Nursing Assessment of Dexmedetomidine Withdrawal

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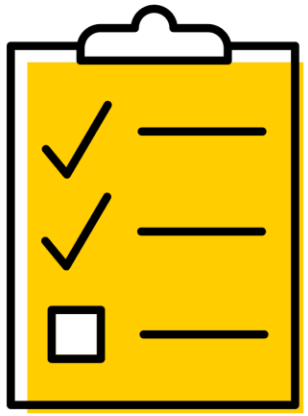
April 2024

Learning Objectives

1. Understand dexmedetomidine pharmacokinetics & pharmacodynamics.
2. Gain insight into the prevalence of dexmedetomidine withdrawal in the literature
3. Learn about assessment tools used for dexmedetomidine withdrawal
4. Gain knowledge on evidence-based treatment of withdrawal

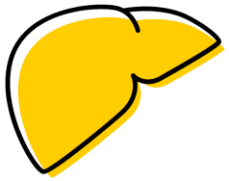


What is Pharmacokinetics?

- **Definition**
  - Pharmacokinetics is a fundamental concept in pharmacology that helps us understand how a drug behaves once it enters the body.
- **Key stages:**
  1. Absorption
  2. Distribution
  3. Metabolism
  4. Elimination
- **Relation to Nursing Care:**
  - **Assessment**: Patients' age, body mass, liver and kidney function, and the presence of other medical conditions affect the way medications work.
  - **Monitoring**: Close monitoring of drug effects as well as side effects

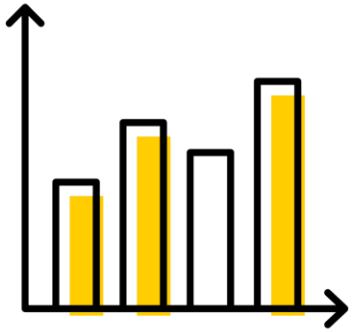
Dexmedetomidine: Pharmacokinetic Profile

- **Absorption:**
  - Administered intravenously for rapid, complete absorption.
- **Distribution:**
  - Rapid and extensive body distribution.
  - Distribution half-life: ~6 minutes.
- **Metabolism and Elimination:**
  - Primarily metabolized in the liver
  - Renal excretion of metabolites: 95%
  - Elimination half-life: 2.1–3.1 hours (healthy volunteers); 2.2–3.7 hours (ICU patients).
  - Clearance rate: 0.6–0.7 L/min in healthy volunteers; similar in ICU patients.



What is Pharmacodynamics?

- **Definition:**
  - Pharmacodynamics describes the drug's biological and physiological effects on the body and the mechanisms of drug action.
- **Key Components:**
  - Receptor Binding
  - Dose-Response Relationship
  - Therapeutic Window
  - Drug Reactions



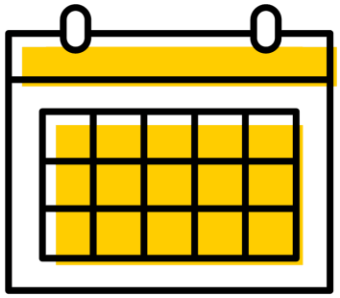
- **Relation to Nursing Care**
  - Anticipate drug responses, manage dosing, and educate patients about expected effects and possible side effects.

Dexmedetomidine: Pharmacodynamic Profile

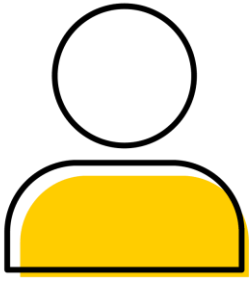
1. **Mechanism of Action**:
    - Dexmedetomidine primarily works by binding to alpha-2 adrenoceptors in the brain, leading to inhibition of norepinephrine release.
    - This action results in sedation, analgesia, and a decrease in sympathetic activity.
2. **Therapeutic Effects**:
    - Sedative Effects
    - Analgesic Effects
3. **Side Effects/Toxicities**:
    - Includes bradycardia, hypotension, and dry mouth

MICU Stats

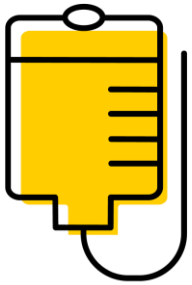
January 1st to February 21st



69 patients received dex



442 bags administered



Prevalence of Dexmedetomidine Withdrawal in the Literature

- The incidence of dexmedetomidine withdrawal ranged from 30% to 64%
- Higher doses vs duration of infusion were associated with increased withdrawal rates
- On average, there was a noted withdrawal from dexmedetomidine in patients
  - exceeding 0.8 mcg/kg/hr
  - total daily doses surpassing 12.9 micrograms per kilogram

Assessment for Dexmedetomidine Withdrawal:

Richmond Agitation-Sedation Scale (RASS)

1.Purpose:

1. RASS is primarily used to assess the level of sedation and agitation in critically ill patients.

2.Scoring:

1. RASS assigns scores from -5 to +4.

3.Components:

1. It assesses responses to verbal and physical stimulation and spontaneous behavior.

4.Clinical Use:

1. It helps healthcare providers achieve the desired level of sedation while avoiding oversedation or agitation.

Withdrawal Assessment Tool-1 (WAT-1)

1.Purpose:

1. It is a clinical assessment tool to evaluate and monitor withdrawal symptoms

2.Scoring:

1. Symptoms are typically scored from 0 - 3.

3.Components:

1. The scale includes a range of withdrawal symptoms such as restlessness, agitation, muscle twitching, sweating, and other signs of discomfort.

4.Clinical Use:

1. It guides healthcare providers in identifying withdrawal.

Signs and Symptoms of Withdrawal

- **Most Common Withdrawal Symptoms:**
  - Delirium
  - Agitation
  - Hypertension (systolic blood pressure > 140 mm Hg or mean arterial pressure > 90)
- **Other Symptoms**
  - Tachycardia (heart rate > 90 beats/min)
  - Vomiting
  - Tremors
  - Sweating
  - Restlessness
- **Observations From Literature:**
  - Symptoms typically present within 24 hours of discontinuation.
- **Clinical Considerations:**
  - Regular monitoring for symptoms is recommended, especially after discontinuation.
  - Symptom management may include the administration of α2-agonists such as clonidine.

Treatment for Withdrawal

- **Clonidine may be utilized to transition patients from dexmedetomidine due to similar mechanisms of action.**
  - Clonidine and dexmedetomidine are both centrally acting α2 agonists.
  - Clonidine possesses a longer half-life of 8-12 hours.
- **Clonidine's Role in Dexmedetomidine Discontinuation:**
  - Hypothesized to reduce central nervous system hyperactivity through α2 agonist effects.
- **Advantages of Clonidine Use:**
  - Clonidine is available for enteral and transdermal
  - Facilitates potential transition out of the ICU.

Clonidine for Treatment of Withdrawal

ICU sedation, transition from dexmedetomidine to clonidine

ICU sedation, transition from dexmedetomidine to clonidine (off-label use):

Note: Consider use in patients who are hemodynamically stable and able to receive medications enterally. Monitor blood pressure and heart rate during initiation and transition (Ref).

Oral: Immediate release:

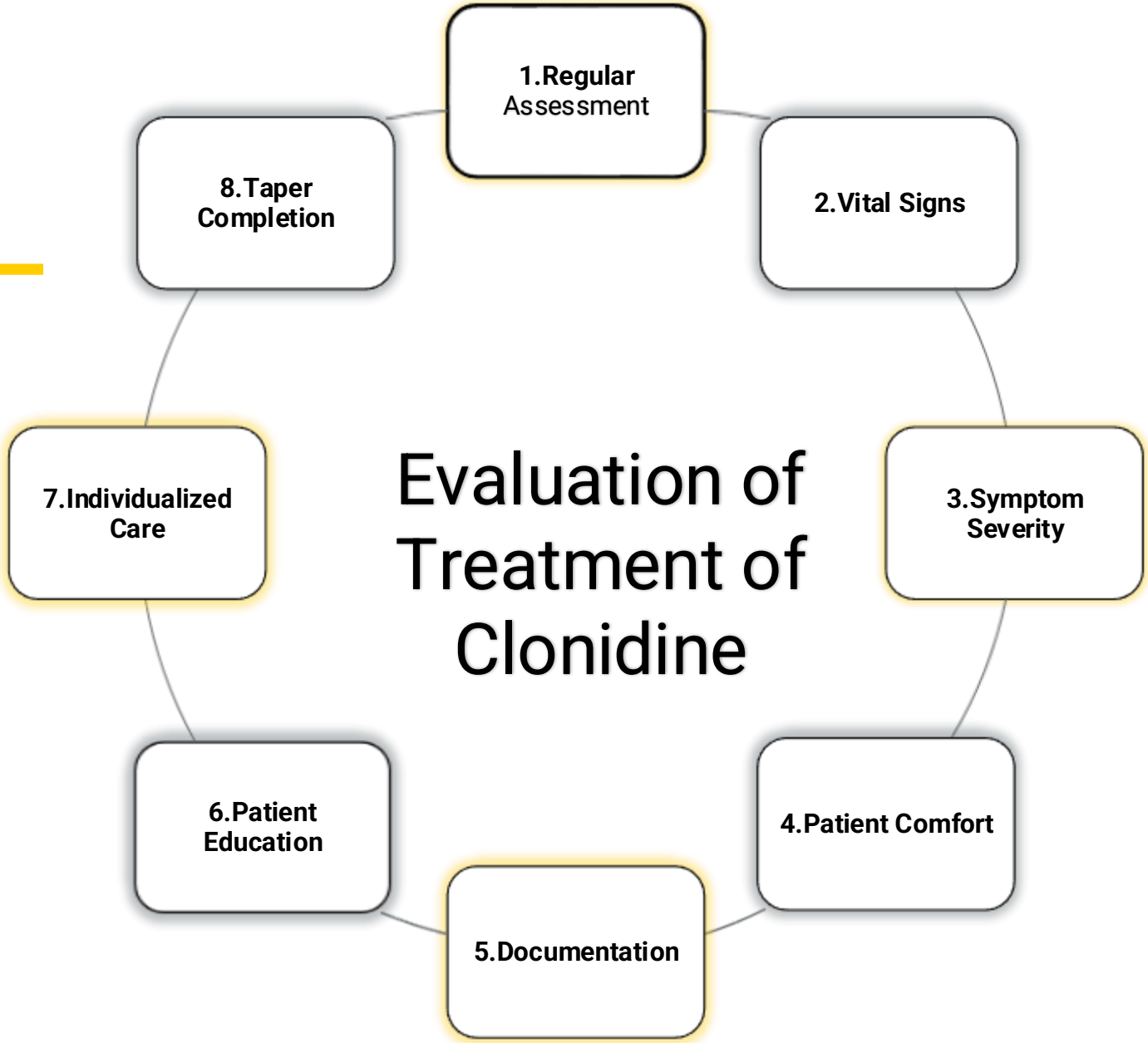
Initial: Note: Decrease dexmedetomidine dose by 25% within 6 hours of each clonidine dose. Dexmedetomidine can usually be stopped within 48 hours.

Dexmedetomidine dose <0.7 mcg/kg/hour: 0.1 to 0.2 mg every 6 to 8 hours (Ref).

Dexmedetomidine dose ≥0.7 mcg/kg/hour: 0.3 mg every 6 to 8 hours (Ref).

Maintenance: Titrate to achieve target sedation levels to a usual dosage range of 0.2 to 0.5 mg every 6 hours (Ref). Gradually taper clonidine by extending the dosing interval every 24 to 48 hours (Ref).

Evaluation of Treatment of Clonidine



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