



Prevention of Mucormycosis

Protocol in High Risk COVID Patients

- 1) Investigations:  
Baseline HbA1C  
Serum Ferritin
- 2) Rational use of Steroids and antibiotics
- 3) Maintaining nasal hygiene by saline isotonic nasal spray and or Betadine drops
- 4) Consider to add Amphoterecin solution in nasal washings in highly suspected cases
- 5) Care of Equipments used for Oxygenation

ITEM	CLEANING/ WASHING	Disinfection	STERILIZATION
Oxygen Mask,Nasal Prongs	With Multi Rapid Enzymatic Agent	Wash with water and Dry properly	Ethylene oxide sterization
Ambu Bag	With Multi Rapid Enzymatic Agent	Wash with water and Dry properly	Ethylene oxide sterization
Suction Bottle	With Multi Rapid Enzymatic Agent	Wash with water and Dry properly	Ethylene oxide sterization
Suction tubings	With Multi Rapid Enzymatic Agent	Dip for 15 min in Gluteraldehyde solution and flush it with distilled water	Ethylene oxide sterization
Ventilator tubings	With Multi Rapid Enzymatic Agent	Dip for 15 min in Gluteraldehyde solution and flush it with distilled water	Ethylene oxide sterization
ET Tube	With Multi Rapid Enzymatic Agent	Wash with water and Dry properly	Ethylene oxide sterization
Humidifiers	Regular cleaning	Use only sterile water	Ethylene oxide sterization



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Editorial

Healthcare associated infections are one of the most common adverse events in the hospitals. These infections are seen especially in high risk population. Recently there was sudden increase in mucormycosis cases in COVID 19 positive patients. Our hospital is having a Hospital Infection Control Programme. The aim of this programme is to guide Health care Workers on minimizing patients infection risk and ensuring safety. Risk of infection can be avoided by adhering to Infection control protocols. One of the protocols is to follow bundle care approach which is a systematic method of delivering patient care.

It gives me pleasure to present 6<sup>th</sup> Issue of Infection Control Bulletin **MICROVISION**. This bulletin focuses on bundle care approach in our hospital with special mention on prevention of mucormycosis.

The implementation of bundles will promote multi-disciplinary collaboration since they are developed in consultation with clinicians.

Health care providers are advised to follow each bundle element for every patient for patient safety.

### Care Bundles

The care bundle involves **grouping together key elements of care for procedures to provide a systematic method to improve and monitor the delivery of clinical care processes**. In short, care bundles aim to ensure that all patients consistently receive the best care or treatment, all the time.

#### General principles

- The implementation of care bundles can assist in enhancing compliance to evidence-based quality process measures to improve patient care.
- Care bundles include a set of evidence-based measures (where possible level 1, randomized controlled trial evidence) that when implemented together have shown to produce better outcomes and have a greater impact than that of the isolated implementation of individual measures.
- Bundles also help to create reliable and consistent care systems in hospital settings since they are simple (three to five elements), clear, and concise.
- In addition to creating safer patient care environments, the implementation of bundles also promotes multi-disciplinary collaboration since they should be developed collaboratively and consensus obtained with strong clinician engagement and endorsement.
- In order for bundle implementation to be successful, each element of the bundle must be implemented collectively with complete consistency to achieve the most favorable outcomes (“all or none” approach).
- The effective implementation of a care bundle requires that the measures are adapted to the local setting; appropriately followed; entrenched in the patient care culture and; recorded and evaluated to ensure compliance by all members of the health care team involved.
- Health care providers are advised to follow each bundle element for every patient, always. This aims to develop and promote a positive habit-forming behavior among providers and ultimately a reliable care processes.
- Bundled interventions are an effective way to implement change and improve the “culture” of patient safety by promoting teamwork, measuring compliance and providing feedback and accountability to frontline teams and hospital leadership to improve care.

#### Implementation and performance measures

- A multi-disciplinary approach coupled with an institution-wide multi-modal strategy including: will-building, awareness, training, education, measurement and feedback are required to optimally promote and sustain the implementation of care bundles in hospital settings.
- The development of “how-to guidelines,” and the provision of standardized data collection tools that calculate bundle compliance are advised to ensure healthcare team members are clear on the elements of each bundle, the actions required and, how compliance is measured and tracked for feedback.
- Should elements of a bundle require particular supplies or products, these should be appropriately procured prior to bundle roll-out and implementation.
- The elements of a bundle are measured in an “all or nothing” manner to simplify assessment of compliance for feedback to providers and to emphasize the completion of every component. This measurement is different from an average compliance score.
- A bundle compliance percentage goal should be set for the healthcare team to work toward achieving (95% bundle compliance is recommended best practice).

- Perioperative selected surgical procedure
- Assisting with pressure ulcer healing for incontinent patients
- **Insert urinary catheter using aseptic technique**
  - Hand hygiene
  - Catheter insertion kit with sterile gloves, drape, cleaning supplies
  - Sterile lubricant
  - Sterile urinary catheter attached to a drainage bag
  - Maintain urinary catheter based on recommended guidelines

- **Secure catheter to prevent irritation of the urethra**
  - Maintain an unobstructed flow
  - Maintain the drainage bag below the level of the bladder and off the floor
  - Perform hand hygiene before and after each patient contact
  - Provide individual labelled collection container at the bedside
  - Review urinary catheter necessity daily, remove catheter promptly when not needed

#### CAUTI maintenance bundle

- Daily documented assessment of need
- Catheter secured device to secure catheter in place
- Hand hygiene performed for patient contact
- Daily meatal hygiene performed with soap and water
- Drainage bag emptied using a clean container
- Unobstructed flow maintained

#### Insertion

- Insert only for specific reasons
  - Urinary output in critical ill
  - Bladder outlet obstruction or neurogenic bladder dysfunction
  - Prevent contamination of sacral wounds
  - Terminal care
- Competent HCW to insert
- Aseptic technique

Closed system with bag below bladder

- **Management**
  - Review need for catheter daily
  - Empty when ¾ full and use clean container for each patient
  - Secure catheter to leg/abdomen
  - Urine samples from sampling port only
  - Hand hygiene & PPE before and after any catheter care

### 6. Pressure Ulcer Prevention Bundle

1. Risk assessment (Braden tool)
2. Skin assessment 8 hrly
3. Head of bed less than 30° unless contraindicated or superseded by VAP bundle
4. Incontinence skin car
5. Position change
  - bed 2 hourly
  - Chair hourly
6. Heel elevation
7. Nutritional assessment
8. Pressure relief mattresses (not a replacement for positional change)

distress syndrome. Plateau pressure should always be measured in these patients and kept below 30 cm of H<sub>2</sub>O, particularly in patients with normal extrapulmonary compliance. These strategies minimise the incidence of Ventilator induced lung injury.

Do not use Activated Protein C in any form of sepsis As opposed to previous recommendations Activated Protein C has not been found to be useful in a recent study of septic shock patients and the drug has subsequently been withdrawn from the market.

### 3. Bundle for the prevention of ventilator associated pneumonia (VAP)

VAP, defined as a new pneumonia occurring > 48 hours after endotracheal intubation, is a common and serious hospital-acquired infection. It occurs in up to 20% of patients receiving mechanical ventilation, and is associated with increased antibiotic use, length of hospitalization, and health care costs. The mortality associated with VAP ranges from 20% to 50%, and the attributable mortality is estimated at 13%. It has been estimated that over half the cases of VAP may be preventable with evidence-based strategies, with an impact on mortality. The following bundle of ventilator care processes have been shown to substantially reduce VAP rates,<sup>3</sup> and are recommended in international guidelines:

- a. Elevate the head of the bed to between 30 and 45 degrees
- b. Daily “sedation interruption” and daily assessment of readiness to extubate
- c. Daily oral care with chlorhexidine
- d. Prophylaxis for peptic ulcer disease
- e. Prophylaxis for deep venous thrombosis

These interventions should be implemented together with standard precautions (hand hygiene and use of gloves when handling respiratory secretions) as well as adequate disinfection and maintenance of equipment and devices.<sup>21</sup> Other components of the VAP bundle may include:

- a. Utilization of endotracheal tubes with subglottic secretion drainage (only for patients ventilated for longer than 24 hours)
- b. Initiation of safe enteral nutrition within 24–48 hours of ICU admission

### 4. Bundle for the prevention of surgical site infection (SSI)

SSIs are infections of the incision or organ or space that occur after surgery. SSIs complicate ~1.9% of surgical procedures in the United States, and result in excessive health care costs. In contrast, infection is the most common postoperative complication in African countries, occurring in 10% of procedures; it is associated with a 9.7% case fatality rate. It has been estimated that approximately half of SSIs are preventable. The following evidence based interventions should be provided as part of a bundle of care to prevent SSI:

#### a. Administration of parenteral antibiotic prophylaxis

- Antibiotic prophylaxis should be administered within 60 minutes prior to incision, including for Cesarean section
- Re-dosing is recommended for prolonged procedures and in patients with major blood loss or excessive burns

#### b. Patients should take bath with soap or an antiseptic agent within a night prior to surgery

#### c. Avoid hair removal: use electric clippers if necessary

#### d. Use alcohol-based disinfectant for skin preparation in the operating room

#### e. Maintain intraoperative glycemic control with target blood glucose levels < 200 mg/dL (in patients with and without diabetes)

#### f. Maintain perioperative normothermia

#### g. Administer increased fraction of inspired oxygen during surgery and after extubation in the immediate postoperative period in patients with normal pulmonary function

## 5. Urinary Catheter Care Bundle

### Bundle of care for prevention of CAUTI

#### CAUTI insertion bundle

#### • Verification of need prior to insertion

- Urinary retention/obstruction
- Severely ill/ immobility
- Lack bladder control
- Patient request/ end of life

## Specific interventions

## Bundle Therapy in Critical Care

### 1. Central line Bundle

Approximately 48% of ICU patients have central venous catheters (CVC) and majority of catheter related blood stream infections (CRBSI) are due to the use of CVC. Attributable mortality for these infections is around 20%.

The key components of a Central Line Bundle are Hand Hygiene

- Proper compliance with hand hygiene procedures by all health care workers reduces incidence of all nosocomial infections and particularly of CRBSI. Easy accessibility of an alcohol based hand cleaner or soap and water solution is a necessity for this.

Appropriate time for hand washing includes

- Before and after touching a patient
- Before and after an invasive procedure
- After removing gloves
- If contamination is suspected
- Maximum Barrier precautions during insertion

Maximum barrier precautions mean strict compliance with hand washing, wearing cap, mask, sterile gown and gloves, covering the patient from head to toe with a sterile drape with a small opening at the incision site. Odds of developing CRBSI are six times if these precautions are not taken.

- Chlorhexidine skin antisepsis: Use of 2 percent chlorhexidine in 70 percent isopropyl alcohol is an essential component for preventing CRBSI. It provides better antisepsis than Povidone-Iodine solution. Allow antiseptic solution to dry for two minutes before puncturing the skin.

- Optimal catheter site selection with avoidance of the femoral vein for central venous access in adult patients .Whenever possible the femoral site should be avoided and subclavian site should be preferred over jugular for line insertion in adults. These recommendations are only from prevention of CRBSI view point. Other considerations like operator experience, chance of mechanical complication and bleeding risk has also to be considered.

- Daily review of Line necessity with prompt removal of unnecessary lines.

Risk of infection increases over time as the line remains in place and these should be taken out at the earliest.

### Bundle of care for prevention of CLABSI

#### Insertion bundle

- Maximal sterile barrier precautions (surgical mask, sterile gloves, cap, sterile gown, and large sterile drape).

- Skin cleaning with alcohol-based chlorhexidine (rather than iodine).

- Avoidance of the femoral vein for central venous access in adult patients; use of subclavian rather than jugular veins.

- Dedicated staff for central line insertion and competency training/ assessment.
- Standardized insertion packs.

- Availability of insertion guidelines (including indications for central line use) and use of checklists with trained observers.

- Use of ultrasound guidance for insertion of internal jugular lines.



### Maintenance bundle

- Daily review of central line necessity
- Prompt removal of unnecessary lines
- Disinfection before manipulation of the line
- Daily chlorhexidine washes (in ICU, patients less than 2 months)
- Disinfect catheter hubs, ports, connectors, etc. before using the catheter
- Change dressings and disinfect site with alcohol-based chlorhexidine every 57 days (change earlier if soiled)

### 2. Sepsis Bundle

Sepsis is the fourth biggest killer disease in the world. A protocolised manner of managing sepsis has been shown to reduce mortality.

#### • Sepsis Resuscitation Bundle

These are the elements which need to be accomplished within six hours of patient presenting to the hospital with severe sepsis or septic shock.

#### • Measuring Lactate levels

Hyperlactatemia due to anaerobic metabolism and tissue hypoperfusion is usually present in severe sepsis and septic shock and is an important prognostic marker. It is particularly useful in detecting occult hypoperfusion in patients who are normotensive. A raised lactate should alert physician for early triage and instituting prompt therapy. In the absence of availability of lactate a base deficit of more than 2 and increasing metabolic acidosis in arterial blood gas or low serum bicarbonate may be taken as a surrogate marker.

#### • Blood cultures obtained prior to antibiotic administration

30-50 percent of patients presenting with severe sepsis or shock have positive blood cultures. All attempts should be made to send two sets of blood culture (at least one from the periphery) of adequate amount, preferably inoculated at the bedside for an automated culture identification system.

This should ideally be done prior to any antibiotic use (within 45 minutes) but this should not delay prompt institution of antibiotic. Appropriate intravenous antibiotic therapy should be started within one hour of presentation with severe sepsis.

### Sepsis resuscitation Bundle

- Measuring Lactate levels
- Blood cultures obtained prior to antibiotic administration
- Improve time to broad spectrum antibiotics
- Treat hypotension and/or elevated lactate with fluids
- Treat hypotension and/or elevated lactate with fluids
- Apply vasopressors for ongoing hypotension
- Maintain adequate Central Venous Pressure
- Maintain Adequate Central Venous Oxygen saturation

### Sepsis Management Bundle

- Administer Low Dose Steroid by a standard Policy.
- Maintain adequate glycemic control
- Prevent excessive Inspiratory Plateau pressure
- Do not use Activated Protein C in any form of sepsis

All patients of sepsis presenting with hypotension or lactate level of more than 4 mmol/l should be aggressively resuscitated with fluids.

Recent surviving sepsis guidelines recommend crystalloid resuscitation over colloids.

An initial fluid challenge of 1000 ml of crystalloid (normal saline or Ringers solution) to achieve a minimum of 30 ml/kg of fluid should be given in the first 4-6 hours. If the serum albumin is low or anticipated to be low 4% Albumin may be used as a resuscitation fluid. Colloids, particularly hydroxy ethyl starch with higher molecular weight of more than 200 Daltons should be avoided to prevent occurrence of nephropathy.

#### • Apply vasopressors for ongoing hypotension

When an appropriate fluid challenge fails to restore an adequate arterial pressure and organ perfusion therapy with vasopressor agents should be started to keep mean arterial pressure (MAP) above 65 mm Hg preferably monitored through an arterial line. Current recommendation for the choice of vasopressor is intravenous norepinephrine infusion titrated to an appropriate MAP. Epinephrine infusion may be considered as an alternative agent in refractory shock. Vasopressin 0.3 Units/min may be subsequently added or substituted for norepinephrine to achieve an equivalent result. Dopamine at a vasopressor dose may be used in selected patients with low cardiac output and heart rate and who have low risk of arrhythmias.

#### • Maintain adequate Central Venous Pressure

Early goal directed therapy protocolised by Rivers et al for resuscitating severe sepsis patients have an essential component of continuing fluid resuscitation to achieve a CVP of 8-10 mm Hg in non-mechanically ventilated patient. In patients on mechanical ventilation, diastolic dysfunction or increased intraabdominal pressure a higher CVP of 10-12 mm Hg is desirable.

#### • Maintain Adequate Central Venous Oxygen saturation

Central venous oxygen saturation measured by intermittent blood gas analysis of a central venous sample or continuously through a fiberoptic catheter reflects a global oxygen supply and demand ratio of the body. Normal values are more than 70%. This may be achieved by sequential infusion of fluid resuscitation, achieving a CVP of 10 mmHg, then packed red blood cell to achieve a hematocrit of more than 30 percent and Dobutamine infusion. This protocol was associated with an improvement in survival.

#### • Administer Low Dose Steroid by a standard Policy.

Intravenous hydrocortisone (200-300 mg/hour) preferably as a continuous infusion or in 3-4 divided doses for 7 days is suggested for adult patients with septic shock in whom blood pressure is refractory to fluid resuscitation and vasopressor therapy. Serum cortisol level or corticotrophin stimulation test should not be used as a guide for selecting steroids. Higher doses of corticosteroids, addition of mineralocorticoids or use of dexamethasone or other steroids should be avoided in these patients.

#### • Maintain adequate glycemic control

Present recommendation is to use a protocolised approach to blood glucose management of patients in ICU with severe sepsis. Intravenous insulin infusion should be started when two consecutive blood glucose level is 180 mg/dl or more. The infusion should be subsequently titrated to keep a blood sugar level below 180 mg/dl. Prevent excessive Inspiratory Plateau pressure Present recommendations for septic patients on mechanical ventilation are to target a tidal volume of 6 ml/kg of predicted body weight in patients with different severity of acute respiratory