STERILIZATION OF SYRINGES AND NEEDLES

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Our paper on inoculation technique (*Journal*, January 20, p. 79) and our letter (February 17, p. 279) have given rise to considerable comment and more than one request for practical suggestions for the improvement of methods. In reply, while it is difficult to give precise directions which will be acceptable to everybody, there are certain general principles of technique which should be kept constantly in mind—namely:

1. Every medical man should have two sets of syringes—one for the injection of therapeutic products into healthy tissues, and the other reserved solely for the withdrawal of pathological fluids. The suggestions which we offer in this article are based on the assumption that there will be no departure from this fundamental requirement and that the two sets will be readily distinguishable.

2. When syringes and needles have been sterilized, "droplet" infection from the patient or attendants should be avoided, as well as contamination by unsterile hands or dressings.

3. The best and simplest means of sterilizing syringes is by heat, as the ideal antiseptic solution for this purpose is not yet available.

Syringes for Inoculations

In clinics, hospitals, etc., where large numbers of inoculations are carried out, syringes and needles should be placed, while still wet, in suitable containers (for example, test-tubes with parchment covers) and sterilized by steam under pressure in a properly controlled autoclave. Each syringe should be filled only once from the bottle of serum or other product, and if more than one inoculation has to be made from the contents of the syringe a fresh sterile needle should be used for each patient. When empty the syringe should be resterilized and a fresh sterile syringe and needle used for the next withdrawal from the bottle. The risk of infecting multiple-dose containers is thus minimized.

The general practitioner will find the above procedure impracticable unless he has ready access to an autoclave which is adequately supervised. He can, however, use the following method (or some such modification of it as we suggest), which falls short of the ideal but will rarely fail to protect the patient from the risks of infection. Our preference is for boiling syringes and needles, *immediately before use*, for fifteen minutes or longer in water, or, still better, in 1 per cent. phenol, the syringes being emptied completely before being filled with the inoculum. This treatment will destroy all vegetative forms of bacteria, but not necessarily all spores. Stronger solutions of phenol may cause irritation and should not be used. Certain types of syringe can be assembled and then boiled, without risk of breaking, and this procedure reduces the chances of contamination. In all boiling operations the sterilizer should be covered with a lid. It is a good plan to sterilize with the syringes and needles test-tubes of appropriate size, in which the assembled syringes and needles can be placed on the table and so protected from "droplet" infection while cooling and also between injections.

Practitioners will rarely be prepared to wait for upwards of fifteen minutes for the sterilization of syringes and needles on their round of visits, and therefore the following modification is suggested, the first essential being adequate equipment. The lid of the metal case of each syringe should be removed, and the lid and the case itself, holding the barrel, plunger, and needles in separate clips, should be boiled, as previously

recommended, for at least fifteen minutes in 1 per cent. phenol. After boiling, the water in the case should be drained off and the lid replaced. Where a number of injections have to be given on the doctor's round, several syringes may be sterilized in this way before he leaves home. At the bedside the barrel and the plunger are taken from their respective clips and assembled with hands which should be sterilized if possible. (With suitable types of metal case, this operation may be performed immediately after each syringe has been boiled in the doctor's surgery; after barrel and plunger are fitted together they are inserted into the barrel clips and the lid of the box replaced.) The needle should be withdrawn from its holder by the shoulder and fitted to the nozzle of the syringe, care being taken not to touch the end of the nozzle during the operation. A pair of forceps may be boiled with the syringes, carried in one of the boxes, and used for fitting the needle to the syringe at the bedside. Incidentally, the life of most needles is short on account of blunting of the point and rusting. Needles should be of best-quality stainless steel, kept sharp and renewed frequently. An alternative suggestion for sterilization is that a stout test-tube with a rubber cork or rubber cap should be sterilized with each syringe, and that syringe and needle should be assembled in the doctor's surgery and carried in the test-tube. The needle may be protected by a small piece of glass or rubber tubing at the bottom of the test-tube. Practitioners who wish to adopt this method are warned of the dangers of plugging the tubes with unsterile wool, and also of replacing a used syringe in the container and confusing the outfit with another sterile one.

Private practitioners have not the same facilities as hospitals and clinics for proper sterilization technique, and it is advisable for them to use single-dose instead of multiple-dose containers of biological products, as there is always some risk of contaminating the latter.

Syringes for Withdrawal of Pathological Fluids

Usually the remains of the exudate left in the syringe after ejection of the bulk of the material is got rid of by repeatedly drawing up water to fill the barrel of the syringe and ejecting each filling into some strong antiseptic solution in order to destroy any organisms present. The vegetative organisms remaining in the syringe *might* be killed by weak antiseptics or brief exposure to boiling water. Even if the proteins in inflammatory exudates are coagulated during the process of sterilization, boiling may still be effective, but chemicals may not penetrate the coagulum, so that some organisms contained therein may survive the treatment. Resistant sporing organisms may also occasionally be present. The impossibility of guaranteeing the sterility of infected syringes and needles treated by boiling or by ordinary "contact disinfection" with various chemicals—for example, alcohol, ether, thymol, lysol, or phenol, or mixtures of these—must therefore be realized. It has been suggested to us that a mixture of phenol and alcohol might be used for the treatment and storage of syringes, but alcoholic solutions of phenol have very little antiseptic action, and the germicidal power of phenol in watery solutions diminishes as alcohol is added. An aqueous solution of phenol is an efficient germicide, but it is not generally remembered that exposure for several days to a 5 per cent. solution at room temperature is necessary to kill the spores of certain bacilli. Boiling in 5 per cent. phenol is much more rapidly effective than immersion in the antiseptic at room temperature, but boiling for several minutes may be necessary to kill all resistant spores. When autoclaving of contaminated syringes is impossible, we therefore recommend that these should be thoroughly washed as described above and then *boiled for half an hour or longer in 5 per cent. phenol*. Care should be taken that the solution comes in contact with every part of the syringe and needle. This treatment may leave in the syringe sufficient phenol to interfere with the bacteriological examination of pathological fluids collected subsequently. The syringe should, therefore, be boiled for fifteen minutes in water before it is used for the aspiration of fluids which are to be sent to the laboratory for examination—for example, bacteriological or biochemical.

Syringes should never be rinsed in supposedly sterile water; stored water should not be regarded as sterile unless it has been hermetically sealed in a glass container immediately after sterilization. Even in some hospitals it is believed that water once sterilized remains sterile indefinitely under any conditions of storage!

Insulin Syringes

Dr. R. D. Lawrence (January 27, p. 150; and March 2, p. 366) has made out a case for the use of spirit containers, and for some compromise with regard to "sterilization" of both syringes and containers in daily use by himself and his patients. The bactericidal action of a solution containing 70 per cent. of ethyl alcohol is much greater than that of industrial spirit, 95 per cent. alcohol, to which Dr. Lawrence refers. As even 70 per cent. alcohol is an unsatisfactory antiseptic, patients should be instructed to change it from time to time, possibly once or twice a week, when the container itself and the syringe should be boiled. Ordinary insulin solution is acid and is therefore in a somewhat different category from other products, but if protamine-zinc-insulin is used it should be realized that there is greater risk of infection, and measures of cleanliness and "sterilization" should be more thorough. Each patient usually has his own syringes, however, and if he neglects personal cleanliness and the methods recommended by his doctor, any sepsis, trifling or otherwise, which results affects himself alone and not a number of patients injected subsequently with the same contaminated syringe. If an abscess does occur, it will be well for the doctor's peace of mind if he can indicate to his patient that his instructions have not been carried out.

PHARMACY AND POISONS ACT, 1933

Attention is drawn by the Home Office to the Poisons List (Amendment) Order, 1940 (S.R. and O. 1940, No. 453) and the Poisons (Amendment) Rules, 1940 (S.R. and O. 1940, No. 452), which were made by the Secretary of State on March 29, 1940, and came into operation on April 1.

The Order and Rules amend the definition of sulphanilamide derivatives contained in the item "Para-aminobenzene-sulphonamide" which was added to Part I of the Poisons List by the Poisons List (Amendment) Order, 1938, and to the First and Fourth Schedules to the Poisons Rules, 1935, by Rules 5 and 7 respectively of the Poisons (Amendment) Rules, 1938; the amendment consists in the replacement of the words "derivatives of para-aminobenzene-sulphonamide having one or both of the hydrogen atoms of the para-amino group substituted by other radicals" by the words "derivatives of para-aminobenzene-sulphonamide having any of the hydrogen atoms of the para-amino group or of the sulphonamide group substituted by another radical."

Sulphonol and alkyl sulphonals are now included in the First Schedule.

A further amendment to the First Schedule exempts dentifrices containing less than 0.5 per cent. of acetarsol from the special restrictions applying to substances included in the First Schedule. An addition has been made to the Special Exemptions in Group II of the Third Schedule to the Poisons Rules to exempt from all control under the Act and Rules chlorides of antimony contained in polishes.

Copies of the Order and of the Rules may be bought (price 1d. each), directly from H.M. Stationery Office at the following addresses: York House, Kingsway, W.C.2; 120, George Street, Edinburgh, 2; 26, York Street, Manchester, 1; 1, St. Andrew's Crescent, Cardiff; 80, Chichester Street, Belfast; or through any bookseller.

A Society of the History of Medicine has recently been founded in Peru. Its aim is to further the progress of medical history, especially that of Peru, and to cultivate relations with foreign countries, especially France. Several French medical historians have been elected honorary members of the new society.

Local News

SCOTLAND

Pooling of Scottish Ambulances

Arrangements involving the pooling of ambulances in Scotland were made at a conference in Edinburgh on March 12. The conference, which was called by the Department of Health, was presided over by Mr. W. R. Fraser, secretary of the Department, and was held to consider how to make the best and most economic use of the various ambulance services in Scotland. It was attended by representatives of the St. Andrew's Ambulance Association and the British Red Cross Society, and of the Navy, Army, and Royal Air Force. It was agreed that ambulances controlled by the Department and by the two organizations should be pooled in such a way that, subject to local needs and to certain reservations due to prior understandings, they would be sited in the places where they are most likely to be required, and would be made available to deal with any demands for ambulance transport for sick and wounded of the fighting services and for civilian air raid casualties. The Department undertook to investigate and advise as to the probable needs of the various districts in Scotland and to frame proposals for consideration at a further meeting.

Glasgow Health Report

The annual report for 1938 of the medical officer of health, city of Glasgow, deals with a population estimated at 1,127,825 persons, inhabiting 280,561 houses. The general death rate of 13.3 per thousand is the lowest yet recorded. This is chiefly attributable to a marked fall in the deaths due to pneumonia and respiratory diseases. Deaths from heart disease were also less numerous. With regard to infectious diseases, scarlet fever showed a decrease in the number of cases, but diphtheria was more prevalent than it has been since 1927. In the enteric group fifty-seven cases were verified, twenty-eight as typhoid and twenty-nine as paratyphoid B. Six cases of the latter occurred in the surgical ward of a hospital. When the first cases had been diagnosed there was nothing to indicate the source of infection. Following thorough examination of all patients, nursing staff, and ward maids, it was found that one patient, a woman of 55 who had been admitted for pyloric obstruction, showed a strongly positive reaction to *B. paratyphosus* B. She had no symptoms, and temperature and pulse were normal. This patient was removed to a fever hospital, where paratyphoid B bacillus was subsequently obtained from her urine. Three cases of anthrax in human beings occurred during the year. Two of these were among the employees of a firm which manufactures animal fertilizers and foodstuffs from raw materials imported from India. Over a month elapsed between the two cases, each of which developed a typical malignant pustule on the forearm. Both patients made a rapid and uneventful recovery. Despite full investigation the source and manner of infection remained undiscovered. The remaining case was that of a woman worker employed as a twister of hair with a firm of bedding manufacturers. The material used was horse and hog hair imported from South America and U.S.A. In this case the left side of the face was the site of infection.

Central Midwives Board

At the last meeting of the Central Midwives Board for Scotland Professor R. W. Johnstone, M.D., F.R.C.S.Ed., F.R.C.O.G., and Professor James Hendry, M.B., F.R.F.P.S.G., F.R.C.O.G., were elected chairman and deputy chairman respectively for the ensuing year. The Board appointed examiners, and approved, subject to inspection, certain training institutions, with the teachers attached thereto, for the training of pupil midwives.