



सत्यमेव जयते
Ministry of Health & Family Welfare
Government of India



National Training of Trainers for

C  **VID-19**

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Clinical Case Management



Case Definition

- **SARI:** ARI with history of fever or measured temperature $\geq 38\text{ C}^\circ$ and cough; onset within the last ~10 days; and requiring hospitalization. However, the absence of fever does NOT exclude viral infection.

Surveillance case definitions for nCoV

- Severe acute respiratory infection (SARI) in a person, with history of fever and cough requiring admission to hospital, with no other etiology that fully explains the clinical presentation **AND** any of the following:
- a) A history of travel to Wuhan, Hubei Province China in the 14 days prior to symptom onset; **or**

Surveillance case definitions for nCoV

- A person with acute respiratory illness of any degree of severity who, within 14 days before onset of illness, had any of the following exposures:
 - a) close physical contact with a confirmed case of nCoV infection, while that patient was symptomatic; **or**
 - b) a healthcare facility in a country where hospital-associated nCoV infections have been reported

Surveillance case definitions for nCoV

- b)the disease occurs in a health care worker who has been working in an environment where patients with SARI are being cared for, without regard to place of residence or history of travel; or
- c)the person develops an unusual or unexpected clinical course, especially sudden deterioration despite appropriate treatment, without regard to place of residence or history of travel, even if another etiology has been identified that fully explains the clinical presentation

Close Contact

- Health care associated exposure, including providing direct care for nCoV patients, working with health care workers infected with nCoV, visiting patients or staying in the same close environment of a nCoV patient
- Working together in close proximity or sharing the same classroom environment with a with nCoV patient
- Traveling together with nCoV patient in any kind of conveyance
- Living in the same household as a nCoV patient
- The epidemiological link may have occurred within a 14-day period before or after the onset of illness in the case under consideration

Uncomplicated Illness

- Fever, cough, sore throat, nasal congestion, malaise, headache, muscle pain or malaise
- The elderly and immunosuppressed may present with atypical symptoms. These patients do not have any signs of dehydration, sepsis or shortness of breath

Mild pneumonia

- Patient with pneumonia and no signs of severe pneumonia
- Child with non-severe pneumonia has cough or difficulty breathing + fast breathing: fast breathing (in breaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 and no signs of severe pneumonia

Severe Pneumonia

- **Adolescent or adult:** fever or suspected respiratory infection, **plus** one of respiratory rate >30 breaths/min, severe respiratory distress, **or** SpO₂ $<90\%$ on room air
- **Child** with cough or difficulty in breathing, plus at least one of the following: central cyanosis or SpO₂ $<90\%$; severe respiratory distress (e.g. grunting, very severe chest indrawing); signs of pneumonia with a general danger sign: inability to breastfeed or drink, lethargy or unconsciousness, or convulsions. Other signs of pneumonia may be present: chest in-drawing, fast breathing (inbreaths/min): <2 months, ≥ 60 ; 2–11 months, ≥ 50 ; 1–5 years, ≥ 40 . The diagnosis is clinical; chest imaging can exclude complications

Acute Respiratory Distress Syndrome

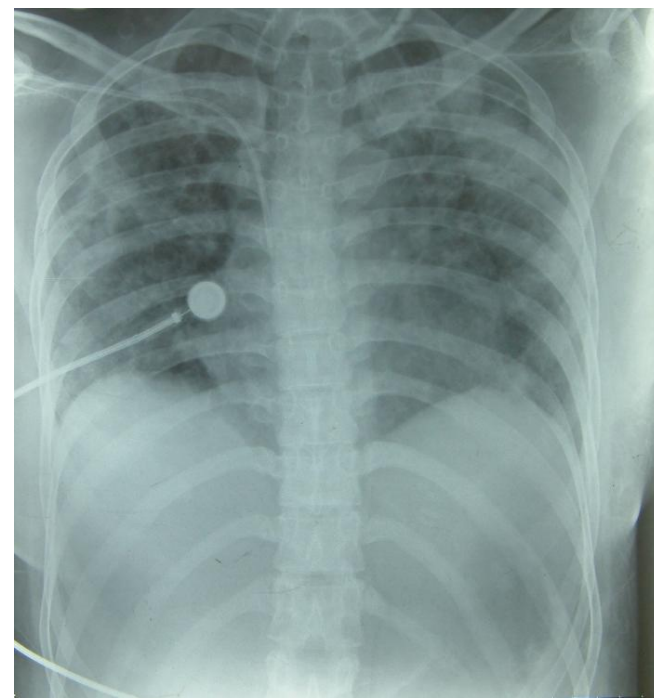
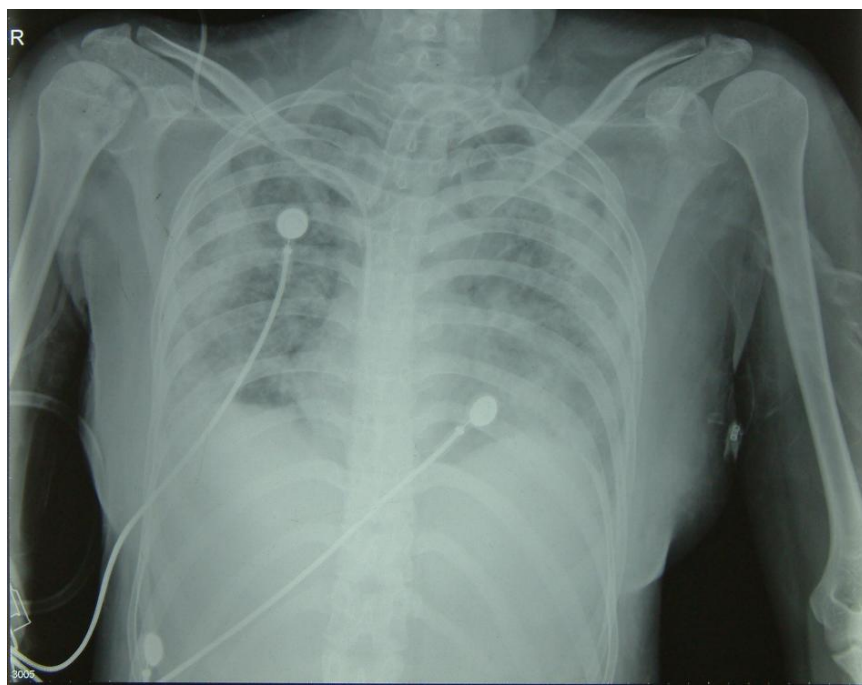
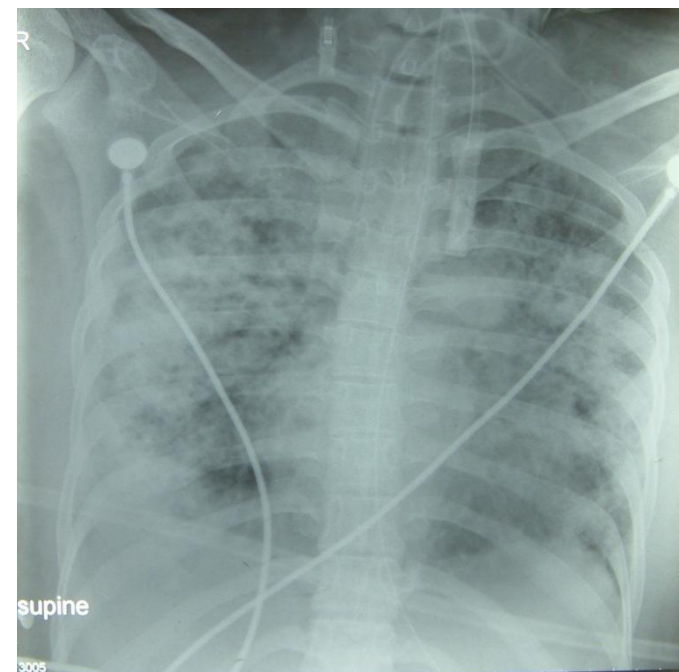
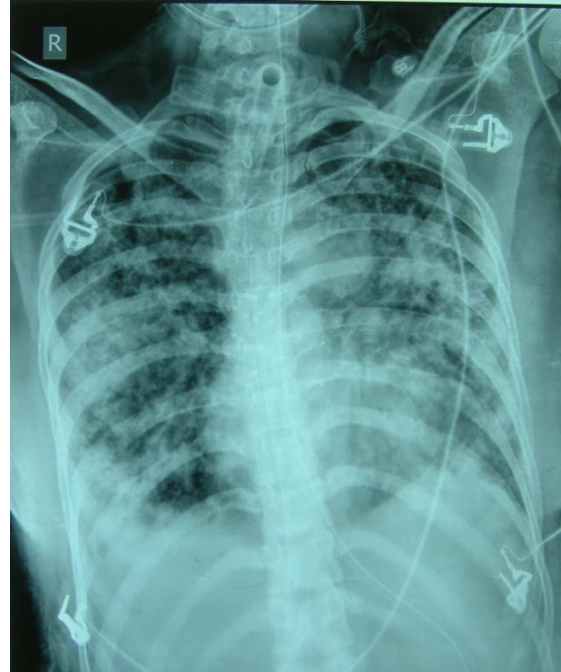
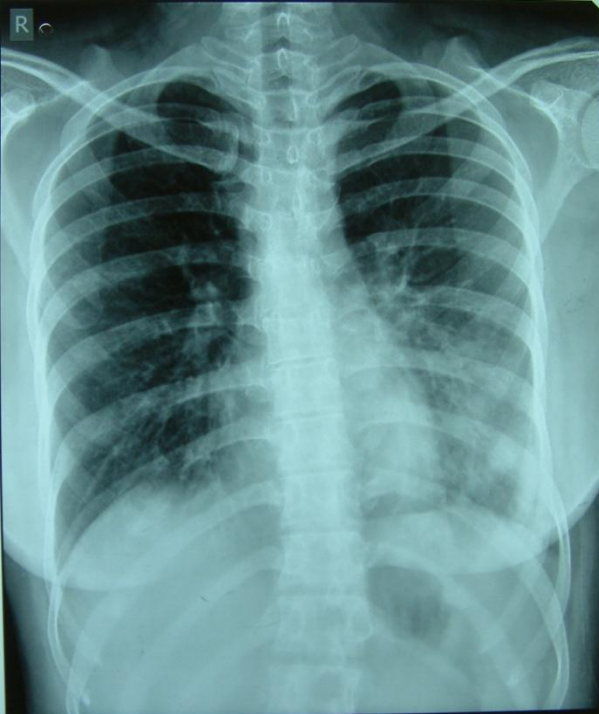
- **Onset:** new or worsening respiratory symptoms within one week of known clinical insult. Chest imaging (radiograph, CT scan, or lung ultrasound): bilateral opacities, not fully explained by effusions, lobar or lung collapse, or nodules
- **Origin of oedema:** respiratory failure not fully explained by cardiac failure or fluid overload. Need objective assessment (e.g. echocardiography) to exclude hydrostatic cause of oedema if no risk factor present.

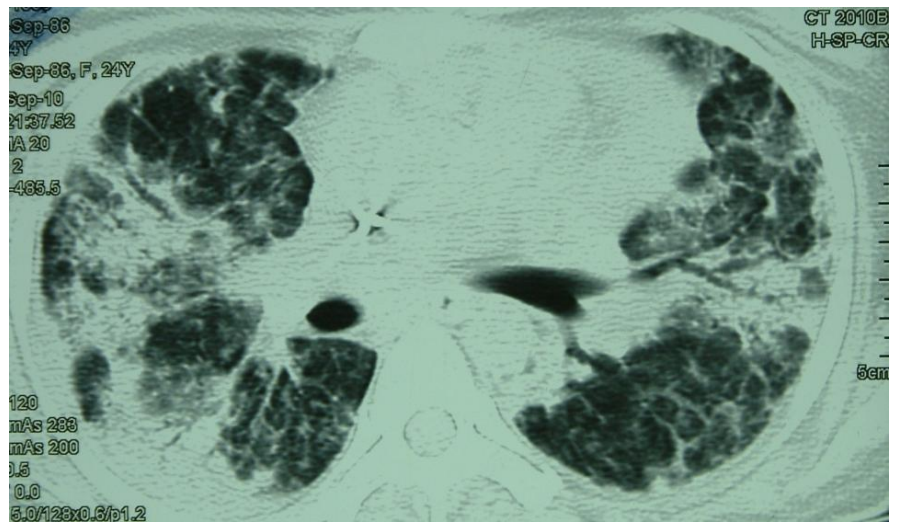
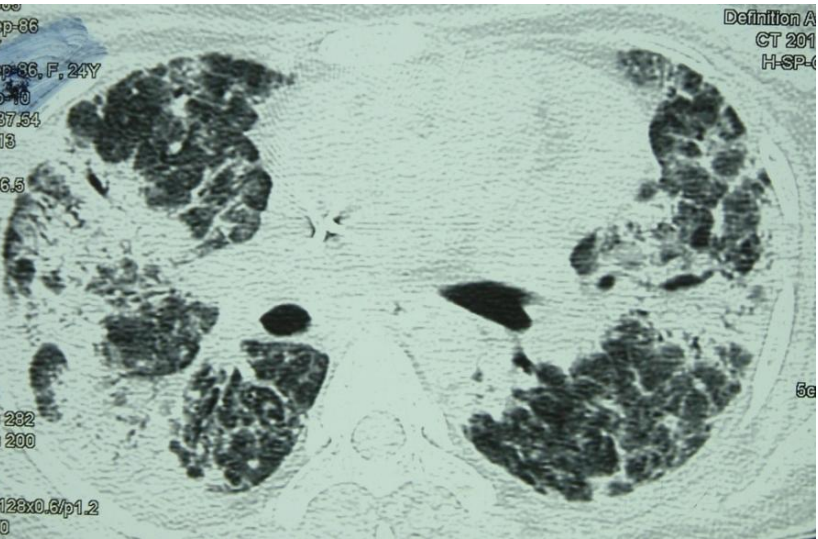
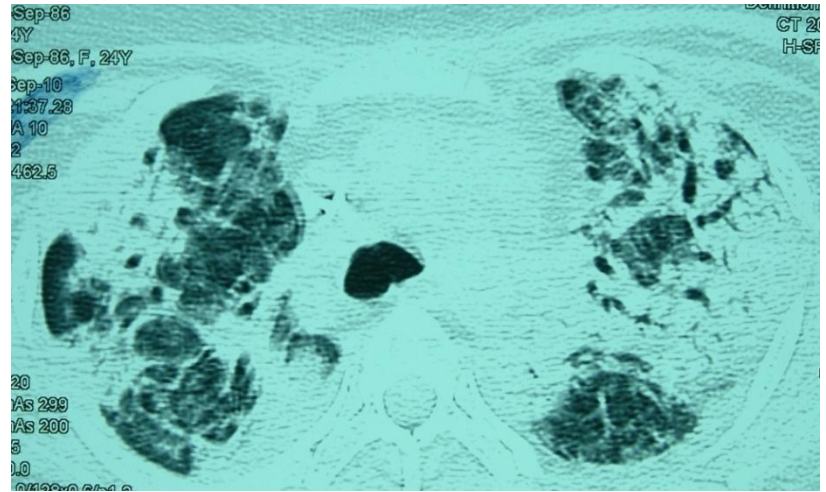
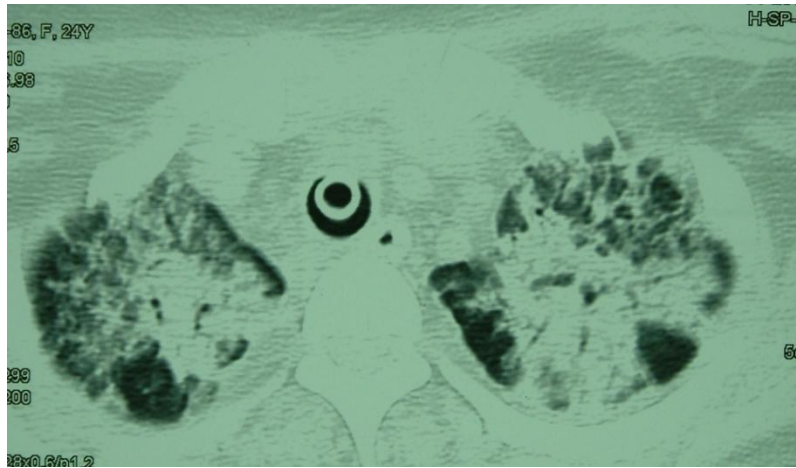
Oxygenation

- Mild ARDS: $200 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 300 \text{ mmHg}$ (with PEEP or CPAP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated)
- Moderate ARDS: $100 \text{ mmHg} < \text{PaO}_2/\text{FiO}_2 \leq 200 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated)
- Severe ARDS: $\text{PaO}_2/\text{FiO}_2 \leq 100 \text{ mmHg}$ with PEEP $\geq 5 \text{ cmH}_2\text{O}$, or non-ventilated)
- When PaO_2 is not available, $\text{SpO}_2/\text{FiO}_2 \leq 315$ suggests ARDS (including in non-ventilated patients)

Oxygenation

- Bilevel NIV or CPAP ≥ 5 cmH₂O via full face mask:
PaO₂/FiO₂ ≤ 300 mmHg or SpO₂/FiO₂ ≤ 264
- Mild ARDS (invasively ventilated): $4 \leq OI < 8$ or $5 \leq OSI < 7.5$
- Moderate ARDS (invasively ventilated): $8 \leq OI < 16$ or $7.5 \leq OSI < 12.3$
- Severe ARDS (invasively ventilated): $OI \geq 16$ or $OSI \geq 12.3$





Sepsis

- Adults: life-threatening organ dysfunction caused by a dysregulated host response to suspected or proven infection, with organ dysfunction.
- Signs of organ dysfunction include: altered mental status, difficult or fast breathing, low oxygen saturation, reduced urine output, fast heart rate, weak pulse, cold extremities or low blood pressure, skin mottling, or laboratory evidence of coagulopathy, thrombocytopenia, acidosis, high lactate or hyper-bilirubinemia.
- Children: suspected or proven infection and ≥ 2 SIRS criteria, of which one must be abnormal temperature or white blood cell count

Septic Shock

- **Adults:** persisting hypotension despite volume resuscitation, requiring vasopressors to maintain MAP ≥ 65 mmHg and serum lactate level > 2 mmol/L
- **Children:** any hypotension (SBP < 5 th centile or > 2 SD below normal for age) or 2-3 of the following: altered mental state; tachycardia or bradycardia (HR < 90 bpm or > 160 bpm in infants and HR < 70 bpm or > 150 bpm in children); prolonged capillary refill (> 2 sec) or warm vasodilation with bounding pulses; tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia

Infection prevention and control

- Medical mask and direct patient to separate area
- At least 1 meter distance between suspected patients and other patients
- Cover nose and mouth during coughing or sneezing with tissue or flexed elbow for others
- Hand hygiene after contact with respiratory secretions

Droplet Precautions

- Medical mask if working within 1-2 metres of the patient
- Place patients in single rooms, or group together those with the same etiological diagnosis
- Group patients with similar clinical diagnosis and based on epidemiological risk factors, with a spatial separation
- Use eye protection (face-mask or goggles)
- Limit patient movement within the institution
- Ensure that patients wear medical masks when outside their room

Cover your mouth and nose

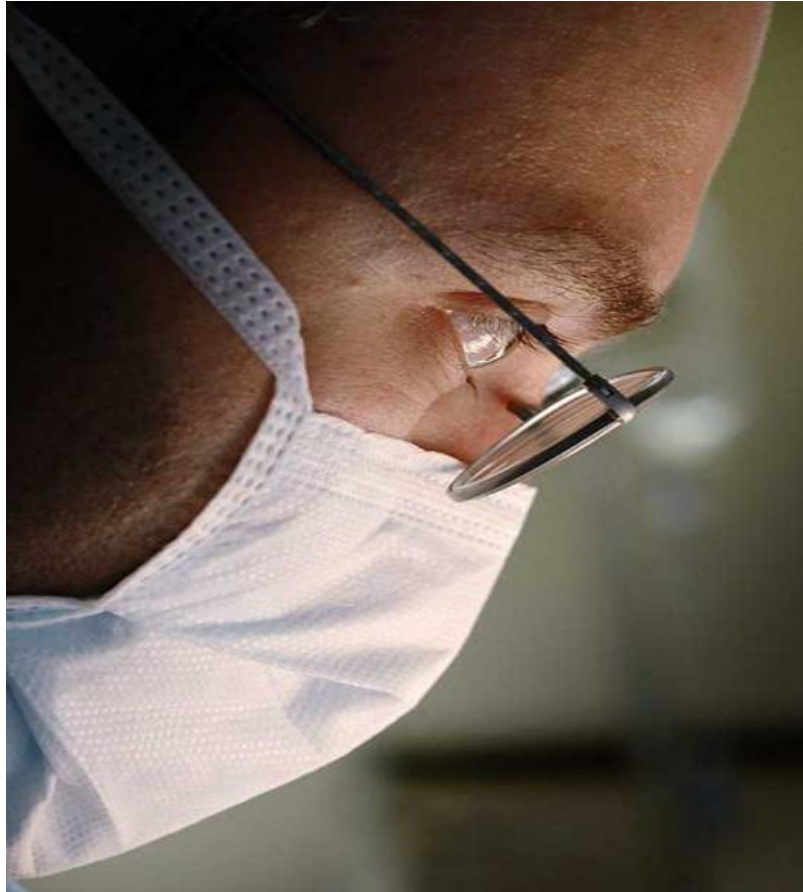


- Cover your mouth and nose with a tissue when coughing or sneezing.
- It may prevent those around you from getting sick

Cover Your Cough/Sneeze!



Droplet precautions: Surgical Masks



Contact precautions

- Use PPE (medical mask, eye protection, gloves and gown) when entering room and remove PPE when leaving
- Use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers)
- If needs to be shared clean and disinfect between each patient use
- Avoid contaminating environmental surfaces that are not directly related to patient care (e.g. door handles and light switches). Ensure adequate room ventilation. Avoid movement of patients or transport. Perform hand hygiene

Airborne precautions when performing an aerosol generating procedure

- Ensure that healthcare workers performing aerosol-generating procedures (i.e. open suctioning of respiratory tract, intubation, bronchoscopy, cardiopulmonary resuscitation) use PPE, including gloves, long-sleeved gowns, eye protection, and fit-tested particulate respirators (N95 or equivalent, or higher level of protection).

Airborne precautions when performing an aerosol generating procedure

- Whenever possible, use adequately ventilated single rooms when performing aerosol-generating procedures, meaning negative pressure rooms with minimum of 12 air changes per hour or at least 160 litres/second/patient in facilities with natural ventilation.
- Avoid the presence of unnecessary individuals in the room
- Care for the patient in the same type of room after mechanical ventilation commences

Section Separator



Early supportive therapy and monitoring

- Initiate oxygen therapy at 5 L/min and titrate flow rates to reach target $SpO_2 \geq 90\%$ in non-pregnant adults and $SpO_2 \geq 92-95\%$ in pregnant patients
- Children with emergency signs (obstructed or absent breathing, severe respiratory distress, central cyanosis, shock, coma or convulsions) should receive oxygen therapy during resuscitation to target $SpO_2 \geq 94\%$; otherwise, the target SpO_2 is $\geq 90\%$

Early supportive therapy and monitoring

- Use conservative fluid management in patients with SARI when there is no evidence of shock
- Patients with SARI should be treated cautiously with intravenous fluids, because aggressive fluid resuscitation may worsen oxygenation, especially in settings where there is limited availability of mechanical ventilation

Early supportive therapy and monitoring

- Give empiric antimicrobials to treat all likely pathogens causing SARI
- Give antimicrobials within one hour of initial patient assessment for patients with sepsis: Although the patient may be suspected to have nCoV, administer appropriate empiric antimicrobials within ONE hour of identification of sepsis
- Empiric antibiotic treatment should be based on the clinical diagnosis (community-acquired pneumonia, health care-associated pneumonia [if infection was acquired in healthcare setting], or sepsis), local epidemiology and susceptibility data, and treatment guidelines

Early supportive therapy and monitoring

- Empiric therapy includes a neuraminidase inhibitor for treatment of influenza when there is local circulation or other risk factors
- Empiric therapy should be de-escalated on the basis of microbiology results and clinical judgment

Early supportive therapy and monitoring

- Do not routinely give systemic corticosteroids for treatment of viral pneumonia or ARDS outside of clinical trials unless they are indicated for another reason: (avascular necrosis, psychosis, diabetes, and delayed viral clearance)

Early supportive therapy and monitoring

- Closely monitor patients with SARI for signs of clinical deterioration, such as rapidly progressive respiratory failure and sepsis, and apply supportive care interventions immediately
- Application of timely, effective, and safe supportive therapies is the cornerstone of therapy for patients that develop severe manifestations of nCoV

Early supportive therapy and monitoring

- Understand the patient's co-morbid condition(s) to tailor the management of critical illness and appreciate the prognosis
- During intensive care management of SARI, determine which chronic therapies should be continued and which therapies should be stopped temporarily
- Communicate early with patient and family
- Communicate proactively with patients and families and provide support and prognostic information
- Understand the patient's values and preferences regarding life-sustaining interventions

Collection of specimens for laboratory diagnosis

- Collect blood cultures for bacteria that cause pneumonia and sepsis, ideally before antimicrobial therapy.
- DO NOT delay antimicrobial therapy to collect blood cultures
- Collect specimens from BOTH the upper respiratory tract (URT; nasopharyngeal and oropharyngeal) AND lower respiratory tract (LRT; expectorated sputum, endotracheal aspirate, or bronchoalveolar lavage) for nCoV testing by RT-PCR
- Clinicians may elect to collect only LRT samples when these are readily available (for example, in mechanically ventilated patients)

Section Separator



Management of hypoxemic respiratory failure and ARDS

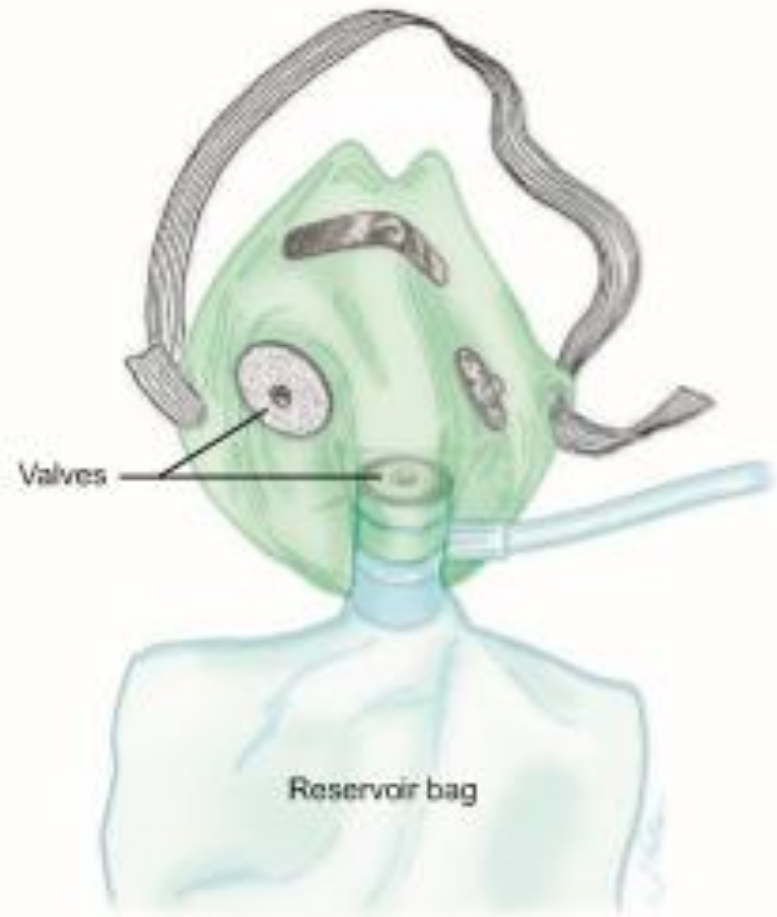
- Facemask with reservoir bag (flow rates of 10-15 L/min, which is typically the minimum flow required to maintain bag inflation; FiO₂ 0.60-0.95)
- High-flow nasal oxygen (HFNO) or non-invasive ventilation (NIV) should only be used in selected patients with hypoxemic respiratory failure.

Partial Rebreathing Mask



A

Non Rebreathing Mask



B

Oxygen mask with reservoir bag



“Venturi” Device with mask



Venturi System Varieties



HFNC



Management of hypoxemic respiratory failure and ARDS

- Endotracheal intubation should be performed by a trained and experienced provider using airborne precautions
- Implement mechanical ventilation using lower tidal volumes (4–8 ml/kg predicted body weight, PBW) and lower inspiratory pressures (plateau pressure <30 cmH₂O)

Management of hypoxemic respiratory failure and ARDS

- Hypercapnia is permitted if meeting the pH goal of 7.30-7.45
- Ventilator protocols are available. The use of deep sedation may be required to control respiratory drive and achieve tidal volume targets.
- In patients with severe ARDS, prone ventilation for >12 hours per day is recommended

Management of hypoxemic respiratory failure and ARDS

- Use a conservative fluid management strategy for ARDS patients without tissue hypoperfusion
- In patients with moderate or severe ARDS, higher PEEP instead of lower PEEP is suggested
- A related intervention of recruitment manoeuvres (RMs) is delivered
- Neuromuscular blocking agents may be used in severe ARDS

Management of hypoxemic respiratory failure and ARDS

- In settings with access to expertise in extracorporeal life support (ECLS), consider referral of patients with refractory hypoxemia despite lung protective ventilation
- Avoid disconnecting the patient from the ventilator, which results in loss of PEEP and atelectasis
- Use in-line catheters for airway suctioning and clamp endotracheal tube when disconnection is required (for example, transfer to a transport ventilator)

Management of septic shock

- Recognize septic shock in adults when infection is suspected or confirmed **AND**
- Vasopressors are needed to maintain mean arterial pressure (MAP) ≥ 65 mmHg **AND**
- Lactate is ≥ 2 mmol/L, in absence of hypovolemia

Management of septic shock

- Recognize septic shock in children with any hypotension (systolic blood pressure [SBP] <5th centile or >2 SD below normal for age) **or** 2-3 of the following:
 - altered mental state
 - tachycardia or bradycardia (HR <90 bpm or >160 bpm in infants and HR <70 bpm or >150 bpm in children)
 - prolonged capillary refill (>2 sec) or warm vasodilation with bounding pulses
 - tachypnea; mottled skin or petechial or purpuric rash; increased lactate; oliguria; hyperthermia or hypothermia.

Management of septic shock

- Standard care includes early recognition and the following treatments **within 1 hour** of recognition: antimicrobial therapy and fluid loading and vasopressors for hypotension.
- The use of central venous and arterial catheters should be based on resource availability and individual patient needs
- At least 30 ml/kg of isotonic crystalloid in adults in the first 3 hours
- Do not use hypotonic crystalloids, starches, or gelatins for resuscitation.

Management of septic shock

- Administer vasopressors when shock persists during or after fluid resuscitation. The initial blood pressure target is MAP \geq 65 mmHg in adults and age-appropriate targets in children
- Vasopressors (i.e. norepinephrine, epinephrine, vasopressin, and dopamine) are most safely given through a central venous catheter at a strictly controlled rate, but it is also possible to safely administer them via peripheral vein and intra-osseous needle

Prevention of complications

- Days of invasive mechanical ventilation
- Incidence of ventilator associated pneumonia
- Incidence of venous thromboembolism
- Catheter related blood stream infection
- Pressure ulcers
- Stress ulcers and gastrointestinal bleeding
- ICU-related weakness



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Thank you

