PHC Chapter 21: Emergencies and Injuries
AH Chapter 20: Emergencies and Injuries

National Department of Health

Affordable Medicines Directorate
Essential Drugs Programme

Primary Healthcare Level Standard Treatment Guidelines – 2020-4 Review cycle
Adult Hospital Level Standard Treatment Guidelines – 2020-4 Review cycle

Evidence

Please access the National Essential Medicines List Committee (NEMLC) report for detailed evidence (including rationale, references and costings) informing decision-making on medicine addition, amendments and deletions:

NHI Website: https://www.health.gov.za/nhi-edp-stgs-eml
Knowledge Hub: www.knowledgehub.health.gov.za/e-library

Disclaimer

This presentation is an implementation tool and should be used alongside the most recently published STGs available on the Knowledge Hub. This information does not supersede or replace the STGs.

SCAN ME

PHC Chapter 21: Emergencies and Injuries

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AHL Chapter 20: Emergencies and Injuries

Presentation Outline

1. Termination of Resuscitation
2. Management of Choking
3. Olanzapine for Delirium
4. Thiamine Dosing
5. Ketamine Analgosedation in Trauma
6. Harm with Morphine use in Pulmonary Oedema

Termination of Resuscitation (TOR)

Background

The BLS TOR rule recommends terminating resuscitation if all the following three criteria are met:

- **the cardiac arrest was not witnessed by EMS personnel,**
- **no return of spontaneous circulation (ROSC) before transport,**
- **and no shock delivered before transport.**

The 2020 AHA guidelines note that in a recent meta-analysis of seven published studies (n=33,795 patients), only 0.13% (95% CI 0.03 to 0.58%) of patients who fulfilled the Basic Life Support (BLS) termination criteria survived to hospital discharge.

A more objective statement was considered for inclusion in the PHC STG. However, there is a paucity of evidence that informs this decision, and most recommendations are based on consensus.

The 2020 AHA guidelines also note in a meta-analysis of two published studies (n=10,178), only 0.01% (95% CI, 0.00-0.07%) of patients who fulfilled the Advanced Life Support (ALS) termination criteria survived to hospital discharge.

The ALS TOR rule recommends terminating resuscitation if all the following four criteria are fulfilled:

- **the cardiac arrest was not witnessed,**
- **there was no bystander CPR,**
- **there was an absence of ROSC before transport,**
- **and an absence of defibrillation before transport**

Both the BLS and ALS TOR (termination of resuscitation) rules have been shown to have good predictive value.

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National Department of Health: National Department of Health: Essential Drugs Programme. Primary Healthcare level STGs and EML. NEMLC Report - Chapter 21: Emergencies & Injuries. PHC-Chp-21_Emerg-and-Injruies-and-supporting-NEMLC-report-and-reviews_2020-4_Version-1.0_1-July-2024.pdf (health.gov.za)

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Termination of Resuscitation (TOR)

Amendments to STG: PHC Chapter 21 & AH Chapter 20

Termination of resuscitation:

» The decision to stop CPR attempts depends on the specifics of the individual patient and should be based on clinical judgement.

» Consider stopping resuscitation attempts and pronouncing death if there is incurable underlying disease, or if asystole > 20 minutes or in the absence of the factors for prolonging resuscitation as listed below.

Consider carrying on for longer especially with:

- hypothermia and drowning
- poisoning or medicine overdose
- neurotoxic envenomation (e.g.black and green mamba or Cape cobra snakebite) – see Section 21.3.1.4: Snakebites

This decision should take into consideration the potential risk that CPR poses to the rescuer e.g. infectious diseases.

Management of Choking

The algorithm for the management of choking in children has been updated to the latest algorithm (2021) from the Resus Council of South Africa17. Amendments are as follows:

<u>Adults & children -</u>
Amended from '5 back blows & up to 5 abdominal thrusts if necessary' to *<u>'up to 5 abdominal thrusts and if ineffective up to 5 back slaps.'</u>*

<u>Infants –</u>
Amended from 'Up to 5 back blows and up to 5 abdominal thrusts' *<u>to 'Up to 5 back slaps. And up to 5 chest thrusts if necessary.'</u>*

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Resus Council of S.Africa. Choking algorithm 2021
https://resus.co.za/Documents/Algorithms/RESUS%20CHOKING%20ALGORITHM.pdf

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Management of Choking

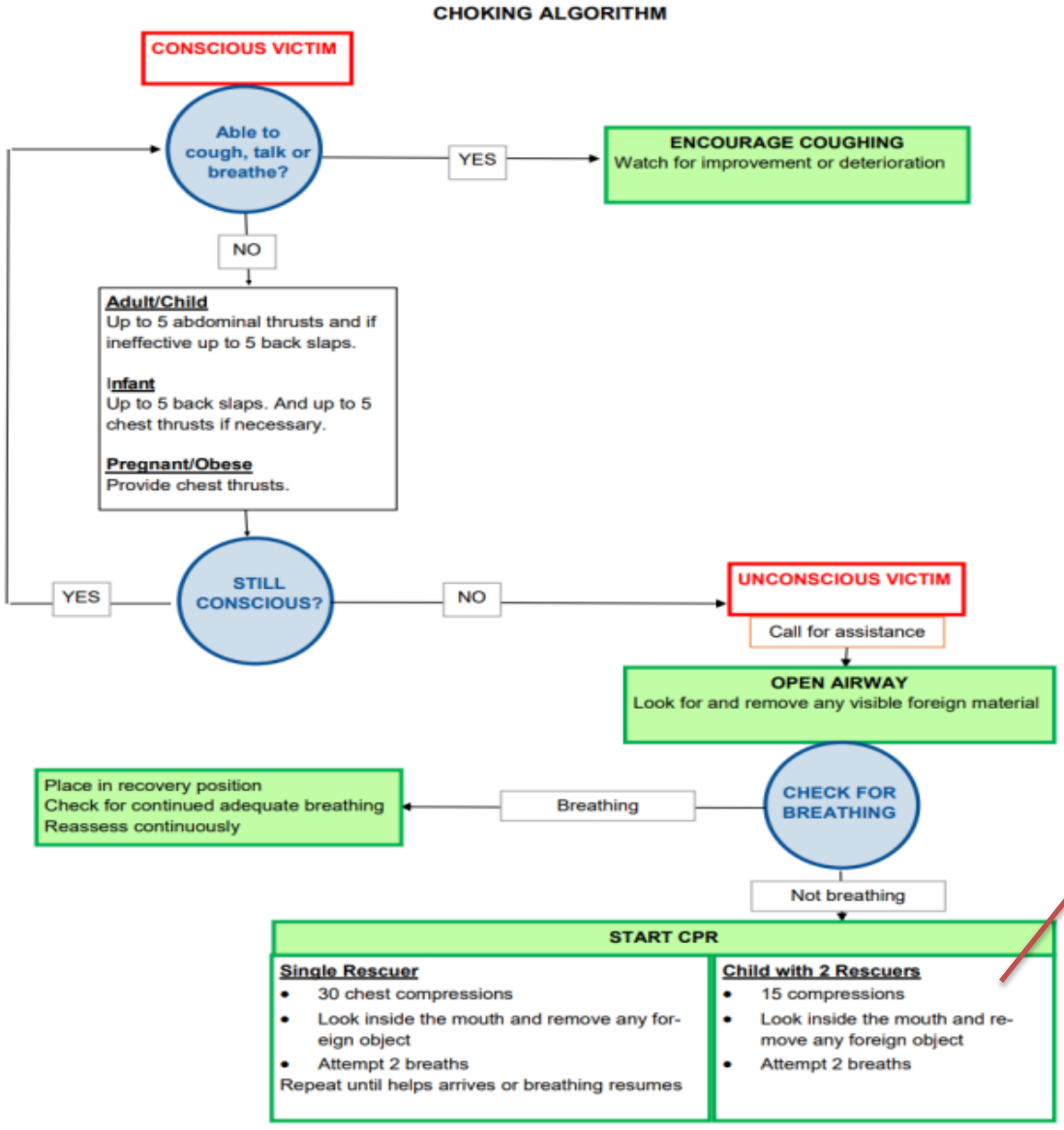
Amendments to STG: PHC Chapter 21

If the child is **able to talk and breathe**	Encourage the child to cough repeatedly while arranging transfer to hospital urgently with supervision.
If the child is **conscious but with no effective cough or breathing**	Give up to 5 abdominal thrusts and if ineffective up to 5 back slaps, followed by re-assessment of breathing. Repeat as a cycle until recovery or child becomes unconscious. See technique below and figure 21.4 for differences between infants and children.
If the child is **unconscious with no effective breathing**	Call for assistance. Open airway and check for any visible foreign body and remove. Start CPR: compressions and breaths (30:2) (check airway for foreign body each time before giving breaths).

(Infant: < 1 year of age; Child: > 1 year of age until puberty).

Table 21.3: Managing suspected choking/foreign body aspiration in children

Management of Choking



Adapted with permission from the Resuscitation Council of Southern Africa.
http://resus.co.za/

Take Note

- The change in **BVM rate** for patients who are intubated was added to the STGs.
- This was **incorrect** on the Resuscitation council website and has since been corrected.

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Olanzapine for Delirium

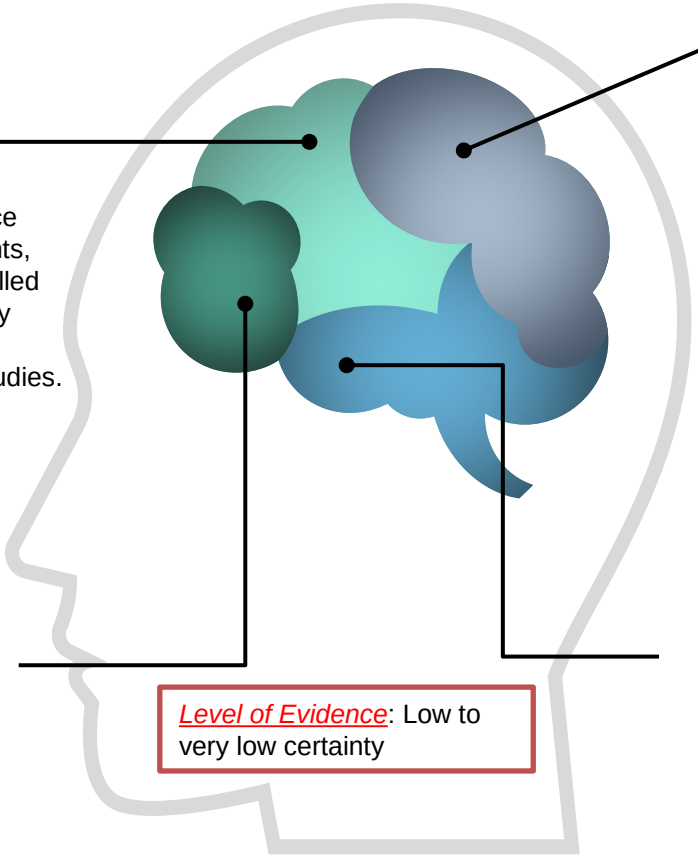
Medicine Review: Olanzapine for Delirium

Methodology

We conducted a review of Clinical practice guidelines, health technology assessments, systematic reviews of randomised controlled trials (RCTs), RCTs and where necessary systematic reviews of non-randomised/ observational studies or observational studies. Ongoing trials were also sought.

Studies Identified

Two systematic reviews, three RCTS and three clinical guidelines were identified, including comparisons of interest. All three clinical guidelines were of relatively high quality assessed against AGREE II. Only one makes a weak recommendation for olanzapine for the treatment of delirium.



Level of Evidence: Low to very low certainty

Results vs Placebo

Comparison of olanzapine to placebo, was reported in one clinical trial, which rated poor in terms of quality, as part of a systematic review. The impact of olanzapine on duration of delirium (days) was uncertain (MD=-2.4, 95% CI 3.51,-1.29, n = 103, 1 trial. Change in delirium severity, appeared to favour olanzapine (reduction in the delirium rating scale (DRS) MD = -11.1, 95% CI 15.51 to -7.69, n=103, 1 trial

Results vs Haloperidol

For comparison of olanzapine versus haloperidol, change in delirium severity results were reported in most studies however these were at different time points and using different measures. Overall, there was no difference in delirium severity between olanzapine and haloperidol (generally very low to low certainty of evidence). Duration of delirium (days) did not differ significantly between haloperidol and olanzapine, in 1 trial, included in a systematic review (mean Difference (MD) 0.62 days, 95% CI 0.06 to 1.18).

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National Department of Health: Affordable Medicines, EDP-Primary Healthcare/Adult Hospital level. Medicine Review: Olanzapine for Delirium, August 2022. http://www.health.gov.za/. PHC-Chp-21_Emerg-and-Injruies-and-supporting-NEMLC-report-and-reviews_2020-4_Version-1.0_1-July-2024.pdf (health.gov.za)

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Olanzapine for Delirium

NEMLC Recommendation

NEMLC recommended the use of olanzapine oro-dispersible tablet or IM injection for delirium with agitated and acutely disturbed behaviour. Once the patient is able to swallow, to continue with oral haloperidol or olanzapine, until behaviour is contained.

Rationale: Available low-quality evidence shows that olanzapine is comparable to haloperidol.

Olanzapine for Delirium

Oro-dispersible olanzapine dissolves on the tongue and is absorbed via the oral mucosa and therefore may be administered in those who cannot/will not swallow which may be beneficial in agitated patients.

Amendments to STG: PHC Chapter 21

If the most likely cause of delirium is a medical disorder and if very restless or agitated:

- Haloperidol, oral, 0.75–1.5 mg, repeated in 30–60 minutes, if required

OR

If unable to swallow or oral medication declined:

- Haloperidol, IM, 0.5–1mg.

OR

If haloperidol, IM is not available:

- Olanzapine, oral dispersible tablet or IM, 2.5–5 mg.
  - Use lowest dose with caution in the elderly
  - May be repeated in 30–60 minutes, if required
  - Monitor vital signs and beware of oversedation, neuroleptic malignant syndrome, and acute dystonia.

Olanzapine for Delirium

Amendments to STG: AH Chapter 20

Acute management

For management of severe aggression and disruptive behaviour: see section 15.1: Aggressive disruptive behaviour in adults.

For agitated and acutely disturbed patient:

- Haloperidol, oral, 0.75–1.5 mg twice daily
  - May be repeated 4 hourly if needed to a maximum dose of 10mg in 24 hours.
  - May be continued short-term (usually 7 days or less) at lowest dose at which behaviour is contained.

OR

If unable to swallow or oral medication declined:

- Haloperidol, IM, 0.5–1mg
  - May be repeated after 30–60 minutes if needed and then 4 hourly, to a maximum dose of 10mg in 24 hours.
  - Monitor vital signs and beware of acute dystonia, other extra-pyramidal side effects, and neuroleptic malignant syndrome.

OR

If haloperidol, IM is not available:

- Olanzapine, oral dispersible tablet or IM, 2.5–5 mg.
  - This can be repeated in 30–60 minutes, if required and then 6 hourly, to a maximum dose of 20 mg within 24 hours.
  - Monitor vital signs and beware of over-sedation, neuroleptic malignant syndrome, and acute dystonia.

OR

For substance withdrawal, Parkinson's disease, or intolerability to haloperidol or olanzapine:

- Benzodiazepine, repeat as necessary, to achieve containment, e.g.:
- Lorazepam, IM, 0.25–1 mg, 2 to 4 hourly, maximum dose 3 mg in 24 hours

OR

- Clonazepam, IM, 0.5–2 mg.

OR

- Diazepam, IV, 5–10 mg.
  - Switch to oral route once containment is achieved.
  - In the elderly, a starting dose of 2 mg is recommended

Thiamine Dosing

Thiamine Dose

- A Cochrane review[1] included one RCT (n=169)[2] in which participants with a history of chronic alcohol use were assigned to one of five doses of IM thiamine (5, 20, 50, 100 and 200 mg once daily), with outcomes measured after 2 days of treatment.
- On day 3 of treatment, participants were assessed by a psychologist on the delayed alternation test.
- This RCT demonstrated a significant difference favouring a dose of 200mg a day compared to 5mg/day in the number of trials taken to reach criteria on a delayed alternation test (MD -17.90, 95% CI -35.4 to -0.40, P = 0.04).
- Guideline recommendations on the dose of thiamine for the management of patients with suspected or diagnosed Wernicke's encephalopathy varies, with case series reports suggesting that doses of 500mg or more IV, were safe and efficacious.
- While the Cochrane reviewers concluded that no good evidence could be derived from available RCTs to help physicians choose the right dose, frequency, route or duration of thiamine treatment for preventing or treating WKS due to alcohol abuse, most guidelines recommend higher doses of thiamine i.e. 100mg and more.

Route of Administration

It was noted that the SAMF[3], 2016 as well as the British National Formulary[4] cautions about anaphylactic reactions associated with IV administration of thiamine; the latter citing MHRA/CHM advice, 2007:

IMPORTANT SAFETY INFORMATION MHRA/CHM ADVICE (SEPTEMBER 2007): Although potentially serious allergic adverse reactions may rarely occur during, or shortly after, parenteral administration, the CHM has recommended that:

- This should not preclude the use of parenteral thiamine in patients where this route of administration is required, particularly in patients at risk of Wernicke-Korsakoff syndrome where treatment with thiamine is essential;
- Intravenous administration should be by infusion over 30 minutes;
- Facilities for treating anaphylaxis (including resuscitation facilities) should be available when parenteral thiamine is administered.

Pragmatic Implications

Thiamine is only available as 100 mg/mL vials and a large volume e.g. 5 mL by IM injection may be poorly tolerated by patients and possibly considered to be impractical

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[1] Day E, Bentham PW, Callaghan R, Kuruvilla T, George S. Thiamine for prevention and treatment of Wernicke-Korsakoff Syndrome in people who abuse alcohol. Cochrane Database Syst Rev. 2013 Jul 1;2013(7):CD004033. https://pubmed.ncbi.nlm.nih.gov/23818100/ 20
[2] Ambrose ML, Bowden SC, Whelan G. Thiamin treatment and working memory function of alcohol-dependent people: preliminary findings. Alcohol Clin Exp Res. 2001 Jan;25(1):112-6. https://pubmed.ncbi.nlm.nih.gov/11198705/
[3] South African Medicines Formulary 14th Ed.
[4] British National Formulary, 2020

Thiamine Dosing

NEMLC Recommendation

NEMLC recommends that dose of thiamine be amended from “100mg” to “200mg”, aligned with available RCT evidence, for the prevention of Wernicke’s encephalopathy. NEMLC also deliberated on the route of administration and recommended that for the prevention of Wernicke’s encephalopathy, that thiamine should be administered intramuscularly and not by the intravenous route.

Amendments to STG: AH Chapter 20

If alcohol withdrawal/ Wernicke’s encephalopathy suspected:

- Thiamine, IM, 200 mg immediately.

Ketamine Analgosedation in Trauma

Evidence

A rapid review of clinical evidence was conducted ***on adjunctive or monotherapy ketamine*** for use in intubated adults with trauma on mechanical ventilation.

7 Systematic reviews were identified addressing adjunctive therapy

1 Systematic review was identified addressing monotherapy

The most relevant, up-to-date, and highest quality review was used to inform recommendations for critical outcomes

Adjunctive Therapy

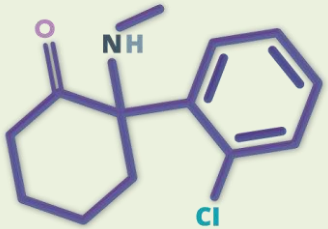
Adjunctive ketamine showed a morphine sparing effect (MD = 0.75 µg kg^{-1} h^{-1}, 95% CI −1.11 to 2.61) or duration of mechanical ventilation in days (MD −0.17 days, 95% CI −3.03 to 2.69, P = 0.91).

We are uncertain whether adjunctive ketamine therapy reduces mortality (OR 0.88, 95% CI 0.54-1.43, P = 0.60, ***low certainty of evidence***, 5 RCTs, n= 3076 patients) and may result in 30 fewer deaths per 1000, ranging from 132 fewer to 87 more.

- Ketamine adjunctive therapy results in little to no difference in length of ICU stay (MD 0.04 days, 95% CI −0.12 to 0.20, P = 0.60, ***high certainty of evidence***, 5 RCTs n=390 patients) or length of hospital stay (MD −0.53 days, 95% CI −1.36 to 0.30, P = 0.21, ***high certainty of evidence,*** 5 RCTs, n=277 patients).

Monotherapy

No evidence found for this review's prespecified outcomes such as sedation and analgesia, ventilator asynchrony, provider satisfaction, RASS scale mortality and hospital length of stay.



KETAMINE

Monotherapy may improve respiratory outcomes (respiratory depression, chest wall compliance, PO2, PCO2) and haemodynamic outcomes (systolic blood pressure, mean arterial pressure, vasopressor use, shock), however, ***certainty of evidence is very low***

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National Department of Health: Affordable Medicines, EDP-Adult Hospital level. Medicine Review: Ketamine Analgosedation in trauma, August 2022. http://www.health.gov.za/.
Adult-Hospital-Ch-20_Emerg-and-Injuries-and-supporting-NEMLC-report-and-reviews_2020-4_Version-1.0_28-June-2024.pdf (health.gov.za)

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Ketamine Analgosedation in Trauma

NEMLC Recommendation

NEMLC recommended **not to use** ketamine as monotherapy for postintubation sedation in intubated adults with trauma on mechanical ventilation (conditional recommendation, very low certainty of evidence).

Rationale: There is uncertainty for benefit and harms for ketamine as monotherapy.

NEMLC recommended the **use of adjunctive ketamine** for postintubation sedation in intubated adults with trauma on mechanical ventilation (conditional recommendation, low certainty of evidence.

Rationale: Ketamine may have benefit as adjunctive therapy but there is uncertainty for benefit and harms as monotherapy.

Ketamine Analgosedation in Trauma

Amendments to STG: AH Chapter 20

Supplemental analgesia:

ADD an analgesia to any of the above regimens:

- Morphine, IV infusion, 0.1–0.2 mg/kg/hour.

OR

- Fentanyl, IV infusion, 1 mcg/kg/hour (also becomes long acting after prolonged infusion due to fat solubility).

OR

- Ketamine, IV infusion, 0.5–1 mg/kg/hour.

Note: If haemodynamically unstable, use adjunctive ketamine for analgosedation.

Harm with Morphine Use in Pulmonary Oedema

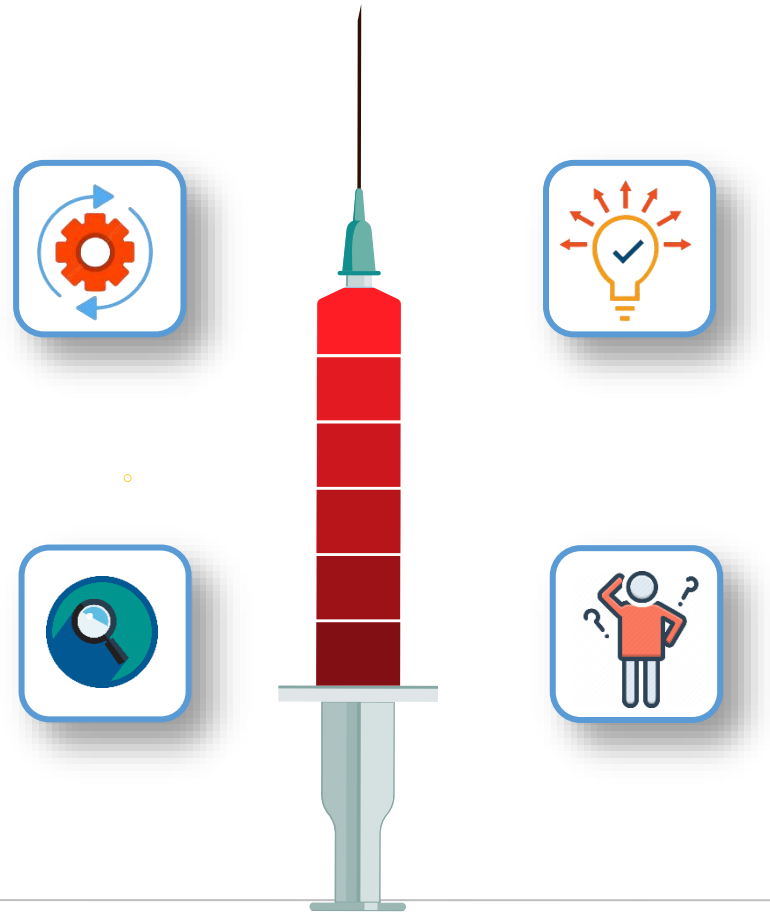
Medicine Review: Morphine in Pulmonary Oedema

Methodology

A rapid review was conducted of clinical evidence on whether intravenous/intra-osseus morphine should be used in the treatment of acute pulmonary distress

Evidence

We identified four systematic reviews of observational studies. The two most relevant, up-to-date, and highest quality reviews were used to inform recommendations for critical outcomes..



Results

Morphine may increase in-hospital and all-cause mortality (OR 1.78; 95% CI 1.01 to 3.13; 15 more per 1000, from 0 fewer to 40 more; n=151 735 participants) and may result in a large increase in need for invasive mechanical ventilation (OR 2.72; 95% CI 1.09 to 6.80; 45 more per 1000, from 2 more to 136 more; n=167 847 participants) compared to not using morphine. .

Other considerations

No available data could be sourced on whether morphine increases non-fatal adverse events, ICU or hospital length of stay.

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National Department of Health: Affordable Medicines, EDP-Adult Hospital level. Medicine Review: Morphine in Pulmonary Oedema, May 2022. http://www.health.gov.za/.
Adult-Hospital-Ch-20_Emerg-and-Injuries-and-supporting-NEMLC-report-and-reviews_2020-4_Version-1.0_28-June-2024.pdf (health.gov.za)

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Harm with Morphine Use in Pulmonary Oedema

NEMLC Recommendation

NEMLC accepted the proposal to remove morphine for the treatment of acute pulmonary distress. However, recommended that a caution be included in the STG, accordingly:

CAUTION Do not use morphine for pulmonary oedema, as there is observational data providing a signal of harm.

Furthermore, NEMLC recommended that a circular be drafted and disseminated regarding the harms associated with use of morphine for distress in pulmonary oedema.

THANK YOU!