12-1963

Technique Of An Apparatus For Bladder Irrigation

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There is increasing awareness of the fact that catheterization of the urinary bladder is not a harmless procedure. Since the use of indwelling urethral catheters is now and will be necessary in the future for large numbers of patients, any method to decrease the risk in these cases should be seriously considered. Since 1957, we have worked on a bladder irrigation device which will be presented. (Figure 2)

The urethral channel is not always sterile and it cannot be readily sterilized. Kass has shown that bacteriuria is present in indwelling catheters in 95 percent of the patients within four days and in most cases within 24 hours and could be prevented by systemic use of antibiotics to any significant degree.

At present emphasis is being placed on the value of indwelling triple lumen catheters through which a gravity drip of antibiotics or acetic acid are being used.

Comparison of relative cross section sizes of a triple lumen #20F (right) catheter which is usually used with the two on the left (#12F and #14F) which can be used with our bladder irrigation apparatus.
Figure 2

This is the apparatus that we have worked on since 1957.

1. Represents a food pump which can be adjusted to deliver the fluid desired.
2. Timer to regulate the shut off motor or solenoid represented by
3. The pump is allowed to run continuously. The clamping apparatus opens for 5 minutes every 30 to 60 minutes.

I wish to thank Mr. Harold Schmidt, Mr. Gordon Bartrem (Maintenance) and Mr. J. M. Fraser (x-ray) deceased, for their great help in building and modifying the apparatus. I also wish to acknowledge the cooperation of E. L. Quinn, M.D. (Infectious Diseases) on this irrigating pump.
The criticism of this method in our experience is:

1. There is no thorough mixing of the irrigating fluid (antibiotics or acid) with the urine and bacteria.

2. Too large a catheter must be employed (Figure 1). The large sizes are not only uncomfortable but are traumatic to the urethra. For gynecological surgery these large triple lumen catheters are quite unsatisfactory in the opinion of most gynecologists.

3. There are still significantly high percentages of patients who develop bacteriuria on this program.

4. The gravity drip requires rather careful attention on the part of the nursing staff.

5. There is no routine distension of the bladder by intermittent filling to prevent contraction and the volume of the bladder may decrease rapidly in three or four days.

We believe that this routine distension of the bladder is a most important factor. Without intermittent filling, there is no prolonged contact between the bacteria and the agent being used to irrigate the bladder. Tidal drainage will overcome some of these objections and has been used for many years. However, tidal drainage requires fairly complicated apparatus which has never been too popular with those on the floors where these patients are cared for. Clamping the drainage tube manually leaves much to be desired. Kass described an electromechanical device for the intermittent clamping of the catheter drainage tube which had given good results with the use of acetic acid rinses.

Since 1957 we have been working with an electromechanical device which consists of a pump to supply the irrigating fluid and a motor or solenoid operated clamp to intermittently empty the bladder. The advantages of this device are as follows:

1. A small double lumen catheter #12 or #14 can be used instead of the large #18 or #20 triple lumen catheter (Figure 1).

2. The device can allow ambulation on the part of the patient which is most important (Figure 3).

3. There is intermittent filling of the bladder so the effects of contraction on the bladder muscles are avoided.

4. There is prolonged contact between the rinsing agent and the urine in the bladder.

5. The pump assures a constant flow of the rinsing agent and requires little supervision.
Latest model of the bladder irrigating apparatus which is being used. This is mechanically the same as the apparatus in Figure II, except this is much more compact.

1. Irrigating solution (antibiotic or acid)
2. Pump to deliver 1 liter of the irrigating fluid daily
3. Electromechanical shut off to intermittently open the catheter drainage tube for 5 minutes every 30 or 60 minutes
4. Urine collection bottle
5. The pump inlet tube and outlet tube attached to a small #12F or #14F double lumen catheter.

All of this is mounted on a stand with wheels in order to allow ambulation as desired. This pump was made on my request on the plan of the apparatus in Figure II by The Oro Manufacturing Company, in the summer of 1963.
BLADDER IRRIGATION

This method has shown real promise from a practical standpoint in preventing or reducing already present bacteriuria and has greatly helped to prevent the annoying effects of bladder contraction. For most part, this apparatus has been used on indwelling catheters in postoperative abdominoperineal resections and colon resections and other surgical cases. I have been pleased with the significant reduction in bladder infection and inability to urinate in these most troublesome cases. We have been able to show no bacteriuria in the great majority of cases. The apparatus described has been used in more than 50 clinical applications. Since indwelling urethral catheters are going to be with us for the indefinite future, we believe that a device such as this offers real possibility for help in a rather serious problem.