

[0012] In one embodiment of the present application, a prosthetic heart valve comprises an internal support frame defining a flow orifice therethrough and wherein the internal support frame is adapted for post-implant expansion. A plurality of flexible leaflets attaches to the support frame so as to extend across the flow orifice and come together within the orifice to define one-way flow therethrough. The prosthetic heart valve further includes a valve-type indicator that signifies the capability of the support frame for post-implant expansion of the orifice. The valve-type indicator is readable using an external imager.

[0013] The prosthetic heart valve preferably has a labeled valve size, and the valve-type indicator comprises a valve-size indicator that denotes the labeled valve size and is visible or readable using an external imager. For example, the valve-size indicator comprises a numerical value that equals the labeled valve size in millimeters. In one embodiment, the internal support frame comprises a structural component that shows up as a positive image on the external imager, and the valve-type indicator is formed by one or more voids integrated into the structural component that show up as negative images on the external imager. For instance, the structural component of the internal support frame may be a generally tubular band that is adapted for post-implant expansion. In some embodiments, the valve-type indicator is integrated into a structural component to provide a positive image, for example as part of a band, stent, and/or wireform.

[0014] In another embodiment, the valve-type indicator comprises an indicator element that shows up as a positive image on the external imager mounted to a structural component of the prosthetic heart valve that is not clearly visible to the external imager so that the valve-size indicator shows in contrast to the structural component on the external imager. For example, the structural component comprises a soft sealing ring surrounding an inflow end of the heart valve, and the indicator element is mounted to the sealing ring.

[0015] In one aspect, the prosthetic heart valve further includes an expandable tubular frame attached to an inflow end of the internal support frame on which the valve-size indicator is located. In such a configuration, the expandable tubular frame may have

axial struts, wherein an upper strut is shaped with peaks and valleys around its periphery, and the valve-type indicator is integrated into the frame as a tag below the upper strut and along one of the axial struts.

[0019] Some embodiments provide a prosthetic heart valve, comprising: an internal support frame defining a flow orifice therethrough, the internal support frame is adapted for post-implant expansion; a plurality of flexible leaflets attached to the support frame and extending across the flow orifice and coming together within the orifice to define one-way flow therethrough; and a valve-type indicator that provides information about a characteristic of the heart valve, the valve-type indicator readable using an external imager.

[0020] Some embodiments provide a prosthetic heart valve, comprising: an internal support frame defining a flow orifice therethrough, the internal support frame defining a plurality of cusps that curve toward the inflow end separated by commissures, the support frame comprising an annular element disposed at an inflow end of the support frame that undulates so as to have peaks and valleys, with the peaks corresponding to the commissures of the support frame; a plurality of flexible leaflets attached to the support frame and extending across the flow orifice and coming together within the orifice to ensure one-way flow therethrough, each of the leaflets attaching at a peripheral edge along the cusps and commissures of the support frame; and an indicator comprising at least one feature located on the annular element, at least a portion of the indicator having a radiopacity different from the radiopacity of the annular element, the indicator being visible using an external imager wherein the prosthetic heart valve has a labeled valve size and the indicator denotes the labeled valve size. At least a portion of the annular element can be radiopaque, with the indicator including at least one opening extending through the at least one radiopaque portion of the annular element.

[0021] Some embodiments provide a method for replacing a prosthetic valve in need thereof, the method comprising: reading a valve-type indicator of a first prosthetic valve, selecting a second prosthetic valve based on the information read, and deploying the second prosthetic valve in the first prosthetic valve. Optionally, the method includes expanding a diameter of the first prosthetic valve prior to, contemporaneously with, or simultaneously with deploying the second prosthetic valve.

WHAT IS CLAIMED IS:

1. A prosthetic heart valve, comprising:
an internal support frame defining a flow orifice therethrough, wherein the
internal support frame is adapted for post-implant expansion;
a plurality of flexible leaflets attached to the support frame and extending across
the flow orifice and coming together within the orifice to define one-way
flow therethrough; and
a valve-type indicator that signifies the capability of the support frame for post-
implant expansion of the orifice, the valve-type indicator readable using
an external imager.
2. The heart valve of claim 1, wherein the prosthetic heart valve has a
labeled valve size, and the valve-type indicator further comprises a valve-size indicator
that denotes the labeled valve size.
3. The heart valve of claim 2, wherein the valve-size indicator comprises a
numerical value that equals the labeled valve size in millimeters.
4. The heart valve of claim 1, wherein the internal support frame comprises
a structural component that shows up as a positive image on the external imager, and the
valve-type indicator is formed by one or more voids integrated into the structural
component which show up as negative images on the external imager.
5. The heart valve of claim 4, wherein the structural component of the
internal support frame comprises a generally tubular band with a diameter that is
expandable post-implant.
6. The heart valve of claim 1, wherein the valve-type indicator comprises an
indicator element that shows up as a positive image on the external imager, the indicator
element mounted to a structural component of the prosthetic heart valve that has a
distinguishable appearance on the external imager so that the valve-type indicator
contrasts with the structural component on the external imager.

7. The heart valve of claim 6, wherein the structural component comprises a soft sealing ring surrounding an inflow end of the heart valve, and the valve-type indicator is mounted to the sealing ring.

8. The heart valve of claim 1, wherein the valve-type indicator comprises a non-numeric symbol.

9. The heart valve of claim 1, wherein the prosthetic heart valve further includes an expandable tubular frame attached to an inflow end of the internal support frame on which the valve-type indicator is located.

10. The heart valve of claim 9, wherein the expandable tubular frame comprises a series of circumferential and axial struts, wherein an upper strut is shaped with peaks and valleys around its periphery, and a second indicator readable using an external imager is integrated into the frame below the upper strut and along one of the axial struts.

11. The heart valve of claim 9, wherein the upper strut includes a series of distributed notches that enable expansion of the upper strut.

12. A prosthetic heart valve, comprising:
an internal support frame defining a flow orifice therethrough, the internal support frame defining a plurality of cusps that curve toward the inflow end separated by commissures, the support frame comprising an annular element disposed at an inflow end of the support frame that undulates so as to have peaks and valleys, with the peaks corresponding to the commissures of the support frame;
a plurality of flexible leaflets attached to the support frame and extending across the flow orifice and coming together within the orifice to ensure one-way flow therethrough, each of the leaflets attaching at a peripheral edge along the cusps and commissures of the support frame; and
an indicator comprising at least one feature located on the annular element, at least a portion of the indicator having a radiopacity different from the radiopacity of the annular element, the indicator being visible using an

external imager wherein the prosthetic heart valve has a labeled valve size, and the indicator denotes the labeled valve size.

13. The heart valve of claim 12, wherein at least a portion of the annular element is radiopaque and the indicator includes at least one opening extending through the at least one radiopaque portion of the annular element.

14. The heart valve of claim 12, wherein the annular element has an implant diameter wherein the prosthetic heart valve is functional and is adapted for post-implant expansion to a larger diameter wherein the prosthetic heart valve is non-functional.

15. The heart valve of claim 12, wherein the annular element includes at least one expandable segment formed by overlapping free ends located at one of the cusps of the support frame.

16. The heart valve of claim 12, wherein an indicator is disposed at at least one of the peaks and the valleys of the annular element.

17. The heart valve of claim 12, wherein the indicator comprises a numerical value that equals the labeled valve size.

18. The heart valve of claim 12, wherein the indicator comprises a non-numeric symbol representative of the labeled valve size.

19. The heart valve of claim 12, wherein the prosthetic heart valve further includes an expandable tubular frame attached to an inflow end of the internal support frame on which a second indicator visible using an external imager is located.

20. The heart valve of claim 19, wherein the expandable tubular frame comprises a series of circumferential and axial struts, wherein an upper strut is shaped with peaks and valleys around its periphery, and the second indicator is integrated into the frame below the upper strut and along one of the axial struts.