LECTURES ON APPENDICITIS AND NOTES ON OTHER SUBJECTS

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CHAPTER I.

PREPARATION OF SURGEON AND PATIENT.

General Cleanliness is obtained by washing our hands, and the skin of the patient, at the proposed field of operation, with ordinary soap and water, aided by a nail-brush.

Special Cleanliness for the surgeon and assistants is gained by immersing the hands in 1:2000 bichloride of mercury solution for five minutes in preparation for ordinary work. Theoretically, this does not completely sterilize the hands, but practically it has been sufficient in my experience. It is difficult to destroy absolutely the spores of some of the bacteria, but if the whole operation is properly conducted, we need hardly fear the few spores which resist the action of the bichloride on our hands. After operation upon a distinctively septic case, and before proceeding to the next one, the hands are prepared by immersing them in a solution of permanganate of potassium, one drachm to the pint, until they are deeply stained, and then bleaching them in a solution of oxalic acid, two drachms to the pint, and afterward rinsing in 1:2000 bichloride of mercury solution.

Special cleanliness for the skin of the patient is obtained by methods employed for cleansing the hands, but, in addition, the skin is always shaved first, and, if possible, a pad of moist bichloride gauze is kept in contact with the skin at the proposed field of operation for ten hours.

Special cleanliness of the alimentary canal of the patient is aimed at by emptying the bowels, and then giving five grains of salol. This is an important measure in abdominal work, because the process of digestion stops when the abdominal sympathetic nerves are shocked, and fermentation ensues, poisoning the patient with saprophytic products. Salol lessens fermentation.

Instruments are sterilized by boiling for ten minutes in 1:100 bicarbonate of sodium solution. The boiling sterilizes, and the bicarbonate of sodium prevents oxidation of the bright metal and of the cutting edges. At the time of the operation, instruments are allowed to remain, while not in use, in boiled water.

Towels are sterilized by boiling for ten minutes just before using, if they were boiled for half an hour after use at a previous operation.

Sponges.—Reef sponges, costing less than two dollars a pound, are used in my work. They are soaked in warm water for a day to soften the dry sarcode which covers the spicules. After a general washing, they are placed in hydrochloric acid solution, one part to ten, and left there until all shell sand is dissolved. Ten hours will suffice for some of the sponges, but an addition of acid will be necessary if the original amount is used up on excessively abundant lime salts. The cleansed sponges are placed in permanganate of potassium solution, 1:100 for ten minutes, and are afterwards rinsed before going into the bleach bath of oxalic acid solution, 1:30. As soon as they are white, a few minutes' immersion being sufficient, the ones that are wanted for early use are immersed in 1:4000 bichloride of mercury solution, containing glycerine in the proportion of one ounce to the pint, and they are left in the solution for ten hours. After being squeezed dry, they are placed in glass jars ready for use. Sponges that are not to be used for several months are stored dry, tied up in paper bags. A repetition of the treatment, minus the hydrochloric acid, will answer for sponges that have been used. The permanganate of potassium combines with the organic sarcode, and stains the inorganic spicules, acting as a germicide. The oxalic acid decomposes the potassium compounds, and is destructive to bacteria and their spores. The bichloride of mercury acts further as a germicide, and glycerine is employed because it is hygroscopic, and prevents for several weeks the change of the bichloride of mercury to calomel—a change which occurs rapidly when dry bichloride is exposed to the air in thin layers over the spicules. If a strong solution of bichloride of mercury is used, it makes the sponges too hard.

Gauze.—Absorbent gauze, which constitutes the principal bulky dressing, is prepared by boiling cheesecloth or mull in a solution of carbonate of sodium (washing soda) 1:16, for two hours: changing the water, rinsing, and boiling again in the same solution for

two hours, then rinsing and boiling in pure water for ten minutes. The gauze is then absorbent, because the soda has saponified the fat and broken up the gummy elements of the cotton fibre. The gauze is finally washed in clean boiling water, and immersed in 1:2000 bichloride of mercury solution, containing one ounce of glycerine to the pint. After squeezing dry, the proportion of the lot that is likely to be used in less than two months is stored in glass jars, but the remainder, as with the sponges, should be securely tied up in paper bags, and again immersed in bichloride and glycerine before being placed in the jars for early employment.

Iodoform Gauze is not used in my clinic for wound treatment, because the iodoform and the fixing agents interfere with the capillarity of the gauze, and thereby destroy the nice mechanical action which is the chief and great virtue of gauze dressings.

Absorbent Cotton can be prepared from cotton batting by the process employed for gauze, and it makes a much cheaper dressing, but the absorbent cotton does not look attractive unless it is re-carded after treatment, and on that account is not often manufactured by the surgeon at home. If the absorbent gauze and cotton are purchased from dealers, each lot must be tested separately, because a patient's life is often staked absolutely upon the capillarity of a filament of gauze, and I have bought alleged absorbent dressings which would have betrayed the patient's trust in me. Test absorbent gauze and cotton by dipping one end of the filament of prepared and unprepared stuff, side by side into a glass of warm water. The water will be seen to shoot up into the absorbent stuff instantly.

Drainage Apparatus.—Drainage is not often required for aseptic wounds, but it has a place of vital importance at times. I depend almost entirely upon the drainage wick, made by rolling absorbent gauze in gutta-percha tissue, very much as one rolls tobacco in a cigarette paper. The average wick is about the diameter of a cigarette, but longer. (See article on Drainage Wick.)

Sutures and Ligatures.—Silk is used by me in one place only in surgery, and that is for ligating the inner tube of the appendix. The tiniest of buried knots is desirable at that point, and the finest strand of silk answers the purpose well. The silk is boiled for half an hour, and then stored on a glass rod in a glass tube filled with alcohol.

Catgut.—Catgut is the ideal material for sutures and ligatures, if prepared according to the following directions: Every surgeon

must attend personally to the preparation of his catgut. No matter how good the intention of the dealer, the work is sometimes given to workmen who do not know what responsibility they are to share with the surgeon, and the patient's needle may turn on a pivotal suture. I buy from L. H. Keller & Co., 64 Nassau Street, New York, the hanks of raw catgut in the form known as "bow-lines." Each bow-line is one metre in length, and the form is convenient because a few strands can be removed from the storage bottle and placed in a saucer of alcohol at the time of the operation, thus avoiding the danger of contaminating the mass remaining in the storage bottle. Different dealers number their sizes of catgut arbitrarily, and in order to establish a standard I have proposed that the American Standard Wire Gauge be used. Such a gauge can be found in almost any mechanic's shop, and there is no good reason why catgut should not be measured by this standard. The sizes that are employed for almost all of my work are No. 25 and No. 20, American wire gauge. The hanks of raw catgut are placed in a glass jar and freely covered with commercial sulphuric ether, in which they remain for a week. The ether removes the fixed oil, and acts as a germicide, becoming very foul, however, and unfit for further use. The foul ether is poured off at the end of a week, and fresh ether containing bichloride of mercury, in the proportion of 1:4000, is added. After standing in this new ether for a week, the hanks are transferred to a storage bottle of absolute alcohol, containing bichloride 1:4000, and are ready for use, unless the chromicizing process is preferred. I use chromic gut altogether, because smaller sizes of this will take the place of clumsy strands of simply prepared gut. To chromicize the catgut, it is first prepared by the simple process, and is then placed in a solution of bichromate of potassium and alcohol, fifteen grains to the pint, first dissolving the bichromate in one ounce of distilled or boiled water, and adding it to the alcohol in the form of a watery solution. The catgut remains in the solution of bichromate of potassium and alcohol for fifteen hours, and is then drained, and placed in absolute alcohol for storage. The chromicizing process doubles the resistance to absorption of the catgut in the tissues. When first prepared, the resistance is not quite doubled, and after standing in the alcohol for a year, it is rather more than doubled; but this variation is of little practical importance. Catgut left in the bichromate of potassium solution for more than fifteen hours be-

comes too resistant, and may not be absorbed in months. Prepared for fifteen hours in the fifteen-grain-to-the-pint solution, No. 25 is absorbed in about ten days, and No. 20 in about twenty days. At the time of the operation, a sufficient number of bow-lines are removed from the storage bottle, and placed in a saucer of alcohol ready for immediate use. Any bow-lines left over after the operation are thrown away. After preparing a lot of catgut, it is tested by cutting up a strand, placing the pieces in boiled distilled water for ten minutes, and then planting the pieces in a test tube of agar-agar.

Irrigating Solutions.—The only irrigating solutions that I employ are physiological saline solution and strong hydrogen dioxide.

Hydrogen Dioxide is used in full strength for flushing septic cavities at the time of the operation, and is then washed out with the physiological saline solution. The dioxide of hydrogen is a powerful germicide, and it not only destroys the bacteria, but throws up pus and septic fluids in a foamy mixture, which is easily washed away. The same antiseptic is used in many septic cavities after operation until granulation begins, but we must discontinue its use then, as a rule, because the peroxide follows leucocytes into granulation tissue, and thus delays repair.

Physiological Saline Solution, representing the normal proportion of chloride of sodium in the blood, is the least irritating and the most useful general irrigating solution. It is made by boiling ninety grains of chloride of sodium in one quart of water.

Common Boiled Water irritates the tissues, and is somewhat corrosive, as may be observed by dropping it on the eye, or placing a glistening piece of peritoneum in it for an hour. Water in the eye causes smarting, and it dulls the surface of the peritoneum. In a peritoneal operation it injures the serosa slightly, and may cause vexatious little adhesions afterward. The injury to the serosa may be sufficient to close the mouths of the lymphatics upon which the surgeon depends for very important aid in carrying off septic matter. Therefore unsalted water should not be used for irrigating purposes.

Chemical Antiseptic Solutions are still more irritating than plain water. We depended upon them until progress carried us to aseptic surgery. Physiological saline solution is used for all ordinary purposes of irrigation in surgical work, and it is practically unirritating. The sponges are kept in basins of it at an operation,