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ARROW®

Arrowg+ard Blue® Central Venous Catheter (CVC) Product

Rx only.

Arrowg+ard Blue® Antimicrobial Catheter Technology Information

Introduction

Infection is the leading complication associated with intravascular devices. The National Nosocomial Infection Surveillance System (NNIS) tracks central line-associated bloodstream infection (BSI) rates in adult and pediatric intensive care units from 300 participating hospitals. This report gives a benchmark for other hospitals. Approximately 90% of catheter-related bloodstream infections (CRBSIs) occur with central lines. (Maki, 1997) Mortality attributable to CRBSIs has been reported to be between 4% to 20% resulting in prolonged hospitalization (mean 7 days) and increased hospital costs. (Pittet, 1994)

Rationale for Antimicrobial Catheters

Pathogenesis of Catheter-Related Bloodstream Infections:

Vascular catheter infections develop for many reasons, but begin when a catheter becomes colonized by microorganisms entering through one of two routes, or both: 1) colonization of outside of catheter, or 2) colonization of inside of catheter. Colonization of outside of catheter can occur from skin microorganisms, contiguous infections, or hematogenous seeding of catheter from a distant site. Colonization of inside of catheter can happen through introduction of microorganisms through catheter hub or contamination of infusion fluid. (Sherertz, 1997)

Product Description:

The Arrowg+ard Blue® antimicrobial catheter consists of an Arrow® standard polyurethane catheter with Blue FlexTip®, plus an external surface treatment using antimicrobials, chlorhexidine acetate and silver sulfadiazine.

- Significant antimicrobial activity associated with the Arrow® catheter has been demonstrated using zone of inhibition bioassays against the following organisms:
  - *Klebsiella pneumoniae*
  - *Candida albicans*
  - *Escherichia coli*
  - *Pseudomonas aeruginosa*
  - *Staphylococcus aureus*
  - *Staphylococcus epidermidis*

Intended Use:

The Arrowg+ard technology is intended to provide protection against catheter-related bloodstream infections. It is not intended to be used as a treatment for existing infections nor is it indicated for long-term use (> 30 days).

Indications for Use:

The Arrowg+ard Blue antimicrobial catheter is indicated to permit short-term (< 30 day) central venous access for the treatment of diseases or conditions requiring central venous access, including, but not limited to the following:

- Lack of usable peripheral IV sites
- Central venous pressure monitoring
- Total parenteral nutrition (TPN)
- Infusions of fluids, medications, or chemotherapy
- Frequent blood sampling or receiving blood transfusions/blood products

The catheter is not intended to be used as a treatment for existing infections nor as a substitute for a tunneled catheter in those patients requiring long-term therapy. One clinical study indicates antimicrobial properties of the catheter may not be effective when it is used to administer TPN.

Contraindications:

The Arrowg+ard Blue antimicrobial catheter is contraindicated for patients with known hypersensitivity to chlorhexidine, silver sulfadiazine and/or sulfa drugs.

Clinical Benefits to be Expected:

The ability to gain access to the central circulation system through a single puncture site for applications that include fluid infusion, blood sampling, medication administration, central venous monitoring, and the ability to inject contrast media.

Provide protection against catheter-related bloodstream infections.

Special Patient Populations:

Controlled studies of this product have not been conducted in pregnant women, pediatric or neonatal patients, and patients with known sulfonamide hypersensitivity, erythema multiforme, Stevens-Johnson syndrome and glucose-6-phosphate dehydrogenase deficiency. Benefits of use of this catheter should be weighed against any possible risk.

Antimicrobial Catheter Size	Minimum Safe Infant Weight
4 Fr.	≥ 2.0 kg
5 Fr.	≥ 2.5 kg
5.5 Fr.	≥ 3.0 kg

Hypersensitivity Potential:

Hypersensitivity reactions are a concern with antimicrobial catheters in that they can be very serious and even life-threatening. Since antimicrobial catheters were introduced into the market, there have been reports of hypersensitivity occurrences. This may affect your patient population, especially if your patient is of Japanese origin.

See the Warning section for additional information.

Clinical Evaluations:

- A prospective randomized clinical trial of 403 catheter insertions in adult patients in a medical-surgical ICU showed antimicrobial catheters were 50% less likely to be colonized than control catheters (p=0.003) and 80% less likely to produce catheter related bacteremia (p=0.02).
- Complete data was obtained for 403 catheters (195 control catheters and 208 antimicrobial catheters) in 158 patients. Control catheters removed from patients who were receiving systemic antibiotic therapy occasionally showed low-level surface activity that was unrelated to length of time catheter had been in place (mean zone of inhibition ± SD, 1.7 ± 2.8 mm); in contrast, antimicrobial catheters uniformly showed residual surface activity (mean zone of inhibition, 5.4 ± 2.2 mm; $P < 0.002$), which declined after prolonged periods in situ. Antimicrobial activity was seen with antimicrobial catheters that had been in place for as long as 15 days.

Maki DG, Stolz SM, Wheeler S, Mermel LA. Prevention of central venous catheter-related bloodstream infection by use of an antiseptic-impregnated catheter. *Ann Intern Med*. 1997;127:257-266.

Warning:

1. **Remove catheter immediately if adverse reactions occur after catheter placement. Chlorhexidine containing compounds have been used as topical disinfectants since the mid-1970's. An effective antimicrobial agent, chlorhexidine**

found use in many antiseptic skin creams, mouth rinses, cosmetic products, medical devices and disinfectants used to prepare the skin for a surgical procedure.

NOTE: Perform sensitivity testing to confirm allergy to catheter antimicrobial agents, if adverse reaction occurs.

⚠ *General Warnings and Precautions*

Warnings:

1. **Sterile, Single use: Do not reuse, reprocess or resterilize. Reuse of device creates a potential risk of serious injury and/or infection which may lead to death. Reprocessing of medical devices intended for single use only may result in degraded performance or a loss of functionality.**
2. **Read all package insert warnings, precautions and instructions prior to use. Failure to do so may result in severe patient injury or death.**
3. **Do not place/advance catheter into or allow it to remain in the right atrium or right ventricle. The catheter tip should be advanced into the lower 1/3 of the Superior Vena Cava.**

   For femoral vein approach, catheter should be advanced into vessel so catheter tip lies parallel to vessel wall and does not enter right atrium.

   Catheter tip location should be confirmed according to institutional policy and procedure.
4. **Clinicians must be aware of potential entrapment of the guidewire by any implanted device in circulatory system. It is recommended that if patient has a circulatory system implant, catheter procedure be done under direct visualization to reduce risk of guidewire entrapment.**
5. **Do not use excessive force when introducing guidewire or tissue dilator as this can lead to vessel perforation, bleeding, or component damage.**
6. **Passage of guidewire into the right heart can cause dysrhythmias, right bundle branch block, and a perforation of vessel, atrial or ventricular wall.**
7. **Do not apply excessive force in placing or removing catheter or guidewire. Excessive force can cause component damage or breakage. If damage is suspected or withdrawal cannot be easily accomplished, radiographic visualization should be obtained and further consultation requested.**
8. **Using catheters not indicated for pressure injection for such applications can result in inter-lumen crossover or rupture with potential for injury.**
9. **Do not secure, staple and/or suture directly to outside diameter of catheter body or extension lines to reduce risk of cutting or damaging the catheter or impeding catheter flow. Secure only at indicated stabilization locations.**
10. **Air embolism can occur if air is allowed to enter a central venous access device or vein. Do not leave open needles or uncapped, unclamped catheters in central venous puncture site. Use only securely tightened Luer-Lock connections with any central venous access device to guard against inadvertent disconnection.**
11. **Clinicians should be aware that slide clamps may be inadvertently removed.**
12. **Clinicians must be aware of complications/undesirable side-effects associated with central venous catheters including, but not limited to:**
    - cardiac tamponade secondary to vessel, atrial, or ventricular perforation
    - pleural (i.e., pneumothorax) and mediastinal injuries
    - air embolism
    - catheter embolism
    - catheter occlusion
    - thoracic duct laceration
    - bacteremia
    - septicemia
    - thrombosis
    - inadvertent arterial puncture
    - nerve injury
    - hematoma
    - hemorrhage
    - fibrin sheath formation
    - exit site infection
    - vessel erosion
    - catheter tip malposition
    - dysrhythmias
    - extravasation

Precautions:

1. **Do not alter the catheter, guidewire or any other kit/set component during insertion, use or removal.**
2. **Procedure must be performed by trained personnel well versed in anatomical landmarks, safe technique and potential complications.**
3. **Use standard precautions and follow institutional policies for all procedures including safe disposal of devices.**
4. **Some disinfectants used at catheter insertion site contain solvents which can weaken the catheter material. Alcohol, acetone, and polyethylene glycol can weaken the structure of polyurethane materials. These agents may also weaken the adhesive bond between catheter stabilization device and skin.**
   - **Do not use acetone on catheter surface.**
   - **Do not use alcohol to soak catheter surface or allow alcohol to dwell in a catheter lumen to restore catheter patency or as an infection prevention measure.**
   - **Do not use polyethylene glycol containing ointments at insertion site.**
   - **Take care when infusing drugs with a high concentration of alcohol.**
   - **Allow insertion site to dry completely prior to applying dressing.**
5. **Ensure catheter patency prior to use. Do not use syringes smaller than 10 mL (a fluid filled 1 mL syringe can exceed 300 psi) to reduce risk of intraluminal leakage or catheter rupture.**
6. **Minimize catheter manipulation throughout procedure to maintain proper catheter tip position.**

Kits/Sets may not contain all accessory components detailed in these instructions for use. Become familiar with instructions for individual component(s) before beginning the procedure.

A Suggested Procedure: Use sterile technique.

Prep Puncture Site:

1. Position patient as appropriate for insertion site.
   - Subclavian or Jugular approach: Place patient in slight Trendelenburg position as tolerated to reduce risk of air embolism and enhance venous filling.
   - Femoral approach: Place patient in supine position.
2. Prepare clean skin with an appropriate antiseptic agent.
3. Drape puncture site.
4. Administer local anesthetic per institutional policies and procedures.
5. Dispose of needle.

SharpsAway® II Locking Disposal Cup (where provided):

The SharpsAway II Locking Disposal Cup is used for disposal of needles (15 Ga. - 30 Ga.).

- Using one-handed technique, firmly push needles into disposal cup holes (refer to Figure 1).

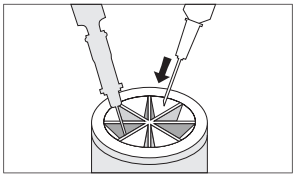

Figure 1

- Once placed into disposal cup, needles will be automatically secured in place so that they cannot be reused.

⚠ **Precaution: Do not attempt to remove needles that have been placed into SharpsAway II Locking Disposal Cup. These needles are secured in place. Damage may occur to needles if they are forced out of disposal cup.**

- Where provided, a foam SharpsAway® system may be utilized by pushing needles into foam after use.

⚠ **Precaution: Do not re-use needles after they have been placed into the foam SharpsAway system. Particulate matter may adhere to needle tip.**

Prepare Catheter:

6. Flush each lumen with sterile normal saline for injection to establish patency and prime lumen(s).
7. Clamp or attach Luer-Lock connector(s) to extension line(s) to contain saline within lumen(s).
8. Leave distal extension line uncapped for guidewire passage.

⚠ **Warning: Do not cut catheter to alter length.**

Gain Initial Venous Access:

Echogenic Needle (where provided):

An echogenic needle is used to allow access to the vascular system for the introduction of a guidewire to facilitate catheter placement. The needle tip is enhanced for approximately 1 cm for clinician to identify exact needle tip location when puncturing the vessel under ultrasound.

Protected Needle/Safety Needle (where provided):

A protected needle/safety needle should be used in accordance with manufacturer's instructions for use.

Arrow® Raulerson Syringe (where provided):

Arrow Raulerson Syringe is used in conjunction with Arrow Advancer for guidewire insertion.

9. Insert introducer needle or catheter/needle with attached syringe or Arrow Raulerson Syringe (where provided) into vein and aspirate.

⚠ **Warning: Do not leave open needles or uncapped, unclamped catheters in central venous puncture site. Air embolism can occur if air is allowed to enter a central venous access device or vein.**

⚠ **Precaution: Do not reinsert needle into introducer catheter (where provided) to reduce risk of catheter embolus.**

Verify Venous Access:

Utilize one of the following techniques to verify venous access because of the potential for inadvertent arterial placement:

- Central Venous Waveform:
  - Insert fluid primed blunt tip pressure transduction probe into rear of plunger and through valves of Arrow Raulerson Syringe and observe for central venous pressure waveform.
    - ◊ Remove transduction probe if using Arrow Raulerson Syringe.
- Pulsatile Flow (if hemodynamic monitoring equipment is not available):
  - Use transduction probe to open syringe valving system of Arrow Raulerson Syringe and observe for pulsatile flow.
  - Disconnect syringe from needle and observe for pulsatile flow.

⚠ **Warning: Pulsatile flow is usually an indicator of inadvertent arterial puncture.**

⚠ **Precaution: Do not rely on blood aspirate color to indicate venous access.**

Insert Guidewire:

Guidewire:

Kits/Sets are available with a variety of guidewires. Guidewires are provided in different diameters, lengths and tip configurations for specific insertion techniques. Become familiar with the guidewire(s) to be used with the specific technique before beginning the actual insertion procedure.

Arrow® GlideWheel™ Wire Advancer or Arrow Advancer (where provided):

Arrow Advancer is used to straighten "J" Tip of guidewire for introduction of the guidewire into Arrow Raulerson Syringe or a needle.

- Using thumb, retract "J" (refer to Figure 2 GlideWheel or 2A Standard Advancer depending on which Arrow Advancer is provided).

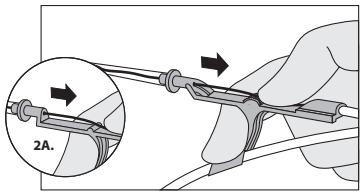

Figure 2

- Place tip of Arrow Advancer – with "J" retracted – into the hole in rear of Arrow Raulerson Syringe plunger or introducer needle.

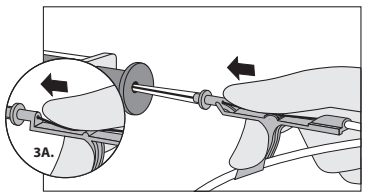

Figure 3

10. Advance guidewire into Arrow Raulerson Syringe approximately 10 cm until it passes through syringe valves or into introducer needle.
    - Advancement of guidewire through Arrow Raulerson Syringe may require a gentle twisting motion.
    - If using Arrow GlideWheel Advancer, advance guidewire through the Arrow® Raulerson Syringe or through the introducer needle by pushing advancer wheel and guidewire forward (refer to Figure 3). Continue until guidewire reaches desired depth.
    - If using standard Arrow Advancer, raise thumb and pull Arrow Advancer approximately 4 - 8 cm away from Arrow Raulerson Syringe or introducer needle. Lower thumb onto Arrow Advancer and while maintaining a firm grip on guidewire, push assembly into syringe barrel to further advance guidewire (refer to Figure 3A). Continue until guidewire reaches desired depth.
11. Use centimeter markings (where provided) on guidewire as a reference to assist in determining how much guidewire has been inserted.

NOTE: When guidewire is used in conjunction with Arrow Raulerson Syringe (fully aspirated) and a 2-1/2" (6.35 cm) introducer needle, the following positioning references can be made:

- ***20 cm mark (two bands) entering back of plunger = guidewire tip at end of needle***
- ***32 cm mark (three bands) entering back of plunger = guidewire tip approximately 10 cm beyond end of needle***

⚠ **Precaution: Maintain firm grip on guidewire at all times. Keep sufficient guidewire length exposed for handling purposes. A non-controlled guidewire can lead to wire embolus.**

⚠ **Warning: Do not aspirate Arrow Raulerson Syringe while guidewire is in place; air may enter syringe through rear valve.**

⚠ **Precaution: Do not reinfuse blood to reduce risk of blood leakage from rear (cap) of syringe.**

⚠ **Warning: Do not withdraw guidewire against needle bevel to reduce risk of possible severing or damaging of guidewire.**

12. Remove introducer needle and Arrow Raulerson Syringe (or catheter) while holding guidewire in place.
13. Use centimeter markings on guidewire to adjust indwelling length according to desired depth of indwelling catheter placement.
14. If necessary, enlarge cutaneous puncture site with cutting edge of scalpel, positioned away from guidewire.

⚠ **Warning: Do not cut guidewire to alter length.**

⚠ **Warning: Do not cut guidewire with scalpel.**

- **Position cutting edge of scalpel away from guidewire.**
- **Engage safety and/or locking feature of scalpel (where provided) when not in use to reduce the risk of sharps injury.**

15. Use tissue dilator to enlarge tissue tract to the vein as required. Follow the angle of the guidewire slowly through the skin.

⚠ **Warning: Do not leave tissue dilator in place as an indwelling catheter. Leaving tissue dilator in place puts patient at risk for possible vessel wall perforation.**

Advance Catheter:

16. Thread tip of catheter over guidewire. Sufficient guidewire length must remain exposed at hub end of catheter to maintain a firm grip on guidewire.
17. Grasping near skin, advance catheter into vein with slight twisting motion.

⚠ **Warning: Do not attach catheter clamp and fastener (where provided) until guidewire is removed.**

18. Using centimeter marks on catheter as positioning reference points, advance catheter to final indwelling position.

NOTE: Centimeter marking symbology is referenced from catheter tip.

- ***numerical: 5, 15, 25, etc.***
- ***bands: each band denotes a 10 cm interval, with one band indicating 10 cm, two bands indicating 20 cm, etc.***
- ***dots: each dot denotes a 1 cm interval***

19. Hold catheter at desired depth and remove guidewire.

⚠ **Precaution: If resistance is encountered when attempting to remove guidewire after catheter placement, guidewire may be kinked around tip of catheter within vessel (refer to Figure 4).**

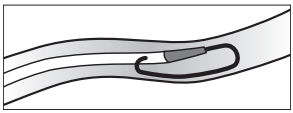

Figure 4

- In this circumstance, pulling back on guidewire may result in undue force being applied resulting in guidewire breakage.
- If resistance is encountered, withdraw catheter relative to guidewire about 2-3 cm and attempt to remove guidewire.
- If resistance is again encountered, remove guidewire and catheter simultaneously.

⚠ **Warning: Do not apply undue force on guidewire to reduce risk of possible breakage.**

20. Always verify entire guidewire is intact upon removal.

Complete Catheter Insertion:

21. Check lumen patency by attaching a syringe to each extension line and aspirate until free flow of venous blood is observed.
22. Flush lumen(s) to completely clear blood from catheter.
23. Connect all extension line(s) to appropriate Luer-Lock connector(s) as required. Unused port(s) may be "locked" through Luer-Lock connector(s) using standard institutional policies and procedures.
    - Slide clamp(s) are provided on extension lines to occlude flow through each lumen during line and Luer-Lock connector changes.

⚠ **Warning: Open slide clamp prior to infusion through lumen to reduce risk of damage to extension line from excessive pressure.**

Secure Catheter:

24. Use a catheter stabilization device, catheter clamp and fastener, staples or sutures (where provided).
    - Use catheter hub as primary securement site.
    - Use catheter clamp and fastener as a secondary securement site as necessary.

⚠ **Precaution: Minimize catheter manipulation throughout procedure to maintain proper catheter tip position.**

Catheter Stabilization Device (where provided):

A catheter stabilization device should be used in accordance with manufacturer's instructions for use.

Catheter Clamp and Fastener (where provided):

A catheter clamp and fastener are used to secure catheter when an additional securement site other than the catheter hub is required for catheter stabilization.

- After guidewire has been removed and necessary lines have been connected or locked, spread wings of rubber clamp and position on catheter making sure catheter is not moist, as required, to maintain proper tip location.
- Snap rigid fastener onto catheter clamp.
- Secure catheter clamp and fastener as a unit to patient by using either catheter stabilization device, stapling or suturing. Both catheter clamp and fastener need to be secured to reduce risk of catheter migration (refer to Figure 5).

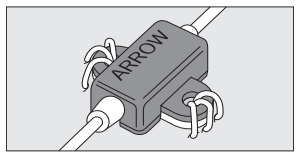

Figure 5

25. Ensure insertion site is dry before applying dressing per manufacturer's instructions.
26. Assess catheter tip placement in compliance with institutional policies and procedures.
27. If catheter tip is malpositioned, assess and replace or reposition according to institutional policies and procedures.

Care and Maintenance:

Dressing:

Dress according to institutional policies, procedures, and practice guidelines. Change immediately if the integrity becomes compromised e.g. dressing becomes damp, soiled, loosened or no longer occlusive.

Catheter Patency:

Maintain catheter patency according to institutional policies, procedures and practice guidelines. All personnel who care for patients with central venous catheters must be knowledgeable about effective management to prolong catheter's dwell time and prevent injury.

Catheter Removal Instructions:

1. Position patient as clinically indicated to reduce risk of potential air embolus.
2. Remove dressing.
3. Release catheter and remove from catheter securement device(s).
4. Ask patient to take a breath and hold it if removing jugular or subclavian catheter.
5. Remove catheter by slowly pulling it parallel to skin. If resistance is met while removing catheter **STOP**

⚠ **Precaution: Catheter should not be forcibly removed, doing so may result in catheter breakage and embolization. Follow institutional policies and procedures for difficult to remove catheter.**

6. Apply direct pressure to site until hemostasis is achieved followed by an ointment-based occlusive dressing.

⚠ **Warning: Residual catheter track remains an air entry point until site is epithelialized. Occlusive dressing should remain in place for at least 24 hours or until site appears epithelialized.**

7. Document catheter removal procedure including confirmation that entire catheter length and tip has been removed per institutional policies and procedures.

For reference literature concerning patient assessment, clinician education, insertion technique, and potential complications associated with this procedure, consult standard textbooks, medical literature, and Arrow International LLC website: www.teleflex.com

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Symbol Glossary: Symbols are in compliance with ISO 15223-1.
Some symbols may not apply to this product. Refer to product labeling for symbols that apply specifically to this product.

								
Caution	Medical device	Consult instructions for use	Contains a medicinal substance	Do not reuse	Do not resterilize	Sterilized by ethylene oxide	Single sterile barrier system with protective packaging inside	
								
Single sterile barrier system	Keep away from sunlight	Keep dry	Do not use if package is damaged	Not made with natural rubber latex	Catalogue number	Lot number	Use by	Manufacturer


Date of manufacture

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