

BiPAP use for acute hypercapnic respiratory failure

Indications for BiPAP

COPD:

pH <7.35, pCO₂ >6.5kPa, RR>23
If persisting after broncho-dilators and controlled oxygen therapy

Neuromuscular disease:

Respiratory illness with RR>20
if usual VC <1L even if pCO₂ <6.5
Or
pH <7.35 and pCO₂ >6.5kPa

Obesity:

pH <7.35, pCO₂ >6.5kPa, RR>23
Or
Daytime pCO₂ >6.0 and drowsy/
reduced GCS

BiPAP not indicated

Asthma/Pneumonia

Refer to ICU for consideration
IMV if increasing
respiratory rate/distress
Or
pH <7.35 and pCO₂ >6.5kPa

Contraindications for BiPAP

Absolute:

Severe facial deformity
Facial burns
Fixed upper airway obstruction

Relative:

pH <7.15
(pH<7.25 and additional adverse feature)
GCS <8
Confusion/agitation
Cognitive impairment
(warrants enhanced observation)

Indications for referral to ICU:

AHRF with impending respiratory arrest

BiPAP failing to augment chest wall movement or
reduce pCO₂

Inability to maintain sats > 85-88% on BiPAP

Timed breaths (patient not spontaneously breathing)

Need for IV sedation or adverse features indicating
need for closer monitoring and/or possible difficult
intubation as in OHS, NMD.

Prescribe BiPAP

BiPAP must be prescribed by the treating
clinician using BSUH 'NIV pathway'

Contact CCOT when initiating BiPAP.
NIV pathway available on Critical Care
Outreach infonet

BiPAP setup

Mask

Full face mask (or own if home user of NIV)
Size mask appropriately

Initial Pressure Settings (S/T mode)

EPAP: 4 (or higher if OSA known/expected)

IPAP in COPD/OHS/KS :15 (or 20 if pH <7.25)

Up titrate IPAP over 10-30 mins to IPAP 20-30 to
achieve adequate augmentation of chest/abdo
movement and reduce RR
IPAP should not exceed 30 or EPAP 8 * without
expert review

IPAP in NMD :10 (or 5 above usual setting)

Backup Rate

Backup rate of 10
(set appropriate inspiratory time)
If RR inadequate consider increasing
Backup rate until
spontaneous rate improves

relating
to timed
breaths
only

I:E ratio

COPD 1:2 or 1:3
OHS, NMD & CWD 1:1

Inspiratory Time

COPD 0.8-1.2s
OHS, NMD & CWD 1.2-1.5s

Use BiPAP for as much time as possible
in initial 24 hours.

Wean BiPAP depending on tolerance and ABGs
in next 48-72 hours.

Seek and treat reversible causes of AHRF

*Possible need for EPAP >8

Severe OHS (BMI >35), lung recruitment e.g.
hypoxia in severe KS, oppose intrinsic PEEP in
severe airflow obstruction or to maintain adequate
PS when high EPAP required.

BiPAP monitoring

Oxygenation

Aim 88-92% in all patients
If high oxygen need or rapid desaturation
on disconnection from BiPAP consider IMV
Note: home style ventilators CANNOT
provide >50% inspired oxygen

ECG

Continuous ECG monitoring for HR >120,
dysrhythmia, or known cardiomyopathy

BiPAP settings

Documented as per BSUH NIV pathway.
Consider aim for tidal volume (TV)
to avoid under/over ventilation.
Aim for a leak of 25-40.
Adjust mask as required.

Red Flags

pH<7.25 on optimal BiPAP settings
RR persisting >25
New onset confusion or patient distress
Requiring EPAP > 6
Timed breaths (patient not spontaneously
breathing)

Actions

Check synchronisation, mask fit, exhalation
port : give physiotherapy, bronchodilators,
consider anxiolytic
CONSIDER IMV

Abbreviations:

AHRF: acute hypercapnic
respiratory failure
BiPAP: BiLevel positive
airway pressure
COPD: chronic obstructive
pulmonary disease
CWD: chest wall deformity
EPAP: expiratory positive
airway pressure
KS: Kyphoscoliosis
IMV: invasive mechanical
ventilation

IPAP: inspiratory positive
airway pressure
OHS: obesity
hypoventilation syndrome
NIV: non-invasive (positive-
pressure) ventilation
NMD: neuromuscular
disease
PEEP: positive end
expiratory pressure
PS: pressure support
VC: vital capacity



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