Endoscopy service in paediatric

Mak Mo Kit
Ward Manager
KWH
8-9-2016
Learning objective

- Provide safe and effective different endoscopy service in pediatric patients.
- Ensuring adequate knowledge and technical competency in endoscopy nursing care.
- Familiarize with the endoscopes, facilities and setting of the endoscopy room
- Prepare the patient for endoscopic procedures
- Have knowledge on endoscopic procedures, equipment management, cleansing & disinfection of endoscopes and accessories
Endoscopy is a nonsurgical procedure used to examine a person’s internal organ. Using an endoscope, a flexible tube with a light and camera attached to it, your doctor can view pictures on a color TV monitor. The practice of pediatric endoscopy offers unique challenges in both the physiological and emotional wellbeing of children and their families. Successful procedures result in part from providing thorough pre-procedure education and preparation.

Staff preparing these patients must be knowledgeable about the developmental and physiological needs of each age group of patients entrusted into their care.

Awareness and understanding of the developmental approaches to their care is essential to provide positive outcomes for children and their families.
Introduction

- Bronchoscopy: persistent wheezing, foreign body, BAL...
- Colonoscopy: Crohn’s disease / polyps
- Sleep endoscopy
- Oesophagogastrroduodenoscopy ODG
- Percutaneous endoscopic gastrostomy (PEG) placement
- Intestinal dilation
- Pyloric dilation and botox injection
- Esophageal stent placement
- Single balloon small bowel endoscopy / Small bowel capsule Endoscopy
- ERCP
- Therapeutic / Diagnostic
Role and responsibility in Endoscopy Unit

- Screening the patient list in order to well prepare the procedure.
- Check and prepare the setting, equipment and document all ready before procedure.
- Explain and reassure the patient about the procedure.
- Monitor and document the patient’s condition during procedure.
- Assist the endoscopist during procedure.
- Assess and report any potential complication.
- Attend the patient’s enquiry and need.
- Tidy up and provide patient with after care instruction.

Check all specimen and handover to the receiving ward.
Endoscopy nurse should understand:
- Structure, operation and function of the equipment.
- Precaution in using of endoscopy equipment.
- Cleaning, disinfection and maintenance of the equipment.
Role and responsibility in Endoscopy Unit

- Knowledge in infection control:
- Prepare and after care all equipment and accessories
- Check the condition and function of the equipment and accessories.
- Adult the cleaning and disinfection process.
- Check the efficacy of the disinfectant daily/ before the session start.
- Keep all washing machines and cleaning accessories tidy.
- Report and arrange repair.
- Lock all procedure room before leave
Followed by setting guideline and protocols, stressed on the importance of cleaning, disinfection, documentation, etc.

Endoscopy nurses perform a variety of functions in various practice settings including hospital, clinics, endoscopy units, operating rooms and physician's office.

Endoscopy nurses are qualified personnel who care for a diverse patient population, including paediatric, adult and older people.

The primary role of the endoscopy nurse is to safeguard the patient before, during and after endoscopic procedure, as well as ensuring the highest technical and hygienic standard throughout.

The patient for endoscopy procedure can be the healthiest of our patients and seemingly the sickest patient in the hospital.
To safeguard for patient, the endoscopy nurses should have knowledge and skills; process the competencies required to provide quality care for patients who are having diagnostic and therapeutic endoscopic procedures.

The areas of responsibility include direct patient care, assisting in various endoscopic procedures, risk and complications awareness, management, maintenance and care of equipment and accessories. (as an assistant to the endoscopist (team work with collaboration and to establish effective communication)

- Nurse Endoscopist – for screening colonoscopy / Sigmoidoscopy
- Nurse lead clinic: in UK for inflammatory bowel disease
Major functions performed by the endoscopy nurse are as below:

- **Nursing duties:**
  a) Care of patient / as patient advocate / resource person
  b) Managerial / supervisory / leader duties: budget and procurement / deal with conflicts / policies and guidelines formulations / infection control policies and minimize OSH hazards for all staffs.
  c) Trainer
  d) Assistant to the endoscopists in performing the endoscopic procedure.
  e) Handling of specimen in Endoscopy.
  f) Knowledge of Pharmacology, assist in the administration of medication and antidote
  g) Management of troubleshooting

- **Secretarial work:**
  a. Co-ordination
  b. Reception / Triage
  c. Booking
  d. Documentation

- **Technical work:**
  a. Technical knowledge of equipment
  b. Care and maintenance of equipment
  c. Ensuring the proper labelling of correct specimens
Patient and parent preparation

- Provide a comfortable environment and making patient / parents feel welcome and secure.
- Every patient has the right to have his or her dignity preserved.
- Check patient identification, patient assessment and prepare appropriate procedure position, prepare patient monitoring.
- Prepare psychosocial and emotional needs of paediatric patient and their parents.
- Provide sufficient information about potential risks and benefits of the procedure using age-appropriate language.
- Acknowledged in writing and signed to provide legal documentation.
- Obtain informed consent from parents or guardians.
- Never ignore a patient’s pain, and don’t afraid to communication this information with the physician.
- If electrosurgical units are used, potentially dangerous must be prevented:
  I. Place the grounding pad over a muscular area
  II. Check the skin integrity prior to the procedure
Record baseline vital observation.

Continuous monitoring patient’s blood pressure, pulse, respiration, oxygen saturation, conscious level, physical appearance as well as psychological status before, during and after endoscopic procedures.
During procedure Sedation

Aim:

i. ↑ cooperation

ii. ↓ unnecessary/jerky movements, violence or damage of endoscope ... etc
Sedation

- A paediatric-trained anaesthetist must be in attendance to administer an appropriate level of sedation to the child.
- Most endoscopic procedure in children are generally performed under moderate sedation (conscious sedation) or even general anesthesia (deep sedation).
- Moderate sedation: remaining protective airway reflexes and spontaneous breathing during examination.
- General anesthesia: provides a more reliable state of sedation.
- Recently, propofol-based sedation seems to be the safest and most convenient method of inducing a sufficient sedation.
Desirable effects

- Allay fear & anxiety prior the procedure.
- Facilitate better cooperation.
- Increase tolerance to pain.
- Allow easy arousability.
- Provide an amnestic effect.
- Allow a rapid & safe return to ambulance / ward.

Undesirable effects

- Severely slurring of speech.
- Unarousable sleep.
- Hypotension.
- Respiratory distress.
- Apnoea.
Sedation

- Demonstrate knowledge of pharmacology: IV therapy, emergency medication, IV. Medication and antidote

<table>
<thead>
<tr>
<th>Medication</th>
<th>Antidote</th>
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<tbody>
<tr>
<td>Pethidine</td>
<td>Narcan</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Anexate</td>
</tr>
<tr>
<td>Dormicum</td>
<td>Anexate</td>
</tr>
<tr>
<td>Diazemuls</td>
<td>Anexate</td>
</tr>
<tr>
<td>Propofol</td>
<td>Nil</td>
</tr>
</tbody>
</table>

Always have the antidote ready in accessible drawer, trolley or in a portable emergency drug box.

Safety of patient under sedation rests upon appropriate use of drugs, close monitoring and prompt resuscitation.
The ability to clean and disinfect the endoscopes and their accessories efficiently and safely is one of the most important functions of an endoscopy center.

Always remove bio-burden (any tissue, blood, body fluids etc.) and rinse scope through to prevent body fluid and debris drying within the channel of the scope.
# Recommended Time for Disinfection in 2% Gluteraldehyde by the Hong Kong Society of Endoscopy Nurses

<table>
<thead>
<tr>
<th>TIME</th>
<th>ACTION</th>
<th>STAGE</th>
<th>SITUATIONS</th>
</tr>
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<tbody>
<tr>
<td>10 mins</td>
<td>Destroy all vegetative bacteria except for a large amount of Mycobacterium Tuberculosis, but including Pseudomonas aerogenosa, pathogenic fungi and viruses.</td>
<td>Intermediate Level Disinfection</td>
<td>Before the session and between cases for all GI endoscopes except for ERCP scopes.</td>
</tr>
<tr>
<td>20 mins</td>
<td>Kill all microbial pathogens, except bacterial endospores.</td>
<td>High Level Disinfection</td>
<td>Before the session and between cases for all bronchoscopes and ERCP scopes. At the end of sessions for all endoscopes including bronchoscopes.</td>
</tr>
<tr>
<td>10 hrs.</td>
<td>Kill all bacterial endospores.</td>
<td>Sterilant</td>
<td>In operating areas where sterile procedure is required.</td>
</tr>
</tbody>
</table>
Soak 1 hour for all infectious case and bronchoscopes after session
Cidex OPA MEC Test Log Book

Preparation for emergency endoscopy
<table>
<thead>
<tr>
<th>Device</th>
<th>Being decontaminated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Name</td>
<td></td>
</tr>
<tr>
<td>Serial No.</td>
<td></td>
</tr>
<tr>
<td>Date</td>
<td>Decontamination starting time</td>
</tr>
</tbody>
</table>

### Sporicidal Wipe Quality Audit Trail

**Endoscope’s Model No.**

**Endoscope’s Serial No.**

**Patient’s Gum Label**

**Date**

**Pre-Cleaning Method**

**Sporicidal Wipe Traceability label**

**Activation**

**Rinsing Method**

**Destination of device**

**Confirmation By person responsible**

**Storage**

**Confirmation By person responsible**

**The one who decontaminates the endoscope**

**Signature**

---

**For non-lumen bronchoscope**

**Affix here**

**Write on both labels**

**Please affix this label to the area under doctor’s signature of the Endoscopy Report**
Minimise and prevention of occupational safety and health hazards

Knowledge in OSH:

- Purpose is to promote safety and health of the employee when they are at work
  - Spacious procedure room
  - Well ventilated procedure room for patient & staff safety e.g. with HEPA filter / negative pressure available
- Able to identity signs and symptoms of life threatening situations before, during and after the procedure and response appropriately to ensure safe patient care
Occupational Health Hazards (Healthcare-Endoscopy Unit)

- Chemical Hazards
- Physical Hazards
- Biological Hazards
- Ergonomic Hazards
- Psychological Hazards
Adequate vapour containment systems: Air exchange rate of 10-15 air exchanges per hour (ANSI/AAMI, 1996)
Protection of Health Hazards

- Personal protective equipment
- Protective installation
OSH Management

- Risk assessment
- Monitoring
- Prevention
- Protection
- Emergency preparedness
- Injury of duty reporting system (follow up action-review)
- Recovery program for post IOD staff
Full protective clothing and safety devices must be provided for cleaning staff.

- Long cuff gloves, protective eye wear/face shield, impervious apron/gown and a suitable ventilation system to eliminate toxic vapours will be provided.
- Should be used in closed or semi closed systems with forced air extraction.
- If glutaraldehyde is used then it is necessary to monitor workplace fume levels of glutaraldehyde to ensure that environmental contamination remains below the accepted level of 0.1 parts per million.
- Non-slip flooring for wet areas where reprocessing of equipment is performed.
- Adequate air conditioning system to maintain airflow and a comfortable temperature when procedures are performed.
Legal in endoscopy

- The most important point to raise in this section is that equipment must be used only according to manufacturer’s instructions.

- Never change the design, e.g. never bend or shape a piece of equipment such as a scope to fit something for which it was not designed.

- Consent is quality care / good practice for practitioners as well as a legal requirement
Endoscopy Service in KWH Paediatric
Paediatric Endoscopy Lab in N8
Structure of the Paediatric Endoscopy Centre

Endoscopy Team Head

Consultant
AC
Anesthtist
MO (Trainee)

Director of Endoscopy Centre
Nurses

PCA 1
Endoscopy Centre Services in Paediatric

- Bronchoscopy
- OGD
- Colonoscopy
- Sigmoidoscopy
- Sleep endoscopy: started in 1997, it provided early investigation of upper airway obstruction or sleep breathing disorder in children
- FESS: Flexible endoscopic examination: collaboration with the speech therapist / occupational therapist
- Emergency endoscopy: e.g. intubation / control bleeding
Pre procedure assessment

- Examination and documentation of any loose teeth, oral pice clings and enlarged tonsils, allergy history and medical history which should be evaluated by the physician before procedure and sedation.
- Laboratory result available: CBC, Blood gas etc.
- To reduce anxiety, premedication will be given. Benzodiazepines, midazolam are common use.
Patient preparation

- Duration of fasting, usually limited preoperatively to four hours in infants, must be considered to avoid hypoglycaemia and dehydration.
Patient monitoring

- Pre-procedure
  - AR, RR, SpO2, NIBP
  - Conscious level
- During procedure
  - AR, RR, SpO2 NIBP Q5mins
- Post procedure
  - AR RR SpO2 NIBP
  - Conscious level ?ASA
- Temperature control which is vitally important in small infants
Environment and equipment

- To provide the necessary endoscopes and accessory equipment for the type of procedures to be performed in that unit.
- the responsible for the cleaning, maintenance and repair of all the equipment.
- A safety performs endoscopic procedure needs a well organised room where working equipment is readily available. Never assume that someone else has completely set up for a procedure.
- Be a trouble-shooter, base on mental or written checklist, locate, inspect and test all necessary equipment and accessories prior to each procedure.
- the facility will keep up with technological advancements and replace equipment in order to maintain a high standard of service.
- Monitor like oximetry , Blood pressure monitor
Ancillary equipment

High resolution medical standard monitor

Endoscopy light source/video processor

Oxygen with a flow regulator

Suction
Equipment

- In view of the size of the paediatric patient, appropriately sized equipment and accessories will need to be available for the performance of endoscopic procedures.
- Appropriately sized resuscitation equipment must also be available, including endotracheal tubes, laryngoscopes, oxygen devices etc. to manage any reasonably foreseeable emergency.
Ancillary equipment

- Resuscitation trolley
- Pulse oximeter/s
- Non-invasive B/P monitoring
- Stethoscope
- Access to ECG tracing
- Transportable oxygen cylinder
Bronchoscope
Time in Time out completed by Endoscopist / Nurse
Tap water and/or water that has been filtered by passage through a 0.2 micron filter or water of equivalent quality (i.e., suitable for drinking) should be available in the reprocessing area.

(American Society for Gastrointestinal Endoscopy Quality Assurance in Endoscopy Committee et al., 2011; Rutala & Weber, 2004).
Time Out!
停一停！對一對！

- Correct patient?
- 正確病人？
- All documents available?
- 資料齊全？
- Correct diagnoses?
- 診斷正確？
- Appropriate procedure?
- 適當程序？
- All essential rescue equipments available?
- 急救儀器齊全？
- Prophylactic antibiotics?
  需要預防性抗生素？
Guidelines for endoscope reprocessing

1. Pre-cleaning
2. Leak testing
3. Manual cleaning
4. High level disinfection (manual or automated)
5. Rinse after cleaning
6. Rinse after high-level disinfection
7. Drying and storage
Automatic Flexible Endoscope Reprocessors
Manual Flexible Endoscope Reprocessors
Reprocessing areas within the procedure room

For equipment Cleaning with enzymatic detergent

A leak test is carried out before the decontamination process takes place.

For equipment rinse

Water of suitable quality for the reprocessing of medical and surgical equipment, e.g. equipment must be rinsed in sterile or 0.2 micron filtered water.

Fully immersible endoscopes in order to cleaning and disinfection of endoscopic equipment.
OGD
Indication for OGD

- **Diagnostic**
  - Upper gastrointestinal tract bleeding
  - Epigastric/ abdominal pain
  - Unexplained recurrent vomiting
  - Pain or difficulty in swallowing
  - Unexplained iron deficiency anaemia

- **Therapeutic purpose**
  - Foreign body removal
  - Hemostasis for bleeding in the oesophagus
  - Feeding tube insertion
  - Percutaneous endoscopic gastrostomy (surgical)
Causes of Peptic Ulcer
Signs & symptoms of Peptic ulcer

- Dyspepsia
  - Epigastric pain
  - Gnawing or burning
    - relieved with food or antacids, awakens at night or between meals (DU)
    - Worse after eating (GU)

- Bleeding
  - Haematemesis, Melena, Anemia, Shock

- Obstruction
  - e.g. Nausea, vomiting

- Perforation
  - e.g. Sever abdominal pain, free air under diaphragm

- Cancer
  - e.g. Weight loss, anorexia
Endoscopic diagnosis

- Invasive Helicobacter pylori test (Biopsy)
- Rapid Urease Test (RUT)
  - Urea (medium) + Urease enzyme
  - Ammonia + bicarbonate → Alkaline
  - Pink → +ve
  - False –ve in bleeding PU, intake of PPI, H2 receptor antagonists, antibiotics
- *Histology → HP
- Culture (expensive)
- Barium meal

Therapeutic

- Early endoscopy for bleeding ulcer
- Injection 1:10000 adrenaline - tamponade effect + vasoconstriction
- Thermal therapy
- Mechanical Clipping
Local Anesthesia:
Max dose of Lignocaine: 4mg/kg
<table>
<thead>
<tr>
<th>Drug</th>
<th>Actions</th>
<th>Dose</th>
<th>Onset of action, min</th>
<th>Duration of action, min</th>
<th>Antagonist</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midazolam</td>
<td>Anxiolysis, amnesia</td>
<td>Intravenous (bolus): 75-300ug/kg</td>
<td>1-5</td>
<td>90</td>
<td>Anexate (Flumazenil)0.01mg/kg</td>
</tr>
<tr>
<td>Pethidine</td>
<td>Analgesia</td>
<td>Intravenous (bolus): 0.5-2mg/kg</td>
<td>5</td>
<td>180-240</td>
<td>Naloxone 0.01mg/kg</td>
</tr>
<tr>
<td>Ketamine</td>
<td>Analgesia, Anaesthesia, Amnesia</td>
<td>Intravenous (intermittent bolus): 0.25-0.5mg/kg</td>
<td>2-4</td>
<td>10-20</td>
<td>-</td>
</tr>
<tr>
<td>Propofol</td>
<td>Anaesthesia</td>
<td>Intravenous (intermittent bolus):0.5-1mg/kg</td>
<td>&lt;1</td>
<td>30</td>
<td>-</td>
</tr>
<tr>
<td>Fentanyl</td>
<td>Anaesthesia, Analgesia</td>
<td>Intravenous (continuous infusion): 0.05ug/kg/min</td>
<td>2-5</td>
<td>2-3</td>
<td>-</td>
</tr>
</tbody>
</table>
# Vasoconstrictors (Nasal)

<table>
<thead>
<tr>
<th>Product available in KWH:</th>
<th>Xylometazoline HCl 0.05% (0.5mg/ml) Nasal Drops - Otrivin®</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanism of action:</td>
<td>Stimulate alpha-adrenergic receptors in the arterioles of the nasal mucosa to produce vasoconstriction</td>
</tr>
<tr>
<td>Onset of action:</td>
<td>5-10 minutes</td>
</tr>
<tr>
<td>Duration of action:</td>
<td>5-6 hours</td>
</tr>
</tbody>
</table>

**Dosage suggestion (Endoscopy)**

<table>
<thead>
<tr>
<th>Age</th>
<th>Dosage</th>
</tr>
</thead>
<tbody>
<tr>
<td>6 months to 6 years: 6 months to 6 years:</td>
<td>(0.05%) - 0.05ml, 5 - 10 minutes before and 0.05ml PRN Maximum in total: 0.1ml</td>
</tr>
<tr>
<td>&gt; 6 years</td>
<td>(0.05%) - 0.1ml, 5 - 10 minutes before and 0.1ml PRN, Maximum in total: 0.2ml</td>
</tr>
</tbody>
</table>

Small volume direct application

Lavage of bronchus 1:10 dilution with saline

**Reference:**
1. Drug Insert (Otrivin®, Novartis)
Sleep endoscopy
CPAP titration during Sleep Endoscopy
**BAL via Bronchoscopy**

<table>
<thead>
<tr>
<th>Aliquot volume in paediatric BAL</th>
<th>Aliquot volume in paediatric BAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;5kg</td>
<td>5ml aliquot</td>
</tr>
<tr>
<td>5-40kg</td>
<td>10ml aliquot</td>
</tr>
<tr>
<td>&gt;40kg</td>
<td>20ml aliquot</td>
</tr>
</tbody>
</table>

- BAL for Culture:
- Use 0.9% normal saline
- BAL for mucus plug:
- Use 8.4% NaHCO3 + 0.9% normal saline
- Ratio 1 : 4
Colonoscopy / Sigmoidoscopy
Colonoscopy / Sigmoidoscopy

- Indication
  - Rectal bleeding
  - Occult blood in stool
  - Recent change in bowel habit
  - Chronic diarrhea or constipation
- Therapies
  - Removal of polyp
  - Perform biopsy
Bowel Preparation

- Low residue diet 48 hours before procedure (no fruit or vegetable)
- Admit 24 hours before procedure and allow clear liquid diet only (breast milk allowed)
- Start Klean Prep the evening before procedure, around 25ml/kg/hour over 3-4 hours until it reaches 100ml/kg or total 3L.
- NPO after midnight.

For infant

- Same as above except no Kclean Prep
- Normal saline enema 5ml/kg 1 hour before procedure
Training of paediatric endoscopy nurse in KWH

- All staff must receive training and show competence before using endoscopy equipment.
- 5 training sessions for each trainee.
- Trainer: APN or Senior RN with Experience on Endoscopy
- Hands on Training: 2 Sessions
- Practice: 2 Sessions
- Assessment: 1 Session
- Yearly audit for all trainee.
# Checklist for Patient Safety & Equipment Audit

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<tbody>
<tr>
<td></td>
<td>Pre-Procedural Record</td>
<td>Sedation Consent</td>
<td>Sign in/Time out</td>
<td>Procedure Consent</td>
<td>Sedation Consent</td>
</tr>
<tr>
<td></td>
<td>Yes</td>
<td>No</td>
<td></td>
<td></td>
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</table>
Tips for safe & Effective Endoscopic Procedure

- Environment will prepared.
- Equipment checked & appropriate.
- Staff properly trained.
- Patient & procedure checked & correct (Time in & Time procedure).
- Patient understanding & co-operating.
- Patient well monitoring and accurate documentation.
- Written policies and procedures for all nursing practice should be available.
Thank you