

Claims

1. A steerable guide wire for use in a catheter assembly comprising:
 - a. a distal end expandable assembly, wherein said expandable assembly is capable of being changed from a retracted state to an expanded state and wherein said expandable assembly is arranged in a substantially conical configuration;
 - b. a pivotable joint connecting said expandable assembly to said guide wire.
2. The guide wire for use in a catheter assembly according to claim 1, wherein said expandable assembly is retrievable and resiliently deformable in a retrievable configuration.
3. The guide wire for use in a catheter assembly according to any of the claims 1 and 2, wherein said expandable assembly comprises an impermeable membrane, wherein said membrane is made of a shape memory material and has a net-like filter structure.
4. The guide wire for use in a catheter assembly according to the claims 1 to 3, wherein said expandable assembly has an expansion ratio ranging from at least 1:5 to at least 1:10 of its diameter before and after expansion.
5. The guide wire for use in a catheter assembly according to any of the claims 1 to 4, wherein said expandable assembly is configured to adhere to the inner wall of a vessel lumen by means of at least one adhesive component.
6. The guide wire for use in a catheter assembly according to any of the claims 1 to 5, wherein the pivotable joint of said guide wire allows for deflecting the expandable assembly in two or three dimensions relative to said guide wire.
7. The guide wire for use in a catheter assembly according to claim 6, wherein said pivotable joint is selected from the group consisting of: non-axial joint, uniaxial joint, biaxial joint, multiaxial joint.

8. A catheter assembly comprising
- a. a first tube,
 - b. a guide wire according to any of the claims 1 to 7 located within said first tube,
 - c. optionally wherein said guide wire is located in a second tube positioned within said first tube,

wherein said first and/or second tube is made of or covered with a non-sticking material comprising polytetrafluoroethylene (PTFE) or perfluoroalkoxy (PFA) and, wherein said first tube comprises one or more side holes.

9. The catheter assembly according to claim 8, wherein said catheter assembly comprises a sliding sleeve accommodating the expandable assembly in a retracted state within said catheter assembly.
10. The catheter assembly according to any of the claims 8 and 9, wherein said first tube has an inner diameter ranging from 0.6 to 2.2 mm, an outer diameter ranging from 0.8 to 2.8 mm and a length of 15 to 85 cm.
11. The catheter assembly according to any of the claims 8 to 10, wherein said catheter assembly is conceived to temporary occlude tortuous and/or branched vessel segments in mammals.
12. Use of a catheter assembly according to any of the claims 8 and 11 for temporary vessel occlusion, the use comprising the steps of:
- a. Vein access by hollow needle puncture;
 - b. Insertion of a standard guide wire;
 - c. Advancing the catheter assembly to the desired position;
 - d. Removal of the standard guide wire;
 - e. Loading of the steerable guide wire into said catheter, wherein the expandable assembly is temporarily locked in a retracted state within a sliding sleeve of said catheter;
 - f. Advancing the expandable assembly within said catheter by pushing the attached guide wire;

- g. Release of the expandable assembly from the sliding sleeve either when inside of the catheter or when reaching its distal position within the catheter;
- h. Positioning the catheter assembly over the location intended to occlude;
- i. Withdrawing the catheter while the guide wire is kept in place, until the expandable assembly is released and expanded;
- j. Optionally, electric current via one or a plurality of contacts may be used to retract the vein walls to support tight occlusion and/or reduce the target vein diameter;
- k. Retraction and positioning of the expanded assembly by pulling the guide wire to ensure the occlusion of the target vessel;
- l. Optionally, testing closure by injecting air-foamed saline or ultrasound contrast medium;
- m. Performing foam sclerotherapy;
- n. Advancing the catheter to collect the expanded assembly;
- o. Retracting the expanded assembly by pulling its guide wire to a position within the catheter, optionally wherein said step comprises additional injection of foam to fill the lumen of side branch veins;
- p. Optionally further sclerofoam deployments may be performed, e.g. to fill side branches or perforator veins, during catheter withdrawal;
- q. Optionally the occlusion device may be used in one or several further locations, depending on the requirements of sclerotherapy;
- r. Removal of the steerable guide wire and the catheter assembly from the vein.

13. Guide wire for use in a catheter assembly according to any of the claims 8 to 12, comprising:

- a. an expandable assembly,
- b. one or a plurality of contacts positioned on said expandable assembly, wherein each contact comprises an electrode element connected to a conductor,
- c. an electrically conducting pivotable joint connecting said expandable assembly to said guide wire, wherein said guide wire has an insulated conductive core, and
- d. a power supply capable of selectively generating an electrical signal transmitted to said one or a plurality of contacts via conductive core of said guide wire.

14. The guide wire for use in a catheter assembly according to claim 13, wherein said one or a plurality of contacts are activated when said expandable assembly is in the expanded state.

15. Use of a guide wire according to any of the claims 13 and 14 for temporary vessel occlusion, wherein the activation of said one or a plurality of contacts induces a vasospasm of the vessel lumen.