專責委員會(2)文件編號: : H127
SC2 Paper No. : H127

Information on strategies or guidelines in respect of performing intubation and bagging procedure of Severe Acute Respiratory Syndrome patients and on the use of BiPAP

Dr LUK Che-chung Hospital Chief Executive, Kwong Wah Hospital	**Appendix I**
Dr FUNG Hong, JP Hospital Chief Executive, Prince of Wales Hospital	**Appendix II**
Dr CHEN Chung-i, Raymond Hospital Chief Executive, Alice Ho Miu Ling Nethersole Hospital	**Appendix III**
Dr TSE Chun-yan Hospital Chief Executive, United Christian Hospital	**Appendix IV**
Dr Lily CHIU Lee-lee Hospital Chief Executive, Princess Margaret Hospital	**Appendix V**
Dr CHEUNG Wai-lun Hospital Chief Executive, Tuen Mun Hospital	**Appendix VI**
Extract of the Hospital Authority Guidelines on SARS issued on 3 and 6 April 2003	**Appendix VII**

Kwong Wah Hospital
廣華醫院

醫院管理局
HOSPITAL AUTHORITY

Dr C C Luk Hospital Chief Executive
醫院行政總監 陸志聰醫生

3 April 2004

Select Committee
Attn. Miss Flora TAI
Legislative Council Building, Hong Kong

Dear Miss TAI,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome Outbreak by the Government and the Hospital Authority

Referred to your letter dated 26 March 2004 (Re. CB2/SC2), attached below are the required information from our Hospital.

(1) Our Hospital has followed the guidelines issued by Hospital Authority in respect of performing intubation and aerosol generating procedures for Severe Acute Respiratory Syndrome patients.

(2) Some departments of our Hospital have formulated procedural instructions to frontlines in accordance with Hospital Authority's guidelines. I herewith attach copies of these instructions formulated during the SARS Outbreak period for your perusal:

a) Adult Intensive Care Unit, April 2003
b) Department of Paediatrics, April 2003
c) Operation Theatre, May 2003
d) Infection Control Enforcement Team (Dr YEUNG Yuk-pang), April 2003

If the Committee has further queries, please feel free to contact me. Thank you.

Yours sincerely,

(Dr LUK Che-chung)
Hospital Chief Executive

Encls

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Infection Control Guidelines for SARS
E5 Adult Intensive Care Unit KWH

Case Definition of SARS & Criteria for reporting (HAHO 22/4/2003)

⌘ Radiographic evidence of infiltrates consistent with pneumonia, and
⌘ Fever > 38C or history of such at any time in the past 2 days, and
⌘ At least 2 of the following:
- ☒ History of Chills in the past 2 days
- ☒ Cough (New or increased cough) or breathing difficulty
- ☒ General malaise or myalgia
- ☒ Known history of exposure

Diagnosis of SARS (HAHO)

⌘ Still made on clinical grounds and history of exposure;
⌘ Antibody tests
⌘ RT-PCR for coronavirus
- ☒ Blood
- ☒ NPA or Nasal & Throat swab
- ☒ Stool

⌘ **A neg. PCR result does not rule out SARS**, if other evidence compatible with it;
⌘ The sensitivity & specificity of RT-PCR test are still low to exclude SARS.

Infection Control in ICU for SARS

⌘ All staff must attend a talk on infection control precautions against SARS;
⌘ **All staff must put on N95 mask AT ALL TIME**, follow the infection control measures strictly:
- ☒ Standard precautions
- ☒ Droplet precautions & Contact precaution
- ☒ Airborne precautions for high risk procedures

⌘ **Never expose the nostril & mouth by tousling or adjusting N95 mask inside the ward.** It should be adjusted inside a clean area e.g. rest room or changing room.

Protective apparel (1)
Entering & Leaving SARS Area
On ENTERING (in sequential order)

⌘ Wash hands & **ensure to put on a *N95 mask;**
⌘ **Put on shoe cover e.g. indicated for relatives
⌘ Put on protective eyewear;
⌘ Put on a cap;
⌘ Put on gloves;
⌘ Put on a gown;

⌘ Enter ICU

*** N95 mask should be worn all the time once ICU entry.**

**** Provide shoe cover for relatives, salesman…**

Protective apparel (2)

Entering & Leaving SARS Area

On LEAVING (in sequential order)

⌘ Remove gloves (dispose into waste bag);

⌘ Wash hands;

⌘ Remove gown (dispose into waste bag);

⌘ Remove cap (dispose into waste bag);

⌘ Wash hands & remove protective eyewear (clean with 70% alcohol store in labeled paper bag);

⌘ **DO NOT Remove the N95 Mask**

⌘ Leaving ICU

Hand Hygiene

- ☒ Wash hands on entering & before leaving the SARS area;
- ☒ Wash hands after gloves removal;
- ☒ Never wash hands with gloves on;
- ☒ Avoid touching mask, eyes, nose, mouth & face;
- ☒ **Wash hands immediately once touching the surface of N95 mask for fit adjustment;**
- ☒ Change gloves & wash hands in:
  - ☒ after or between patient contact
  - ☒ after contact with blood, body fluid, secretion, excretions, mucous membranes and contaminated items exposed to SARS patient

Environmental Precaution (1)

☒ To minimize aerosol & risk of spreading the infection:

- **NO BiPAP, CPAP, Steam Inhalation & Nebulizer FOR ALL PATIENTS**

☒ All surfaces disinfected by 1:50 Na Hypochlorite solution & rinse with water at least once per day;

☒ Clean & disinfect immediately the contaminated facilities e.g. spit with blood, body fluid, secretion…with 1:50 Na Hypochlorite

Environmental Precaution (2)

☒ ⇑ waste box with cover & red bags;

☒ ⇑ placement of microshield or alcoholic hand rub;

☒ Plastic cover to keyboard & other stored equipment;

☒ Cotton alcohol swabbed to telephone after use;

Other Infection Control Measures
Intubation (ALL PATIENTS)

☒ Be well prepared & ensure adequate self-protection:

- ☒ Goggles
- ☒ N95 mask **(N100 mask is preferable)**
- ☒ gown & gloves
- ☒ **attach expiratory flow diverter, bacterial filter & external PEEP device to Resuscitator;**
- ☒ **during bagging of patient, ensure the facial mask is tightly fit during inspiratory & expiratory phase** to ensure all gases pass through the filter, to reduce leakage & environmental contamination;

Other Infection Control Measures

☒ **For SARS patients (1)**

☒ Ventilated patients

- **Attach high quality bacterial filter to the expiratory port of the ventilator;**
- Eliminate expired gas from the ventilator with a scavenging system;
- Minimize circuit breaks from patient:
  - Apply 2 sets of suction apparatus;
  - Apply closed-suction system, keeping with wall suction tubing;
  - No change of ventilator circuit;

Other Infection Control Measures

☒ **For SARS patients (2)**

☒ Ventilated patients

- Minimize circuit breaks from patients: (cont'u)
  - Apply HME instead of HWH;
  - Apply Heated Water Humidifier (HWH) for prolonged ventilation, **set RH to –3** to minimize condensation within the circuit;
  - If tracheal aspirate specimen is needed, change the closed suction system to a new one prior to the intervention.

Other Infection Control Measures

☒ **For SARS patients (3)**

☒ Ventilated patients (cont'u)

- If the circuit need to be disconnected
  - Turn ventilator to **"EXP. Hold"** **OR**
  - Turn ventilator to **"Stand-by"** if patient's condition allowed **OR**
  - Disconnect ventilator circuit **during end expiratory phase** to minimize spillage;
- Manage the condensates in universal precaution & discard with 1:50 Na Hypochlorite;

Other Infection Control Measures

☒ For SARS patients (4)

☒ Ventilated patients (cont'u)

- For ventilator accessories:
  - discard the disposable items properly;
  - disinfect the reusable items with Cidex solution & send for autoclave
- **Identify staff wearing N100 mask for specimen collection or high risk intervention e.g. tracheal aspiration, BAL, Intubation.**

Other Infection Control Measures

☒ For SARS patients (5)

☒ Weaning

- Transfer patient to Isolation Room if possible;
- Apply thermovent or V mask to ETT;
- Patient put on surgical mask after extubation;
- Apply nasal cannula is preferable;
- Transfer patient out of ICU when indicated

Other Infection Control Measures

☒ For SARS patients (6)

☒ Linen

- place in soluble linen bags for disinfection;
- discard the disposable gown properly

☒ Waste Handling

- place the contaminated items including patient's secretion, swabs, dressing...in RED bags

Other Infection Control Measures

☒ For SARS patients (7)

☒ Filtrates & Condensates from Ventilator Circuit

- carefully pour into sewage, then instill 1:50 Na Hypochlorite sol. & keep at least 20 mins;
- then flushed gently as usual practice

☒ Urinal & Bedpan

- disinfected by 1:50 Na Hypochlorite sol.

Other Infection Control Measures

☒ For SARS patients (8)

☒ Patient Care Equipment

- Discard disposable devices properly;
- Disinfect reusable items with Cidex OPA at least 15 mins;
- Send for Autoclave

Other Infection Control Measures

☒ **For SARS patients (9)**

☒ Last Office

- Treated as Category II & put the dead body into double plastic bags.

☒ Communication

- No visitors except special request or necessity;
- Daily communication between N.O. and patient's relatives by phone;
- Arrange interview with M.O. via phone if indicated

Other Infection Control Measures

☒ **For Suspected SARS patients**

☒ Cohort area as "**Suspected Area**" e.g. care patient in Isolation Room;

☒ Apply closed-suction system for ventilated patient;

☒ Other Infection Control measures same as above.

Other Infection Control Measures

☒ **For Non-SARS patients**

☒ Cohort area as **"Clean Area"**

☒ Apply closed-suction system for ventilated patient;

☒ Non-ventilated patient put on surgical mask;

☒ Transfer patient out of ICU when indicated

Other Infection Control Measures

☒ **Other Regulation for Staff (1)**

☒ Mandatory attend to Infection Control Talks;

☒ Reinforce to follow Infection Control Guidelines;

☒ Emphasize fit test for fit mask;

☒ Emphasize hand hygiene;

☒ Bedside sharing & discussion on infection control issues;

☒ Self-report & self-isolation if indicated

Other Infection Control Measures

☒ **Other Regulation for Staff (2)**

☒ Restrict social activities rules:

- Create rest rooms (Back & Front Tea Room & S11 Rest Room);
- Meal breaks **NOT MORE THAN** 4 persons at one time;
- Keep distance while at rest room;
- Always put on N95mask after eating

Be alert !
Be considerate !
Thank You for Your cooperation!

ICUSARS 04/2003

懷疑 SARS 病人插氣管導管指引

(1) 除了一般需用品外，加上預防 SARS 感染的保護衣物及用品如下

於進行插氣管導管程序時所，參與之醫護人員需穿上
Full PPE 全套預防感染保護衣物，包括：

- Full face shield 全面罩
- Goggle 眼罩
- N100 mask 口罩
- Cap 用完即棄之紙帽
- Gown 用完即棄之紙袍
- Shoe sheet 鞋套
- Filter attached to wall suction 中央吸濾器要接駁細菌過濾器
- Use close suction system catheter 特用封閉式抽痰喉管

(2) 施行程序

2.1 一般程序依照病人插氣管導管護理指引進行

2.2 如有病人體液沾污立即沐浴更衣

Department of Paediatrics
Kwong Wah Hospital
1.4.2003

懷疑 SARS 病人氣管內導管抽痰指引

(1) 除了一般需用品外，加上預防 SARS 感染的保護衣物及用品如下

於進行插氣管導管程序時所，參與之醫護人員需穿上
Full PPE 全套預防感染保護衣物，包括：

- Full face shield 全面罩
- Goggle 眼罩
- N100 mask 口罩
- Cap 用完即棄之紙帽
- Gown 用完即棄之紙袍
- Shoe sheet 鞋套
- Filter attached to wall suction 中央吸濾器要接駁細菌過濾器
- Use close suction system catheter 特用封閉式抽痰喉管

(2) 施行程序

2.1 一般程序依照抽痰護理指引進行

2.2 如有病人體液沾污立即沐浴更衣

Department of Paediatrics
Kwong Wah Hospital
1.4.2004

KWH OT
Intubation Management of SARS Patient outside Theatre
廣華手術室
外出為急性呼吸系統綜合症病人插喉指引

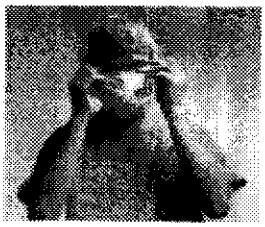
May 2003

1. 一般手術室服飾

2. 洗手

3.外科口罩

or



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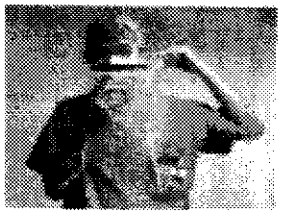

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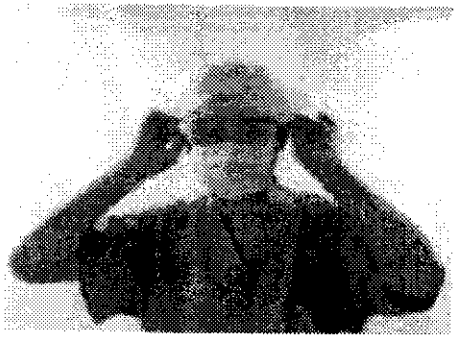
4a.眼罩+ .Splash shield

4b. 眼罩 + 外科面口罩



6. 紙帽 x 2

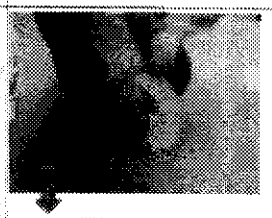
7. 手術大衣

8. 藍色保護衣

9. 第一對手套

10. 黃色保護衣及第二對手套

11. 戴.Splash shield



12. 鞋套 x 1(作機)及手術 Boot

1. 一般手術室服飾

2. 洗手

3.外科口罩

4. 戴眼罩

5. 紙帽 x 2

6. 外科面口罩

7. 手術大衣

8. 藍色保護衣

9. 第一對手套

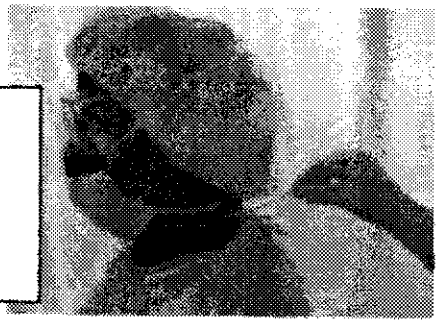
10. 黃色保護衣

11. 第二對手套

12. 鞋套後穿手術 Boot

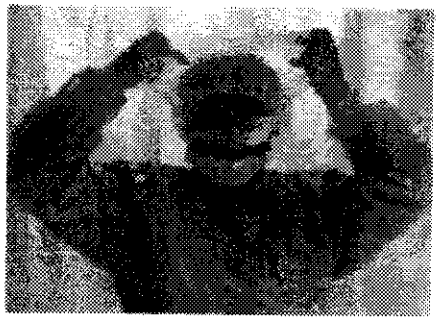
麻醉科醫生 / 護士 / 手術室助理離開病室除去保護衣物步驟 P.3

隔離室內



1. 除去第一對手套，麻醉科醫生與護士 / 助理互解頸繩

2. 除去黃色保護衣，注意沾污面捲向內

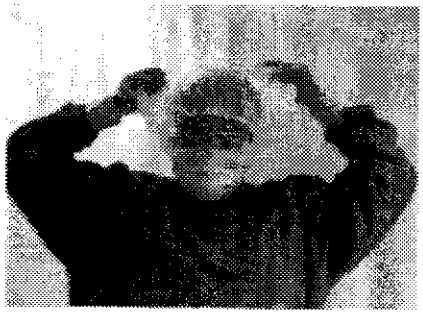


3. 除一頂帽

隔離室外

4. 除藍色保護衣

5. 除面口罩



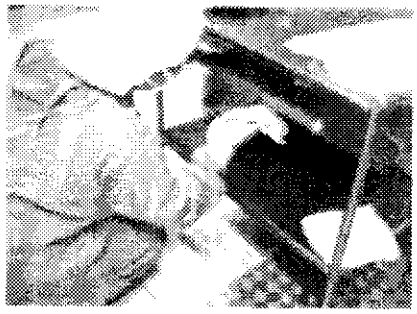
6. 除另一頂紙帽

7. 洗手

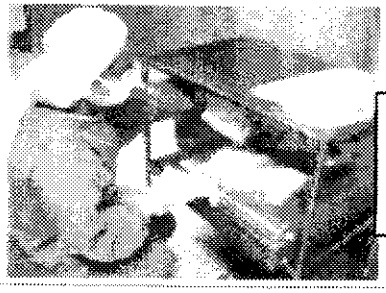
8. 穿手套攜物返手術室

1. 將盛污物膠袋置黃桶內

2. 除去外層膠袋後將插喉物品置敷料車上層



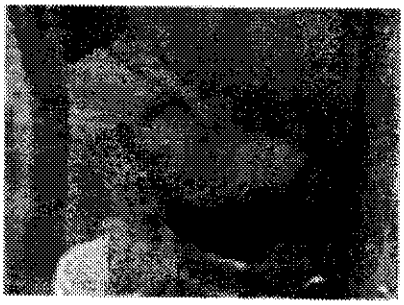
3. 將灰色插喉盒置於敷料車下層，然後用漂白水布抹淨



4.用漂白水布抹淨上層物品後置灰盒上，然後再清理敷料車上層

6. 除去手套

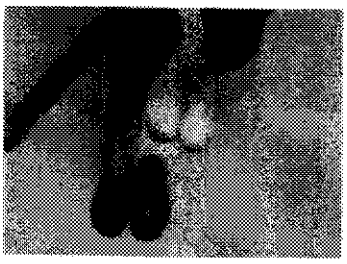
7. 除手術大衣



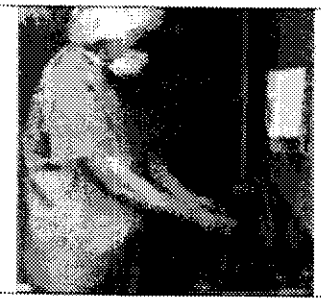
8. 置於污衣桶內

9. 洗手

10. 除紙帽 (注意向後除)



11 更換手術 Boot



12. 洗手

13. 除口罩

14. 將蓋蓋好

15. 洗手

脫去保護衣後

1.只餘下 N95 及手術室一般服飾

2. 打開入手術室服飾包後洗手

3. 戴口面罩

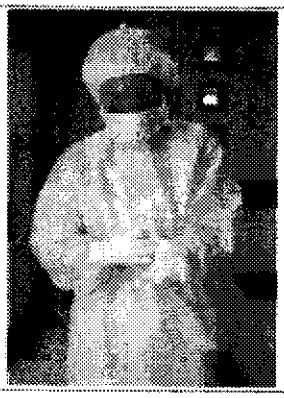
4. 戴帽

5. 穿膠圍裙後

6. 保護衣

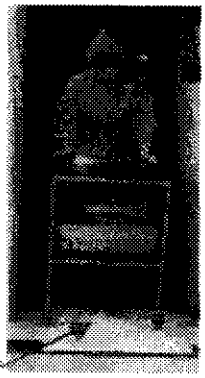
7. 鞋套

8. 洗手



9.手套

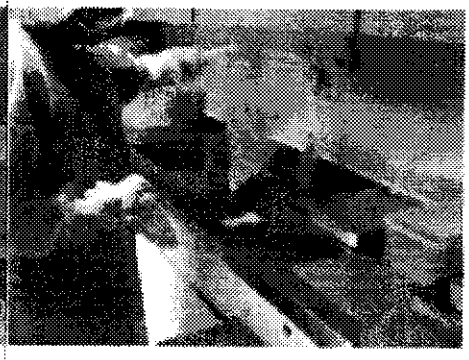
10.取出黃桶中污染物置敷料車上



11. 推入手術室住洗物室清潔

洗物室之清潔步驟（先由較清潔物品開始處理） P.6

1. 環境預備,紅膠袋,紗布,1:5 漂白水



2. 將污物袋置洗物槽上

3. 將漂白水洗滌漂水布

4. 用漂白水布抹敷料車面

5. 再將車下之插喉物品作全面清潔

6. 再全面清潔灰色插喉箱

7. 將眼罩取出清潔

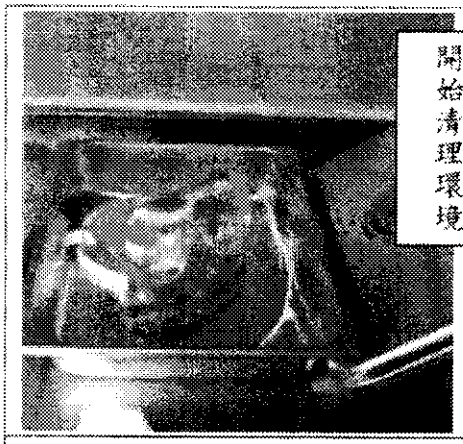
8. 將插喉用品取出清潔(注意小心取出)

9. 凡沾血物品用紗布沾 1:5 漂白水拭抹

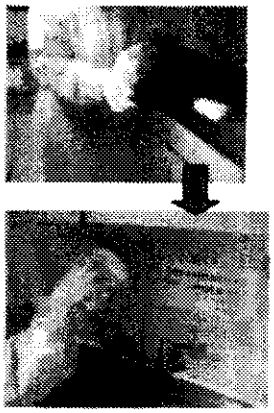
10. 再用漂白布抹所有物品

11. 可清洗之物品則置於洗淨盆中，用清水沖洗

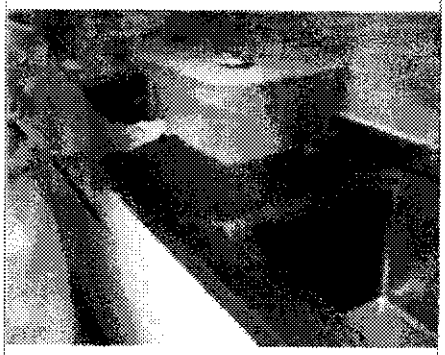
12. 然後用清水抹淨不能浸之物品,再用 70%酒精拭抹.



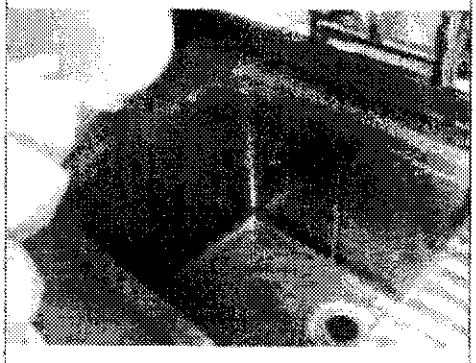
13. 用清水沖淨後抹乾,置於一不銹 鋼盆內



14. 除去第一對手套,然後用漂白水抹周圍環境(如水龍頭等)



15. 抹洗淨盆周圍檯面

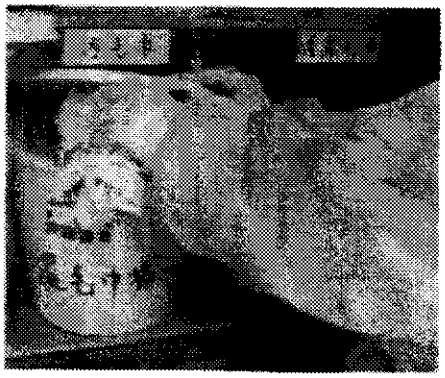


16. 將漂水傾注洗淨盆內

17. 用漂白水濯洗淨盆

18. 用清水過清洗淨及抹周圍

19. 物品抹乾置回原位

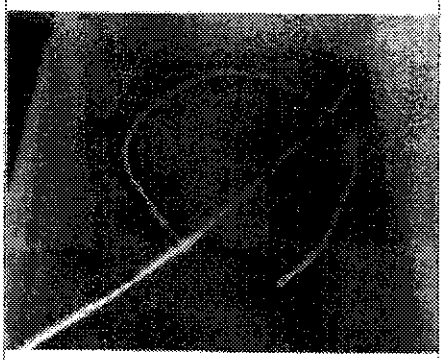


20. 用清水將抹布洗淨置溫毛巾桶中

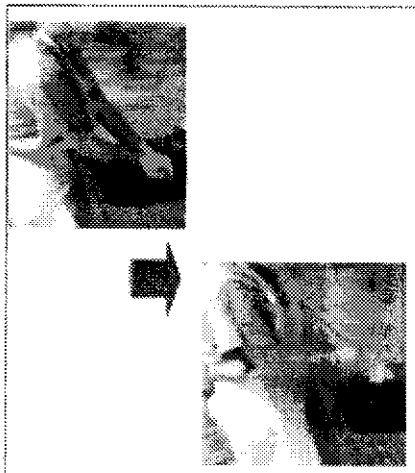
21. 手套及保護衣一起除去

22. 洗手

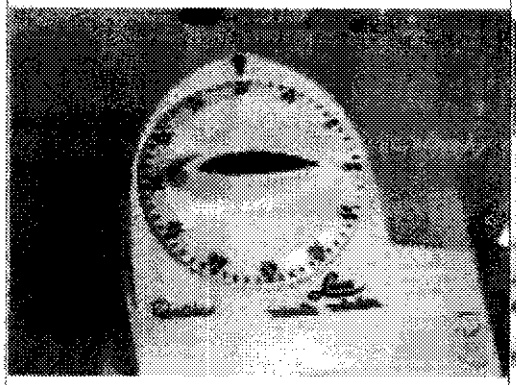
23. 戴回手套



24. 用 OPA Cidex 清毒插喉物品



25. 洗去手套上之 Cidex 後除去

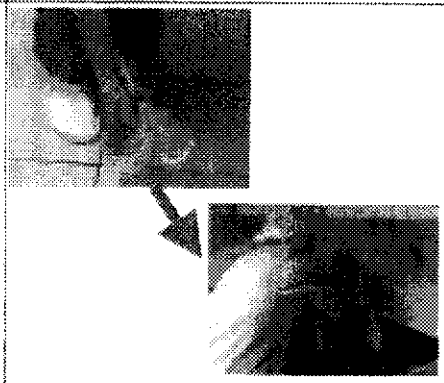


26. 計時器

27. 洗手

28. 除帽(注意向後除)

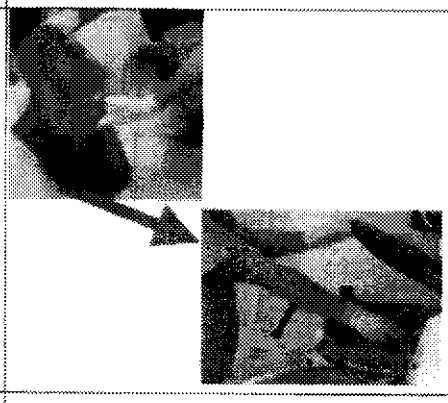
29. 除膠圍裙



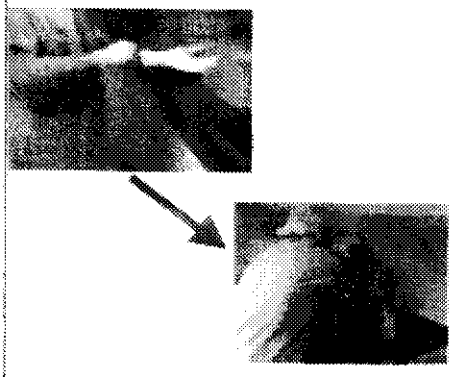
30. 除鞋套後洗手

31. 除面口罩

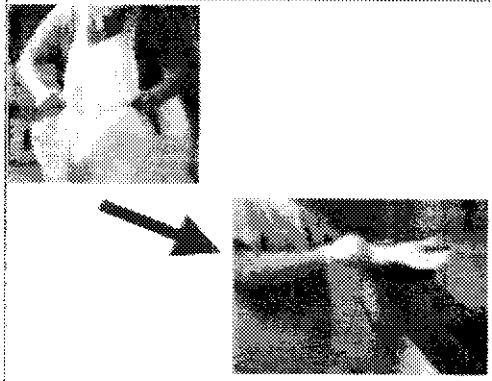
32. 洗手後戴回手套



33. 紮好污物袋, 棄在大紅膠袋內



34. 除手套,洗手



35. 穿膠圍裙及戴回手套

36. 將需消毒之物品用方盒盛載交儀器室同事消毒

Chapter IV. Clinical Management

1. Resuscitation Policy

Double viral filters should be used

Utilization of treatment room for SARS procedure

- Surgical airway establishment in SARS patients
- Other minor operations in SARS patients under LA

Room facilities: (to be run by Department of Anesthesiology and Operating Theater)

1. Negative pressure room with three exhaust fans
2. Suction catheter wall connector and closed suction system catheter
3. Oxygen supply wall connector
4. Reusable sterile minor / tracheostomy sets
5. Sterile gowns and gloves
6. Full PPE for SARS (including disposable cap, goggle, N95 or N100 mask, face shield with or without mask, disposable gown, disposable shoe cover), following updated guidelines by infection control team
7. Portable OT lamp
8. Diathermy machine
9. CMS access

Access control during SARS procedure in treatment room

1. Corridor will be divided into 2 parts for patients traffic when there is SARS procedure scheduled
2. Signage should be posted up whenever procedure undergoing inside treatment room
3. Access control will only be fully relieved after full decontamination

Maintenance of treatment room

To be decided by Department of Anesthesiology and Operating Theater

Decontamination and cleansing routine

To be decided by Department of Anesthesiology and Operating Theater

Degowning guidelines

To be suggested by Department of Anesthesiology and Operating Theater and Infection Control team

SARS patients in preparation for controlled airway and surgeon-standby

1. SARS M&G ward nurse and medical officer inform anesthetist
2. Anesthetic assessment to confirm the necessity for surgeons standby
3. Surgical emergency on call and ICU colleagues informed by M&G medical officer and bed reserved in ICU
4. Anesthetic nurse to alert S6 nursing colleagues for access control in S6 ward corridor
5. OT team (OT nurse, OT assistant and anesthetist) to check preparation in treatment room and surgeon's availability
6. OT team inform transport of patients from M&G ward, as escorted by M&G ward nurse and medical officer to treatment room (much like sending patients to main operating theaters)
7. Persons needed to be present in treatment room and they should all have full PPE (Personal Protection Equipment) before attempted intubation:
   a. Anesthetist in charge
   b. OT nurse
   c. OT assistant
   d. Surgeon in charge

   Note that M&G nurse and doctor should preferably be standby in S6 ward but outside treatment room
8. Intubation carried out by anesthetist or failing ET tube insertion, surgical airway established by surgeon (cricothyroidotomy preferred)
9. OT team members immediate degowning inside treatment room
10. ICU informed again for patients' transferal
11. Patients to be escorted by M&G doctor and nurse to ICU.
12. All disposable materials to be properly disposed in treatment room and all reusable materials to be properly packed and brought back to OT for cleansing
13. Finishing procedure, immediate decontamination should be arranged for the treatment room and the corridor.
14. Ward nurse to be informed by OT team to relieve the access control
15. A record of room utilization and maintenance to be kept by Department of Anesthesiology and Operating Theater

Prepared by Dr. Yeung Yuk Pang
22 April 2003

新界東醫院聯網
NEW TERRITORIES
EAST CLUSTER

Quality Effective Health Care

30-32 Ngan Shing Street, Sha Tin, N T, Hong Kong Tel: (852) 2632 2434 Fax: (852) 2648 4053
香港新界沙田銀城街三十至三十二號 電話: (852) 2632 2434 傳真: (852) 2648 4053

URGENT BY FAX & POST

Yr Ref: CB2/SC2

1 April 2004

Miss Flora Tai
Clerk to Select Committee
Legislative Council
Hong Kong Special Administrative Region
of the People's Republic of China
c/o 3/F, Citibank Tower
3 Garden Road
HONG KONG

Dear Miss Tai,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

I refer to your letter of 26 March 2004.

Please find attached the relevant documents requested in your letter :-

(a) NTEC Guidelines for Infection Control procedures in ultra-high risk areas (Appendix 1); and

(b) PWH Guidelines for both intubation and bagging of patients with SARS in ICU (Appendix 2).

You may like to know that the ICU guidelines were also applicable to the whole hospital. At PWH, we only ventilate patients in ICU. As regards the use of BiPAP, it was our cluster policy that BiPAP would not be used on patients with SARS.

Yours sincerely,

(Dr FUNG Hong)
Cluster Chief Executive
(New Territories East)
Hospital Authority

Guidelines for infection control procedures - ULTRA HIGH RISK areas (ICU, & other SARS isolation areas, PWH)

(Revised 27th March, 2003)

1. **Handwashing**- wash hands promptly and thoroughly with hand antiseptic (e.g. Hibiscrub) after patient handlings, and especially after contact with blood, body fluids, secretion and excretions, and after removing gloves and gowns. Alcoholic hand-rub can be used where handwashing facilities are not readily available.

2. **Gloves** - put on disposable gloves (e.g. latex gloves) when entering isolation area, and wash hands upon removal of gloves.

3. **Masks** - staff should properly apply N95 respirator covering both nose and mouth (Refer to guideline on use of N95 mask). Patients should wear surgical masks.

4. **Gowns and protective apparel** - staff should wear gowns whilst in the isolation area. They must be removed upon leaving the isolation area.

5. **Goggles / visors / eye protection** – should be worn for direct patient contacts, particular care is needed for aerosol generating procedures (e.g. intubation, suction), and for procedures likely to generate splashes of blood, body fluids, secretions or excretions. They can be disinfected with hypochlorite solution diluted 1:50 (1,000 ppm) for 15 min. after use.

6. **Patient care equipment** - contaminated, reusable items should go through proper disinfection / sterilization procedures before recirculation for communal use.

7. Disposal of potentially infected items:

   A/ **Linen/Laundry**- treat all used linens as potentially infectious according to hospital guidelines.

   B/ **Urinal & bedpan** - urine and faeces should be carefully poured into sewage. Wash and disinfect containers using bedpan disinfector (80 – 85°C) or disinfect by immersing in hypochlorite solution of (1000ppm) dilution for at least 15 mins.

8. **Waste handling** – In addition to the current hospital current clinical waste management protocol, all wastes arising from patient diagnosis and treatment, dressing & swabs, items contaminated with patients' secretions & excretions should be placed in red bags with white tag for special treatment.

9. **Specimen handling** - apply Universal Precautions, and follow existing practices. For microbiology specimens (e.g. NPA), ensure that primary containers are securely sealed and place specimen upright in transport box or place specimen in sealed plastic bag in transport box.

10. **Environment** - routine thorough cleansing (once per shift), paying particular attention to surfaces around the patient, using hypochlorite solution 1000ppm.

11. **Visitors** – not permitted in SARS isolation areas. If a special arrangement is made for visitation on discretionary grounds, N95 masks, gloves, caps and gowns must be worn by visitors. Discourage close contact of visitors with patients.

12. Disposal of dead bodies – treated as Category 2 (yellow label).

NTE0312

Aerosol-generating Procedures

Aerosol-generating procedures

- CPR, endotracehal intubation, diagnostic sputum induction, bronchoscopy, positive pressure ventilation via face-mask (e.g. BIPAP, CPAP), aerosolized medication treatment, airway suctioning.

Important rules to follow (as appropriate to the task)

1) Perform only if deemed medically necessary

2) Perform the procedure in an airborne isolation room or, less preferably, in a private room.

3) Place an air cleaning device such as the portable HEPA filtration unit in the vicinity.

4) Limit the number of staff involved.

5) Limit the extent of the procedure.

6) Keep room door closed and minimize entry and exit during the procedure.

7) Give adequate sedation and muscle relaxant for endotracheal intubation and bronchoscopy

Personal Protective Equipment (as appropriate to the task)

1) Must fully protect the eyes, nose and mouth and preferably all exposed areas of skin.

2) In addition to the standard PPE including the full face shield and water resistant gown
   a). N 95 respirator (fit-tested) – minimum requirement
   b). Tight-fitting goggles
   c). +/- impermeable hood that covers both the head and neck areas

3) Higher levels of respiratory protection
   a). Powered air purifying respirator (e.g. AIRMATE)
   - For bronchoscopy
   - Necessary when staff cannot be fit-tested to the disposable particulate respirator

After-care

1) Following CPR, endotracheal intubation and bronchoscopy, clean and disinfect the environment and equipments immediately and with full PPEs on.

Specific Respiratory Precautions

1) Avoid splashing of respiratory secretions

2) Avoid open suctioning of airway secretions if at all possible

3) Use closed-suction system for patients with an endotracheal/ tracheostomy tube in place

4) Minimize disconnecting the ventilator circuit

5) Use disposable ventilator tubings

6) No need to routinely change ventilator tubings

7) Attach a high quality bacterial/ viral HMEF to endotracheal tube/ tracheostomy tube

8) Scavenge expired gas from the ventilator

9) Attach a high quality bacterial/ viral filter to the expiratory port of ventilator and portable ventilator

10) Bag-valve-mask unit – attach a high quality bacterial/ viral filter to the expiratory port and another filter between the mask and valve of the bag

11) Chest drainage system – attach a high quality bacterial/ viral filter to the tubing where it leaves the chest drainage bottle

12) Keep the suction tubing attached to the closed-suction catheter

13) Put the ventilator on 'Standby' mode first when the ventilator needs to be disconnected and also for bronchoscopy

14) Bag-valve-mask ventilation, when required, should be minimized as much as possible.

15) When using the bag-valve-filter-mask unit, one staff holds the mask tightly against the patient's face with both hands, while another staff uses one hand to squeeze the bag gently. Ensure a tight seal between the mask and the face to avoid dispersion of exhaled air and droplets.

16) Discard the filter attached to the BVM unit after use and dispose of as clinical waste

17) Ensure that the cuff of endotracheal/ tracheostomy tube is adequately inflated

18) When sampling endotracheal aspirate for investigation, change the closed-suction catheter to a new one and attach a sputum trap to the distal end of the new closed-suction catheter before obtaining the endotracehal aspirate

19) Place a surgical mask on spontaneously breathing patients

20) No venturi-mask – use nasal prongs, Hudson's mask, non-invasive ventilation mask and non-rebreathing bag instead.

21) Avoid nebulizer – use metered-dose inhaler (give the drug either via a mask or a mouth-piece)

22) No non-invasive positive pressure ventilation unless it is deemed medically necessary and additional airborne precautions are taken

23) No spirometery/ peak flow measurements

24) Avoid sampling naso-pharyngeal aspirate

The Dept of Anaesthesia & Intensive Care would like to thank MAQUET for an unrestricted research and education grant

Intubation

Florence Yap, Ho Oi Man, Charles Gomersall, Gavin Joynt

1. Only experienced doctors should attempt intubation (spread of infection at the time of intubation appears to be associated with difficult intubation, prolonged manual bagging)
2. Muscle relaxants should be used to facilitate intubation and minimize the risk of the patient coughing
3. Prepare all drugs and equipment in advance including end-tidal CO_2 monitor.
   a. Prepare manual bag-valve resuscitator
   b. Attach high quality bacterial/viral filter to the endotracheal tube via a catheter mount before intubating (this is designed to minimize the risk to staff if the patient coughs).
   c. Prepare ventilator
   d. Ensure that all connections are compatible.
   e. Set the ventilator prior to intubation but leave it in standby mode until it is connected to the ETT.
4. Before intubation assign one person to listen to chest to exclude endobronchial intubation. (This person should not be in close proximity to the patient during intubation and should only return to the area to confirm that the tip of the ETT is not in a bronchus). All other staff involved in the intubation should then go to the de-gowning area to remove personal protection equipment and then go to the gowning area to don new equipment, adding a hood for additional protection.
5. If the procedure is a change of endotracheal tube use a nerve stimulator to ensure the patient is adequately paralysed before attempting laryngoscopy.
6. Minimize manual bagging. If essential, should be carried out by two members of staff
   - one person holds mask tightly against patient's face
   - other person squeezes bag gently
7. Inflate ETT cuff before ventilating the patient
8. All staff involved in the intubation should remove personal protection equipment and don new equipment immediately after the intubation.

The Dept of Anaesthesia & Intensive Care would like to thank MAQUET for an unrestricted research and education grant

Respiratory equipment

Florence Yap, Ho Oi Man, Gavin Joynt, Charles Gomersall

Avoid splashing of respiratory secretions

Mechanical ventilators

- high quality heat and moisture exchange bacterial/viral filter (HMEF) at Y-piece
- high quality hydrophobic bacterial/viral filter at expiratory port
- scavenge expiratory gases
- avoid breaking ventilator circuit if possible
  - if breaking the ventilator circuit is unavoidable turn ventilator to standby mode prior to breaking the circuit
- use disposable ventilator circuits
- avoid nebulizers and heated water humidifiers
- ensure cuff of endotracheal tube is adequately inflated

Self inflating resuscitators

- high quality hydrophobic bacterial/viral filter
  - between mask and bag of self-inflating resuscitator (eg Ambu bag or Laerdal bag)
  - at expiratory port
    - this may require the addition of a custom made adaptor as well as expiratory gas divertor
  - filters should be discarded (as clinical waste) immediately after use
- minimize use of bag-valve-mask ventilation. If essential, should be carried out by two members of staff
  - one person holds mask tightly against patient's face
  - other person squeezes bag gently
  - CPR when only two people are available:
    - person responsible for chest compressions will also squeeze the bag at a ratio of 15 compressions: 2 breaths

Tracheal suction

- Avoid open suctioning of airway secretions
- Use closed tracheal suction
  - keep suction tubing connected to closed-suction catheter

Non-invasive ventilation

- avoid non-invasive ventilation through BiPAP ventilator due to inability to filter or scavenge expiratory gases and air leak around mask

Oxygen masks

- avoid Venturi masks. Use simple face masks, nasal cannulae or non-rebreathing masks
- avoid nebulizers. Consider use of metered dose inhalers with spacers (eg Aerochamber)

Intercostal drains

- high quality hydrophobic bacterial/viral filter at the outlet of the underwater seal

Peak flow

- avoid peak flow measurements

Hong Kong College of Anaesthesiologists Combined Scientific Meeting, November 13-14th
Click here for details

雅麗氏何妙齡那打素醫院
Alice Ho Miu Ling Nethersole Hospital

(By Fax and By Post)

31st March 2004

Your ref.: CB2/SC2

Miss Flora Tai
Clerk to Select Committee
Legislative Council
Hong Kong Special Administrative Region
Legislative Council Building
8 Jackson Road
Central
Hong Kong

Dear Miss Tai,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

Your letter dated 26th March 2004 refers.

As requested, I enclose the documents for your information.

Yours sincerely,

(Dr. Raymond Chen)
Hospital Chief Executive
Alice Ho Miu Ling Nethersole Hospital

RC/rc
Encl

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

Answers to the questions raised by the Select Committee are as follows:

AHNH was only designated to manage patients with Severe Acute Respiratory Syndrome (SARS) starting 14.4.2003.

AHNH followed NTEC and HAHO guidelines regarding aerosol generating procedures including intubation. A viral filter was added to the Ambubag to prevent droplet infection during bagging. (please see Appendix)

Appendix

Guidelines on In-hospital resuscitation of definite / possible SARS cases

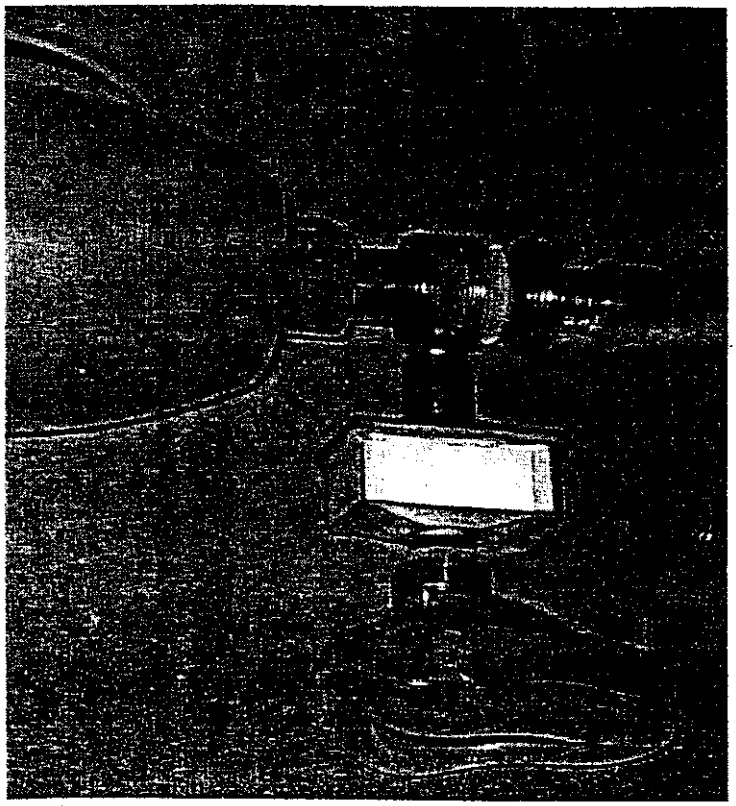
1. Wear personal protective equipment during resuscitation

    a. N95 masks as a minimum
    b. Goggles / eye protection
    c. Gowns – purple cotton gowns or disposable paper gowns
    d. Gloves
    e. cap

    These should be added to the emergency trolley in each ward. Minimum stock count in the trolley: 5.

2. During assist / manual ventilation with the bag-mask-valve resuscitation unit (Lardel or Ambu bag), put a bacterial/virus filter between the resuscitation bag and the mask. This will filter the viruses from the expired gases proximal to the expiratory valve. See diagram attached.

3. Be vigilant and careful during the disposal and cleansing of the contaminated / soiled equipment and linen / gowns



Resuscitation Committee
10 Apr 2003

Appendix IV

基督教聯合醫院
UNITED CHRISTIAN HOSPITAL
香港九龍觀塘協和街一百三十號
130, Hip Wo Street, Kwun Tong, Hong Kong

Tel 電話號碼: 2379 4702
Fax 圖文傳真: 2727 1990

Your ref: CB2/SC2

1 April, 2004

By Fax: 2248 2011

Miss Flora TAI,
Clerk to Select Committee.

Dear Miss Tai,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

Thank you for your letter of 26.3.2004. Our hospital followed HAHO in respect of performing intubation and bagging procedure of SARS patients and on the use of BiPAP.

Thank you for your attention.

Yours sincerely,

Dr. C.Y. Tse
Hospital Chief Executive

CYT/sn

PRINCESS MARGARET HOSPITAL
瑪 嘉 烈 醫 院
Princess Margaret Hospital Road, Lai Chi Kok, Kowloon, Hong Kong Tel: (852) 2990 1111 Fax: (852) 2786 3629, (852) 2370 3443
Home page http://www.ha.org.hk/pmh

3 April 2004

Miss Flora Tai
Clerk to Select Committee
Legislative Council

Dear Miss Tai,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

With reference to your letter dated 26 March 2004, please note that PMH followed HAHO guidelines on management of SARS patients regarding intubation and aerosol generating procedures. I understand HAHO guidelines have been sent to the Select Committee already. I hereby attach a copy of the relevant guidelines for your reference.

Yours sincerely,

(Dr Lily Chiu)
Cluster Chief Executive (Kowloon West)/
Hospital Chief Executive
Princess Margaret Hospital

Encl.

Dated: 8th April 2003

SARS Patients with Severe Respiratory Failure
Guidelines for M&G

Definition

Patient requiring 100% oxygen and still with borderline or low SpO_2

Initial Management

- Optimise medications
- Watch out for hospital-acquired infections
- Consult ICU
- If ICU bed unlikely to be available within a short time, transfer patient to E5
- Intubate at E5 if required
- If emergency intubation is done in any ward, consult ICU. If the patient is unlikely to be taken over within a short time, transfer patient to E5

Precautions during intubation

- Preferably done in E5 or a location with good ventilation
- Doctor and nurses must wear **N100 mask**, face shields as well as other standard barrier apparel
- **During Ambu bagging, exhaled air from the patient goes directly to the nearby healthcare personnel posing great risk for infection. This procedure should be minimized as far as possible**

Infection Control for Ventilated Patients

- If available use Siemens Servo ventilator (all are fitted with exhalation filters so that viruses will not be pumped into the room air)
- Avoid opening the ventilator circuit as far as possible, if unavoidable, personnel must take precautions for intubation as outlined above
- During suctioning of the airways, always use "close-suction" devices to avoid spillage of secretions
- Faecal matter may contain a lot of viruses and must be disposed of properly. During cleaning of faecal and urinary matter, precautions as outlined above for intubation must be applied

Care of ventilator patients in E5 is a temporary measure and the ICU should be contacted regularly to consider taking over the patient.

Appendix VI

新界西·醫院聯網
New Territories West Cluster

聯網辦事處 Cluster Office
屯門醫院 Tuen Mun Hospital
Tsing Chung Koon Road, Tuen Mun, New Territories, Hong Kong. Tel: (852) 2468 5111 Fax: (852) 2466 1911

Our ref.: ( ) in HA/NTWC/CCEO/SARS/SELECT

6 April 2004

FAXED
DATE: 7.4.04

Miss Flora TAI
Clerk to Select Committee
Legislative Council
Legislative Council Building
8 Jackson Road
Central
Hong Kong

Dear Miss TAI,

Select Committee to inquire into the handling of the Severe Acute Respiratory Syndrome outbreak by the Government and the Hospital Authority

I refer to your letter ref CB2/SC2 dated 26 March 2004 and would like to provide the following information as requested:

(a). All along in clinical practice, the need for intubation was based on patient's clinical condition. If the patient's condition immediately required intubation, it would be carried out immediately regardless of the placement of the patient at the moment in need. Intubation would be performed by the most appropriate doctor available at the time of clinical need. If ICU doctor was available at that time of clinical need, ICU doctor would perform the intubation in most circumstances. However, if intubation was not immediately required and the patient required Intensive Care Unit admission, the patient would be sent to ICU for further management and treatment. All intubation within ICU would be performed by ICU doctor. This clinical practice applied to SARS patients.

(b). There is no written policy on the above.

Thank you.

Yours sincerely,

(Dr. Cheung Wai Lun)
Cluster Chief Executive, New Territories West Cluster,
/ Hospital Chief Executive, Tuen Mun Hospital,
Hospital Authority

WLC/NL

Extract of HA Guideline on Severe Acute Respiratory Syndrome issued on 3 April 2003

- Monitor blood sugar and signs of sepsis while on pulse MP.

13. **Use of BIPAP/CPAP**

    BIPAP and CPAP may reduce the need for assisted ventilation if given early (e.g. first sign of lethargy). However, there is a significant risk of spreading the infection and these procedures should only be performed when deemed medically really necessary, and under airborne precautions such as negative pressure isolation rooms (with 6-12 air changes/hour) and use of protective hoods (powered air purifying respirator system).

For Paediatric patients

14. History of contacts, progressive radiological infiltrates and lymphopenia are important in making the diagnosis.

15. 3rd generation cephalosporin (e.g. Cefotaxime) *plus* macrolide (e.g. Erythromycin or Clarithromycin) for coverage of usual pathogens of CAP

16. Commence Ribavirin 40-60 mg/kg/day po div Q8H if contact history definite and with fever *(oral bioavailability of ribavirin is 20-64%.* It may not be effective if virus load is high).

17. In highly suspected case or rapidly progressive disease, start steroid at the same time with ribavirin. Methylprednisolone 3 mg/kg/day/IV or Hydrocortisone 1-2 mg/kg iv Q6h or Prednisolone 1-2 mg/kg/day po div BD depending on severity and urgency.

18. If fever persists, or clinical deterioration or progressive CXR changes, pulse Methylprednisolone 10 mg/kg/dose iv Q24H for up to 3 doses, depending on clinical response *plus* Ribavirin 20-60 mg/kg/day iv div Q8H (maximum dose used in some adult patients is 60 mg/kg/day or 1.2 g Q8H).

19. Continue with prednisolone 1-2 mg/kg/day or Hydrocortisone 1-2 mg/kg iv Q6H after pulse methylprednisolone. If condition improves at 1-2 weeks after commencement of steroid therapy, start tapering of steroid over 1 week. If CXR returns to normal by 2-3 weeks, may stop steroid or rapid tail off over a few days. If CXR is still abnormal by 3 weeks, try slow tapering of the steroid according to clinical and radiological improvement.

20. Ribavirin will be given for a total of 10-14 days. Antibiotics may be discontinued if afebrile for 5 days. However patients started on pulse steroid should be carefully observed for secondary infection.

21. The antibiotic regimen can be modified on clinical grounds if secondary or hospital acquired infection is suspected after prolonged stay in ICU and course of high dose steroid.

Special precautions

Ventilator

18. Aerosolized medication treatments (by nebulizer) should be avoided in confirmed and suspected cases of SARS.

19. BiPAP and cPAP should only be performed when such procedures are deemed medically essential, and under high airborne precautions such as strong negative pressure isolation rooms, and use of strict protective gears by healthcare personnel.

High-risk procedures

20. Potentially aerosol-generating procedures (diagnostic sputum induction, bronchoscopy, airway suctioning, endotracheal intubation), laboratory handling and processing of fresh specimens associated with SARS, post-mortem examination of human remains of SARS patients.

    i Performed only if deemed medically necessary.
    ii Limit the extent of procedure to the minimum necessary.
    iii Limit the number of personnel to the minimum necessary.

Additional precautions

21. Laboratory processing of fresh SARS specimen should be performed in a biological safety cabinet. If centrifugation is required, it should be carried out using sealed centrifuge cups or rotors that are loaded and unloaded in a biological safety cabinet.

22. Contact precautions should vary with the risk of exposure. For post-mortem examination, for example, protective garments should include surgical scrub suit, surgical cap, impervious gown or apron with full sleeve coverage, eye protection (goggles or face shield), shoe covers and double surgical gloves with an interposed layer of cut-proof synthetic mesh gloves. Make sure that the protective outer garments are removed when leaving the immediate autopsy area and discarded in appropriate laundry or waste receptacles.

Go to Top

F. INFECTION CONTROL MEASURES AT HOME (3/4/2003)

1. All staff caring for SARS patients / contacts of SARS patients or SARS patients discharged from hospital should adopt the following infection control measures at home:

    i. Frequent handwashing with liquid soap rather than bar soap, especially after contact with nose, mouth and respiratory secretions, e.g. after sneezing.
    ii. Family members should practise handwashing frequently, and avoid touching the eyes, nose and mouth with their hands.
    iii. Put on a surgical mask.
    iv. Avoid close contact with family members (e.g. mucosal contact).
    v. Avoid sharing food and utensils with family members.
    vi. Shower immediately after work (for staff caring for patients with Severe Respiratory Syndrome).

- Monitor blood sugar and signs of sepsis while on pulse MP.

13. **Use of BIPAP/CPAP**

    BIPAP and CPAP may reduce the need for assisted ventilation if given early (e.g. first sign of lethargy). However, since there is a significant risk of spreading the infection, these procedures should not be used for all patients. If deemed medically really necessary, they should be performed under airborne precautions such as negative pressure isolation rooms (with 6-12 air changes/hour) and use of protective hoods (powered air purifying respirator system).

For Paediatric patients

14. History of contacts, progressive radiological infiltrates and lymphopenia are important in making the diagnosis.

15. 3rd generation cephalosporin (e.g. Cefotaxime) *plus* macrolide (e.g. Erythromycin or Clarithromycin) for coverage of usual pathogens of CAP

16. Commence Ribavirin 40-60 mg/kg/day po div Q8H if contact history definite and with fever *(oral bioavailability of ribavirin is 20-64%.* It may not be effective if virus load is high).

17. In highly suspected case or rapidly progressive disease, start steroid at the same time with ribavirin. Methylprednisolone 3 mg/kg/day/IV or Hydrocortisone 1-2 mg/kg iv Q6h or Prednisolone 1-2 mg/kg/day po div BD depending on severity and urgency.

18. If fever persists, or clinical deterioration or progressive CXR changes, pulse Methylprednisolone 10 mg/kg/dose iv Q24H for up to 3 doses, depending on clinical response *plus* Ribavirin 20-60 mg/kg/day iv div Q8H (maximum dose used in some adult patients is 60 mg/kg/day or 1.2 g Q8H).

19. Continue with prednisolone 1-2 mg/kg/day or Hydrocortisone 1-2 mg/kg iv Q6H after pulse methylprednisolone. If condition improves at 1-2 weeks after commencement of steroid therapy, start tapering of steroid over 1 week. If CXR returns to normal by 2-3 weeks, may stop steroid or rapid tail off over a few days. If CXR is still abnormal by 3 weeks, try slow tapering of the steroid according to clinical and radiological improvement.

20. Ribavirin will be given for a total of 10-14 days. Antibiotics may be discontinued if afebrile for 5 days. However patients started on pulse steroid should be carefully observed for secondary infection.

21. The antibiotic regimen can be modified on clinical grounds if secondary or hospital acquired infection is suspected after prolonged stay in ICU and course of high dose steroid.

Special precautions