References:
**INSERTION PROCEDURE**

**Seldinger Technique (S.):**
- Insert needle into正确的 vessel.
- Using the Arrow Advancer®, straighten Spring-Wire guide if used, and advance into vessel using Spring-Wire guide. Grasping the tip of Spring-Wire guide with a firm grip on Spring-Wire guide at all times.
- Maintain a firm grip on Spring-Wire guide at all times.
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- If making skin-nick, enlarge cutaneous wound if needed to accommodate pressure transducer. Failure transducer probe into the cutaneous wound.
- Prior to trying needle or needle orientation, verify venous access by inserting fluid into the needle.
- Secure catheter using thin-wall introducer needle.
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**Antiseptic Solutions: Pro/Con**

**Chlorhexidine**
- Placement of indwelling catheters in the right atrium is a dangerous practice that may lead to cardiac perforation and tamponade.
- High mortality rate is associated with cardiac tamponade secondary to pericardial effusion.
- Advancing the catheter too far relative to patient size may cause cardiac tamponade.
- No particular route or catheter type is exempt.
- Confirm catheter tip position by X-ray (or other method in compliance with hospital protocol) examination of the catheter placement can ensure that the catheter tip has not entered the heart or no longer lies parallel to the vessel wall.
- There is a potential for the guidewire to be entrapped by an implanted device in the circulatory system (e.g., ventricular filters or stents). Review patient’s history before catheter insertion procedure to assess for possible implants. And take care regarding the length of Spring-Wire guide inserted.
- Passage of the guidewire into the right heart can cause dysrhythmias, bundle branch block, and perforation of the wall, atrial or ventricular.
- If removing the guidewire becomes difficult, immediately perform chest X-ray examination to confirm catheter tip position. 
- If catheter has shifted, immediately perform chest X-ray examination to confirm catheter tip position.
- To keep risk of disconnections, use only securely tightened Luer-Lock connections.
- To guard against air embolism, follow hospital protocols for all catheter maintenance procedures.
- There are minimal differences in the antimicrobial effects of these two alcohols.
- Dilute alcohol before use: 70% and 90% (v/v) are the most effective concentrations. To achieve maximum kill, apply alcohol to the insertion site with a vigorous rub lasting one minute. Keep the site wet with solution the entire time.

**Disadvantages:**
- Ineffective against spores. Repeated applications can dry skin. No residual property is left on the skin. Flammable when wet.

**Iodine/Iodophor Solutions**
- Effective against gram-positive and gram-negative bacteria, M. tuberculosis, viruses and fungi (prolonged contact may be needed to kill certain fungi and spores).
- The most common iodine is Povidone-Iodine, a combination of iodine and polyvinylpyrrolidone. Povidone Iodine reduces toxicity and skin irritation. With other iodine or iodophor solutions, two minutes of contact time are necessary for optimum microbial kill. Iodophors have approximately a two-hour residual property.

**Disadvantages:**
- Iodine and iodophors can irritate skin and cause allergic or toxic effects in sensitive individuals.
- Proteinaceous fluids such as blood and pus can neutralize iodophors’ antimicrobial properties. There have been reports of microbial growth in certain iodophor solutions, prompting careful attention to the proper dilution and container.
- The available concentrations are 5%, 2%, 7.5%, and 10%, and should be provided in a single-use bottle, syringe, or applicator.
- Chlorhexidine
- Very active against gram-positive organisms, gram-negative organisms and viruses. Chlorhexidine binds to the skin surface and provides a residual antimicrobial property on the skin surface. The residual property for aqueous chlorhexidine solutions is effective up to six hours; chlorhexidine combined with alcohol is effective for a minimum of 48 hours.
- Chlorhexidine is active in the presence of organic matter (i.e., blood). In fact, one study a 2% solution has been found to be superior to a 70% isopropanol alcohol solution and 10% Povidone Iodine for preventing IV-related infections*

**Warnings:**
- Do not place the catheter into or against any tissue that remains in the right atrium or right ventricle.
- Read instructions!

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**Disadvantages:**
- Less active against fungi; minimally effective against M. Tuberculosis Chlorhexidine irritation is optimum at a pH between 5.5 and 7, which corresponds to body fluids and tracts; it can be inhibited by compounds found in hard water and soap.*
VENOUS ACCESS
FLOW RATES AND PRIMING VOLUMES (continued)

ARROW® MULTI-LUMEN CATHETERS

VENOUS ACCESS

DECLOTTING PROCEDURE

- Verify catheter tip placement by chest X-ray.
- Rule out mechanical occlusion.
- Evaluate medications being infused to assess the possible nature of the occlusion.
- Use a 10 cc syringe or larger to avoid excessive pressure.
- Do not use excessive force during the declotting procedure.
- Use gentle aspiration to dislodge any occlusion.
- Do not exceed catheter's lumen-filling volume.

SITE PREPARATION GUIDELINES

1. Don’t remove hair at the site unless it interferes with dressing adherence. Clipping is preferable to shaving; it minimizes skin lacerations and disruption of the epidermal barrier that can lead to infection.

2. Check for patient sensitivity to the prepping solution by requesting known allergy information or testing on a small area of skin away from the proposed insertion site.

3. Physically clean the skin prior to applying antiseptic solution and inserting the catheter. Take care to remove all soap residue.

4. Apply the antiseptic following the specific antiseptic manufacturer’s packaging instructions.

5. Allow the antiseptic solution to air dry prior to inserting the catheter.

References:
2 Reference includes but are not limited to Maki 1997, Sampath 1995 and Bach 1994.

VENOUS ACCESS
ARROW® MULTI-LUMEN CATHETERS

FLOW RATES AND PRIMING VOLUMES

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<th>Description</th>
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ARROW® BLUE TECHNOLOGY

Over 30 randomized, controlled trials, meta-analyses and case-control studies have proven the efficacy of ARROW® antiseptic technology. In particular, ARROW® reduces bacterial colonization of the catheter by 60 percent and catheter-related bacteremia by an even greater 80 percent. And it's effective against a wide array of gram-positive bacteria, including S. epidermidis, MRSA and S. aureus, gram-negative bacteria, including Enterococci and Pseudomonal strains; and fungi, including C. albicans.

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