EXPERIENCE WITH A SYRINGE UNIT

BY

ANTHONY G. RICKARDS, M.D.

(From the Department of Pathology, Royal Lancaster Infirmary)

Many hospitals in this country are at present considering the establishment of a comprehensive syringe service. Such a unit has been in operation at this hospital for the past sixteen months, and it is felt that our experience may be of help to those about to undertake a similar service.

Method of Cleaning and Packing

Many different techniques have been tried in the sterilization and packing of syringes; the method of our choice is outlined below.

The syringes are first cleaned on the wards, and on arrival at the depot are placed in a bowl of soapy water or soapless detergent and boiled for 20 minutes. They are then rinsed in hot running water. These procedures are carried out with the piston pulled out of the barrel to about three-quarters of its distance. After rinsing well, clean warm water is drawn up and discarded with every syringe. The syringes are then dried in the hot-air oven again, with pistons pulled out to three-quarters of their distance, and, after cooling, a *little* liquid paraffin is applied to the bottom of the piston, the syringe being worked until an even coating of oil is obtained between piston and barrel.

The needles are similarly treated by boiling in soapy water, rinsing, and drying, and are then tested for sharpness and patency.

We have found that the simplest method of packing the syringes and needles is to place them in a hard glass test-tube of appropriate size containing a wad of cotton-wool on the bottom. The top of the tube is then similarly sealed with a cotton-wool plug. The method advocated by the Medical Research Council (War Memorandum, No. 15, 1945) differs from our own in that the assembled syringe is placed in a glass tube of such diameter that the barrel of the syringe is a loose fit but the flange rests on the top of the tube. The disadvantage of this latter procedure is that the top of each syringe must be covered with paper or "cellophane," tied or twisted, to keep its position. Moreover, paper subjected to the required heat often becomes very friable and cracks on handling.

The disadvantage of our method of packing is that the nozzle of the syringe is in direct contact with the plug of cotton-wool at the bottom of the tube. Sometimes pieces of wool become adherent to the nozzle and interfere with a good join between needle and syringe. This difficulty has been overcome by protecting the nozzle of the syringe with a Durham tube.

Two needles of different bore are threaded through a small slip of paper and placed in the same tube alongside the syringe in such a way that the paper prevents the points of the needles from touching the wool at the bottom of the tube.

Sterilization

Sterilization is carried out by placing the assembled units in wire baskets in a hot-air oven at a temperature of 160° C. for not less than one hour. A point of difficulty which often arises is the degree of temperature variation at different places within the same oven. The usual method of estimating the temperature is to place a thermometer through a slot in the top of the oven so that the mercury

bulb is just within the cavity. It will sometimes be found that the temperature recorded this way is much lower than that at the bottom and sides of the oven, the variation being as much as 20° C. To overcome this difficulty it is best to place a thermometer in a test-tube plugged with wool and take recordings wherever it is intended to sterilize the syringes.

A further point to bear in mind is the rapid lowering of the oven temperature when cold syringes are placed within it. A considerable time may elapse before the oven regains its heat, and allowances for this factor must be made in the sterilizing time. As an alternative to dry sterilization an autoclave with drying facilities may be used. This would allow sterilization to be effected at a much lower temperature—a distinct advantage when dealing with glass-and-metal syringes.

Syringes

In the past all-glass syringes have been almost exclusively used where sterilization by hot air has been required, but several manufacturers are now producing glass syringes with metal nozzles which will withstand ordinary dry sterilizing heat at 160° C.

This syringe unit started with a stock of all-glass syringes, but these are now being replaced by the metal-and-glass types. There are two serious disadvantages to the all-glass syringe. The first is the fragility of the nozzle: approximately half of our breakages have been due to chipped glass nozzles. The second disadvantage lies in the poor join between needle and glass nozzle. This union is not as satisfactory as with the metal nozzle. A disadvantage encountered in the glass-and-metal syringe is that occasionally the solder melts at sterilizing temperature. This has not been a frequent occurrence in our experience, and when it does occur the syringe can usually be repaired by clamping it in a vertical position, applying gentle heat to the supported metal base, and allowing the solder to set again.

A recent innovation by a firm of syringe manufacturers is the production of interchangeable pistons and barrels. These, however, are as yet produced only in the all-glass type of syringe, but the innovation has much to commend it. A further point to remember is the desirability of eccentric nozzles. In syringes of 5-ml. volume and upwards eccentric nozzles are preferable to the central type, especially when using a metal-and-glass syringe. It will be found that some makes have a rather large metal base, rendering intravenous work difficult without eccentric nozzles. Some manufacturers of metal-and-glass syringes do not charge more for those with eccentric nozzles, but in other cases there is a considerable increase in cost.

Syringe Markings.—This problem has given more anxiety than any other in the syringe service. Originally it was found that the markings on the all-glass syringes had become almost invisible after six to eight weeks of constant use. The notice of the manufacturers was drawn to this fault, and they have improved the staying-power of the markings; but syringes still differ in the durability of the markings, and before large orders are placed it would be wise to test samples for this failing. Syringes with engraved markings are preferable to those of transfer type.

Number of Syringes required for the Service.—From experience it is found that three times the estimated daily turnover is the minimum number of syringes necessary to meet all requirements with efficiency. The estimation of the daily needs is a more difficult problem, and will vary with different types of hospitals. In this hospital, which has 230 beds and caters for fairly large out-patient needs,

it is found that the average daily turnover is in the region of 400 to 500 syringes.

Expenditure.—The following items of expenditure are based on the first year's experience with the service: cost of initial outlay on syringes and needles, £600; cost of replacements, £750; cost of labour, £300.

Breakages and Lost Syringes.—As will be seen from the expenditure figures, the cost of replacements has been very high during the first year's trial period, the average number of breakages being approximately 1% per day. If this rate of loss were to continue the service would hardly justify the expense. Approximately 50% of these losses were due to chipped and broken nozzles, and the introduction of metal nosepieces has proved a great saving. Moreover, to avoid clerical work, an over-generous attitude was originally adopted to the issue of syringes, but it is felt that the system is not conducive to careful handling on the part of the users, so a system has been instituted by which each ward and each department are allotted an adequate number of syringes, and sterilized units are issued only in exchange for used syringes. It is already becoming apparent that the introduction of metal-and-glass types, together with the more rigid check on the return of the syringes, is resulting in a decrease in the number of breakages.

It has been found that one person working eight hours a day is capable of servicing 300 syringes daily. This includes cleaning, assembling, sterilizing, and sharpening of needles.

Conclusion

It is hoped that this short account will save others needless expense and trouble. In particular it is emphasized that before ordering large numbers of syringes the manufacturer's claims should be thoroughly confirmed.

AMOEBIASIS IN ENGLAND AS A HOUSEHOLD DISEASE

BY

A. R. D. ADAMS, M.D., F.R.C.P.

AND

D. R. SEATON, M.B., M.R.C.P.

(From the Liverpool School of Tropical Medicine)

The recorded cases of acute amoebic dysentery or amoebic liver abscess occurring in persons who have not been out of Great Britain have for the most part been described as isolated instances, without regard to the source of the infection or of their infectivity to contacts. There have recently come to our notice three families, living in Liverpool, in each of which more than one member of the household was suffering from amoebiasis.

Case Reports

In July, 1947, we were consulted by a ship's officer who had developed dysentery during the previous few weeks. Examination of his stools showed vegetative *Entamoeba histolytica*. While receiving treatment in hospital he mentioned that his wife, who had not been overseas, had recently developed diarrhoea, and he inquired whether he might not have infected her with his complaint. He was assured that this was most unlikely, but, as his wife's diarrhoea continued, her stools were examined, and it was found that she, too, had acute amoebic dysentery.

In July, 1948, a boy aged 16 came under our care suffering from dysentery of undetermined causation which he had had intermittently for the previous two years. His stools contained blood, mucus, and numerous vegetative *E. histolytica*. This boy had dwelt all his life in a Liverpool slum. In the household were his mother, stepfather (a dock-labourer), and six other children, none of whom had lived out of Liverpool. On inquiry it was found that the boy's mother had been troubled with diarrhoea during the previous two months. Examination of her stools showed that she had acute amoebic dysentery. The remainder of the family were in good health, but it was found that the stepfather and four of the six children were passing cysts of *E. histolytica*. This family was also largely infected with threadworms, *Giardia lamblia*, and *Entamoeba coli*.

In February, 1949, a boy aged 7 was admitted under our care suffering from an intractable colitis which he had had for three years. His stools contained blood, mucus, and very large numbers of vegetative *E. histolytica*. This boy had never lived out of Liverpool. Specimens of faeces were obtained from his family, which consisted of his mother, stepfather, and three sisters. Of these the stepfather was found to be passing *E. histolytica* cysts. He had no history of dysentery, but it is of interest that he was born in India and had lived there until he was 13, since when (he is now 45) he has been in England. The remainder of the family had not been abroad.

Comment

The experience of these families serves as a reminder that amoebiasis is a condition which may easily spread in a household where personal cleanliness is not of a high order. This fact, though plain enough, has perhaps suffered from a lack of attention in this country. By contrast, French medical publications contain a number of instances of autochthonous amoebic dysentery in which association with proved carriers was established. Dopter (1917) reviews these; see also Garin and Lépine (1924).

Finally, we would stress the undesirability of diagnosing ulcerative colitis before excluding amoebic dysentery as a possible cause of the syndrome by microscopical examination of the stools by someone familiar with the appearance of *E. histolytica*. Two of the cases recorded here had been ill for years and were sadly reduced in health from the want of this precaution.

REFERENCES

- Dopter, C. (1917). *Paris méd.*, **21**, 389.
Garin, C., and Lépine, P. (1924). *Pr. méd.*, **32**, 927.

The National Tuberculosis Association of the United States has made 22 grants for research during the present year. Four of these awards are new; the remainder are for the continuance of work already started. Dr. E. R. Long, director of medical research, has given details of current work aided by the association. Professor James Waring, University of Colorado, will be investigating the modification of tubercle formation to allow better access of drugs to the bacillus. Constitutional factors responsible for resistance and susceptibility to tuberculous infection are being investigated by Dr. P. B. Sawin, of Maine, and Dr. M. B. Lurie, of Philadelphia. Dr. D. Seligson, of Vancouver, Washington, will be making a study of the blood pictures of tuberculous patients. Work on the virulence of strains of the organism and their resistance to drugs is being done by Dr. Mary Bunting, of Yale. Grants have also been made for further research into the factors responsible for caseation, and it is hoped these studies will indicate how tissue destruction in tuberculosis can be reduced. The chemistry of tuberculin is currently under examination in the Universities of Pennsylvania and Wisconsin; an investigation of moulds to discover an additional therapeutic agent against tuberculosis is being made at the University of Colorado. Most of the remaining grants are for clinical work in tuberculosis.