

5. *Mode of Delivery*

The delivery should be conducted in a well-controlled manner to ensure better infection control. Therefore, for non-emergency cases, delivery by elective Caesarean section at near term is preferred to allowing vaginal delivery after onset of labour. The risk of vaginal delivery may be higher in the following aspects,

- a. The first and second stage of the labour may last for hours, therefore the staff attending the delivery will have a longer exposure to patient's secretions.
- b. The struggling of the mother during the labour will cause shedding of secretion and thus the virus.
- c. Mothers with poor respiratory reserve would have poor effort during labour. This may lead to the use of instrumental delivery. The use of vacuum extraction may induce wound over scalp of the newborns and so increase the chance of infection.
- d. Emergency delivery by Caesarean section may be needed during the first and second stage of the labour such as in cases of cord prolapse and foetal distress. There may not be sufficient time to prepare and put on the protective clothing.
- e. The chance of having meconium stained liquor is higher when the pregnancy is full term or even post term. The procedure of clearing the meconium from the trachea of the newborns by repeated intubation and suction would impose a great risk to the staff.

Conclusion

The neonatal section of the Seminar of Paediatric SARS served the purpose of sharing the experience of the Princess Margaret Hospital in the management of newborns of mothers with SARS. The importance of infection control in the delivery suite and the neonatal intensive care unit has also been raised.

Reference

1. Shek CC, Ng PC, Fung PG, et al. Infants born to mothers with Severe Acute Respiratory Syndrome (SARS). Pediatrics (unpublished).

Infection Control and Staff Protection

YW KWAN

Department of Paediatrics, Princess Margaret Hospital, Lai Chi Kok, Kowloon, Hong Kong, China.

The virus causing SARS is identified to be Coronavirus. It is detected in respiratory tract secretion, urine and stool. It should be stressed that standard droplet and contact precautions should be strictly enforced. From the up to date information of epidemiological study, the mode of transmission is by droplets and direct contact with patient's secretions and subsequent inoculation into mucous membranes e.g. oral mucosa, conjunctiva etc.

We should practice infection control precautions in all healthcare settings. All staffs (including working in ancillary areas) working in healthcare settings should receive proper infection control training. The staffs should be informed the latest guidelines in infection control and there should be an enforcement group in hospital to reinforce the infection control policy among the front line staffs.

Negative Pressure Room

SARS patients should preferably be nursed individually in rooms with negative pressure, the contaminated air will be drawn outside to the environment and not recirculate into the ward. The air exchange in these rooms should be up to at least 12 exchanges per hour. These can markedly decrease the viral load present in the nursing environment and the chance of staff getting infected.

If the negative pressure rooms is not available. The isolation rooms should be well ventilated with adequate fresh air exchange. Consultation with and advices from aerodynamic and architectural specialists is useful.

Environmental Control and Decontamination

There should be a good environmental control. The ward environment should be divided into Dirty Zone (the viral load is high) and Clean Zone (it should be a clean area, the viral load should be zero). Inside the Dirty Zone is where the patient was nursed whereas the Clean Zone is the changing and resting area for staffs.



Dirty Zone – Inside where all staffs are in full protective gear.

All clinical areas should be disinfected by hypochlorite 1000 ppm frequently e.g. ward environment, facilities and equipments (regularly and after used). These include all horizontal surfaces (e.g. over-bed table, night stand), surfaces that are frequently touched by patients and healthcare personnel (e.g., door knobs, bed rails, public phone), and lavatory facilities.

Avoiding sharing of equipment/devices (stethoscope, scissors, bedpan, etc.) between patients, if sharing cannot be avoided. These should be disinfected in between patient use. Disinfectants should be widely available at appropriate concentrations.

There should be proper procedures in waste disposal, handling of dirt linen and soiled gowns. Staffs performing cleansing and laundry should wear appropriate Personal Protective Equipment and these should readily available for them.

Staff Safety and Protective Gears

Infection Control measures for staffs should include: **Standard precautions** (e.g. hand hygiene); **Contact precautions** (e.g. use of gown and gloves for contact with the patient or their environment) and **Airborne precautions** (e.g. an isolation room with negative pressure relative to the surrounding area and use of an N-95 filtering disposable respirator for persons entering the room).

Staffs should be trained the correct procedures when entering or leaving a dirty zone. They should have full barrier precaution including N95



Staff wearing full protective gear.

particulate respirator or mask, goggles/eye shields, head cover, protective gowns. The use of gowns with different degree of water permeability depends on different medical or nursing procedures.

The use of "Barrierman" or "Shoe covers" is controversial, the perceived benefit must be balanced against the users compliance to correct usage.

Procedures When Entering and Leaving a SARS Ward (Dirty Zone)

On ENTERING:

1. Put on a mask
2. Put on protective eyewear (especially if there is close patient contact)
3. Put on a cap
4. Put on a gown
5. Rub hands with alcoholic handrub and allow to dry
6. Put on gloves
7. Enter the ward/ICU

On LEAVING

1. Remove gloves (dispose into waste bag)
2. Remove gown (dispose into waste bag)
3. Must wash hands
4. Remove cap (dispose into waste bag)
5. Remove protective eyewear, clean with 70% alcohol and store in labeled paper bag
6. Remove mask; discard if contaminated, or store in labeled paper bag for reuse
7. Rub hands with alcoholic hand rub and allow to dry (if hands soiled, must wash hands before leaving the ward)
8. Put on a surgical mask whilst outside high-risk area.



Particulate Respirator Mask

A particulate respirator is designed to provide respiratory protection for the wearer. It provides an effective barrier to prevent healthcare workers from inhaling airborne pathogens such as Mycobacterium tuberculosis. The level of protection is determined by the efficiency of the filter material and how well the face piece fits or seals to the health care worker's face. N95/N100 means filter efficiency level of 95%/99.75% against particulate aerosols free of

oil respectively. N95/N100 masks (non-valve or valved) comes in different models e.g. SH 2950, 8210, 1860, 9210, 9211 and 8233 etc. A Half face respirator with P-100 filter can be used when staff fails the fit test in all the available models of N-95 respirators supplied by the hospital.

All respirators that rely on a mask-to-face seal need to be annually checked with either qualitative or quantitative methods to determine whether the mask provides an acceptable fit to a wearer.

The particulate filter should be changed if breathing become difficult or respirator becomes damaged or distorted or a proper face fit cannot be maintained.



N95 mask comes in different models to fit different face contour.

How to Test Fit a Particulate Filter (Fit Check)?

A fit check should be performed every time the respirator is put on. Cup both hands over the respirator and exhale sharply, if air leak from the nose, the user should adjust the nosepiece. If air leak from the edges, reposition the headband can achieve a better fit.

A Qualitative Fit Test

The qualitative fit test procedures rely on a subjective sensation (taste, irritation, smell) of the respirator wearer to a particular test agent e.g. Isoamyl Acetate, Saccharin Solution Aerosol, Bitrex™ (Denatonium Benzoate) Solution Aerosol. The most convenience is the Saccharin Solution Aerosol.



Staff performing Fit Test using the Saccharin solution aerosols method.

Higher Level of Respiratory Protection

A higher level of respiratory protection may be required for staffs working during aerosol-generating procedures on SARS patients. It include: Powered air purifying respirator (PAPRs) designed with loose-fitting facepieces that form a partial seal with the face; PAPRs with hoods that completely cover the head and neck and may also cover portions of the shoulder and torso.

The use of these devices requires training and practice and they are difficult to disinfect. The user must strictly follow the guideline before its use.



High efficiency Powered Air Purifying Respirator (PAPRs).

High Risk Procedures

Staffs performing certain high risks procedures may have an increased risk of contracting SARS. These procedures capable of stimulating cough and promoting the generation of aerosols include: nasopharyngeal aspiration, administration of aerosolized/nebulized medication; diagnostic sputum induction; bronchoscopy; airway suctioning; endotracheal intubation; positive pressure ventilation via facemask (e.g. BiPAP, CPAP), during which air may be forced out around the facemask; and high frequency oscillatory ventilation (HFOV).

These high risks procedures should be performed in rooms with negative pressure and all staffs should be reminded to wear full barrier precaution.



Attachment of a high quality bacterial filter to the expiratory port of the ventilator.

Restricted Access to SARS Areas

There should be no visiting policy for SARS ward. In exceptional circumstances whereas visiting is allowed, the visitors should be educated to take full barrier precaution when visiting SARS patients and they should be responsible for their own health.



No visitor policy.

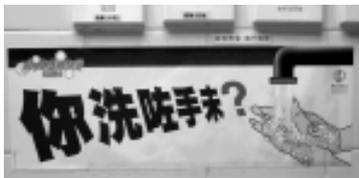
Personal Health and Hygiene

All staffs should have their own temperature measured before going to work. They should report fever and symptoms to their supervisors to prevent cross-infection among workers in case they contracted SARS.



Staff measuring tympanic temperature before duty.

Careful hand hygiene is urged. Staffs are also reminded of the importance of hand washing (hand anti-septic e.g. Hibiscrub, especially after removing face mask and gowns and handling patients) and the strict avoidance of touching or scratching of eyes, nose and mouth with hands. Non-alcoholic handrub may be a substitute if there is no obvious organic material contamination and immediate handwashing is not available.



Signs reminding and re-enforce staffs handwashing.



Personal belonging must protected against contamination with viruses e.g. put in a plastic bag and discarded when leaving the dirty zone.



Avoid bringing personal stationery into the dirty zone. Tray with shared stationery, which will stay in the dirty zone.

Staff should minimise their social activities. They should keep adequate distance during social contact e.g. having lunch and gathering, preferably wearing a surgical mask.

Infection Control Related Links

1. Paediatric SARS Group (HK)
Discussion Forum for Specialist Paediatricians on SARS
<http://www.paedsarshk.org>
2. World Health Organization - Section on SARS
<http://www.who.int/csr/sars/infectioncontrol/en/>
3. Centre of Disease Control and Prevention
<http://www.cdc.gov/ncidod/sars/ic.htm>
4. Centre of Disease Control and Prevention
Information on hand hygiene
www.cdc.gov/handhygiene
5. Procedures in performing a Qualitative Fit Check
http://www.osha.gov/pls/oshaweb/owadisp.show_document?p_table=STANDARDS&p_id=9780&p_text_version=FALSE
<http://www.osha.gov/SLTC/etools/respiratory/oshafiles/fittesting1.html>
6. Health Canada: SARS information for professionals
http://www.hc-sc.gc.ca/pphb-dgspsp/sars-sras/prof_e.html
7. Paediatric Approach to SARS - Hospital for Sick Children, Toronto, Canada
http://www.sickkids.on.ca/HealthCareProfessionals/custom/paeds_sars.asp?s=Paediatric+Approach+to+SARS&sID=5139
8. Ministry of Health, Singapore - SARS update
<http://app.moh.gov.sg/sar/sar01.asp>
9. Taiwan Center for Disease Control - SARS information page
<http://www.cdc.gov.tw/atyp/en/>
10. Ministry of Health, Malaysia - SARS information page
<http://webjka.dph.gov.my/sars/>
11. Ministry of Health, People Republic of China (Chinese GB code webpage)
<http://www.moh.gov.cn/>
12. Beijing Center for Disease Control, PRC (Chinese GB code webpage)
<http://www.bjcdc.org/jkzl/zwfd.asp>
13. Chinese Centre for Disease Control and Prevention (Chinese GB code webpage)
<http://www.chinacdc.net.cn/>