

CRITICAL CARE ORDER SET

Noninvasive Ventilation

Initiation, monitoring, and weaning of NIPPV (BiPAP / CPAP) in adult acute respiratory failure. Select the right patient, set pressures to the etiology, and watch the first 1–2 hours like a hawk — a failing trial means intubation, not more time. Never let NIV delay a needed airway. Adapt every setting to your protocol and the patient.

01 Eligibility & Indications

ALL REQUIRED Spontaneous respirations & cooperative enough to tolerate the mask · able to **protect airway & manage secretions** · hemodynamically stable or only mildly unstable (e.g., low-dose pressors) · likely **reversible cause** expected to benefit within hours.

COMMON ICU INDICATIONS

- ☐ **COPD exacerbation, acute hypercapnic RF** — $\text{pH} \leq 7.35$ & $\text{PaCO}_2 \geq 45$, $\uparrow$ WOB / accessory muscle use, or persistent hypoxemia despite O_2
- ☐ **Cardiogenic pulmonary edema** — no frank shock or active ACS
- ☐ **Acute hypoxemic RF** — immunocompromised (SOT / BMT), postoperative deterioration, chest trauma without need for immediate airway control
- ☐ **Postextubation support** — prophylactic in high-risk patients after planned extubation
- ☐ **Weaning** from invasive MV in acute hypercapnic RF
- ☐ **DNI / palliative** — time-limited trial or symptom relief

02 Exclusions / contraindications

FAVOR INTUBATION Do **not** start NIV — favor early intubation — if any are present. If a contraindication **emerges during use** (declining mental status, shock), stop NIV and reassess for intubation.

Airway / neurologic

- ☐ Cardiac / respiratory arrest; no effective spontaneous breathing
- ☐ Severe encephalopathy (**GCS < 10**) / markedly depressed LOC
- ☐ Uncontrolled agitation despite minimal sedation; uncooperative
- ☐ Suspected / known upper airway obstruction

Aspiration / secretions

- ☐ Impaired airway protection / high aspiration risk
- ☐ Inability to clear secretions
- ☐ Recurrent vomiting, severe upper GI bleeding

Interface / facial

- ☐ Unable to achieve mask seal; severe facial deformity
- ☐ Major facial trauma, burns, postoperative facial wounds

High risk from positive pressure

- ☐ Profound hemodynamic instability or shock
- ☐ Uncontrolled life-threatening arrhythmias
- ☐ Recent upper airway / upper GI surgery where leak / barotrauma is dangerous

03 Pre-initiation steps

AIRWAY / CODE STATUS & BASELINE

- ☐ Confirm **full code vs DNI** and goals of care
- ☐ Vitals, mental status, accessory muscle use; **ABG (or VBG)**, CXR as indicated; BMP, lactate if shock concern

MONITORING SETUP & EQUIPMENT

- ☐ Continuous ECG, SpO₂, NIBP (**q2–5 min** initially); ensure repeat ABG at 1–2 h is feasible
- ☐ Select **orofacial / full-face mask** (usual first choice); suction available; **backup intubation equipment ready**

04 Initial mode & settings by etiology

A · COPD / hypercapnic RF — **BiPAP (S/T)**

IPAP
10–12

EPAP
4–5

FiO₂
0.3–0.4

BACKUP RR
10–16

- ☐ Titrate to comfort & VT ~6–8 mL/kg IBW; SpO₂ **88–92%** (avoid O₂-induced hypercapnia)
- ☐ ↑ IPAP by 2–3 cm H₂O q10–15 min to lower RR & improve pH/PaCO₂; usual target IPAP 16–20, EPAP often 5–8

B · Cardiogenic pulmonary edema — CPAP or BiPAP

- ☐ CPAP 8–10 cm H₂O to reduce preload/afterload & improve oxygenation
- ☐ If hypercapnia / marked WOB — BiPAP IPAP 10–14, EPAP 5–8
- ☐ FiO₂ start 1.0, titrate down to SpO₂ ≥ 92–94%

C · Hypoxemic RF — immunocompromised / postop / trauma

- ☐ CPAP or BiPAP — EPAP/CPAP 8–12; if BiPAP for WOB, IPAP start 12–16
- ☐ FiO₂ start high 0.6–1.0, titrate to SpO₂ ≥ 92–94%

05 Analgesia / sedation

GOAL Calm, cooperative, airway-protecting (RASS –1 to 0). Non-pharmacologic first — coaching, mask fitting, frequent reassurance.

- ☐ Low-dose opioid for pain/anxiety (e.g., small **fentanyl** boluses) with close monitoring
- ☐ Carefully titrated **dexmedetomidine** often preferred if available; avoid deep sedation

AVOID Agents that suppress respiratory drive or airway reflexes — **high-dose benzodiazepines, propofol boluses.**

06 Monitoring & reassessment — first 1–2 h are critical

MINIMUM MONITORING

- ☐ Continuous SpO₂, ECG, RR; **NIBP q5–15 min** until stable; **nurse / RT at bedside** during initiation & after pressure changes

CLINICAL REASSESSMENT — AT 15–30 MIN, THEN ≥ HOURLY

- ☐ WOB, RR, accessory muscle use; mental status; patient–ventilator synchrony, mask tolerance, leaks
- ☐ **ABG** baseline, then at **1–2 h** after initiation, then by trajectory

DESIRED EARLY RESPONSE (1–2 H, ESP. COPD)

↓ RR & WOB · improved pH (even modestly) & ↓/stable PaCO₂ · improved/stable oxygenation on same or ↓ FiO₂ · stable hemodynamics, no decline in mental status

07 NIV failure / intubation criteria

DO NOT PERSIST Convert to invasive MV if any develop despite optimization (typically within the first **1–2 h**).

Worsening gas exchange

- ☐ pH falls further or remains severely acidemic (< **7.25** & not improving)
- ☐ Rising PaCO₂ or refractory hypoxemia despite high FiO₂ / EPAP

Clinical deterioration

- ☐ ↑ WOB, exhaustion, RR climbing; deteriorating mental status / unable to cooperate
- ☐ New / escalating shock, serious arrhythmias

Airway / interface

- ☐ Inability to clear secretions or recurrent aspiration; intolerable mask despite different masks / straps / minimal sedation

AECOPD Persistent respiratory acidosis, worsening mental status, life-threatening hypoxemia, or severe hemodynamic instability are **clear triggers for intubation**.

08 Ongoing management & complications

MONITOR FOR

Barotrauma

Sudden chest pain, subcutaneous emphysema, hypoxia → CXR, consider pneumothorax

Gastric distension / aspiration

Consider NG tube in select patients (if compatible with interface)

Skin breakdown

Regular checks at contact points; rotate interfaces; protective dressings

Hemodynamic compromise

From ↑ intrathoracic pressure — watch BP, JVP, UOP; ↓ EPAP/CPAP if needed

ADJUNCTIVE THERAPY — PER UNDERLYING CAUSE

- ☐ **COPD** — bronchodilators, systemic steroids, antibiotics as indicated, careful fluid balance
- ☐ **Cardiogenic edema** — nitrates, diuretics, afterload reduction, ACS workup
- ☐ **Immunocompromised / postop** — early infection workup, lung-protective strategy if transitioning to invasive MV

ROUTINE PROPHYLAXIS

- ☐ DVT prophylaxis; GI prophylaxis if indicated

09

Weaning & discontinuation

CRITERIA TO BEGIN WEANING

- ☐ Improved / resolved underlying cause; stable, cooperative mental status; **RR ≤ 24–28**, minimal accessory muscle use
- ☐ Adequate gas exchange on modest settings — COPD: acceptable pH/PaCO₂ on low IPAP/EPAP, SpO₂ 88–92%; others: SpO₂ ≥ 92–94% on **FiO₂ ≤ 0.4–0.5**, EPAP 5–8

WEANING STRATEGY

- ☐ **Stepwise** — lower IPAP by 2–3 cm H₂O every few hours, then EPAP/CPAP in 1–2 cm H₂O steps, watching for desaturation / ↑ WOB
- ☐ **Intermittent off-trials** on low-flow O₂ or HFNC, increasing duration as tolerated
- ☐ **Post-NIV monitoring 12–24 h** for recurrent respiratory failure; high-risk postextubation patients — scheduled prophylactic NIV (e.g., nighttime / high-WOB sessions) before full discontinuation

Not a substitute for clinical judgement. NIV must never delay needed intubation — reassess constantly in the first 1–2 hours. Verify settings, allergies, and contraindications. Adapt all modes, pressures, and targets to your institutional protocol and the individual patient.

Spreading knowledge

Improving outcomes