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TWO-COMPONENT NEEDLE HOUSING FOR CATHETER INTRODUCER ASSEMBLY

Background of the Invention

Field of the Invention

This invention relates to medical devices and, in particular, to vascular access products.

There are essentially two types of catheter introducer assemblies in use today for introducing venous catheters into the vascular system of a patient. The first type is a through-the-needle catheter in which the catheter itself is positioned within a piercing needle that is then used to pierce the skin and emplace the catheter within the vascular system of the patient. The needle is then removed and normally split or otherwise incapacitated for the remainder of the use of the catheter.

The second type of catheter emplacement unit and the type related to the present invention is an over-the-needle catheter in which the catheter rides on the outside of a hollow cannula or needle. The needle is used to pierce the skin of a patient and introduce the catheter into the vascular system of the patient. The catheter is then advanced off the needle into the vein and the needle is withdrawn from the inside of the catheter for disposal.

Over-the-needle catheter emplacement units have a drawback in that once the needle is withdrawn a series of other operations must take place before the catheter is finally attached (i.e., taping and attachment of a fluid supply). During this time, the exposed needle is a hazard to both

the healthcare professional working on the patient and other hospital personnel who may come into contact with it at a later time. For this reason, a significant amount of research and development has been performed on making such units safer to the various people who become exposed to them. This has spawned an entire new class of products which have various types of protection devices on the catheter emplacement unit in order to incapacitate the needle point such that it reduces the risk of sticking an individual after use.

Many of these devices require a modification of the introducer housing, that is, the actual portion of the introducer assembly gripped by the healthcare professional during the emplacement process. This housing usually has extending therefrom a cannula. Various types of devices have been attached to or passed through such housings in order to provide an attachment mechanism for protective features. This has made the fabrication of such housing a very complicated matter.

Summary of the Invention

The present invention provides a novel housing and method for making a housing such that the fabrication process is made easier and less expensive. In the fabrication process, the flash chamber which receives the blood flow back through the cannula during emplacement is fabricated separately from a least a portion of the remainder of the housing. This flash chamber is then attached to the housing in fluid communication with the cannula in order to provide the catheter emplacement unit. That is, the housing with flash chamber is the emplacement unit on which the catheter rides during its insertion into a

patient. By forming the flash chamber as a separate piece and then attaching it to the housing, various modifications can be made to the housing in order to receive various aspects and portions of protective devices for protecting the healthcare professionals from accidental needle sticks. This simplifies the fabrication process as the molds are simpler to make as provision for the flash chamber need not be made in the housing mold and the later attachment of the flash chamber eases the fabrication process.

The flash chamber may be ultrasonically welded, adhesively attached, or press fit into the remainder of the housing. When the flash chamber is press fit into the remainder of the housing it is often advantageous to have formations on either the housing or the flash chamber to assist in the attachment of the flash chamber.

In a press-fit situation the housing may be provided with rings and the flash chamber may have an open end surrounded by ring-shaped barbs which are received within the rings of the housing. In this way the flash chamber, when press fit into the housing, causes the mating of the two sets of rings and an attachment of the flash chamber to the housing in a manner which reduces the risk of removal by a user.

Brief Description of the Drawings

The invention will now be described with reference to the attached figures wherein

FIG. 1 shows a housing body for receiving a separate flash chamber;

FIG. 2 is a perspective view of a separately formed flash chamber for receipt in the housing of FIG. 1; and

FIG. 3 shows the assembled flash chamber and housing without a cannula.

Description of the Preferred Embodiment

Referring to FIG. 1, there is shown a housing 1 having a cannula opening 2 defined in a front portion thereof. The cannula opening 2 is adapted for receipt of a hollow sharpened cannula (not shown) such that the cannula will extend from the housing for receipt of a catheter unit thereover.

The housing has a grip portion 3 having serrated edges for providing positive grip to the housing during emplacement of the device. A proximal hollow portion 4 is provided for receipt of a separate flash chamber which will be described hereafter. A distal portion of the hollow portion 4 defines an opening that is in fluid communication with the cannula opening 2.

Referring now to FIG. 2, there is seen a flash chamber 5 separately formed from the housing of an appropriate material. The flash chamber is normally translucent or clear and therefore is formed out of a material such as polypropylene or polycarbonate in order to provide a visual indication of catheter emplacement by blood flowing into the flash chamber. A distal end 6 of the flash chamber 5 has formed thereon a neck 7. The neck 7 provides external rings 8 and barbs 9. A flash chamber opening 10 is defined by the neck 7 and is positioned at a distal end of the flash chamber. After fabrication of

the flash chamber, the neck is inserted into the distal portion of the hollow portion 4 and press fit into the opening described above formed thereby. This opening has previously been described as in fluid communication with the cannula opening and therefore provides fluid communication between the cannula opening and the internal volume of the flash chamber 5. The flash chamber may have a second opening 11 at its proximal end for receipt of an appropriate porous flash plug (not shown). The flash plug permits the exit of air from the internal volume of the flash chamber and the replacement of the air by the blood flowing up the cannula. Otherwise, it is possible for the flash chamber to become airlocked and not permit the inflow of blood even though the catheter emplacement unit has properly positioned the catheter within the vein of a patient.

FIG. 3 shows the assembled flash chamber and housing unit. As is seen, the flash chamber 5 is received in the hollow portion 4 of the housing 1. After press fitting the flash chamber 5 presents a smooth outer surface in combination with the housing 1 to reduce the risk of gripping and removing of the flash chamber.

Although the flash chamber has been described with a neck 7 having external rings 8 and bars 9, it is easily seen that the same flash chamber may be made without such press fitting formations and separately ultrasonically welded to the housing or adhesively attached either through the neck or other means to the housing itself in a sealed condition. In this way, once attached, the flash chamber provides a unitary device with respect to blood flow from the tip of the sharpened cannula through to the flash chamber.

An attachment opening 12 has been previously formed in the housing 1 as, for example, during the molding of housing 1. The provision of a separate flash chamber eases the fabrication of the housing 1 with the attachment opening 12 defined therein. The gating and mold formation is simplified by the removal of the need to provide a mold which simultaneously forms the flash chamber. The attachment opening 12 is used to receive the attachment portion of a protective device such as a cap for capping the tip of the sharpened cannula after emplacement of the catheter unit. The attachment mechanism received in the attachment opening may, for example, be a sliding member that slides out of the housing as the capping portion of the device slides along the cannula during removal of the cannula from the catheter. The actual attachment mechanism has not been shown as it is anticipated that any number of the various types of attachment devices contemplated currently by those skilled in the art may be used with the present device.

Claims

We claim:

1. In a catheter introducer assembly having a housing for gripping the assembly by a user, a hollow sharpened cannula extending from said assembly for piercing the skin of a patient during introduction of said catheter and a flash chamber in fluid communication with said hollow cannula for receiving blood that travels through said cannula during catheter introduction; the improvement wherein said flash chamber is separate from said housing and is attached thereto by attachment means.

2. The improvement according to Claim 1 wherein said attachment means is a press fit between said flash chamber and said housing.

3. The improvement according to Claim 2 wherein there is a formation on said flash chamber to assist in said attachment.

4. The improvement according to Claim 3 wherein said formation is a barbed formation on the flash chamber for receipt within an opening defined by said housing.

5. The improvement according to Claim 2 wherein there are coacting formations on said introducer assembly and said flash chamber to assist in attaching said flash chamber to assist in attaching said flash chamber to said introducer assembly.

6. The improvement according to Claim 5 wherein said formations assist in maintaining a seal between said flash chamber and said housing.

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7. In a method of forming a catheter introducer assembly having a housing for gripping said assembly, a cannula extending from said housing and a flash chamber in fluid communication with said cannula, the improvement wherein said flash chamber is formed as a separate piece from said housing and is thereafter attached to said housing for communication with said cannula.

8. The method according to Claim 7 including press fitting said flash chamber to said housing.

9. The method according to Claim 8 including the step of forming barbs on a portion of said flash chamber and said press fitting step press fits said barbs into a portion of said housing.

10. The method according to Claim 7 further including the step of ultrasonically welding or thermal forming said flash chamber to said housing.

11. The method according to Claim 7 further including the step of applying adhesive to at least one of said flash chamber and housing to adhere said flash chamber to said housing.

12. The method according to Claim 10 wherein said welding step also seals said flash chamber in communication with said cannula.

13. The method according to Claim 11 wherein said adhesive seals said flash chamber in communication with said cannula.

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