COOK MEDICAL

Cook Spectrum® Silicone Cuffed Central Venous Catheter

Instructions For Use

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COOK SPECTRUM® SILICONE CUFFED CENTRAL VENOUS CATHETERS

CAUTION: U.S. federal law restricts this device to sale by or on the order of a physician (or properly licensed practitioner).

DEVICE DESCRIPTION

The Cook Spectrum® Silicone Cuffed Central Venous Catheters are impregnated with antimicrobial agents, minocycline and rifampin, which may minimize the risk of catheter-related bloodstream infection during use. The activity of these antimicrobial agents is localized at the catheter surface and is not intended for treatment of systemic infections. The antimicrobial agents, minocycline and rifampin, have a yellow and an orange appearance; therefore, some coloration of the catheter is normal.

From HPLC assay, the average amount of minocycline contained in a Cook Spectrum silicone catheter is approximately 410 µg/cm for a 12.0 French double-lumen catheter, and 135 µg/cm for a 7.0 French double-lumen catheter. From HPLC assay, the average amount of rifampin contained in a Cook Spectrum silicone catheter is approximately 208 µg/cm for a 12.0 French double-lumen catheter, and 68 µg/cm for a 7.0 French double-lumen catheter. These total amounts of minocycline and rifampin are significantly lower than typical daily systemic pharmacologic doses.

Volumes

Single-Lumen Central Venous Catheters

Catheter	French Size	Lumen Volume
HASC-4.0-ABRM	4.0	0.1cc
HASC-5.0-ABRM	5.0	0.2cc

Double-Lumen Central Venous Catheters

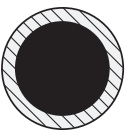
Catheter	French Size	Small Lumen Volume	Large Lumen Volume
HASDC-7.0-LSC-ABRM	7.0	0.5cc	0.6cc
HASDC-7.0-RSC-ABRM	7.0	0.5cc	0.5cc
HASDC-9.0-ABRM	9.0	1.0cc	1.1cc

Triple-Lumen Central Venous Catheters

Catheter	French Size	Small Lumen (2) Volume	Large Lumen Volume
HASTC-8.0-ABRM	8.0	0.9cc	1.1cc

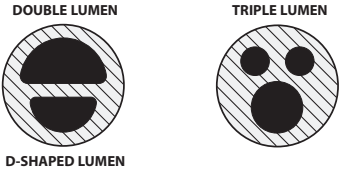
Lumen Diameters of Cook Spectrum® Silicone Central Venous Catheters

SINGLE LUMEN



Single-Lumen Round Lumen

French Size	Lumen Diameter
4.0	.026 inch
5.0	.036 inch



Double-Lumen D-Shaped Lumens

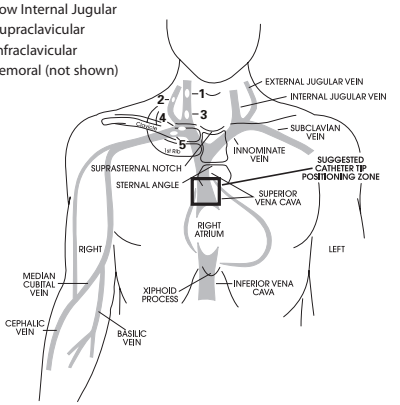
French Size	Small Lumen Diameter	Large Lumen Diameter
7.0	.019 x .045 inch	.025 x .050 inch
9.0	.025 x .065 inch	.036 x .074 inch

Triple-Lumen Round Lumens

French Size	Small Lumen (2) Diameter	Large Lumen Diameter
8.0	.029 inch	.043 inch

Cook Spectrum® Silicone Cuffed Central Venous Catheters Access Sites of Choice

1. High Internal Jugular
2. External Jugular
3. Low Internal Jugular
4. Supraclavicular
5. Infraclavicular
6. Femoral (not shown)



INTENDED USE

The Cook Spectrum Silicone Cuffed Central Venous Catheters are intended for the intravenous administration of nutrient fluids, chemotherapeutic agents and other drugs for therapy; blood sampling; blood delivery; and venous pressure monitoring. The catheter is impregnated with the antimicrobials minocycline and rifampin to help provide protection against catheter-related bloodstream infection (CRBSI). It is not intended to be used as a treatment for existing infections.

CONTRAINDICATIONS

- Allergy or history of allergy to tetracyclines or rifampin.
- **NOTE:** Because the Cook Spectrum Silicone Cuffed Central Venous Catheter is impregnated with a combination of the antimicrobial agents minocycline (a derivative of tetracycline) and rifampin (a derivative of rifamycin B), the contraindications, warnings and precautions regarding use of these antimicrobials apply and should be adhered to for use of this device, although systemic levels of minocycline and rifampin in patients receiving this device are highly unlikely to result from their use.

WARNINGS

- Development of a hypersensitivity reaction should be followed by removal of the catheter and appropriate treatment at the discretion of the attending physician.
- Only medical practitioners licensed by law, and trained and experienced in proper positioning of catheters in the central venous system using percutaneous entry (Seldinger) technique should place this catheter. **EXTREME CAUTION** must be used in placement and monitoring.
- To distend great vessels and to prevent inadvertent air aspiration during catheter insertion, patient should be placed in Trendelenburg position.

- Every effort must be made to ascertain proper tip position in order to prevent erosion or perforation of central venous system. Tip position should be verified by X-ray and monitored on a routine basis. Periodic lateral view X-ray is suggested to assess tip location in relation to vessel wall. Tip position should appear to be parallel to vessel wall.
- During blood sampling, temporarily shut off remaining port(s) through which solutions are being infused.
- To avoid vascular injury, do not use excessive force when advancing dilator. Use the smallest size dilator catheter placement will allow. Wire guide must always lead dilator by several centimeters. Do not advance dilator more than a few centimeters into the vessel.
- **Do not power inject contrast medium through catheter.** Catheter rupture may result. Use of a 10 ml syringe or larger will reduce the risk of catheter rupture.
- Do not re-sterilize the Cook Spectrum Silicone Cuffed Central Venous Catheter.
- Placement of this catheter into the subclavian vein may result in compression of the catheter by the clavicle and first rib. Excessive compression may result in catheter damage, including rupture or catheter embolus. Compression of the catheter and consequent risks may be minimized by placement lateral to the junction of the clavicle and first rib or use of alternative venous sites.

PRECAUTIONS

- This product is intended for use by physicians trained and experienced in the proper positioning of catheters in the central venous system using percutaneous entry (Seldinger) technique. Standard techniques for placement of central venous catheters should be employed.
- Select puncture site and length of catheter needed by assessing patient anatomy and condition.
- If lumen flow is impeded, do not force injection or withdrawal of fluids. Notify attending physician immediately.
- Patient movement can cause catheter tip displacement. Catheters placed via an antecubital vein have shown forward tip movement of up to 10 cm with motion of the extremity. Catheters placed from either a jugular or subclavian vein have demonstrated forward tip movement of 1-3 cm with neck and shoulder motion.
- Use of ECG and/or fluoroscopy is suggested for accurate catheter placement.
- The Cook Spectrum Silicone Cuffed Central Venous Catheter should not come into contact with ethyl alcohol, isopropyl alcohol or other alcohols, acetone or other non-polar solvents. These solvents may remove the antimicrobial from the catheter and reduce the catheter's antimicrobial efficacy.
- The Cook Spectrum Silicone Cuffed Central Venous Catheter should not supersede strict aseptic techniques as they relate to catheter placement and maintenance.

PRODUCT RECOMMENDATIONS

Catheter Site Care

Catheter care and maintenance should be performed in accord with the CDC Guidelines for the Prevention of Intravascular Catheter-Related Infections.

Disinfect clean skin with an appropriate antiseptic before catheter insertion and during dressing changes. Although a 2% chlorhexidine-based preparation is preferred, tincture of iodine, an iodophor or 70% alcohol can be used. Allow the antiseptic to remain on the insertion site and to air dry before catheter insertion. If using povidone iodine, allow it to remain on the skin for at least two minutes, or longer if it is not yet dry before insertion. Do not apply organic solvents (e.g., acetone and ether) to the skin before insertion of catheters or during dressing changes.

Catheter Maintenance

Catheter entry site must be prepared and maintained in a manner consistent with standard procedure for central venous catheterization. After catheter placement and prior to use, tip position and lumen patency should be confirmed by free aspiration of venous blood. If blood is not freely aspirated, catheter tip position should be immediately reevaluated by physician. If catheter is not to be used immediately, its lumen should be maintained by continuous saline or heparinized saline drip or locked with heparinized saline solution.

Catheter heparinization should be determined by institutional protocol and clinical judgement. Heparin concentrations of 10 units/ml to 100 units/ml have been reported adequate to maintain lumen patency. Heparin lock should be reestablished after every use or at least every 24 hours if unused. Before using catheter lumen already locked with heparin, lumen should be flushed with twice the indicated lumen volume using normal saline. Lumen should be flushed with normal saline between administration of different infusates. After use, lumen should again be flushed with twice the indicated lumen volume using normal saline before reestablishing heparin lock.

To prevent damage to injection cap and catheter, 1 inch or shorter needles should be utilized for solution administration or flushing. Strict aseptic technique must be adhered to while using and maintaining catheter.

CLINICAL STUDIES

To evaluate efficacy of the Cook Spectrum Silicone Central Venous Catheter in reducing the incidence of catheter-related bloodstream infection, a prospective, randomized clinical trial was conducted in which 365 patients were enrolled to receive either a Cook Spectrum silicone catheter or a non-impregnated silicone control catheter. A total of 191 patients received Cook Spectrum silicone catheters and 174 received control catheters. Patient characteristics (age, sex, underlying disease, degree of immunosuppression, therapeutic interventions, site of insertion, complications, and reason for catheter removal) were comparable between the two groups. Mean catheter dwell time was comparable for the two groups (65±31 days for the Cook Spectrum silicone catheter and 62±31 days for the control, p=0.3).

Catheters Used in the Clinical Study

Type of Catheter	Control Cohort	Treatment Cohort
Double-Lumen Subclavian	84 (48.3%)	84 (44%)
Single-Lumen Subclavian	24 (13.8%)	34 (17.8%)
PICC Line	66 (37.9%)	73 (38.2%)
Total	174 (100%)	191 (100%)

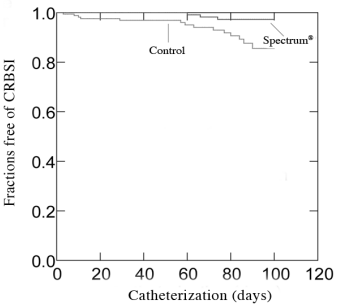
Results from the clinical study showed a statistically significant decrease in the incidence of catheter-related bloodstream infection in patients receiving the Cook Spectrum silicone catheter, with infections occurring in 3 of 191 patients (1.6%) as compared to 14 of 174 patients (8.0%) for the control catheter (p=0.003).

Organisms isolated from patients having catheter-related bloodstream infection in the treatment cohort included *Candida parapsilosis* and *Klebsiella pneumonia*. Testing of isolates revealed no evidence of resistance to minocycline or rifampin developed.

Blood samples obtained from 9 patients at 1–2 days after insertion of the Cook Spectrum silicone catheter were assayed for minocycline and rifampin by high-performance liquid chromatography (HPLC) analysis. No detectable systemic levels of minocycline or rifampin were observed (limit of detection= 1.0 µg/mL for both antimicrobials).

The rates of catheter-related bloodstream infection (calculated according to CDC definition) were 0.24 per 1,000 catheter-days for treatment catheters and 1.30 per 1,000 catheter-days for control catheters. Kaplan-Meier survival analysis indicated that Cook Spectrum silicone catheters were, over time, associated with a significantly lower risk of catheter-related bloodstream infection than the control catheters (p=0.003 by log-rank test).

Kaplan-Meier Survival Curves for Freedom from Catheter-Related Bloodstream Infection (CRBSI)



Discussion of Antimicrobial Activity

Antimicrobial activity associated with the Cook Spectrum Silicone Central Venous Catheter over time has been demonstrated in the following way:

The length of activity of the antibiotics was established during *in vitro* zone of inhibition testing after suspension in saline at 37 degrees C. Antimicrobial activity in the 7.0 French double-lumen catheter was demonstrated for at least 28 days against *Staphylococcus epidermidis*, the most common organism implicated in catheter-related infection.

PATIENT SELECTION

Controlled clinical trials of Cook Spectrum Silicone Central Venous Catheters in pregnant women, pediatric and neonatal populations have not been conducted. The benefits of the use of Cook Spectrum Silicone Central Venous Catheters should be weighed against possible risks.

INSTRUCTIONS FOR USE

1. After preparing the insertion site, introduce the thinwall percutaneous entry needle into the vessel. Venous blood should be easily aspirated to confirm position of needle tip within vessel.

2. Slide Safe-T-J® wire guide straightener (positioned on distal tip of wire guide) over "J" portion of wire guide. Pass straightened wire guide through needle; advance wire guide 5-10 cm into vessel.
3. If straight wire is used, always advance soft, flexible end through needle hub and into vessel. If resistance is encountered during wire guide insertion, do not force wire guide. Withdrawal of wire guide through needle should be avoided; breakage may result.
4. While maintaining wire guide position, withdraw needle and Safe-T-J wire guide straightener.
5. Enlarge puncture site with number 11 scalpel blade, if required. If dilation is required, dilator can be advanced over wire guide and removed prior to insertion of central venous catheter.

   CAUTION: To avoid vascular injury, do not use excessive force when advancing dilator. Use the smallest size dilator catheter placement will allow. Wire guide must always lead dilator by several centimeters. Do not advance dilator more than a few centimeters into the vessel.
6. If a subcutaneous tunnel is desired, the catheter can be passed through the tunnel at this time. Please refer to references for proper tunneling technique.
7. Introduce the sheath-dilator assembly over the wire guide. With a twisting motion, advance the assembly into the vessel.
8. Leaving the sheath in place, remove the dilator and wire guide. (To prevent inadvertent air aspiration, place thumb or finger over the cuffed proximal end of the sheath after removing the introducer and wire guide.)
9. Measure catheter to be used against patient to determine approximate length of catheter needed from puncture site to central venous tip position.
10. Introduce the catheter into the sheath; advance the catheter into position. Verify catheter tip position using radiography or appropriate technology. In order to guarantee extrapericardial location, the catheter tip should be located above the SVC-RA junction, within the lower 1/3 of the SVC. Every effort must be made to ascertain proper tip position in order to prevent erosion or perforation of the central venous system and to ensure proper delivery of infusates.
11. After catheter is in position, venous blood should be easily aspirated. Remove the sheath by grasping the two knobs of the sheath and pulling outward and upward at the same time to peel the sheath away from the catheter. Secure catheter in place with suture or other method. If catheter is not introduced to its full length, additional suture should be carefully placed around catheter and affixed to the skin at entry site. This will help prevent backward or forward catheter movement. Lumens should now be flushed with 5-10 ml normal saline prior to use or establishment of heparin lock.

    NOTE: A wire guide that is at least twice as long as the catheter is recommended for catheter exchange procedure.

HOW SUPPLIED

Supplied sterilized by ethylene oxide gas in peel-open packages. Intended for one-time use. Sterile if package is unopened or undamaged. Do not use the product if there is doubt as to whether the product is sterile. Store in a dark, dry, cool place. Avoid extended exposure to light. Upon removal from package, inspect the product to ensure no damage has occurred.

REFERENCES

These instructions for use are based on experience from physicians and (or) their published literature. Refer to your local Cook sales representative for information on available literature.

1. Raad I, Darouiche R, Dupuis J, et al. "Central Venous Catheters Coated with Minocycline and Rifampin for the Prevention of Catheter-related Colonization and Bloodstream Infections. A Randomized, Double-blind Trial." *Ann Intern Med,* 1997; 127:267-274.
2. Darouiche R, Raad I, Heard S, et al. "A Comparison of Two Antimicrobial-impregnated Central Venous Catheters." *N Engl J Med*, 1999; 340:1-8.
3. Raad I, Darouiche R, Hachem R, et al. "The Broad-spectrum Activity and Efficacy of Catheters Coated with Minocycline and Rifampin." *J Infect Dis*, 1996; 173:418-424.
4. Raad I, Darouiche R, Hachem R, et al. "Antibiotics and Prevention of Microbial Colonization of Catheters." *Antimicrob Agents Chemother,* 1995; 39(11):2397-2400.
5. Darouiche RO, Raad II, Bodey GP, Musher DM. "Antibiotic Susceptibility of *Staphylococcal* Isolates from Patients with Vascular Catheter-related Bacteremia: Potential Role of the Combination of Minocycline and Rifampin." *Int J Antimicrob Agents,* 1995; 6:31-36.

6. Darouiche RO, Hampel OZ, Boone TB, Raad II. "Antimicrobial Activity and Durability of a Novel Antimicrobial-impregnated Bladder Catheter." *Int J Antimicrob Agents*, 1997; 8:243-247.
7. Raad II, Darouiche RO, Hachem R, et al. "Antimicrobial Durability and Rare Ultrastructural Colonization of Indwelling Central Catheters Coated with Minocycline and Rifampin." *Crit Care Med*, 1998; 26:219-224.
8. Darouiche RO, Smith JA, Hanna H, et al. "Efficacy of Antimicrobial-impregnated Bladder Catheters in Reducing Catheter-associated Bacteriuria: A Prospective, Randomized, Multicenter Clinical Trial." *Urology,* 1999; 154:976-981.
9 Marik PE, Abraham G, Careau P, et al. "The *Ex Vivo* Antimicrobial Activity and Colonization Rate of Two Antimicrobial-bonded Central Venous Catheters." *Crit Care Med*, 1999; 27:1128-1131.

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