Claims

1. A safety device for a catheter and introducer needle assembly (10), said catheter and introducer needle assembly (10) comprising: a catheter assembly (20) including: a catheter (21) having a proximal end and a distal end; a catheter hub (24) in fluid communication with the catheter (21) and having a proximal end and a distal end connected to the proximal end of the catheter (21);an introducer needle assembly (30) including: an introducer needle (31) having a proximal end and a distal end and a longitudinally axis, and an needle hub (34) affixed to the proximal end of the introducer needle (31), said introducer needle (31) disposed in the catheter (21); and said safety device, said safety device including:

a needle shield (40) defining a longitudinally extending passage (42) with an opening (60) along the longitudinal direction of the longitudinally extending passage (42), the diameter of which is at least slightly larger than the diameter of the introducer needle (31) so as to allow the introducer needle (31) to pass through the extending passage (42), said needle shield (40) having at least one first latch (47) and at least one second latch formed thereon;

a spring clip (50) having at least one first catch (52), at least one second catch (55) and a tab (53), said spring clip (50) fitted into the needle shield (40) through the opening (60), and the second catch (55) of the spring clip (50) is irreversibly engaged the second latch of the needle shield (40), and said spring clip (50) is adapted to flex between a compressed mode prior to the withdrawal of the introducer needle (31) and an uncompressed mode after the withdrawal of the introducer

needle (31) in a plane substantially perpendicular to the longitudinal axis of the introducer needle; and

a restriction means(80) for restricting the distal end of the introducer needle (31) from moving out of the needle shield (40) after the withdrawal of the introducer needle (31),

wherein, prior to the withdrawal of the introducer needle (31), the spring clip (50) is abutted in the compressed mode by the introducer needle (31) passing through the extending passage (42), and upon the introducer needle (31) moving past the spring clip (50) during the withdrawal of the introducer needle, the spring clip (50) is released by the introducer needle and spring open into the uncompressed mode, and after the withdrawal of the introducer needle (31), the first catch (52) of the spring clip (50) is irreversibly engaged the first latch (47) of the needle shield (40), and the tab (53) moves in front of the distal end of the introducer needle and prevents the distal end of the introducer needle from out of the shield , and the engagement between the first catch (52) and the first latch (47) prevents the spring clip (50) from being recompressed after the withdrawal of the introducer needle (31) and the engagement between the second catch (55) and the second latch prevents the spring clip (50) from being pulled out of the needle shield (40), and the restriction means (80) restricts the distal end of the introducer needle (31) from moving out of the needle shield (40) after the withdrawal of the introducer needle (31).

2. A safety device for a catheter and introducer needle assembly (10) according to claim 1, wherein, the spring clip (50) further including at least one third catch (51) formed thereon, said third catch (51) actively engaging a third latch (25) formed on the catheter hub (24) when the spring clip (50) is in the compressed mode prior to the withdrawal of the introducer needle and disengaging the third latch (25) when the spring clip (50) is in the uncompressed mode after the

withdrawal of the introducer needle.

3. A safety device for a catheter and introducer needle assembly (10) according to claims 1 or 2, wherein, the spring clip (50) is a V shaped spring clip, and the apex of the V is pointed opposite to the opening (60) and legs defining the V shape will straddle the longitudinal axis of introducer needle (31) when spring clip (50) is in its uncompressed mode.

4. A safety device for a catheter and introducer needle assembly (10) according to claims 3, wherein, one of the legs defining the V shape of the spring clip (50) including a clip arm (54) which extends generally parallel to the longitudinal axis of introducer needle (31), and two fingers are formed on the opposite ends of clip arm (54), said first catch (52) is a detent formed on one of said fingers, said first latch (47) is a detent or recess formed on the needle shield (40).

5. A safety device for a catheter and introducer needle assembly (10) according to claim 4, wherein, said first catch (52) is a barb formed on one of said fingers.

6. A safety device for a catheter and introducer needle assembly (10) according to claim 4, wherein, said first catch (52) is a flange formed by folding the edge of said one of said fingers.

7. A safety device for a catheter and introducer needle assembly (10) according to claim 3, wherein the second catch 55 is a detent formed on the other leg defining the V shape of spring clip (50).

8. A safety device for a catheter and introducer needle assembly (10) according to claim 7, wherein the second catch 55 is a detent formed on a finger (56) formed on the free end of the other leg defining the V shape of spring clip (50).

9. A safety device for a catheter and introducer needle assembly (10) according to claim 1, wherein the restriction means (80) is a washer fitted in the needle shield (40) and having a hole, the diameter of which is larger than the diameter of shaft portion of the introducer needle (31) and smaller than an enlarged discontinuous portion (33) of the introducer needle (31), and during the withdrawal of the introducer needle (31), the washer will stop the enlarged discontinuous portion (33).

10. A safety device for a catheter and introducer needle assembly (10) according to claim 9, wherein the tab (53) includes a hole the diameter of which is larger than the shaft portion of the introducer needle (31) but smaller than the enlarged portion (33) of the introducer needle (31).

11. A safety device for a catheter and introducer needle assembly (10) according to claim 1, wherein the restriction means (80) could be a hole on the needle shield (40), the diameter of which is larger than the shaft portion of the introducer needle (31) but smaller than an enlarged discontinuous portion (33) of the introducer needle (31).

12. A safety device for a catheter and introducer needle assembly (10) according to claim 1, wherein the restriction means (80) could be a tether, one end of which is connected to the needle hub (34), and the other end of which is connected to the needle shield (40).

13. A safety device for a catheter and introducer needle assembly (10) according to claim 1, wherein the restriction means (80) could be a separate spring plate which will engage an annular recess discontinuous portion of the introducer needle (31) after the withdrawal of the introducer needle (31).

14. A catheter and introducer needle assembly (10), said catheter and introducer needle assembly (10) comprising:
a catheter assembly (20) including: a catheter (21) having a proximal end and a distal end; a catheter hub (24) in fluid communication with the catheter (21) and having a proximal end and a distal end connected to the proximal end of the catheter (21);

an introducer needle assembly (30) including: an introducer needle (31) having a proximal end and a distal end and a longitudinally axis, and an needle hub (34) affixed to the proximal end of the introducer needle (31), said introducer needle (31) disposed in the catheter (21); and

a safety device, including:

a needle shield (40) defining a longitudinally extending passage (42) with an opening (60) along the longitudinal direction of the longitudinally extending passage (42), the diameter of which is at least slightly larger than the diameter of the shaft portion of the introducer needle (31) so as to allow the introducer needle (31) to pass through the extending passage (42), said needle shield (40) having at least one first latch (47) and at least one second latch formed thereon;

a spring clip (50) having at least one first catch (52), at least one second catch (55) and a tab (53), said spring clip (50) fitted into the needle shield (40) through the opening (60), and the second catch (55) of the spring clip (50) is irreversibly engaged the second latch of the needle shield (40), said spring clip (50) is adapted to flex between a compressed mode prior to the withdrawal of the introducer needle (31) and an uncompressed mode after the withdrawal of the introducer needle (31) in a plane substantially perpendicular to the longitudinal axis of the introducer needle; and

a restriction means (80) for restricting the distal end of the introducer needle (31) from moving out of the needle shield (40) after the withdrawal of the introducer needle (31);

wherein, prior to the withdrawal of the introducer needle (31), the spring clip (50) is abutted in the compressed mode by the introducer needle (31) passing through the extending passage (42), and upon the introducer needle (31) moving past the spring clip (50), the spring clip (50) is released by the introducer needle and spring open into the uncompressed mode, and after the withdrawal of the introducer needle (31), the first catch (52) of the spring clip (50) is irreversibly engaged the first latch (47) of the needle shield (40), and the tab (53) moves in front of the distal end of the introducer needle and prevents the distal end of the introducer needle from moving back, and the engagement between the first catch (52) and the first latch (47) prevents the spring clip (50) from being recompressed by the user after the withdrawal of the introducer needle (31) and the engagement between the second catch (55) and the second latch prevents the spring clip (50) from being pulled out of the needle shield (40) by the user, and the restriction means (80) restricts the distal end of the introducer needle (31) from moving out of the needle shield (40) after the withdrawal of the introducer needle (31).

15.A catheter and introducer needle assembly (10) according to claim 14, wherein, the spring clip (50) further including at least one third catch (51) formed thereon, said third catch (51) actively engaging a third latch (25) formed on the catheter hub (24) when the spring clip (50) is in the compressed mode prior to the withdrawal of the introducer needle and disengaging the third latch (25) when the spring clip (50) is in the uncompressed position after the withdrawal of the introducer needle.

16. A catheter and introducer needle assembly (10) according to

claims 14 or 15, wherein, the spring clip (50) is a V shaped spring clip, and the apex of the V is pointed opposite to the opening (60) and legs defining the V shape will straddle the longitudinal axis of introducer needle (31) when spring clip (50) is in its uncompressed mode.

17. A catheter and introducer needle assembly (10) according to claims 14, wherein, one of the legs defining the V shape of the spring clip (50) including a clip arm (54) which extends generally parallel to the longitudinal axis of introducer needle (31), and two fingers are formed on the opposite ends of clip arm (54), said first catch (52) is a detent formed on one of said fingers, said first latch (47) is a detent or recess formed on the needle shield (40).

18. A catheter and introducer needle assembly (10) according to claim 17, wherein, said first catch (52) is a barb formed on one of said fingers.

19. A catheter and introducer needle assembly (10) according to claim 17, wherein, said first catch (52) is a flange formed by folding the edge of said one of said fingers.

20. A catheter and introducer needle assembly (10) according to claim 14, wherein the second catch (55) is a detent formed on the other leg defining the V shape of spring clip (50).

21. A catheter and introducer needle assembly (10) according to claim 20, wherein the second catch 55 is a detent formed on a finger (56) formed on the free end of the other leg defining the V shape of spring clip (50).

22. A catheter and introducer needle assembly (10) according to claim 14, wherein the restriction means (80) is a washer fitted in the needle shield (40) and having a hole, the diameter of which is larger

than the diameter of shaft portion of the introducer needle (31) and smaller than an enlarged discontinuous portion (33) of the introducer needle (31), and during the withdrawal of the introducer needle (31), the washer will stop the enlarged discontinuous portion (33).

23. A catheter and introducer needle assembly (10) according to claim 22, wherein the tab (53) includes a hole the diameter of which is larger than the shaft portion of the introducer needle (31) but smaller than the enlarged portion (33) of the introducer needle (31).

24. A catheter and introducer needle assembly (10) according to claim 14, wherein the restriction means (80) could be a hole on the extending passage of the needle shield (40), the diameter of which is larger than the shaft portion of the introducer needle (31) but smaller than an enlarged discontinuous portion (33) of the introducer needle (31).

25. A catheter and introducer needle assembly (10) according to claim 14, wherein the restriction means (80) could be a tether, one end of which is connected to the needle hub (34), and the other end of which is connected to the needle shield (40).

26. A catheter and introducer needle assembly (10) according to claim 14, wherein the restriction means (80) could be a separate spring plate which will engage an annular recess discontinuous portion of the introducer needle (31) after the withdrawal of the introducer needle (31).

CLAIMS

1. A catheter assembly comprising:

a catheter having a distal end and a proximal end attached to a catheter hub;

an introducer needle having a sharp distal tip and a proximal end connected to a needle hub, the introducer needle extending into the catheter; and

a needle shield through which the introducer needle extends, the needle shield being positioned over the introducer needle between the needle hub and the catheter hub, the needle shield comprising:

a proximal portion and a distal portion that form an internal extending passage through which the introducer needle extends, the internal extending passage extending along a longitudinal axis, the distal portion and proximal portion each including an opening through which the introducer needle extends out from the needle shield; and

a spring clip disposed within the internal extending passage, the spring clip having a first and a second leg that are connected at one end thus forming a V shape, the first leg including a clip arm disposed at the end of the first leg, the clip arm extending parallel to the longitudinal access and a tab that protrudes inwardly from the first leg in a direction perpendicular to the longitudinal axis, the second leg including a finger that extends from the end of the second leg;

wherein, when the introducer needle extends through the needle shield, both the first and the second legs of the spring clip are compressed to one side of the longitudinal axis, and when the sharp distal tip of the introducer needle is retracted proximally through the opening in the distal portion of the needle shield, the spring clip decompresses so that the first leg of the spring clip is positioned on an opposite side of the longitudinal axis than the second leg thereby placing the tab over the opening in the distal portion of the spring clip preventing the sharp distal tip from passing back through the opening in the distal portion;

wherein the clip arm includes a finger at each end, each finger including a catch that interacts with a portion of the proximal or distal portions of the needle shield to

prevent the spring clip from being recompressed after the spring clip is decompressed.

2. The catheter assembly of claim 1, wherein each catch comprises a barb.

3. The catheter assembly of claim 1, wherein each catch comprises a detent.

4. The catheter assembly of claim 1, wherein the finger on the second leg includes a catch that interacts with a portion of the proximal or distal portions of the needle shield to prevent the spring clip from being removed from the needle shield after the needle shield is inserted into the needle shield.

5. The catheter assembly of claim 4, wherein the catch on the finger of the second leg is a detent, barb or flange.

6. The catheter assembly of claim 1, wherein the needle shield further comprises a washer having an opening with a diameter greater than the diameter of the introducer needle but less than the diameter of a feature on the introducer needle thereby preventing the introducer needle to be slid proximally sufficient to remove the sharp distal tip from the needle shield.

7. The catheter assembly of claim 6, wherein the washer is contained within an opening in the needle shield that is separate from the internal extending passage.

8. The catheter assembly of claim 1, wherein the needle shield further comprises a tether that connects the needle hub to the needle shield, the tether having a length that prevents the needle hub from being separated from the needle shield sufficiently to remove the sharp distal tip from the needle shield.

9. A needle shield for securing an introducer needle after the introducer needle has been withdrawn from a catheter, the needle shield being positioned over the introducer needle between a needle hub and a catheter hub, the needle shield comprising:

a proximal portion and a distal portion that form an internal extending passage through which the introducer needle extends, the internal extending passage extending along a longitudinal axis, the distal portion and proximal portion each including an opening through which the introducer needle extends out from the needle shield; and

a spring clip disposed within the internal extending passage, the spring clip having a first and a second leg that are connected at one end thus forming a V shape, the first leg including a clip arm disposed at the end of the first leg, the clip arm extending parallel to the longitudinal access and a tab that protrudes inwardly from the first leg in a direction perpendicular to the longitudinal axis, the second leg including a finger that extends from the end of the second leg;

wherein, when the introducer needle extends through the needle shield, both the first and the second legs of the spring clip are compressed to one side of the longitudinal axis, and when the sharp distal tip of the introducer needle is retracted proximally through the opening in the distal portion of the needle shield, the spring clip decompresses so that the first leg of the spring clip is positioned on an opposite side of the longitudinal axis than the second leg thereby placing the tab over the opening in the distal portion of the spring clip preventing the sharp distal tip from passing back through the opening in the distal portion;

wherein the clip arm includes a finger at each end, each finger including a catch that interacts with a portion of the proximal or distal portions of the needle shield to prevent the spring clip from being recompressed after the spring clip is decompressed.

10. The needle shield of claim 9, wherein each catch comprises a barb.

11. The needle shield of claim 9, wherein each catch comprises a detent.

12. The needle shield of claim 9, wherein the finger on the second leg includes a catch that interacts with a portion of the proximal or distal portions of the needle shield to prevent the spring clip from being removed from the needle shield after the needle shield is inserted into the needle shield.

13. The needle shield of claim 12, wherein the catch on the finger of the second leg is a detent, barb, or flange.

14. The needle shield of claim 9, wherein the needle shield further comprises a washer having an opening with a diameter greater than the diameter of the introducer needle but less than the diameter of a feature on the introducer needle thereby preventing the introducer needle to be slid proximally sufficient to remove the sharp distal tip from the needle shield.

15. The needle shield of claim 14, wherein the washer is contained within an opening in the needle shield that is separate from the internal extending passage.

16. The needle shield of claim 9, wherein the needle shield further comprises a tether that connects to the needle hub to the needle shield, the tether having a length that prevents the needle hub from being separated from the needle shield sufficiently to remove the sharp distal tip from the needle shield.

17. A catheter assembly, herein described with reference to the accompanying drawings.

18. A needle shield, herein described with reference to the accompanying drawings.