

Heart Failure

Table 3.65

Therapies in Heart Failure

GTN

- The use of nitrates in pulmonary oedema is associated with improved survival to hospital discharge.
- Buccal nitrates produce an immediate reduction in preload, comparable with IV GTN.
- Nitrates have some benefit as the first-line treatment in acute pulmonary oedema.

Furosemide

- There is little high-level evidence for or against the use of furosemide ([refer to furosemide protocol for dosage and information](#)) in the treatment of acute pulmonary oedema, but it has been standard treatment for many years.
- There is some evidence that furosemide can have a transient adverse vasoconstrictor effect; it is unclear whether this is beneficial or harmful.
- The acute vasodilator effect of furosemide is inhibited by aspirin.
- Prehospital trials comparing repeated furosemide vs. repeated nitrates favour the use of nitrates.

Furosemide should only be given after nitrates (which act on both preload and after-load).

Salbutamol

- The effectiveness of salbutamol in the treatment of pulmonary oedema presenting in the acute setting is unclear.
- Studies addressing the use of bronchodilators in chronic heart failure suggest worse outcomes following their use, however a number of prehospital trials of combination drug therapies (including salbutamol) indicate improved outcomes.

Owing to the diagnostic uncertainty and possibility for misdiagnosis, salbutamol may still be considered in the management of heart failure where wheeze is present; this may avoid depriving COPD/asthma patients of vital bronchodilators.

Morphine

- Morphine and diamorphine are commonly used in the in-hospital emergency management of pulmonary oedema.

The drugs act by reducing preload (venodilation) and also serve to decrease anxiety.

- Despite their widespread use, there is no conclusive trial evidence showing symptomatic improvement or mortality benefit.

Analysis of large heart failure registries suggest that the use of opiates in heart failure increases mortality; therefore they should not routinely be used unless they are being used to manage ACS and the patient is complaining of chest pain.

CPAP

- Non-invasive positive pressure ventilation (NiPPV) comprises two main treatment modalities – continuous positive airway pressure (CPAP) and bilevel positive airways pressure (BiPAP). The fundamental difference between these two modalities is the level of pressure maintained throughout the patient's respiratory cycle. In CPAP therapy pressure remains constant through the inspiratory and expiratory phases; in BiPAP therapy pressure is reduced during the expiratory phase and increases during the inspiratory phase.
- The objective of non-invasive positive pressure ventilation (NiPPV) is two-fold. First is to 'splint' open collapsing alveoli and increase intra-alveolar pressure. The increase in pressure helps shift fluid present in the alveoli back into the pulmonary capillaries thereby reducing pulmonary oedema. Second is to raise intrathoracic pressure throughout the respiratory cycle. This increase in intrathoracic pressure increases pressure in the vena cavae, and consequently serves to reduce filling pressures. Combined, these two actions serve to reduce congestion.
- Prospective randomised controlled trials have demonstrated that CPAP improves survival to hospital discharge, decreased intubation rates and fewer complications.
- Prehospital studies exist suggesting CPAP is feasible in this setting, and may reduce severity of acute LVF, increase SpO₂ levels and improve survival to hospital discharge.

Expert opinion has recommended CPAP for use in the prehospital environment.

Methodology

For details of the methodology used in the development of this guideline refer to guideline webpage.

KEY POINTS

Heart Failure

- Pulmonary oedema can be difficult to differentiate from other causes of breathlessness, such as exacerbation of COPD, pulmonary embolism or pneumonia; therefore, a thorough history and physical examination are needed.
- Symptoms include dyspnoea, worsening cough, pink frothy sputum, waking at night gasping for breath, breathlessness on lying down (sleeping on more pillows recently?), and anxiousness/restlessness.
- Sit the patient upright where possible.
- Early nitrate administration is the cornerstone of early treatment.
- Furosemide administration MUST be secondary to nitrate administration and should only be considered in cases with adequate perfusion and evidence of oedema.
- Morphine should be avoided unless there are signs of ACS.
- CPAP should be utilised where equipment and suitably trained personnel are available.