# OVER-THE-NEEDLE CATHETER INSERTION DEVICE

This invention concerns a catheter device of the kind (hereinafter termed "of the kind referred to") wherein a catheter is introduced into a blood vessel by being advanced over a needle which has previously penetrated the vessel. After the catheter is in position the needle and its support means is removed and discarded.

It is an object of the invention to provide a catheter device of the kind referred to wherein the tip of the needle is automatically shielded at the end of the catheter insertion to minimise the risk of accidental needle-stick injuries and the attendant risk of infection of health workers with such as the hepatitis and AIDS viruses.

According to the present invention there is provided a catheter device of the kind referred to comprising a needle extending from a support means, a catheter extending from a catheter hub, means for pushing the hub over the needle to advance the catheter forwardly from the needle and slidable along guide means having stop means at its forward end, the means for pushing the hub having a shield at its forward end in which the needle tip locates when the pushing means is arrested by said stop means.

The means for pushing the hub may engage the guide means such that reverse movement is prevented.

The support means may comprise a finger grip from which the guide means extends.

The guide means may comprise a pair of spaced parallel fingers which pass through apertures in the means for pushing the hub.

The fingers may incorporate ramped tooth means which engage the apertures to prevent reverse movement of the means for pushing the hub.

The fingers may be upwardly bowed at their forward ends to tilt the shield at the end of its forward stroke whereby the needle tip locates behind a lip in the shield.

The invention will be further apparent from the following description with reference to the several figures of the accompanying drawings, which show, by way of example only, two forms of catheter device embodying same.

Of the drawings :-

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| | Figure 1 | shows a perspective view of a first form of device at an initial position; |
| | Figure 2 | shows a perspective view of the device of Figure 1 at an intermediate position; |
| | Figure 3 | shows a perspective view of the needle of the device of Figure 1 and its support means after removal from the catheter hub; |
| | Figures 4 to 6 | show perspective views similar to those of Figures 1 to 3, but of a second form of device; |
| and | Figure 7 | shows a cross-section through the pushing means on the line VII-VII of Figure 6. |

Referring now to Figures 1 to 3 of the drawings, it will be seen that the first form of catheter device comprises a finger grip 10 which mounts a forwardly extending hollow needle 11 which passes through a catheter 12 and catheter hub 13 from which the catheter 12 extends.

A hub pusher 14 having a forwardly extending cylindrical shield 15 is slidable over the needle 11 to advance the catheter 12 and hub 13 forwardly.

Spaced parallel guide fingers 16 extend forwardly from the finger grip 10 and pass through apertures 17 in the pusher 14.

Ramped teeth 18 on the fingers 16 co-operate with the apertures 17 to prevent reverse movement of the pusher 14.

Stops 19 at the forward ends of the fingers 16 arrest forward movement of the pusher 14 when the hub 13 has cleared the needle 11 and in this position the shield 15 encloses the needle tip.

In use the finger grip 10 is manipulated to introduce the tip of the needle 11 into a blood vessel. The needle 11 has an aperture in its wall behind its open forward end so that blood will be visible within the catheter 12 when the needle 11 has penetrated the vessel as an aid to correct insertion of the needle.

The pusher 14 is now moved forwardly to advance the catheter 12 into the blood vessel.

At the forward end of the stroke the hub 13 is released from the needle and the needle tip is enclosed by the shield 15 and remains protected since the pusher cannot

be retracted. The needle and all parts shown in Figure 3 are removed and discarded leaving the catheter and hub in position.

Referring now to Figures 4 to 7 wherein like parts are indicated by like reference numerals it will be seen that the second form of device is of generally similar construction. In this embodiment the fingers 16 are upwardly bowed at their forward ends to cause the shield 15 to tilt at the end of its forward stroke to locate the needle tip behind a lip 20 at the forward end of the shield 15.

The upward bow of the forward ends of the fingers is such that when they are parallel to the skin the needle will be at the correct angle for penetration of a blood vessel.

Also, in this embodiment, there is a single tooth 18 behind the stop 19 on each finger 16.

As with the previously described embodiment there is an aperture 30 in the needle 11 behind its tip as can be seen in Figure 7.

The clearance between the needle 11 and the rearward end of the pusher 14 on both embodiments is no more than to provide a sliding fit whereby advancement of the pusher 14 serves to wipe blood from the needle 11 into a cavity 40 within the pusher 14.

It will be appreciated that it is not intended to limit the invention to the above examples only, many variations, such as might readily occur to one skilled in the art, being possible, without departing from the scope thereof as defined by the appended claims.

Thus, for example, a single guide finger may be provided instead of a pair of parallel fingers.

Each embodiment may include means for indicating that blood has reached that end of the needle (flash back) proximate the finger grip 10. This may be implemented by providing the finger grip 10 with a chamber (not shown) into which the needle opens so that blood passing along the length of the needle enters into the chamber. The chamber may include an observation window, or alternatively it may be defined at least in part by a wall composed of material which is sufficiently transparent that blood entering the chamber can be observed by the person carrying out the fitting of the catheter to a patient.

## CLAIMS

1. A catheter device of the kind referred to comprising a needle extending from a support means, a catheter extending from a catheter hub, means for pushing the hub over the needle to advance the catheter forwardly from the needle and slidable along guide means having stop means at its forward end, the means for pushing the hub having a shield at its forward end in which the needle tip locates when the pushing means is arrested by said stop means.

2. A catheter device according to claim 1 wherein the support means comprises a finger grip from which the guide means extends.

3. A catheter device according to claim 1 or claim 2 wherein the guide means comprises a pair of spaced parallel fingers which pass through apertures in the means for pushing the hub.

4. A catheter device according to any one of claims 1 to 3 wherein the means for pushing the hub engages the guide means such that reverse movement is prevented.

5. A catheter according to claim 4 wherein the fingers incorporate ramped teeth which engage the apertures to prevent reverse movement of the means for pushing the hub.

6. A catheter device according to claim 3 wherein the forward ends of the fingers are upwardly bowed to tilt the shield at the end of its forward stroke whereby the needle tip locates behind a lip in the shield.

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7. A catheter device according to claim 6 wherein the upward bow of the forward ends of the fingers is such that when they are parallel to the skin the needle will be at the correct angle for penetration of a blood vessel.

8. A catheter device according to claim 6 or claim 7 wherein there is a single ramped tooth behind the stop means on each finger to prevent reverse movement of the pushing means after its forward stroke has been completed.

9. A catheter device according to any preceding claim wherein there is an aperture in the wall of the needle rearwardly of its tip whereby blood will be visible within the catheter when the needle has penetrated a blood vessel.

10. A catheter device according to any preceding claim wherein there is a sliding fit between the pusher and needle whereby advancement of the pusher wipes blood from the needle into a cavity within the pusher.

11. A catheter device according to any preceding claim wherein means is provided for visualisation of blood flow to the vicinity of the supported end of the hollow needle.

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