SUPRAPUBIC CATHETER INserter

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ABSTRACT

Surgical apparatus for suprapubically inserting a Foley-type catheter into a patient’s bladder, including a trocar having a reduced diameter along a portion of its length and a telescopingly removable rigid cannula having a slot cut along its length. After the trocar and cannula have been inserted into the bladder, the trocar is removed and the flexible Foley-type catheter threaded into place along the length of the cannula. The Foley bag of the catheter is then inflated, and the cannula is withdrawn from the wound and stripped from the catheter along the slot.

3 Claims, 3 Drawing Figures
SUPRAPUBIC CATHETER INSERTER

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to improvements in surgical and medical apparatus and more particularly to apparatus for inserting a catheter into a body cavity for establishing a fluid transmission path thereto.

2. Description of the Prior Art

In the prior art, many types of catheters and catheter inserters have been proposed, most of which are designed and intended for insertion into an orifice or along a particular tract, such as that of a blood vessel, the urethra, or the like. One catheter frequently used for urethral insertion is a Foley-type catheter, such catheter being well known in the art as having coaxial tubes, one of which to conduct a fluid from within the bladder and the other of which to interconnect a syringe and a bag or balloon which may be inflated within the bladder by a syringe to hold the catheter in the desired transurethral position. In the prior art, the Foley-type catheters have been generally used only transurethrally.

The transurethrally inserted Foley-type catheter frequently results in chronic urethral infection as a result of the prolonged irritation it produces. In attempts to overcome these disadvantages, it has been suggested that a small needle with or without plastic cannula of smaller bore be used to insert an even smaller tube suprapubically to within the bladder. These devices themselves, however, have several disadvantages. For instance, after insertion, the tube must be retained by some retaining device external to the body, for example, adhesive tape, glue, or the like. Neither this needle type nor other prior art suprapubically inserted devices include an inflatable bag in the bladder or other internal constraint, such as that presented by a Foley-type catheter. Additionally, the needle type, and most others frequently used, require that the cannula sheath be slipped off the end of the tube. This method of removing the cannula sheath from the catheter tube is awkward and inconvenient. Also, because the needles used are of very small diameter, they generally are too small to allow drainage without frequent irrigation; such devices frequently become clogged with foreign matter, necessitating constant attention. Thus, such needle devices generally do not permit a patient wearing them to go home, for example, from the hospital unattended, or to care for the device himself.

Finally, and most importantly, these devices, like most suprapubic devices, require special skill in insertion, since during penetration and before the bladder is reached, considerable resistance is encountered, whereas, when the bladder itself is reached, practically no resistance is presented. Thus, to prevent the device from being undesirably thrust entirely through the bladder into the organs beyond, great care must be exercised in exerting simultaneously a "backward-forward" type insertion pressure on the device. This is further complicated since the devices heretofore proposed have no means to indicate when the device has penetrated to the interior of the bladder, except the low physical insertion resistance therein.

No known devices have been proposed for achieving an abdominally inserted Foley-type catheter, although many types of trocars have been proposed. For example, recently a catheter insertion device was proposed which held a flexible catheter. In the proposed device the flexible catheter is inserted within a rigid cannula having a slot along its length, and also having a pressure member for constraining the catheter within the cannula and for aiding in insertion of the cannula along a particular orifice. (The device itself is primarily directed to insertion into a body orifice, particularly wherein the channel or orifice follows an irregular path.) Once the cannula and its confined catheter are inserted, the pressure or locking member is removed and the cannula withdrawn from the body, leaving behind the inserted catheter. The cannula may then be removed from the catheter through the slot along the rigid cannula wall. As mentioned, this device is intended for use by insertion into an orifice and, additionally, during the insertion process, the catheter is partially restricted and, therefore, would not indicate when the catheter is properly inserted. Additionally, this device and other devices of this nature proposed heretofore would not satisfactorily function as means for suprapubically inserting a catheter of any type into the bladder, since no means for piercing through the abdominal wall are provided.

Many different types of trocars, including cannula, have been proposed with the specific object of puncturing a portion of the body to drain fluid from or to inject fluid into a sac or other body cavity. One suggested trocar includes a cannula sheath of diameter larger than the main shaft portion of the trocar, and has a tube connected to its interior whereby connection to a vacuum line removes whatever fluid exists within the cannula. In this particular device, both the trocar and cannula are inserted partially into the body; consequently, to catch fluid which escapes the cannula at its point of insertion, to prevent infection, an additional sheath is provided. A hole formed through a wall of the cannula to within the additional sheath provides a path for any fluid which may have escaped past the cannula and into the additional sheath to pass back to the main flow of fluid to the vacuum line connection. The particular piercing action performed by the device represents its entire function and use. Thus, like the present invention, it has an area of reduced diameter of the trocar member for constraining the catheter within the cannula. Unlike the present invention, it has no function or accommodating structure for flexible catheters or the like.

BRIEF DESCRIPTION OF THE INVENTION

It is, therefore, in light of the above, an object of the invention to present a catheter insertion device for introducing a flexible catheter into a person's body through the abdominal wall.

It is further object of the invention to present an insertion device for introducing a Foley-type catheter through the abdominal wall into a person's bladder.

It is yet a further object of the invention to present a catheter insertion device which gives immediate indication of its penetration to within the bladder.

It is a yet further object of the invention to present a catheter insertion device which because of its simplicity has low consequences of complications and which will introduce a catheter which may be left in place for prolonged draining without much discomfort to the patient.

These and other objects, features, and advantages of the invention will become apparent to those skilled in the art from the following detailed description when
read in conjunction with the appended claims and accompanying drawing.

The invention is directed to a structure intended for suprapubic insertion of a Foley-type catheter into a person's bladder, and, to achieve this, a structure is presented to pierce through the person's abdominal and bladder walls to the interior of the bladder, and which allows the Foley-type catheter to be inserted through these walls to a desired position. In accordance with the invention, in its broad aspect, a trocar of the type having a coaxially disposed or telescoping cannula is presented. The trocar has a reduced diameter between its ends to allow fluid to pass within the cannula along the length of the reduced diameter. The cannula, additionally, has a slot formed through its wall entirely along its length, for the dual purpose of indicating penetration into the bladder and allowing subsequent removal from a flexible catheter of slightly smaller diameter than the cannula inserted through the cannula along its length into the bladder.

**BRIEF DESCRIPTION OF THE DRAWING**

The invention is illustrated in the accompanying drawing wherein:

FIG. 1 is a plan view of the trocar and cannula of the invention, with portions of the cannula cut away showing the underlying trocar structure.

FIG. 2 is a plan view of the trocar and cannula of the invention diagrammatically illustrating withdrawal of the trocar from the cannula.

And FIG. 3 is a plan view of the cannula of the invention illustrating the flexible catheter inserted through and along the length of the cannula.

Like reference numbers denote like parts in the figures of the drawing, and various sizes and shapes of the structures illustrated have been distorted or exaggerated for clarity of illustration and ease of description.

**DETAILED DESCRIPTION OF THE INVENTION**

Referring now specifically to FIG. 1 of the drawing, the structure of the invention, generally denoted by the reference number 10, includes a trocar 11 and an outer cannula 12, coaxially disposed on the trocar 11. The trocar 11 has along its length a reduced diameter 13 between its tip 14 and base 15. The trocar 11 may be formed of a single piece of material, or, as shown, may be made of several pieces, such as the tip 14, the base 15 and the rod 13 of reduced diameter attached together by welds 16 or the like. Although the trocar can be of any desired length, it has been found that a length of about 5 inches is well suited for ease of use in suprapubic insertion.

The tip 14 of the trocar 11 has a four sided point 17 of medium bevel formed on it to ease insertion through the abdominal tissues. The particular type point formed is of interest, since it is not intended as truly a cutting edge; rather, it is designed for spreading the tissues whereby when the instrument and catheter are withdrawn from the wound the tissues contract readily without producing a constantly draining fistula. Also, in insertion, bleeding is minimized with the medium bevel tip shown. (Any bleeding in the bladder which does occur may be controlled by temporary pulling pressure on the catheter, described below, to afford tamponade of the bladder. Temporary sponge pressure around the skin incision will do the same for external skin bleeding.)

The tip 14 may, for example, be formed with the bevel faces having slightly larger than a 60° angle from the horizontal in a tip of 0.256 inch diameter. Such diameter would, for instance, be appropriate for insertion of a 16-french catheter.

For control of the trocar 11, a ring 18 is provided to enable the user to exert either pushing or pulling force upon the trocar 11, since, as mentioned above, no resistance to pushing forces is encountered when the trocar 11 enters the bladder, the ring allowing the user to easily control downward or pushing pressure on the trocar.

The cannula 12 is constructed with an inside diameter just larger than the tip 14 and the base 15 to telescopically fit over the trocar 11. Thus, as shown in FIG. 2, the trocar 11 may easily be inserted into or withdrawn from the cannula 12. Additionally, the cannula 12 has a slot 19 cut all along its length to allow fluid to flow to its interior and to allow it to be removed from a flexible catheter threaded along its interior length.

Both the trocar 11 and cannula 12 may be made of any rigid material. Stainless steel or the like may, however, be preferred for its desirable strength and ease with which it may be sterilized.

This invention is of particularly beneficial use following a surgical repair on the bladder known as an anterior colporrhaphy, commonly accompanied by posterior colporrhaphy and vaginal hysterectomy, before inserting any vaginal packing. For example, in such surgery the bladder may be drained by a simple 14-french catheter (not shown), and, then, with the same catheter transurethrally inserted, 500 cc sterile saline solution injected with an irrigation bulb syringe (not shown) into the bladder. Then the palpating finger is placed on the upper edge of the symphysis pubis and a small one-half centimeter wound is made with the tip of the scalpel one centimeter above the super edge of the symphysis pubis. During the process of the insertion of the trocar and cannula of the invention into the bladder, the trocar 11, fully inserted in the cannula 12, is held at an inclination of about 30° from perpendicular, in the direction of the patient's head in dorsal position (i.e., flat on back), and pressure applied along its length to pierce both the trocar 11 and cannula 12 into the bladder. As mentioned above, considerable force must be exerted downward on the trocar 11, particularly when penetrating the rectus fascia; however, the particular length of the instrument chosen and the ring 18 enable this force to be controllable thereby enabling considerable force to be exerted, but preventing penetration beyond that desired after the fascia is penetrated, after which resistance is not encountered.

When the device has pierced the bladder, an immediate gush of fluid to the outside occurs, thus quickly, reliably and safely indicating the penetration to the user. This particular feature of the invention, in its simplicity and reliability, leads to low consequences of complications. Thus, for example, the chances of penetration through both walls of the bladder and perhaps subsequent penetration of the large intestine or other vital organ, without the knowledge of the surgeon, encountered in prior art devices, are considerably reduced.

After the trocar 11 and cannula 12 have been inserted into the bladder, the trocar 11 is withdrawn from the cannula 12, as shown in FIGS. 2 and 3, and a flexible catheter, or conveniently, a Foley-type catheter 20, is quickly and easily threaded without lubricant through the cannula 12 (see arrow in FIG. 3) into the
bladder cavity, still partially filled with saline solution. Then, after the catheter has been inserted through the cannula 12, the internal bag 21 is inflated. To be sure that the bag 21 has not burst before withdrawing the cannula, the catheter is gently pulled to insure that it cannot be removed. Thus, in a preferred embodiment of the invention, the edge 22 on the cannula 12 is beveled (see FIGS. 1 and 3) to an extent to allow the cannula 12 to easily slide through tissues upon insertion but not to such sharpness to cut the inflated Foley bag.

The cannula 12 is then withdrawn from the wound and quickly stripped from the Foley catheter tube along slot 19. The catheter tube 20 may then be taped to any desired position (usually under the umbilicus to prevent tugging at the wound).

With the instant invention, after the Foley catheter has been inserted, since it may conveniently be of 16-french diameter, the patient can ordinarily leave the hospital weeks earlier than the normal 5 to 7 week post-operative period and can readily and easily control the catheter for weeks without assistance.

Although the invention has been described and illustrated with a certain degree of particularity, it is understood that this disclosure is made only by way of example, and that various changes and modifications will become apparent to those skilled in the art without departing from the spirit and scope of the invention as hereinafter claimed.

What is claimed is:

1. Apparatus for suprapubically inserting a catheter of size at least 16-French to within a person's bladder, comprising:
   a. a trocar of diameter approximately equal to the diameter of the catheter to be inserted for piercing the abdominal wall into the bladder,
      a. said trocar having a reduced diameter between ends,
   b. said trocar additionally presenting a four faced point on one end thereof, each face forming approximately a 60° angle from the horizontal, whereby said trocar may be inserted without cutting through the tissues in piercing into the bladder;
   2. a cannula of length slightly less than that of the length of said trocar, and within which said trocar is removable, said cannula having an inside diameter approximately equal to an end of said trocar, and having a slot through a wall along its entire length, whereby the slot serves to conduct fluid from within the person's bladder along the length of said reduced diameter of said trocar within said cannula to discharge external the abdominal wall to indicate bladder penetration by the trocar, said cannula additionally having formed on one end overcovering said trocar adjacent the end presenting the four faced point, a bevel, whereby the cannula and trocar may be inserted within the tissue with minimum cutting, whereby, when said trocar and cannula are pierced through the abdominal bladder walls, said trocar may be withdrawn and said 16-French Foley-type catheter may be threaded through said cannula to the interior of the bladder, whereupon said cannula may be withdrawn from the bladder and removed along its slot from the catheter, and
   3. means on an end of said trocar opposite the end on which four faced bevel is presented for controlling the insertion pressure thereupon.

2. The apparatus of claim 1 wherein said means for controlling pressure is a ring attached to said trocar.

3. The apparatus of claim 2 wherein said trocar and cannula are of stainless steel.

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