

CLAIMS

What is claimed is:

1. A rapidly insertable central catheter ("RICC"), comprising:
 - a first section of a catheter tube formed of a first polymeric material having a first durometer, the first section in a distal portion of the catheter tube;
 - a second section of the catheter tube formed of a second polymeric material having a second durometer less than the first durometer, the second section in the distal portion of the catheter tube proximal of the first section; and
 - a tapered junction of the catheter tube formed of the second polymeric material, a third polymeric material having a third durometer closer to the second durometer than the first durometer, or a combination thereof, the first section of the catheter tube having a proximal portion disposed in a receptacle of the junction and fixedly coupled thereto such that an abluminal surface of a distal portion of the junction smoothly transitions onto an abluminal surface of the proximal portion of the first section without an edge that catches on skin when the RICC is inserted into an insertion site of a patient.
2. The RICC of claim 1, wherein the edge includes solvent-interdiffused polymeric material of the first polymeric material and the polymeric material of the junction.
3. The RICC of either claim 1 or claim 2, wherein the first polymeric material is polytetrafluoroethylene, polypropylene, or polyurethane.
4. The RICC of any of claims 1-3, wherein the second polymeric material is polyvinyl chloride, polyethylene, polyurethane, or silicone.
5. The RICC of any of claims 1-4, wherein the RICC is a triluminal catheter having a primary lumen with a primary-lumen aperture in a distal end of the first section of the catheter tube, a secondary lumen with a secondary-lumen aperture in a side of the second section of the catheter tube, and a tertiary lumen with a tertiary-lumen aperture in the side of the second section proximal of the secondary-lumen aperture.

6. The RICC of claim 5, wherein the junction includes the third polymeric material radiofrequency (“RF”) welded to the second section of the catheter tube, only the primary lumen extending from the second section, through the junction, and into the first section.

7. The RICC of any of claims 1-6, wherein the RICC has a column strength sufficient to prevent buckling of the catheter tube when inserted into the insertion site and advanced through a vasculature of the patient.

8. A method of making a rapidly insertable central catheter (“RICC”), comprising:
inserting a stepped mandrel into a primary lumen of a second section of a catheter tube, thereby forming a mandrel-mounted catheter tube;
inserting the mandrel-mounted catheter tube into a cavity of a radiofrequency (“RF”)-welding die such that a distal end of the mandrel-mounted catheter tube is short of an end of the RF-welding die;
melting polymeric material of the mandrel-mounted catheter tube, supplemental polymeric material, or a combination thereof in the RF-welding die by heating the RF-welding die, melted polymeric material conforming to the cavity of the RF-welding die during the melting to form a junction welded to the second section of the catheter tube and, thus, a soft portion of the catheter tube;
thrusting the mandrel and the soft portion of the catheter tube mounted thereon together into the end of the RF-welding die when excess melted polymeric material exudes through an exit hole in the end of the RF-welding die, the thrusting of the mandrel and the soft portion of the catheter tube together into the end of the RF die cutting the excess melted polymeric material from a distal end of the soft portion of the catheter tube;
removing the mandrel and the soft portion of the catheter tube mounted thereon together from the RF-welding die; and
removing the mandrel from both the primary lumen of the second section of the catheter tube and a receptacle of the junction.
9. The method of claim 8, further comprising:
inserting a proximal portion of a hard portion of the catheter tube into the receptacle of the junction; and

fixedly coupling the hard and soft portions of the catheter tube together such that an abluminal surface of a distal portion of the junction smoothly transitions onto an abluminal surface of the proximal portion of the first section without an edge that catches on skin when the RICC is inserted into an insertion site of a patient.

10. The method of claim 9, further comprising applying solvent to the proximal portion of the hard portion of the catheter tube, the receptacle of the junction, or both before inserting the proximal portion of the hard portion of the catheter tube into the receptacle of the junction.

11. The method of either claim 9 or claim 10, further comprising obtaining or extruding a first section of the catheter tube, the first section commensurate with the hard portion of the catheter tube.

12. The method of claim 11, wherein the first section of the catheter tube is formed of a first polymeric material having a first durometer, the second section of the catheter tube is formed of a second polymeric material having a second durometer less than the first durometer, and the junction of the catheter tube is formed of the second polymeric material, the supplemental polymeric material, or the combination thereof, the supplemental polymeric material being a third polymeric material having a third durometer closer to the second durometer than the first durometer.

13. The method of any of claims 8-12, further comprising obtaining or extruding the second section of the catheter tube, the second section of the catheter tube being multiluminal with one or more additional lumens to the primary lumen.

14. The method of claim 13, further comprising inserting one or more polymeric rods into the one-or-more additional lumens before melting the polymeric material in the RF-welding die, the one-or-more polymeric rods providing the supplemental polymeric material.

15. The method of any of claims 8-14, further comprising disposing a sacrificial polymeric tube over the stepped mandrel before or after forming the mandrel-mounted catheter tube, the sacrificial polymeric tube providing the supplemental polymeric material.

16. A method of using a rapidly insertable central catheter (“RICC”), comprising:
creating an insertion site to access a vasculature of a patient with an introducer
needle disposed within a primary lumen of the RICC;
inserting a distal portion of a catheter tube of the RICC into the insertion site
past a tapered junction between a first section of the catheter tube and a
second section of the catheter tube without an edge between the first section
and the junction catching on skin of the patient during the inserting; and
advancing the distal portion of the catheter tube through the vasculature of the
patient without use of a Seldinger technique.
17. The method of claim 16, further comprising withdrawing the introducer needle
from the primary lumen of the RICC after creating the insertion site and inserting at least some
of the distal portion of the catheter tube into the insertion site.
18. The method of either claim 16 or claim 17, wherein the insertion site is at a right
subclavian vein or a right internal jugular vein.
19. The method of claim 18, wherein advancing the distal portion of the catheter
tube through the vasculature of the patient includes advancing the distal portion of the catheter
tube through the right subclavian vein or the right internal jugular vein, a right brachiocephalic
vein, and into a superior vena cava.