh et al.<sup>16, 17</sup>

If the same agent or technique can be both prophylactic and contraceptive, it will then become possible to add a new element to both VD and family planning programs so as to reach large numbers at risk with minimal added costs.

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