Supplement: Evidence to Decision and Voting Results Supplement

ERS Guidelines: High flow nasal cannula in acute respiratory failure

Authors

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Question 1: Should HFNC or COT be used for acute hypoxic respiratory failure?

Recommendation:
We suggest the use of HFNC over COT in patients with purely hypoxic respiratory failure. (conditional recommendation, moderate certainty).

Desirable effects	Trivial	Small	Moderate	Large	Varies	Unsure
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Unsure
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Unsure
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Unsure
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Unsure
Acceptability	No	Probably no	Probably yes	Yes	Varies	Unsure
Feasibility	No	Probably no	Probably yes	Yes	Varies	Unsure

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention	Conditional recommendation for either the intervention or the comparison **1 votes (5%)**	Conditional recommendation for intervention over comparison **16 votes (84%)**	Strong recommendation for intervention over comparison **2 votes (11%)**	No recommendation

Panel comments

If there is sufficient monitoring and continuous availability of personel for endotracheal intubation and start mechanical ventilation. The major danger is prolonged HFNO in a patient who's bound to be intubated.
Moderate certainty of evidence for critical outcomes (mortality, intubation, escalation to NIV).In addition the balance between desirable and undesirable effects is probably favors to intervention

Question 2: Should HFNC or NIV be used for acute hypoxic respiratory failure?

Recommendation:
We suggest the use of HFNC over NIV in purely hypoxic respiratory failure. (conditional recommendation, low certainty)

Desirable effects	Trivial	Small	Moderate	Large	Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes	Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes	Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention	Conditional recommendation for either the intervention or the comparison **4 votes (21%)**	Conditional recommendation for intervention over comparison **13 votes (68%)**	Strong recommendation for intervention over comparison **2 votes (11%)**	No recommendation

Panel comments

Depends on local expertise and patient tolerability. Limiting to just one approach may be inferior to having both available and trialing which one works best for the individual patient. If a unit needs to start using either; preference for starting to use HFNO.
HFNC appears more comfortable, easier to set up

Question 3: Should HFNC or COT be used during breaks from NIV in patients with acute hypoxic respiratory failure?

Recommendation:
We suggest the use of HFNC over COT during breaks from NIV in patients with acute hypoxic respiratory failure (conditional recommendation, low certainty)

Desirable effects	Trivial	Small	Moderate	Large	Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes	Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes	Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention	Conditional recommendation for either the intervention or the comparison	Conditional recommendation for intervention over comparison	Strong recommendation for intervention over comparison	No recommendation
	1 vote (5%)	**14 votes (74%)**	**4 votes (21%)**		

Panel comments

It seems reasonable to use HFNC vs COT during breaks of NIV in patients with high inspiratory demand or whose hypoxemia is highly dependent on alveolar collapse, but makes sense given results of Q1
It based on only one study with no strong results.

Question 4: Should HFNC or COT be used in postoperative patients?

Recommendation:
We suggest that either HFNC or COT are appropriate to use in postoperative patients at low risk of respiratory complications. (conditional recommendation, low certainty)

Desirable effects	Trivial	Small	Moderate	Large	Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes	Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes	Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention **1 vote (5%)**	Conditional recommendation for either the intervention or the comparison **14 votes (74%)**	Conditional recommendation for intervention over comparison **4 votes (21%)**	Strong recommendation for intervention over comparison	No recommendation

Panel comments

COT should be used however, if clinical judgement deems that HFT should be used for example to help with secretions then it should be considered in specific patients
Because many of the studies included heterogeneous patients, finally it is unclear whether HFNC is more effective than COT in some groups of patients (obese, high risk and/or patients undergoing cardiac or thoracic surgery)
Reducing escalation is the main argument, even with a low certainty

Question 5: Should HFNC or NIV be used in postoperative patients at high risk of respiratory complications?

Recommendation:
We suggest the use of either HFNC or NIV in postoperative patients at high risk of respiratory complications. (conditional recommendation, low certainty).

Desirable effects	Trivial	Small	Moderate	Large	Varies	Unsure
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Unsure
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Unsure
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Unsure
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Unsure
Acceptability	No	Probably no	Probably yes	Yes	Varies	Unsure
Feasibility	No	Probably no	Probably yes	Yes	Varies	Unsure

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention	Conditional recommendation for either the intervention or the comparison **17 votes (94%)**	Conditional recommendation for intervention over comparison **1 vote (6%)**	Strong recommendation for intervention over comparison	No recommendation

Panel comments

The usage should be clinical led. if a patient has skin breakdown due to NIV, HFT should be considered
NIV may be more effective than HFNC in surgical patients at high risk of respiratory failure. A small number of trials have compared HFNC and NIV in post-operative patients.
HFNC for comfort and possibly cost. simplier to use than NIV

Question 6: Should HFNC or COT be used in nonsurgical patients at low risk of extubation failure?

Recommendation:
We suggest the use of HFNC over COT in non-surgical patients after extubation at low or moderate risk of extubation failure (conditional recommendation, moderate certainty).

Desirable effects	Trivial	Small	Moderate	Large		Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial		Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High		No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability		No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention	Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings	Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High		No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention	Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased	Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes		Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes		Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention	Conditional recommendation for comparison over intervention	Conditional recommendation for either the intervention or the comparison **3 votes (16%)**	Conditional recommendation for intervention over comparison **13 votes (68%)**	Strong recommendation for intervention over comparison **3 votes (16%)**	No recommendation

Panel comments

Other studies reported potential benefits of NIV in these patients at high risk of reintubation.
The certainty of evidence for some outcomes is low or moderate, limited mainly by the imprecision and risk of bias of the included studies.
In high risk patients

Question 7: Should HFNC or NIV be used in nonsurgical patients at high risk of extubation failure?

Recommendation:
We suggest the use of NIV over HFNC after extubation for patients at high risk of extubation failure unless there are relative or absolute contraindications to NIV (conditional recommendation, moderate certainty).

Desirable effects	Trivial	Small	Moderate	Large	Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes	Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes	Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention **3 votes (18%)**	Conditional recommendation for comparison over intervention **13 votes (76%)**	Conditional recommendation for either the intervention or the comparison	Conditional recommendation for intervention over comparison	Strong recommendation for intervention over comparison **1 vote (6%)**	No recommendation

Panel comments

Question 8: Should HFNC or NIV be used in patients with hypercapnic respiratory failure due to COPD?

Recommendation:
We suggest a trial of NIV prior to use of HFNC in patients with COPD and acute hypercapnic respiratory failure (conditional recommendation, low certainty).

Desirable effects	Trivial	Small	Moderate	Large	Varies	Don't know
Undesirable effects	Large	Moderate	Small	Trivial	Varies	Don't know
Certainty of evidence of effects	Very low	Low	Moderate	High	No included studies	
Variability in values	Important uncertainty or variability		Possibly important uncertainty or variability	Probably no important uncertainty or variability	No important uncertainty or variability	
Balance of effects	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	Don't know
Resources required	Large costs	Moderate costs	Negligible costs or savings	Moderate savings / Large savings	Varies	Don't know
Certainty of evidence of required resources	Very low	Low	Moderate	High	No included studies	
Cost effectiveness	Favours the comparison	Probably favours the comparison	Does not favour intervention or comparison	Probably favours the intervention / Favours the intervention	Varies	No included studies
Equity	Reduced	Probably reduced	Probably no impact	Probably increased / Increased	Varies	Don't know
Acceptability	No	Probably no	Probably yes	Yes	Varies	Don't know
Feasibility	No	Probably no	Probably yes	Yes	Varies	Don't know

Recommendation and voting results

Strong recommendation for comparison over intervention **3 votes (19%)**	Conditional recommendation for comparison over intervention **13 votes (81%)**	Conditional recommendation for either the intervention or the comparison	Conditional recommendation for intervention over comparison	Strong recommendation for intervention over comparison	No recommendation

Panel comments

Studies comparing HFNC and NIV included small samples of patients and reported no actual benefits of HFNC
Definition of which type of Acute Hypercapnic respiratory failure is mandatory , A COPD patients has nothing to do with an hpercapnic Lenovo hypoxemic patiemts or a hypercapnic neuromuscolar patients
The certainty of evidence regarding the effects of HFNC vs. NIV in hypercapnic failure are very limited, but may be useful in less sick patients or those who cannot tolerate NIV
It might be worth modulating the strength of recommendation based on the severity of hypercapnic ARF (eg. severe hypercapnia in COPD, the recommendation should be stronger for NIV)