

Pitfalls in endoscopic sterilisation

By

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GLOBAL PREVALENCE OF HEPATITIS C



Geographic Distribution of HAV Infection



Geographic Distribution of Chronic HBV Infection



Endoscopes & Accessories

- Gastroscopy
 - Colonoscopy
 - Sigmoidoscopy
 - Bronchoscopy
 - Cystoscopy
 - Laryngoscopy
 - Rhinoscopy
 - Pharyngoscopy
 - Laparoscopy
- Biopsy forceps
 - Cytology brushes
 - Cautery probes
 - Needles for injecting
 - Banding devices
 - Laser fibers
 - Snare for tissue removal



Types of Endoscopes

Rigid endoscopes

Arthroscopes (for joints) ; Laparoscopes internal body cavities.

- Some are not thermo labile, steam sterilization possible

Flexible endoscopes

- GI endoscopes, Bronchoscopes etc
- Complex , more difficult to clean & disinfect/sterilize.
- are damaged when exposed > 60°C.
- Chemical disinfection or low temperature sterilization.

Endogenous Infections

Infections caused by microbes from patients own microflora e.g. from gastrointestinal or respiratory tracts

Examples:

- Bacteraemia esp. after GIT endoscopy and cystoscopy
- Joint infection after Arthroscopy
- Pneumonia resulting from aspiration of oral secretions in a sedated patient.
- Endocarditis as a result of bacteraemia induced by endoscopic procedures.

Exogenous Infections

Infections caused by microbes introduced into the patient by the contaminated endoscope

Sources : Patients *or* from the environment

- Inadequate manual cleaning
- Inadequate exposure of all surfaces to the disinfectant
- Inadequate rinsing and drying

Exogenous Infections

- Contaminated cleaning and disinfection agents.
- Contaminated cleaning accessories - channel brushes.
- Biofilms - both in the automated reprocessors and inside the endoscope itself
 - Biofilm: resistant to disinfection and removal

Endoscopic Unit

Patient's safety ... yes

But... do not forget the safety of health care worker !

Unit must be designed to provide a *safe environment* both for *healthcare workers & patients*

Endoscopic Unit

Ideally separate space for procedures & cleaning/disinfection of endoscopes



Endoscopic Unit

Procedures Area

- Designated sink for hand washing
- Adequate utilities to support the patient during the procedure e.g. suction, oxygen
- Adequate space keeping charts, log-books, procedure and equipment manuals etc

Endoscopic Unit

- Should have ventilation system, exhaust hoods, etc... to minimize the exposure of toxic vapours e.g.. Glutraldehyde
- The vapour concentration of the chemical sterilant used should not exceed allowable limits

Staff : Endoscopic Unit

- Staff should also be immunized against hepatitis B virus
- Staff must be educated about the biological and chemical hazards
- Education & training for personnel responsible for reprocessing of endoscopes

Endoscopic Unit

- Written procedures for cleaning and reprocessing based on the most recent guidelines
- Health surveillance and reporting of Staff working in the unit(for protection of HCW) if Glutraldehyde is used.

Endoscopic Unit

- Personal protective equipment (eg gloves, eyewear, and respiratory protection) should be readily available and should be used as appropriate.

Endoscopic Unit

Cleaning & disinfection Area

- Design area so that the workflow can facilitate infection control practices
- Avoid contact between contaminated and clean equipment).
- Large utility sink to accommodate the cleaning and rinsing of endoscopes and of accessories.



Endoscopic Unit

- Exhaust hood with absorbents for chemical vapors.
- Adequate ventilation (7 to15 air changes/ hour) to remove toxic vapors of chemical disinfectants

Endoscopic Unit

Cleaning and disinfection Area

- Adequate storage space for chemical disinfectants
- Glutaldehyde basins must be covered with tight-fitting lids
- Clean spills of Glutaldehyde promptly with disposable towels ; reusable towels contaminated with Glutaldehyde can continue to release vapors from the towel.

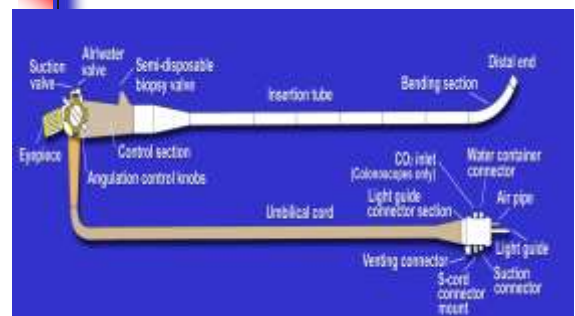
ENDOSCOPY Cleaning & disinfection

Cleaning of Endoscopes

Cleaning is the first and most important step in reprocessing

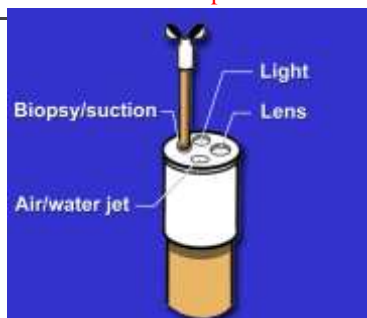
Gastrointestinal Fiberoptic Endoscope

Diagram of Parts



Gastrointestinal Fiberoptic Endoscope

Part of Tip



Cleaning of Endoscopes

You can clean without disinfection but you can *never* disinfect *without* cleaning.

Cleaning of Endoscopes

- Put on appropriate Protective Clothing : gloves; water resistant apron or gown; eye protection.
- Flush channels with water *immediately* after use on a patient using water jet or large syringe.
- Suck water up suction channel.



Wipe outer surface of endoscope. Check for any damage.

Cleaning of Endoscopes

- Attach any water-proof soaking caps necessary to prevent moisture to the electronics.
- Inspect insertion tube, universal cord, and the bending section for damage



Leak testing - how does it work?

- The endoscope is submerged in water.
- Air is pumped into the interstitial space of the endoscope insertion tube.
- Pressure is applied and measured on a gauge.
- If the scopes internal channel(s) have hole(s) pressure will force the interstitial air into the internal channels and bubbles will appear from the submerged endoscope.

Cleaning of Endoscopes

- Dirty endoscopes and accessories contain proteins, fats, carbohydrates and various chemical salts that exist in human blood and other body fluids.
- Enzymatic products will break down the protein on the surfaces of the endoscope.
- Detergent will release and disperse this dirt.
- The use of an enzymatic detergent combines both these properties.

Cleaning of Endoscopes

- Enzymatic detergent should be flushed through all channels and brushing will help the dispersion process.
- *Liquids are preferred to powder. Un-dissolved particles can block channels*



Remove all valves and seals and brush them using a small soft toothbrush.

Brush cleaning of Suction Channel



Brush from control head to biopsy inlet until resistance is felt.



Brush from biopsy inlet to tip of scope.



Take small brush and clean all valve cylinders.



Wipe down the outside of the scope.
Gently brush clean distal tip with soft toothbrush.



clean biopsy inlet seal.



Rinse all the channels of the scope with clean water. Blow air through the channels to expel water.



Wipe any excess detergent from the scope.



Perform Leak Test again before disinfection.

Disinfection

Washer disinfector



Attach to automatic washer/disinfector. Disinfect cleaning brushes and accessories

Washer disinfectant

- Wash with detergent
- Disinfect
- Rinse with clean water

The endoscope is now ready for patients use.

Last process of the day

- If the scope is finished for the day, hang it in a well-ventilated cupboard, removing all valves, seals, soaking cap and angulation locks for storage.



First Patient of the day

Disinfect before use to remove any microbial growth that occurred on the storage

Chemical disinfectants for endoscopes

Glutaldehyde

Advantages

- 40 years in the market
- Numerous use studies published
- Excellent materials compatibility
- Non-corrosive to metals and other materials
- Long-lasting up to 14 day solution available
- Relatively inexpensive

Glutaldehyde

Disadvantages

- Relatively slow mycobactericidal activity
- Poor sporicidal activity.
- Coagulates blood and fixes tissue to surfaces

Glutraldehyde

Disadvantages

- Eye and nasal irritant and may cause respiratory illness (asthma) and allergic dermatitis.
- Must be used only in well *ventilated area and only where essential*. Stored in containers with *close-fitting lids*.

Glutraldehyde

Personal protective equipment:

- Eye shields
- Plastic apron
- *Gloves*: Latex gloves if the duration of contact is short (01-15 minutes) ; nitrile gloves for longer duration.

Ortho-phthaldehyde (OPA)

- High molecular weight aldehyde ; less vapour problem less odour problem
- Contain 0.55 % Ortho-phthaldehyde

Ortho-phthaldehyde (OPA)

Advantages

- Good bactericidal, *greater mycobacterial activity* than Glutraldehyde; poor sporicidal activity.
- Fast acting high-level disinfectant
- Excellent materials compatibility
- Ready to use; no dilution or activation required
- Does not coagulate blood or fix tissues to surfaces
- Used in about 82 cycles vs 28 cycles for Glutraldehyde

Ortho-phthaldehyde (OPA)

Disadvantages

- Stains proteins brown
 - HCW skin if no PPE are used
 - Endoscopes if not clean properly
 - Patient's mucous membrane if inadequate rinsing
- Eye and Respiratory irritant ; potential cause for asthma
- Expensive

مطهرات الجوامد

نوع المطهر وتركيزه	فوق أكسيد الهيدروجين %٧,٥	حمض البيرواسيتيك %٠,٢	جلوترالدهيد %٢	اورثوفاثالدهيد OPA %٠,٥٥	فوق أكسيد الهيدروجين %٧,٣٥
زمن التطهير	٣٠ - ٢٠ دقيقة	٥ دقائق	٤٥ - ٢٠ دقيقة	١٢ دقيقة	١٥ دقيقة
فترة الصلاحية للاستخدام	٢١ يوم	٢٤ ساعة أو دورة تطهير واحدة	١٤ يوم أو ٢٨ دورة تطهير	١٤ يوم	١٤ يوم

THANK YOU

