



Protocol for Non-invasive Ventilation STG-003

Standard Treatment Guideline (STG)



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Standard Treatment Guidelines (STGs) for paediatric critical care are essential to ensure safe, evidence-based, ethical, and standardized management of critically ill children in Nepal. Given the wide variation in healthcare infrastructure, human resources, and availability of critical care services across the country, uniform clinical guidance is necessary to minimize unnecessary variations in practice and improve patient outcomes. These guidelines assist paediatricians, medical officers, residents, and other healthcare professionals in making timely, consistent, and appropriate clinical decisions, particularly in resource-limited settings. STGs also reinforce adherence to the Nepal Medical Council's Code of Ethics and Professional Conduct by promoting professional competence, patient safety, informed consent, appropriate documentation, and accountability. Furthermore, adherence to nationally accepted guidelines helps establish the expected standard of care, thereby reducing the risk of preventable errors, medico-legal disputes, and litigation while supporting defensible clinical practice. As practical bedside references, STGs facilitate rapid decision-making, enhance resident training, improve communication among multidisciplinary teams, and promote rational utilization of available resources. They also provide a framework for quality assurance, clinical audit, and continuous professional development. The adoption and implementation of national paediatric critical care STGs will strengthen clinical governance, promote equitable delivery of critical care services, and contribute to improved survival and health outcomes for critically ill children throughout Nepal.

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Protocol for Non-invasive Ventilation

STG-003

Introduction and Definition

Non-invasive ventilation (NIV) is a technique of providing ventilation without the use of an artificial airway. Non-invasive positive pressure uses some form of interface to provide positive pressure ventilation.

Indications of NIV

- Hypoxemic respiratory failure
- Pneumonia
- Cardiac Failure/ pulmonary edema
- Acute asthma
- Obstructive airway disease e.g., laryngomalacia, tracheomalacia
- Post-extubation/weaning from invasive ventilation
- Neuromuscular disorders

Contraindications of NIV

- Respiratory arrest or the need for immediate intubation
- Hemodynamic instability
- Inability to protect the airway (impaired cough or swallowing reflex)
- Excessive secretions
- Facial deformities or conditions that prevent mask from fitting
- Brain injury with unstable respiratory drive
- Severe ARDS

Modes of NIV

- Pressure control (PC)
- Volume control (VC)
- Continuous positive airway pressure/Pressure support (CPAP/PSV)
- Bilevel positive airway pressure (BiPAP)

Types of interfaces

- Mask – nasal, oronasal, full face
- RAM Cannula
- Nasal pillows
- Helmets
- Mouthpieces with lip seal

Interface	CO ₂ Vent	Circuit Used	Reason	Key Points
Non-vented Interface	absent	Double-limb circuit (separate inspiratory & expiratory limbs) Use with conventional ventilator	Prevents CO ₂ rebreathing	Must have an expiratory limb or valve
Vented Interface	present	Single-limb circuit Use with BiPAP machine	Allows CO ₂ escape through mask vent	Commonly used in BiPAP and NIV portable devices

NIV settings

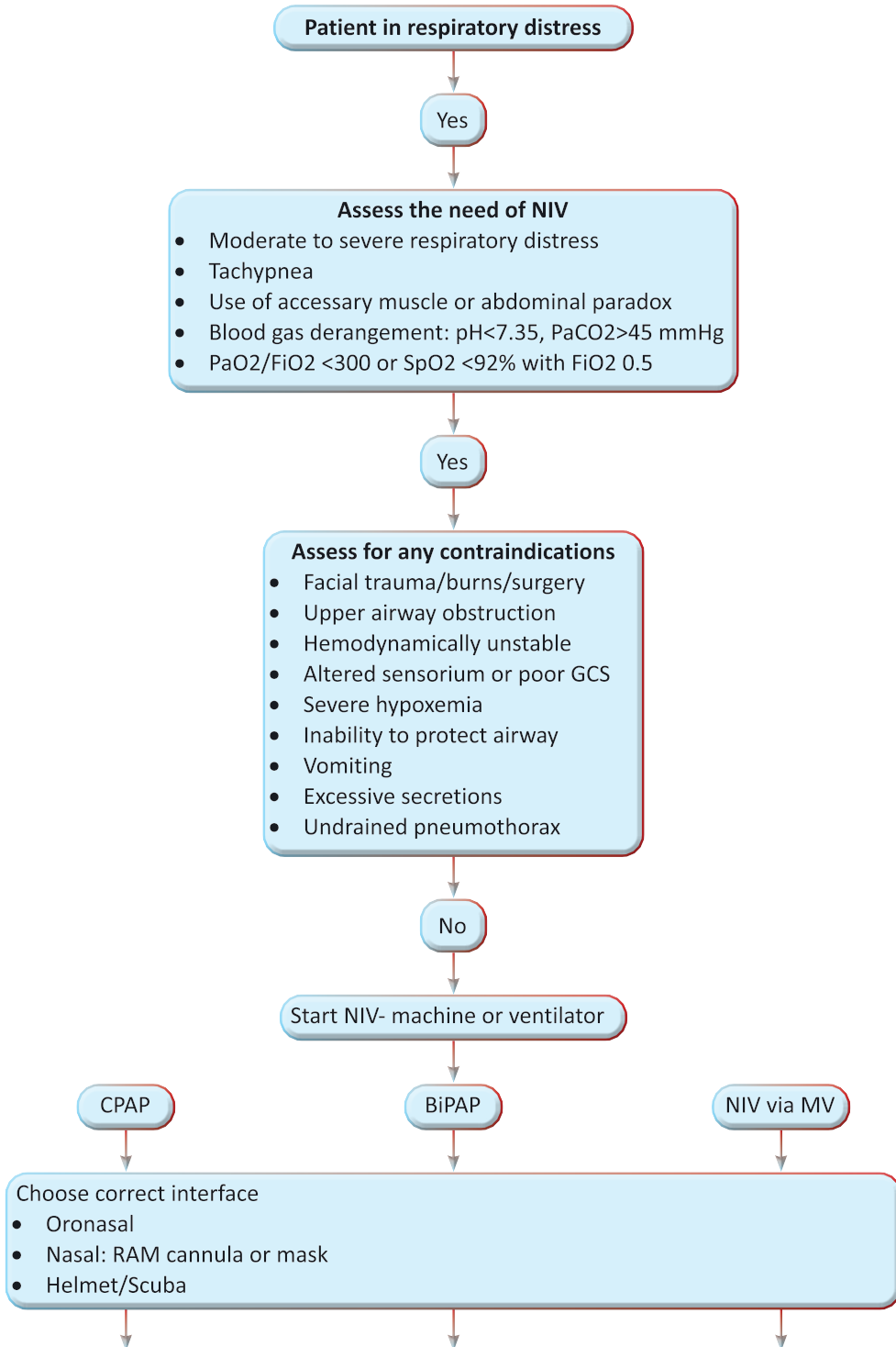
Parameter	NIV-CPAP	NIV-PS	NIV-PC	BiPAP
Mode	CPAP	PSV	PCV	S/T (Preferred)
PEEP / EPAP	5 cm H ₂ O	5 cm H ₂ O	5 cm H ₂ O	5cm H ₂ O
Pressure	—	8-10 cm H ₂ O	PIP 8-10 cm H ₂ O	IPAP 8-10 cm H ₂ O
Backup RR	—	Age appropriate	Age appropriate	Age appropriate
Ti	—	—	Infants 0.4–0.6 s Children 0.6–0.7 s Adolescents 0.8–1.0s	Infants 0.4–0.6 s Children 0.6–0.7 s Adolescents 0.8–1.0s
FiO ₂ *	40–60%	40–60%	40–60%	40–60%
Trigger	Flow 1–3 L/min	Flow 1–3 L/min	Flow 1–3 L/min	Flow 1–3 L/min
Rise Time	Medium	Medium	Medium	1 to 6 (usually 3)
Target VT	—	6–8 ml/kg	6–8 ml/kg	6–8 ml/kg

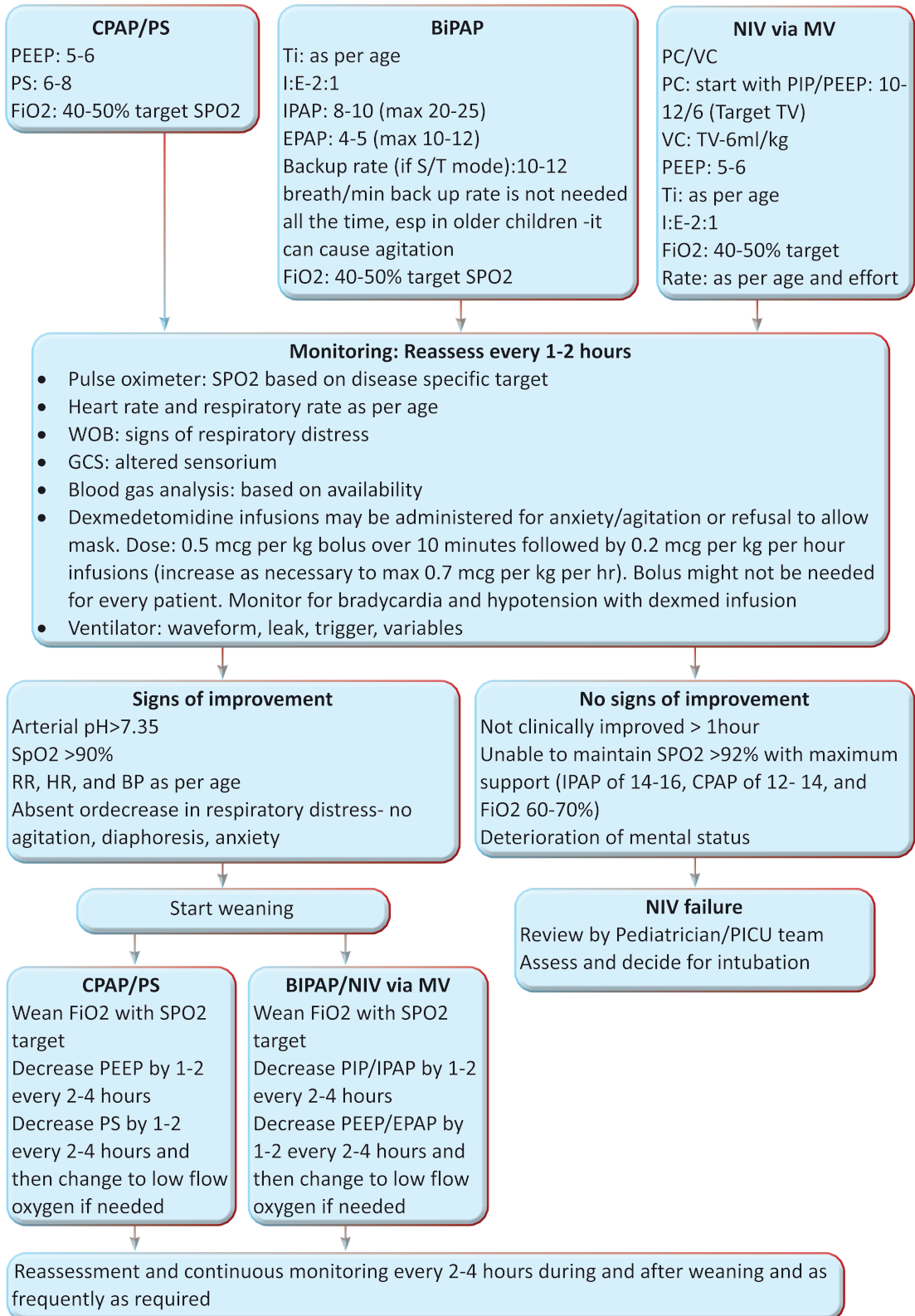
*Titrate as per SPO₂; IPAP: Inspiratory positive airway pressure; EPAP: Expiratory positive airway pressure; Ti: Inspiratory time; FiO₂: Fractional inspired oxygen; PS: pressure support; CO₂: carbondioxide; S/T: Spontaneous/Time

Criteria for terminating NIV and switching to invasive mechanical ventilation

Worsening pH and arterial partial pressure of carbon dioxide
Worsening tachypnea
Hemodynamic instability
Persistent or worsening hypoxia or hypoxemia
Decreased level of consciousness
Inability to clear secretions
Inability to tolerate interface in spite of dexmedetomidine infusion

Flow chart for initiating NIV





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