SNS COLLEGE OF ALLIED HEALTH SCIENCE

Affiliated to The Tamil Nadu Dr. M.G.R Medical University, Chennai

DEPARTMENT OF CARDIAC TECHNOLOGY

COURSE NAME : CARDIAC CATHETERIZATION LABORATORY BASICS

UNIT : CATHETER MAINTENANCE

TOPIC : IMPORTANCE OF CATHETER CLEANING AND COMMON STERLIZATION METHOD

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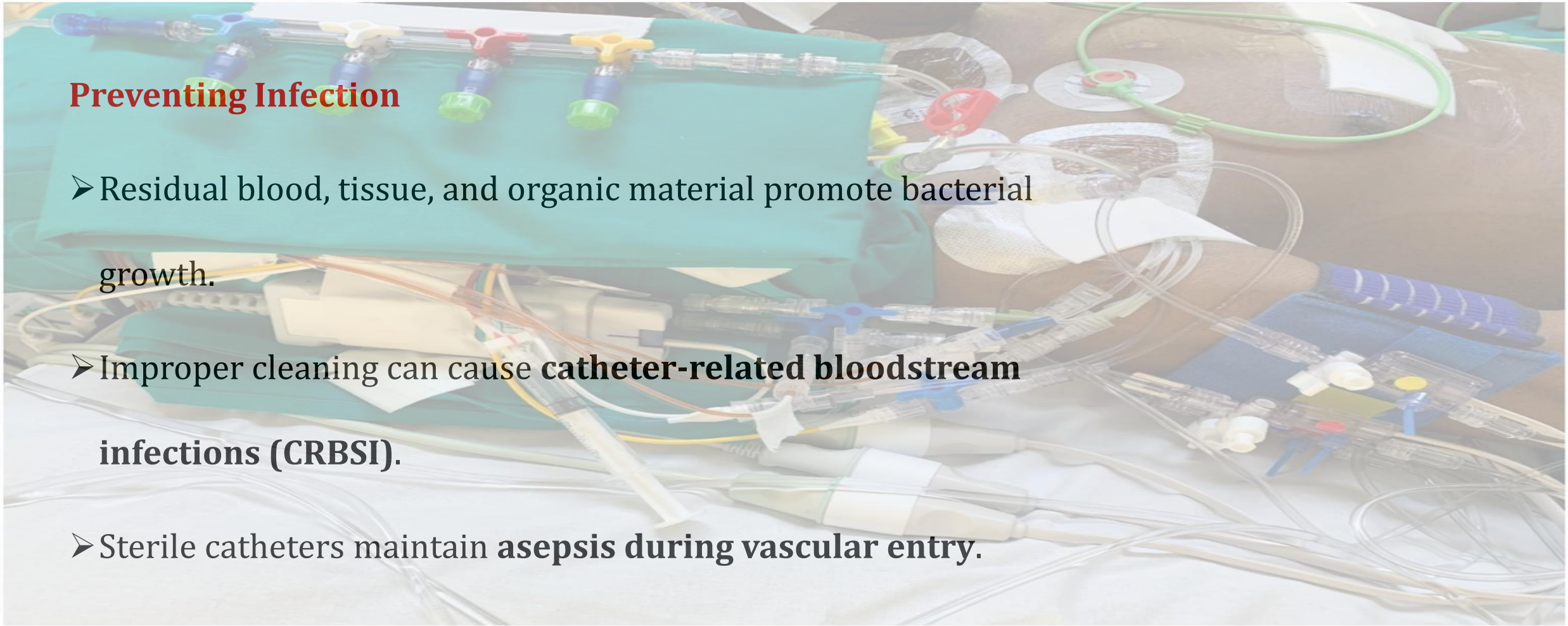
INTRODUCTION

- Cardiac catheters are essential instruments used for diagnostic and interventional procedures such as coronary angiography, ventriculography, angioplasty, EP studies, and pressure recordings.
- Proper catheter cleaning, maintenance, and sterilization procedures are mandatory to prevent infection, preserve device integrity, and ensure accurate hemodynamic measurements.
- Improper handling of catheters may lead to **cross-contamination**, **catheter malfunction**, or **procedure-related complications**.

IMPORTANCE OF CATHETER CLEANING IN CARDIAC CATH LAB



Preventing Infection

- Residual blood, tissue, and organic material promote bacterial growth.
- Improper cleaning can cause **catheter-related bloodstream infections (CRBSI)**.
- Sterile catheters maintain **asepsis during vascular entry**.

IMPORTANCE OF CATHETER CLEANING IN CARDIAC CATH LAB

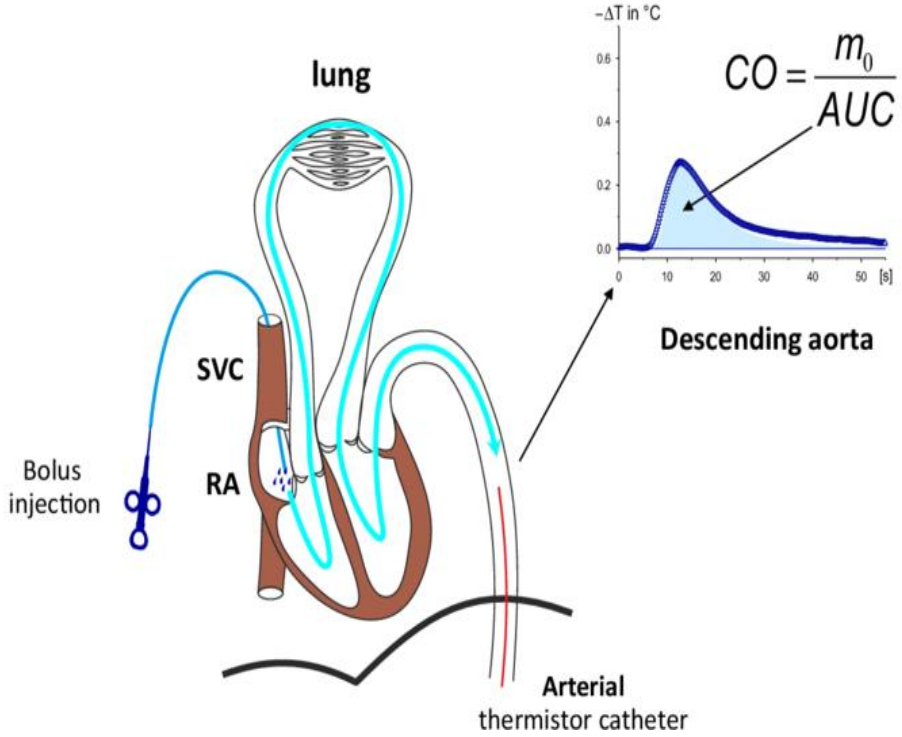
Maintaining Catheter Integrity

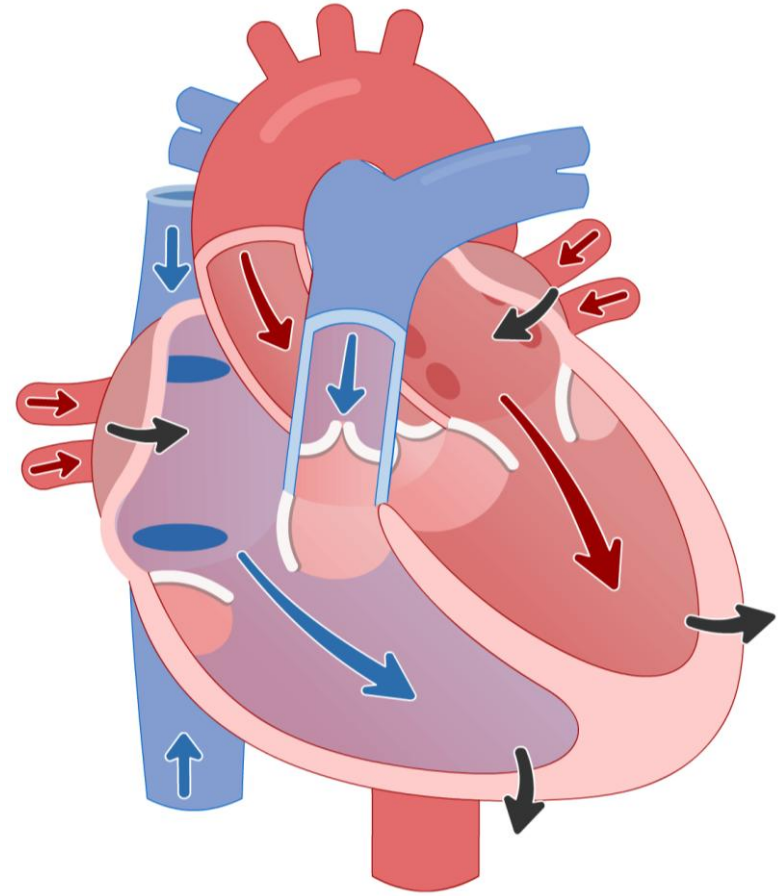
- Blood clots can cause lumen blockage.
- Chemical residue can degrade polymer materials.
- Proper cleaning helps avoid **kinking**, **tip damage**, and **surface deterioration**.

IMPORTANCE OF CATHETER CLEANING IN CARDIAC CATH LAB

Ensuring Accurate Hemodynamics

- Blocked lumens affect pressure recordings.
- Prevents false gradients or waveform damping.





IMPORTANCE OF CATHETER CLEANING IN CARDIAC CATH LAB

Enhancing Life Span of Reusable Catheters

- Diagnostic catheters (Judkins, pigtail, multipurpose) can be reused a limited number of times if well maintained.
- Proper care reduces cost and maintains performance.

IMPORTANCE OF CATHETER CLEANING IN CARDIAC CATH LAB

Regulatory & Safety Compliance

- Adherence to **AAMI**, **CDC**, and **hospital infection control committee (HICC)** standards ensures patient safety.
- Proper documentation supports audits and accreditation.

Catheter Maintenance — General Guidelines

Handling & Storage

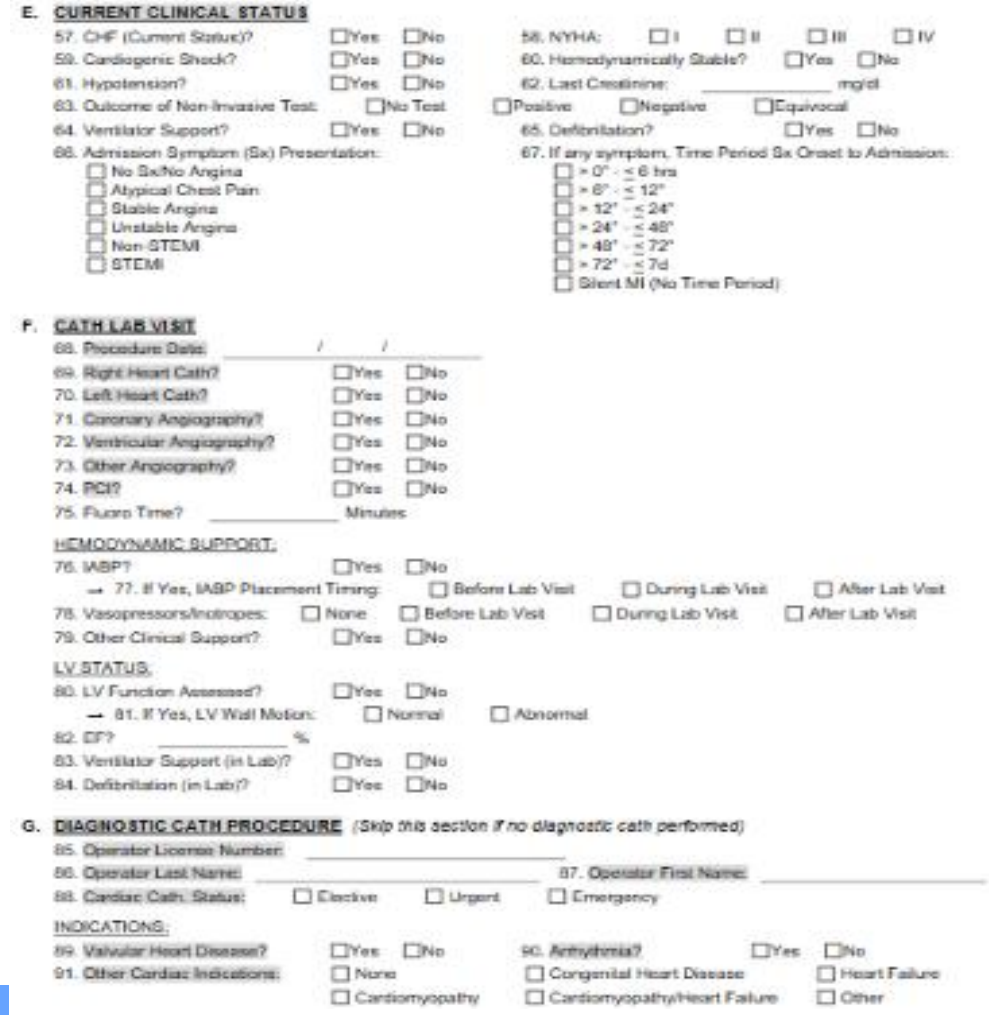
- Store catheters in **dry, dust-free, temperature-controlled shelves.**
- Avoid bending, twisting, or compressing catheters.
- Use racks or pouches to maintain natural curvature.
- Follow **FIFO (First-In, First-Out)** method to avoid expired stock.

Catheter Maintenance — General Guidelines

Documentation

Maintain a **Catheter Usage Logbook** including:

- Catheter type and size
- Manufacturer
- Number of reuses (max allowed 5–10 depending on brand)
- Date of sterilization
- Technician initials
- Inspection outcome



E. CURRENT CLINICAL STATUS

57. CHF (Current Status)? ☐Yes ☐No
58. NYHA: ☐I ☐II ☐III ☐IV
59. Cardiogenic Shock? ☐Yes ☐No
60. Hemodynamically Stable? ☐Yes ☐No
61. Hypotension? ☐Yes ☐No
62. Last Creatinine: _____ mg/dl
63. Outcome of Non-Invasive Test: ☐No Test ☐Positive ☐Negative ☐Equivocal
64. Ventilator Support? ☐Yes ☐No
65. Defibrillation? ☐Yes ☐No
66. Admission Symptom (Sx) Presentation:
☐ No Sx/No Angina
☐ Atypical Chest Pain
☐ Stable Angina
☐ Unstable Angina
☐ Non-STEMI
☐ STEMI
67. If any symptom, Time Period Sx Onset to Admission:
☐ > 0° - ≤ 6 hrs
☐ > 6° - ≤ 12°
☐ > 12° - ≤ 24°
☐ > 24° - ≤ 48°
☐ > 48° - ≤ 72°
☐ > 72° - ≤ 7d
☐ Silent MI (No Time Period)

F. CATH LAB VISIT

68. Procedure Date: ___/___/___
69. Right Heart Cath? ☐Yes ☐No
70. Left Heart Cath? ☐Yes ☐No
71. Coronary Angiography? ☐Yes ☐No
72. Ventricular Angiography? ☐Yes ☐No
73. Other Angiography? ☐Yes ☐No
74. PCI? ☐Yes ☐No
75. Fluoro Time? _____ Minutes

HEMODYNAMIC SUPPORT:

76. IABP? ☐Yes ☐No
→ 77. If Yes, IABP Placement Timing: ☐Before Lab Visit ☐During Lab Visit ☐After Lab Visit
78. Vasopressors/Inotropes: ☐None ☐Before Lab Visit ☐During Lab Visit ☐After Lab Visit
79. Other Clinical Support? ☐Yes ☐No

LV STATUS:

80. LV Function Assessed? ☐Yes ☐No
→ 81. If Yes, LV Wall Motion: ☐Normal ☐Abnormal
82. EF? _____ %
83. Ventilator Support (in Lab)? ☐Yes ☐No
84. Defibrillation (in Lab)? ☐Yes ☐No

G. DIAGNOSTIC CATH PROCEDURE *(Skip this section if no diagnostic cath performed)*

85. Operator License Number: _____
86. Operator Last Name: _____ 87. Operator First Name: _____
88. Cardiac Cath. Status: ☐Elective ☐Urgent ☐Emergency

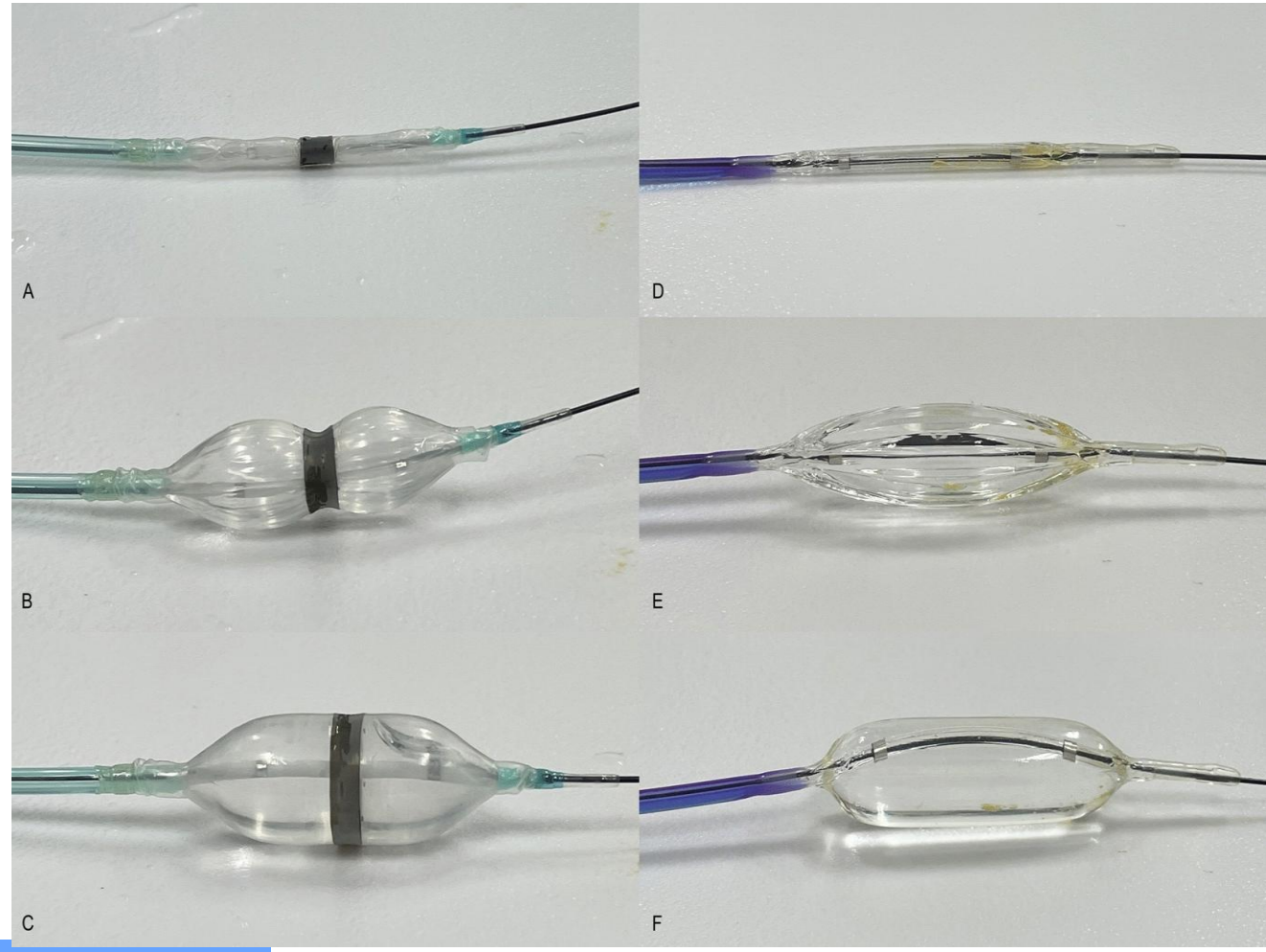
INDICATIONS:

89. Valvular Heart Disease? ☐Yes ☐No
90. Arrhythmia? ☐Yes ☐No
91. Other Cardiac Indications:
☐None ☐Congenital Heart Disease ☐Heart Failure
☐Cardiomyopathy ☐Cardiomyopathy/Heart Failure ☐Other

Catheter Maintenance — General Guidelines

Avoid Reprocessing of Single-Use Devices

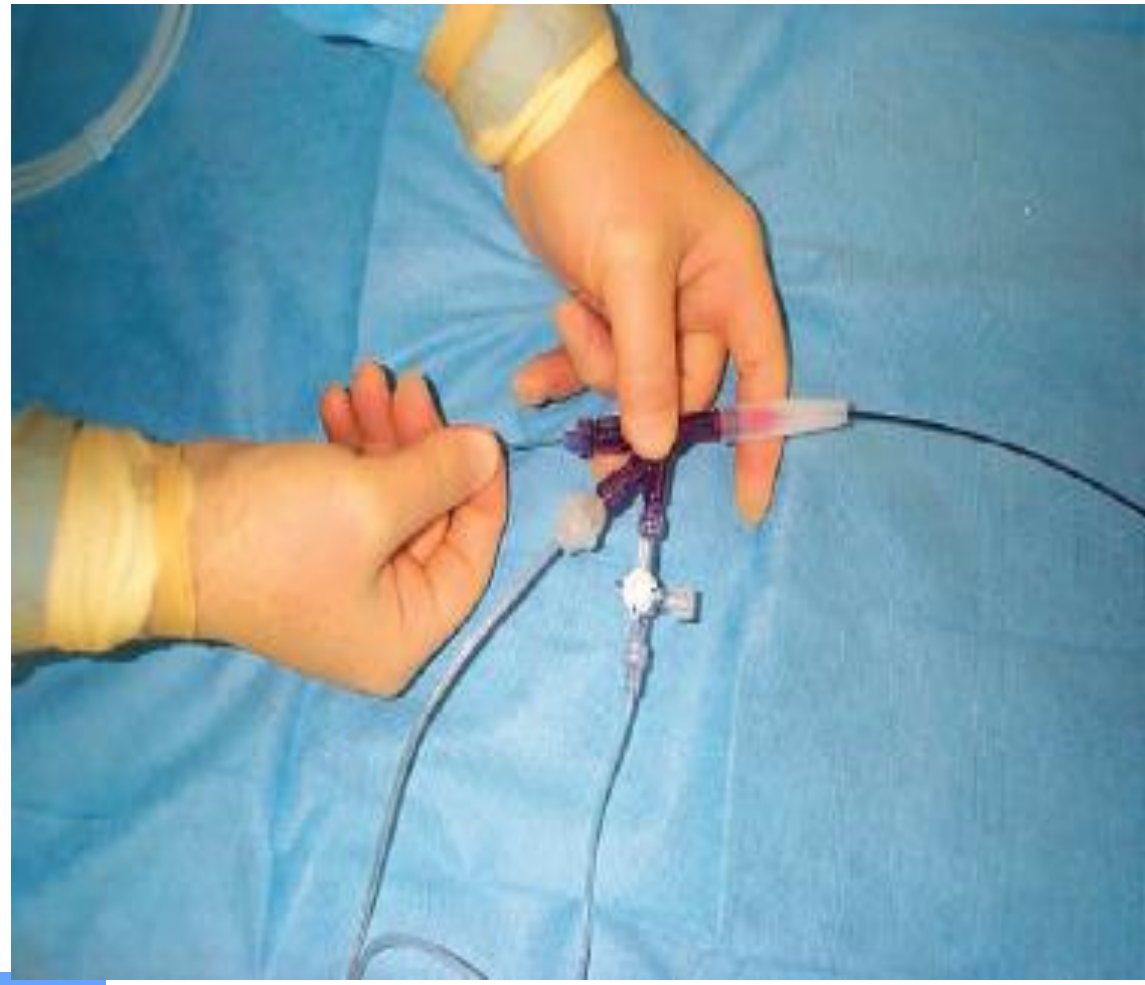
- Guiding catheters, stents, balloons, and EP ablation catheters **must not be reused.**



Step-by-Step Catheter Cleaning Procedures

Step 1: Bedside Pre-cleaning (Immediately After Use)

- Wipe external surfaces with sterile gauze.
- Flush catheter lumen with **heparinized saline** immediately.
- Never allow blood to dry inside or outside the catheter.
- Place catheter in a **moist towel or container** until transported.



Step-by-Step Catheter Cleaning Procedures

Step-2 : Safe Transport to Decontamination Area

- Transfer catheter in **closed, leak-proof, labeled containers.**
- Mark container as **biohazard.**

Step-5 : Thorough Rinsing

- Rinse catheter with **distilled or sterile water** to remove detergent residues.
- Continue flushing lumen until water runs clear.

Step-by-Step Catheter Cleaning Procedures

Step 3: Enzymatic Soaking (Pre-washing)

- Immerse catheter in **enzymatic detergent solution** for 10–20 minutes.
- Purpose: break down proteins, lipids, and organic debris.
- Use solution recommended for delicate polymer materials.

Step-by-Step Catheter Cleaning Procedures

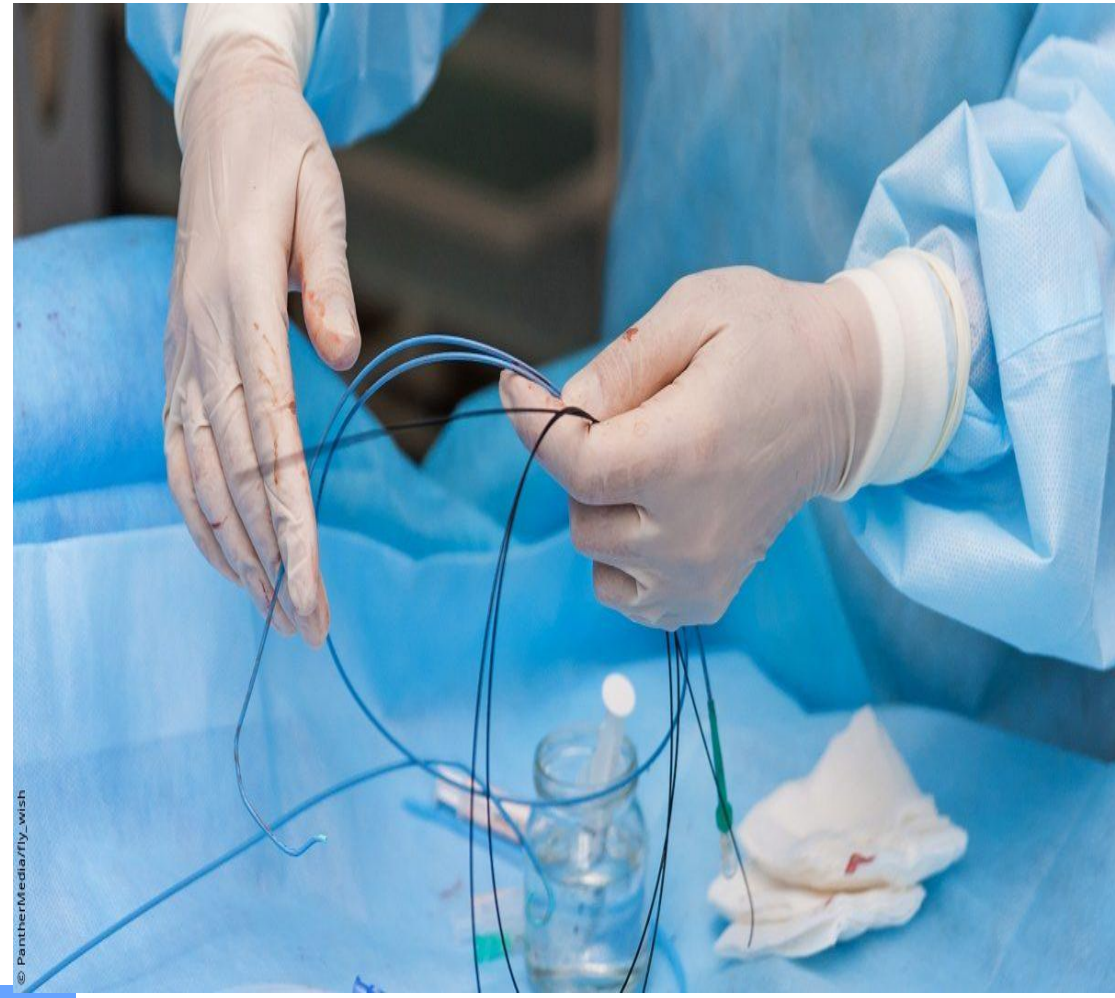
Step 4: Manual Cleaning

A. Lumen Cleaning

- Flush lumen using a syringe with detergent solution.
- Use **soft flexible brushes** appropriate for catheter diameter.
- Avoid forceful insertion to prevent lumen damage.

B. External Surface Cleaning

- Gently wipe catheter body using non-abrasive sponge.
- Inspect **tip and side holes** for clots or debris.



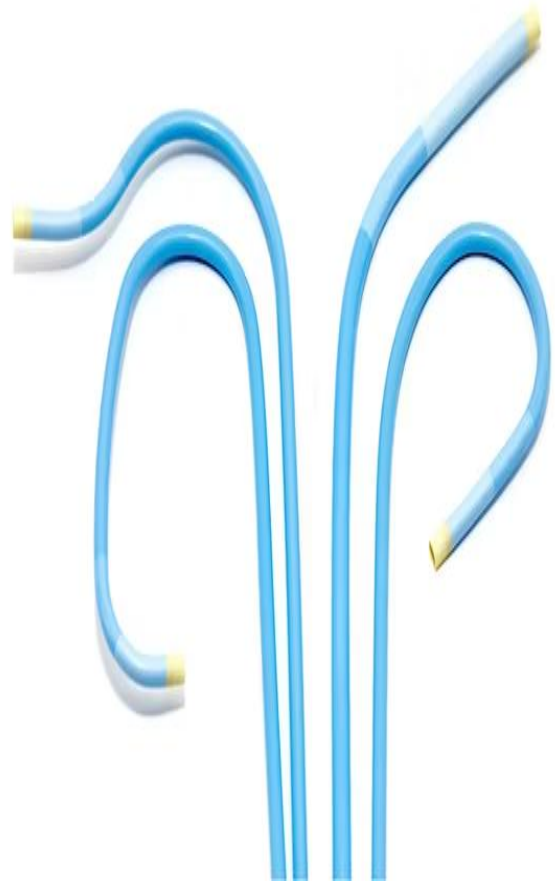
Step-by-Step Catheter Cleaning Procedures

Step 6: Inspection & Integrity Check

Check for:

- ❖ Kinks or cracks
- ❖ Lumen obstruction
- ❖ Discoloration
- ❖ Tip deformation
- ❖ Leaks from hub or side holes
- ❖ Connector detachment

Any damaged catheter must be immediately discarded.



Step-by-Step Catheter Cleaning Procedures

Step 7: Drying

- Air dry in a dust-free environment.
- Use forced air drying for lumen if available.
- Ensure catheter is absolutely dry before sterilization.

Step-by-Step Catheter Cleaning Procedures

Step 8: Sterilization

Method selection depends on catheter material:

A. Ethylene Oxide (ETO) Sterilization

•Preferred for heat-sensitive catheters.

•Requires aeration for 12–24 hours post-sterilization.

B. Hydrogen Peroxide Plasma Sterilization

•Faster process (45–60 minutes).

•No toxic residues.

C. Glutaraldehyde (2–2.5%) High-Level Disinfection

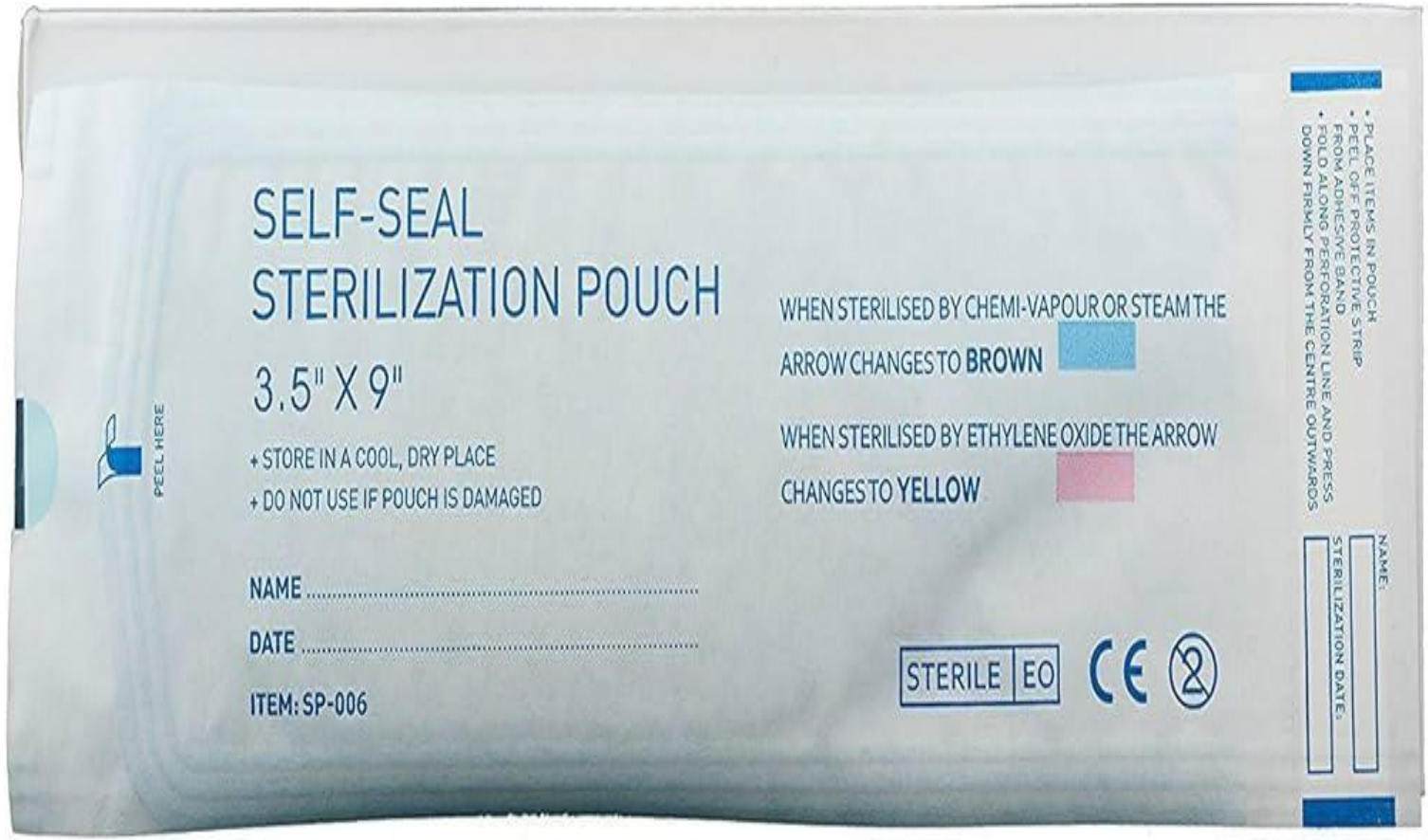
•Soak for 20–45 minutes.

•Rinse thoroughly with sterile water to avoid chemical irritation.

Step-by-Step Catheter Cleaning Procedures

Step 9: Packing

- Pack catheter in **sterile pouches.**
- Label with:
    1. Catheter name
    2. Size
    3. Sterilization date
    4. Expiry
    5. Batch number
- Seal pouch using heat sealers.



Step-by-Step Catheter Cleaning Procedures

Step 10: Storage

- Store vertically or horizontally depending on the catheter type.
- Protect from moisture, heat, and dust.
- Do not compress catheter coils.

Summary Table

Step	Description	Key Points
Bedside care	Flush & wipe	Prevent clot drying
Transport	Biohazard container	Safety precaution
Enzymatic soak	10–20 min	Breaks organic debris
Manual cleaning	Brush lumen	Avoid damage
Rinsing	Sterile water	Clear all detergents
Inspection	Check damage	Discard defective
Drying	Complete dry	Prevent microbial growth
Sterilization	ETO/Plasma/HLD	Depends on catheter
Packing	Sterile pouch	Proper labeling
Storage	Rack or shelf	Preserve shape

References

- **Fuster V, Harrington R, Narula J. *Hurst's The Heart: Manual of Cardiology*. McGraw-Hill Education.**
  – Cleaning and maintenance listed in invasive cardiology sections.
- **John G. Webb, Michael J. Rinaldi. *Textbook of Cardiac Catheterization*. Elsevier.**
  – Detailed procedures for catheter handling and maintenance.
- **Baim DS. *Grossman's Cardiac Catheterization, Angiography, and Intervention*. 9th Edition, Lippincott Williams & Wilkins.**
  – Gold-standard reference for cath lab instrumentation and reprocessing.