MHA Keystone Center for Patient Safety & Quality

Procedure For Semi-Quantitative Cultures of Central Lines

Background information:
Catheter-associated infections develop through one of two mechanisms: migration of skin micro-flora down the outside of a catheter and migration of microorganisms through the lumen of a catheter. The first mechanism is common when catheters are left in place for long periods of time (>72 hours). The second mechanism occurs with excessive manipulation of the catheter hub, e.g. forgetting to disinfect the IV access port or stopcock prior to infusion, and contamination of the internal lumen.

This laboratory procedure is designed to detect bacteria on the outer surface of catheters. The number of bacteria on the surface of catheters has been correlated with the development of catheter-related bloodstream infection [note: this is a subset of the broader surveillance term, central line-associated bloodstream infection]. Catheters from patients with central line - related bloodstream infection (CLRBSI) are statistically more likely to have 15 or more colonies on their surface than catheters from patients without sepsis. Other techniques for microbiologic diagnosis of CLRBSI have been published elsewhere.[1] Check with your facility's microbiology lab to confirm methods they offer.

CATHETER SEGMENTS:
Any segment of a catheter is acceptable, except for foley catheters which are to be rejected. Ideally the intracutaneous segment and distal tip of long catheters should be submitted, but in practice the catheter tip is usually received and should be accepted. The catheter must be in a sterile container and must **not** remain at room temperature for more than 4 hours.

PROCEDURE FOR COLLECTION OF CENTRAL LINE SEGMENT(S) BY DIRECT CARE PERSONNEL:

A. Thoroughly cleanse skin about the insertion site with 70% alcohol, e.g. alcohol swab, and allow to dry.

B. Using sterile forceps, carefully withdraw the catheter keeping the externalized portion directed upward and away from the skin surface.

C. Procedure for obtaining tip varies with the length of the catheter.

1. **Shorter catheters (5.7 cm)**: Using sterile scissors, cut the catheter beginning a few millimeters inside the former skin-surface-catheter-interface.

2. **Longer catheters (≥16 cm)**: **Two** 5 cm to 7 cm segments are obtained.
Using sterile scissors, a proximal segment is cut beginning a few millimeters inside the former skin-surface-catheter-interface; and also the distal tip segment is obtained.

D. Place each catheter segment in a sterile transport container, avoiding contact with the outside of container.

E. Inspect the catheter exit site and note if any purulence can be expelled.

F. If pus can be expelled from the catheter exit site, swab the drainage with a culturette swab and send to the laboratory requesting a routine wound culture.
Label the source as: drainage from (location of) IV exit site, (e.g., drainage from Rt. IJ exit site).

G. Send the catheter segment(s) to the laboratory requesting a routine culture. Label the source as: location/type of IV catheter, (e.g., Rt. IJ Swan).

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CLINICAL MICROBIOLOGY LABORATORY: SPECIMEN SETUP PROCEDURE

1. Aseptically transfer the catheter segment onto the surface of a sheep blood agar plate.
2. Using sterile swab, roll the catheter segment and/or tip across the plate, back and forth at least 4 times.
3. Incubate in CO2 at 35^{O} C.

LABORATORY WORK-UP PROCEDURE:

1. Plates are to be held for 48 hours before being discarded as negative.
2. Each colony type that appears on the plate is to be enumerated and identified regardless of colony count. All yeast should have germ tubes performed, and should be speciated if >15 colonies.
3. A colony count of 15 colonies or greater is considered a positive culture, denoting possible cannula related infection, whereas a count of less than 15 colonies is suggests contamination.
4. Perform susceptibility test on all appropriate organisms present in quantities > 15 colonies if susceptibility testing was ordered.

RESULT REPORTING:

12-24 hours:
Report morphotype or identification. Add interpretive "≥15 colonies, suggests local canula infection. Removal of the catheter may be curative. OR
If <15 colonies, probably not significant. If no growth, report "No growth".

24-48 hours:
Add identification and susceptibility request when available.

REFERENCES
Linares J, Sitges-Serra, Grarav J, Percex JL, Martin R: Pathogenesis of catheter sepsis: a prospective study with quantitative and semiquantitative cultures of catheter hub and segments. J. Clin Microbiol 1985; 21:357-360

Maki, D.G., Wise CE, Safarin HW: A semiquantitative culture method for identifying intravenous catheter-related infections. New Engl J Med 1977; 296:1305-1309.

ADDITIONAL CITATION:
1. Safdar, N., J.P. Fine and D.G. Maki; *Meta-Analysis: Methods for Diagnosisng Intravascular Device-related Bloodstream Infection.* Annals of Internal Medicine 15 March 2005; 142 (No. 6):451-66.