Improved Antegrade Catheter for Delivery of Cardioplegia Solutions

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Technology description

Market Summary

Millions of cardiac surgeries are performed each year. Cardiac surgery requires the heart to stop beating for a period of time so that coronary artery bypass surgery and/or valve surgery can be performed. The heart muscle must be protected during this period to decrease the incidence of ischemic tissue damage and subsequent heart dysfunction. This protection of the heart tissue is typically achieved by temperature reduction and perfusion of cardioplegia (cardio = heart; plegia = paralysis) solutions to stop heart contractions, provide intermittent of continuous oxygen, and deliver protective drugs. Currently, the delivery of cardioplegia solutions requires the assembly and/or application of multiple components including the cardioplegia catheter, hemostatic clamps, and tourniquet tubing. The need for multiple devices impairs surgeon visibility, economy of motion, and access to the surgical field.

Technical Summary

The present device is a catheter system for the delivery of cardioplegia solutions that reduces clutter, improves organization within the operative site, and enhances surgeon visibility. In fact, no hemostatic clamps are needed to secure sutures used to maintain homeostasis around the catheter insertion site, which makes this novel design better suited for minimally invasive cardiac surgery compared to existing devices. This improved catheter also has a suture lock system that stabilizes the improved platform that holds the catheter to the surface of the aorta, thereby increasing stability even when the catheter is moved in all directions. Additional improvements added to aid in stability include a finger rest and revised suture trapping stylets to maintain a grasping position. Further, it has a separate pressure port to monitor aortic blood pressure or to vent air bubbles. Finally, the catheter can be attached to standard cardioplegia delivery tubing using luer lock connectors as well as easily removed while tack site sutures are left in place for subsequent closure of the insertion "tack" site.

Application area

Catheter device for the delivery of cardioplegia solutions in conventional surgery using cardiopulmonary bypass and in minimally invasive cardiac surgery.

Advantages

One-piece design eliminates need to assemble separate components (tourniquet tubing), resulting in improved stability of the catheter, decreased clutter in the operative field, and increased economy of motion and visibility for healthcare provider.
More compatible with minimally invasive cardiac surgery techniques compared to existing cardioplegia catheter designs.
Stabilizes tension and locks the aortic tack site sutures around the insertion site, prevents leaks around the insertion site, and is easily removable for subsequent tying of insertion site sutures.
Includes ergonomic grips for easier handling.
May be used in a number of cardiovascular procedures including cardiopulmonary bypass, left ventricular assist device implantations, and left ventricular apical access devices. Future models can be used for securing catheters used in catheter-based diagnostics, angioplasty, and stent placement.

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