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This invention relates in general to devices for administering intravenous therapy and, more particularly, to intravenous catheters.

Conventional intravenous catheters generally consist of an administration needle of large bore through which there is partly passed a flexible plastic tube. After the needle is inserted into a vein, the tube is further passed through the needle and advanced into the vein. The needle is then withdrawn leaving the catheter in place. This conventional device requires the use of a very heavy gauge needle since the plastic tube must pass through the bore of the needle and must have a lumen of its own sufficient in size to dispense fluids, often of high viscosity, into the vein. The insertion of this large gauge needle is most painful particularly since patients in need of repeated transfusions are usually dehydrated. In such a condition, their tissues lack flexibility and their skin elasticity since it is depleted of subcutaneous fatty tissue. This renders the insertion of a large bore needle very difficult.

More recently a conventional needle containing a beveled opening at one end has been available with the needle portion having a short catheter disposed about it. This needle and the catheter are inserted into a vein whereupon the needle is withdrawn leaving the short catheter in the vein. This device is disadvantageous in that, as soon as the needle penetrates a vein, blood flows through the bore of the needle and out of its hub much to the distress of a patient. Further, the conventional needle with its bevel opening does more damage than necessary to the wall of a vein and is harder to insert.

A main object of this invention is to provide a more easily and less painfully inserted intravenous catheter.

Another object of this invention is to provide a more easily and less painfully inserted intravenous catheter which may be of any desired length.

A further object of this invention is to provide an intravenous catheter having a stylet extend end through its bore for insertion into a vein, the end of the catheter about the stylet having a configuration which more easily facilitates its entry with the stylet into a vein.

Many other objects, advantages and features of invention reside in the particular construction, combination and arrangement of parts involved in the embodiments of the invention and its practice as will be understood from the following description and accompanying drawing wherein:

FIGURE 1 is a side view of an intravenous catheter containing a stylet for insertion into a vein according to a first embodiment of this invention;

FIGURE 2 is a side view of the catheter of FIGURE 1 with the stylet not inserted in section;

FIGURE 3 is a side view of the stylet of FIGURE 1 with the rear end of the hub portion broken away in section;

FIGURE 4 is a side view of a fragment of the stylet and the end portion of the catheter disposed about it;

FIGURE 5 is a side view of a stylet and an intravenous catheter assembled according to a second embodiment of this invention; and

FIGURES 6 and 7 are top views of fragments of an intravenous catheter which may be used in the second embodiment of this invention.

Referring to the drawing in detail, FIGURE 3 shows a stylet 10 having a shaft portion 11. Shaft portion 11 is fine boreless round rod that terminates in a gradually tapering completely rounded tip 12 having a sharp lance-like point. Stylet 10 has a hub portion 13 containing an opening 14 fixed to it so that the stylet 10 may be fitted on the male luer tip of a syringe for easier insertion into a vein. Stylet 10 may be of stainless steel with a metal or plastic hub 13.

FIGURE 2 shows an intravenous catheter 15 having a tubular portion 16 containing a longitudinal lumen 17. A hub portion 18 is fixed to or formed integrally with one end of tube 16 and the hub contains an opening 19 to receive the tip of a syringe or any other equivalent apparatus for administering intravenous therapy. The intravenous catheter tube is formed from any of the plastics conventionally used to make intravenous catheters.

FIGURE 1 shows the first embodiment of this invention assembled for use. In a sterile condition, the catheter 15 is slipped over the stylet 10. The stylet 10 is then inserted into a vein with its lance like tip 12 easily penetrating the wall of the vein as it stretches about the round cross section of the stylet. As may be seen in FIGURE 4, the end of tube 16 has a particular configuration. The end of tube 16 is cut across in a curve 20 which slopes away on each side 21 to come together at 22 below and behind the front portion 20. This particular configuration enjoys a twofold advantage. It does not have the entire diameter of the tube 16 enter a vein as an annular shoulder, but it enters considerably more gradually as front portion 20 first enters the vein followed by the side portions 21 and then the rearmost portion 22. If front portion 20 was formed in to a V-shaped point or apex, it has been found in practice that it will be flexed backward away from stylet 10 to interfere with the easy entrance of tube 16 in to a vein. The particular configuration shown not only easily enters a vein, but also holds the front portion 20 against stylet 10 for safe, easy insertion. The actual cut end surface 23 of tube 16 may be beveled backward to ease its insertion in to a vein. After insertion of the stylet 10 and the tube 16 into a vein, the stylet is removed and therapy is carried out through the catheter 15.

Referring now to FIGURES 5-7, the second embodiment of this invention has a stylet 30 substantially identical to that shown in FIGURE 3. An intravenous catheter having a tubular portion 31 of much greater length than the shaft portion 11 of stylet 10 has a hub 32 fixed to it. Hub 32 is substantially identical to hub 18 and the front end of tube 31 is substantially identical to that shown in FIGURE 4. A short distance from the front of tube 31, preferably about one and one half inches, the side of tube 31 contains a longitudinal slit 33 as shown in FIGURE 6. The shaft portion 11 of stylet 10 enters tube 31 through slit 33.

In use, the second embodiment of this invention has the tube 31 of catheter 30 inserted into a vein with the stylet 10. The stylet 10 is then removed from tube 31 which is then manually advanced into the vein as desired. When fluids are administered through catheter 30, any slight leakage through slit 33 will be dispersed into the vein. If desired, as shown in FIGURE 7, an elongated opening 34 may be formed in tube 31 to accommodate stylet 10. Slit 33 is generally preferable as it will tend to close completely upon the removal of stylet 10. This embodiment of this invention allows the insertion of a catheter of any length desired. The length of the catheter is no longer limited by the stylet 10 or other device used to insert it.
I claim:
1. An intravenous catheter comprising, in combination, a flexible tube having a wall containing a bore and having front and back ends, the front end of said tube forming a first opening, the wall of said tube containing a second opening behind said front end, a hub on the back end of said flexible tube, and a round rigid pointed member of substantially the same diameter as the bore of said tube extending into said tube through said second opening and emerging through said first opening to extend beyond the front end of said tube so that said member and the front end of said catheter may be inserted into a vein before said member is removed from said tube and said tube is advanced further into the vein.

2. An intravenous catheter comprising, in combination, a flexible tube having a wall and front and back ends and containing a first opening at said front end and a second opening in the wall of said tube behind said front end, a hub on the back end of said flexible tube, and a stylet extending into said tube through said second opening and extending through said first opening beyond the front end of said tube, the front end of said tube having a transverse front portion which is rounded with rearwardly sloping sides which come together behind and on the opposite side of said tube from said transverse rounded front portion, said stylet and the front end of said catheter being inserted into a vein before said stylet is removed from said catheter and said catheter is further advanced into the vein.

3. The combination according to claim 2 wherein said second opening in said tube is a longitudinal slit.

4. An intravenous catheter comprising, in combination, a flexible tube having a wall and front and back ends and containing a first opening at said front end and a second opening in the wall of said tube behind said front end, a hub on the back end of said flexible tube, and a rigid fine boreless round stylet having a gradually tapering completely rounded tip with a sharp lance-like point, said stylet extending into said tube through said second opening and extending through said first opening beyond the front end of said tube so that said stylet and said catheter may be inserted into a vein before said stylet is removed from said catheter and said catheter is further advanced into the vein.

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