Acute Care Pearls

A Primer on the Updated UTI Guidelines

By: Larissa Ostfeld, PharmD

Disclosures

Dr. Ostfeld has no relevant financial relationships with any ineligible companies to disclose.

The off-label use of medications will not be discussed during this presentation.

Learning Objectives

At the completion of this activity, learners will be able to:

1. Define the key changes introduced in the 2023 Urinary Tract Infection (UTI) guidelines.

2. Discuss strategies for implementing the new UTI guidelines into your current professional practice.

3. Develop a comprehensive approach to diabetic ketoacidosis (DKA) treatment by synthesizing knowledge of pathophysiology, laboratory parameters, and treatment pathways to optimize patient care.

4. Review the pharmacology of paralytics.

5. Discuss acceptable sedation strategies post-rapid sequence intubation (RSI).

Definitions- IDSA

Old

Uncomplicated UTI: Infection in the bladder old in healthy, non pregnant females

Acute Pyelonephritis: Infection that has spread from the bladder to the kidneys

Complicated UTI: Everything else

New

Complicated UTI: Infection beyond the bladder including pyelonephritis, febrile or bacteremic UTI, and catheter associated UTI (CAUTI)

Uncomplicated UTI: Everything else (in men and women)

How to apply to practice

Uncomplicated UTI Agent Selection

- Patient’s previous microbial results
- Stewardship concerns
  - Narrower agents
  - Patient and institution affordability
  - Policies on challenging penicillin allergies
- Local antibiograms can be considered

- **Avoid fluoroquinolones!**

Complicated UTI Agent Selection

Sepsis (with or without shock) per defined per the Surviving Sepsis Campaign	Third or fourth generation cephalosporins, piperacillin-tazobactam, fluoroquinolones, carbapenems
Without sepsis	Third or fourth generation cephalosporins, piperacillin-tazobactam, fluoroquinolones

IDSA does not offer an order of preference for these medications. Individual patient factors and stewardship concerns persist, however

Choice of Empiric Therapy in CAUTI

- Sepsis or no sepsis? Lesser emphasis on stewardship in sepsis due to slimmer margin of error
- Review previous microbial results and exposure to fluoroquinolones
    - Fluoroquinolone use in the past 12 months is associated with higher rates of antimicrobial resistance (not true for other antimicrobials)
- Consider antibiogram ONLY in patients with sepsis
    - Limited evidence that antibiograms EMPIRICALLY improve clinical outcomes
    - Aim for >90% in patients with shock and >80% in patients without shock
    - Look at the most relevant bacteria in antibiogram (usually E. coli but can adjust based on patient specific factors)

Assess for Clinical Improvement

- Afebrile or reduction in fever curve
- Hemodynamic stability
- Source control achieved

At this point, can consider a switch to orals using culture directed therapy assuming the agent selected achieves adequate levels in urine, tissue, and blood and the patient is able to take medications PO

Treat for 7 days (5 days if using a fluoroquinolone)

Conclusion

- New definitions for complicated vs uncomplicated UTI
- Evaluate patient’s sepsis status
- Consider previous cultures
- Narrow therapy and switch to orals as able

References:

- Lawati et al. Urinary Tract Infections: Core Curriculum 2024. October 31, 2023. 83(1): 90-100.
- Anger et al. Updates to Recurrent Uncomplicated Urinary Tract Infections in Women: AUA/CUA/SUFU Guideline. Journal of Urology September 1, 2022. 22(9): 46-54.

Diabetic Ketoacidosis (DKA) Reimaging

ASHRAF A AMADOU PHARMD
PHARMACIST
ESSENTIA HEALTH

IGNITE Rx LET'S TAKE ACTION

DISCLOSURES

Dr. Amadou has no relevant financial relationships with any ineligible companies to disclose.

The off-label use of medications will not be discussed during this presentation.

Learning Objectives

At the completion of this activity, the learner will be able to:

1. Define the key changes introduced in the 2023 Urinary Tract Infection (UTI) guidelines.
2. Discuss strategies for implementing the new UTI guidelines into your current professional practice.
3. Develop a comprehensive approach to diabetic ketoacidosis (DKA) treatment by synthesizing knowledge of pathophysiology, laboratory parameters, and treatment pathways to optimize patient care.
4. Review the pharmacology of paralytics.
5. Discuss acceptable sedation strategies post-rapid sequence intubation (RSI).

Goals for this session

- Describe pathophysiology of diabetic ketoacidosis with abnormal laboratory parameters
- Examine the why behind the treatment pathways

What is DKA?

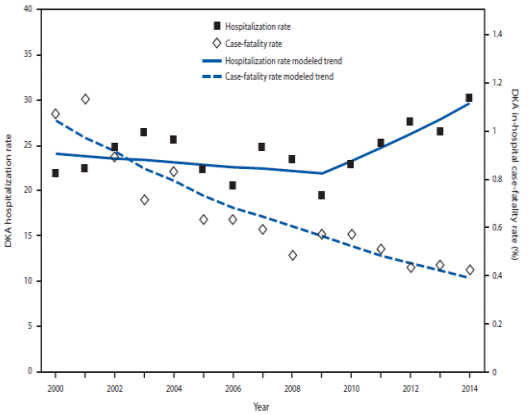
- A life-threatening complication of diabetes and usually seen in type-1 diabetes but can also occur in type-2 diabetes
- It is a state of absolute deficiency in insulin worsened by hyperglycemia, dehydration, and acidosis

Lizzo JM, Goyal A, Gupta V. Adult Diabetic Ketoacidosis. [Updated 2023 Jul 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-

Epidemiology

- 5,376 people in North Dakota are diagnosed with diabetes yearly
- ≥6% of hospital admissions are from DKA
  - Mortality rate has declined

FIGURE. Age-adjusted diabetic ketoacidosis hospitalization rate per 1,000 persons with diabetes and in-hospital case-fatality rate — United States, 2000–2014*



CDC trends in diabetic ketoacidosis hospitalizations

North Dakota 2022 Diabetic Reports

Etiology of DKA

Insulin deficiency

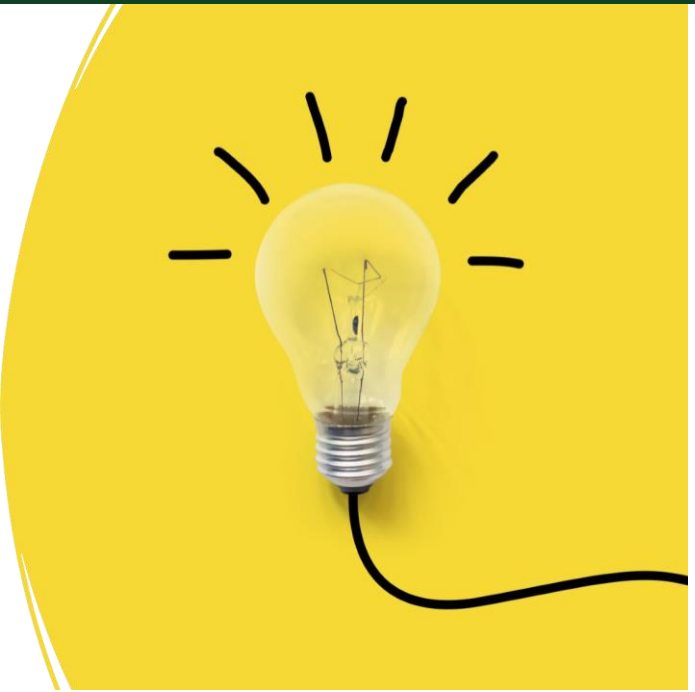
- Medication nonadherence

Increase insulin demand

- Infections
- Myocardial infarction, neurovascular accident, alcohol usage, pancreatitis
- Stress
- Medications (dobutamine, thiazides, corticosteroids, lithium, second-generation antipsychotics, SGLT-2 inhibitors)

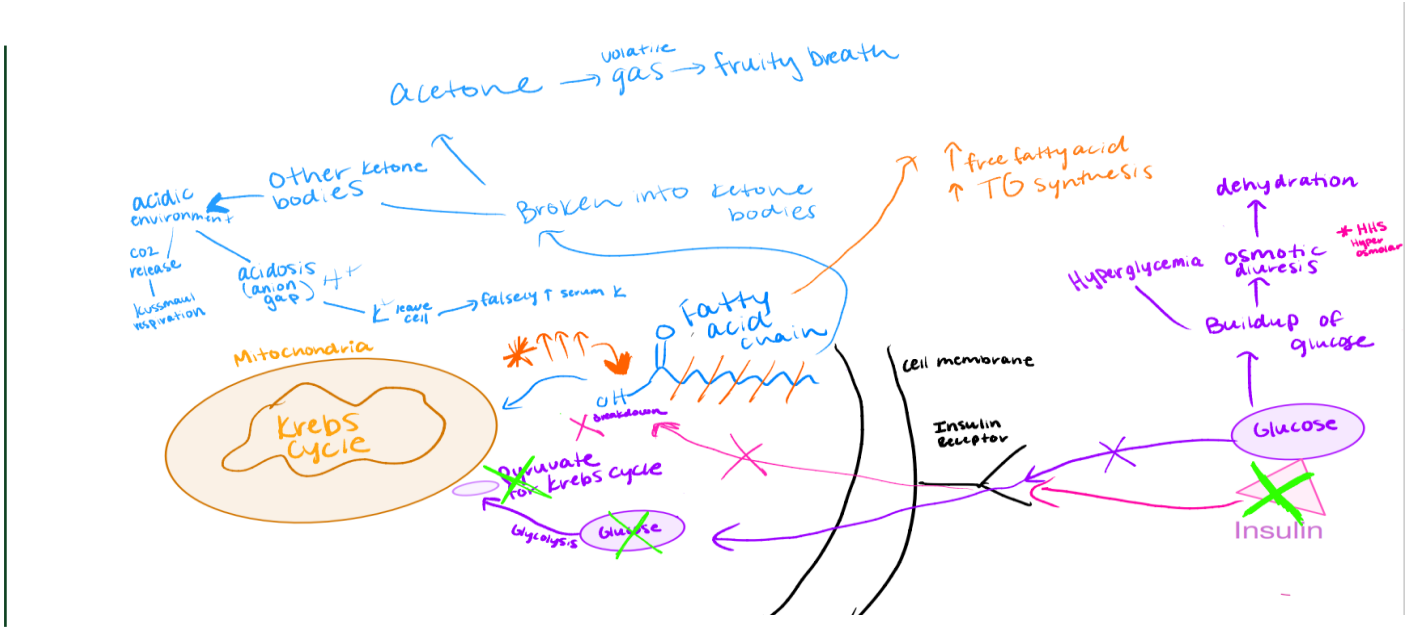
Hassan EM, Mushtaq H, Mahmoud EE, et al. Overlap of diabetic ketoacidosis and hyperosmolar hyperglycemic state. *World J Clin Cases*. 2022;10(32):11702-11711.

Interactive learning activity



- What is the most efficient nutrient that cells use to produce energy?
  - A: Protein
  - B: Lipid
  - C :Glucose
  - D: All the above

Pathophysiology



IGNITE RX LET'S TAKE ACTION

Presentation

polydipsia	Polyurea	Blurry vision	Weight loss
Fruity breathy	Nausea	Kussmaul breathing	Confusion or drowsiness

Hassan EM, Mushtaq H, Mahmoud EE, et al. Overlap of diabetic ketoacidosis and hyperosmolar hyperglycemic state. World J Clin Cases. 2022;10(32):11702-11711

Diagnosis

- Key lab values are the following:

Biochemical diagnostic criteria	Values
Blood glucose (mg/dL)	>250
Arterial or venous pH	7-7.30
Serum bicarbonate (mEq/L)	< 10-18
Serum osmolality (mOsm/kg)	Variable
Serum ketone or beta hydroxybutyrate (mmol/L)	>3
Urine ketones	Positive
Anion gap: (Na+) – (Cl– + HCO3–) (mEq/L).	>12

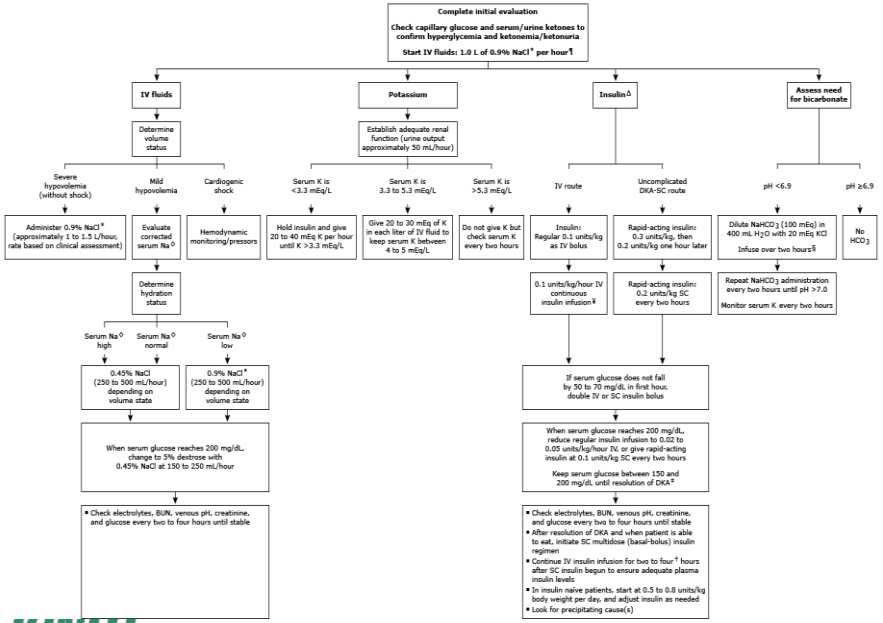
Adapted from Up To Date- Treatment of DKA

Goal of treatment

- Restore circulatory volume and tissue perfusion
- Correct hyperglycemia, acidosis and electrolyte abnormalities
- Monitor for and manage any complication of DKA or its treatment
- Identify the precipitating event

Treatment algorithm

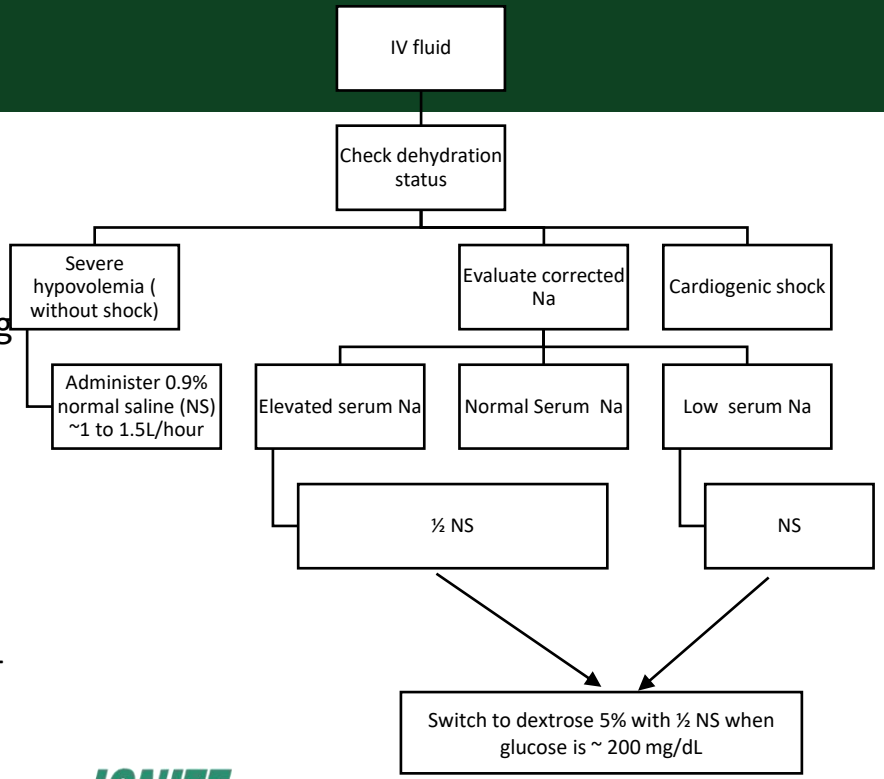
- Fluid repletion
- Electrolyte correction (Potassium)
- Insulin
- Assess the need for bicarbonate



UpTo Date- Treatment of DKA

Treatment: Fluids

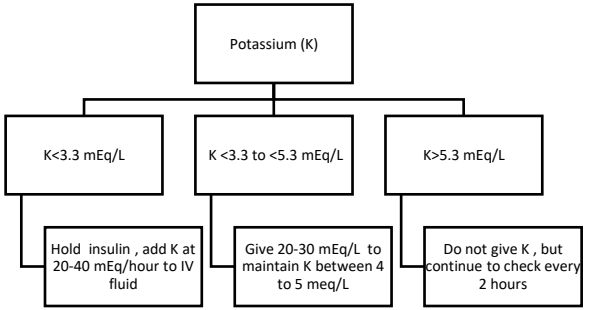
- Treat the dehydration
- Correction of the fluid deficit based on dehydration status
  - Goal 15-20 mL/kg (or 1-1.5L) during the first hour in those without cardiac compromise
    - Isotonic solution
  - Take into consideration the corrected sodium level due to glucose
  - Add potassium to fluids as needed- important for insulin introduction



Adapted from Up To Date- Treatment of DKA

Treatment: Potassium

- Can be falsely elevated
- Insulin causes a shift of potassium intracellular
  - Goal: K to maintain a serum level of 4 to 5 mEq/L
- Check every 1-2 hours until stable with close cardiac monitoring

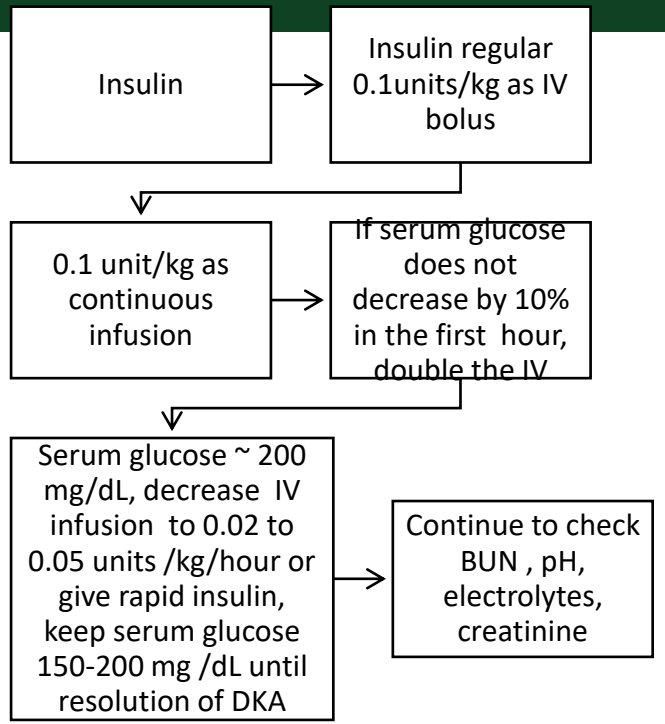


Adapted from UpToDate- Treatment of DKA

IGNITE Rx LET'S TAKE ACTION

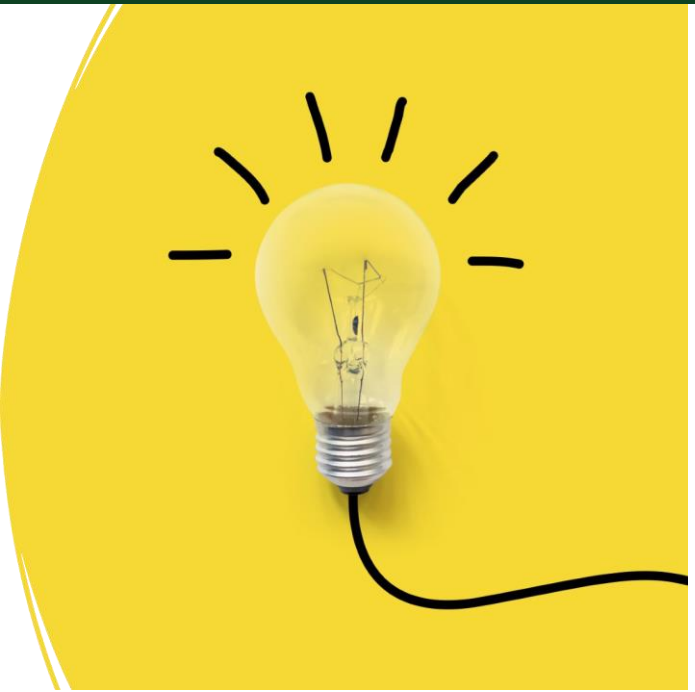
Treatment -Insulin with IV route

- Cornerstone of the treatment of hyperglycemia in DKA
  - Drive the glucose to be used in ATP
  - Do not start insulin until K >3.3 mEq/L
- Two insulin therapy options
  - 0.1 U/kg/h IV infusion after a 0.1 U/kg IV bolus or 0.14 U/kg/h without bolus
- Step down from IV to subcutaneous can occur when the anion gap is closed
- Continue IV infusion 2-4 hours after initiation of subcutaneous Insulin to avoid rebound



Adapted from UpToDate- Treatment of DKA

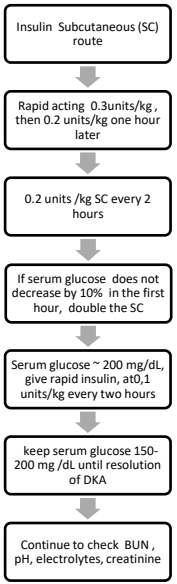
Interactive learning activity



- Subcutaneous insulin can be used in the treatment of DKA
  - True or False

Treatment: Insulin with subcutaneous (SC) route

- “There is no significant difference in outcomes for intravenous human regular insulin versus subcutaneous rapid-acting analogs when combined with aggressive fluid management for treating mild or moderate DKA”
  - Mild: anion gap >10 mEq/L and serum bicarbonate 15-18 mEq/L
  - Moderate: anion gap >12 mEq/L and serum bicarbonate 10-15 mEq/L
  - Severe: anion gap >12 mEq/L and serum bicarbonate <10 mEq/L



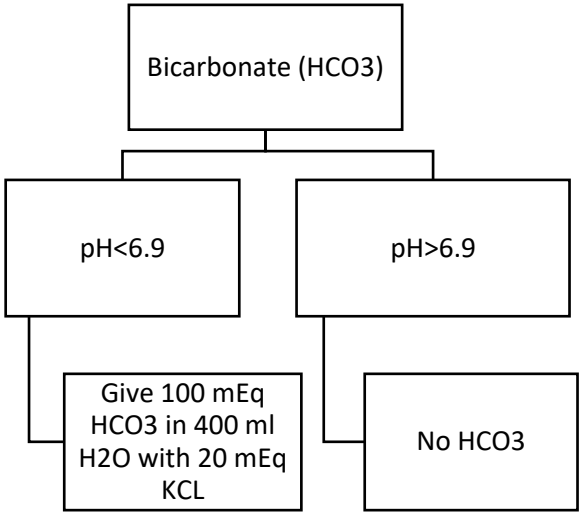
IGNITE RX LET'S TAKE ACTION

ADA Diabetes Care in the Hospital: Standards of Care in Diabetes 2023

Adapted from UpToDate- Treatment of DKA

Treatment: Bicarbonate

- Remain controversial
  - Fluids and insulin should help to resolve the acidosis
  - Risk of cerebral edema



Adapted from Up To Date- Treatment of DKA

Michael Fowler; Hyperglycemic Crisis in Adults: Pathophysiology, Presentation, Pitfalls, and Prevention. *Clin Diabetes* 1 January 2009; 27 (1): 19–23.

Resolution of DKA

- Resolution of DKA
  - Blood glucose <200 mg/dL , Anion gap <12 , pH>7.3
- Timing of transition from IV insulin to subcutaneous insulin
  - At mealtime or evening
- Overlap the IV infusion for 2-4 hours after initiation of subcutaneous insulin

Roles of interdisciplinary team members

Pharmacist

Comprehensive medication education after the resolution of DKA

- Stress importance of medication adherence
- Identify barriers if any

Nurse

Assessment of patient

Monitor fluid and electrolyte balance, adjust insulin dose received

Social work

Help with any support services

Financial resources

Summary

Fluid replacement

Goal of 15-20 mL/kg/hr (or 1-1.5L)

- Examine the hydration status

Electrolytes replacement

Potassium

Insulin

Start insulin when K >3.3

0.1 U/kg/h IV infusion after a 0.1 U/kg IV bolus or 0.14 U/kg/h without the bolus

Interactive learning activity

In the pathophysiology of DKA, the lack of insulin leads to

- A: Increased serum fatty acid
- B-Glucagon excess stimulates gluconeogenesis
- C: Triglyceride and amino acids to be metabolized for energy
- D: Acetone accumulation in serum and slowly disposed of through respiration

References

- Lizzo JM, Goyal A, Gupta V. Adult Diabetic Ketoacidosis. [Updated 2023 Jul 10]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan- available from : https://www.ncbi.nlm.nih.gov/books/NBK560723/
- Hassan EM, Mushtaq H, Mahmoud EE, Chhibber S, Saleem S, Issa A, Nitesh J, Jama AB, Khedr A, Boike S, Mir M, Attallah N, Surani S, Khan SA. Overlap of diabetic ketoacidosis and hyperosmolar hyperglycemic state. World J Clin Cases. 2022 Nov 16;10(32):11702-11711. doi: 10.12998/wjcc.v10.i32.11702. PMID: 36405291; PMCID: PMC9669841.
- Ghimire P, Dhamoon AS, Doerr C. Ketoacidosis (Nursing) [Updated 2023 Aug 8]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2024 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK568717/
- North Dakota 2022 Diabetic Report. Microsoft Word - ADV_2021_State_Fact_sheets_all.docx (diabetes.org)23_5151_03000appendixd.pdf (ndlegis.gov)
- Evans K. Diabetic ketoacidosis: update on management. Clin Med (Lond). 2019;19(5):396-398. doi:10.7861/clinmed.2019-0284
- Clinical Overview : Diabetic Ketoacidosis. In ClinicalKey . Elsevier, 2024, Update July 31,2023. Acesssed December 26, 2023. https://www.clinicalkey.com/#!/content/clinical_overview/67-s2.0-c416092c-b6d9-4626-818d-395e20544802#screening-and-prevention-heading-44
- TrKarslioglu French E, Donihi AC, Korytkowski MT. Diabetic ketoacidosis and hyperosmolar hyperglycemic syndrome: review of acute decompensated diabetes in adult patients. BMJ. 2019 May 29;365:l1114. doi: 10.1136/bmj.l1114. PMID: 31142480.ends in diabetic ketoacidosis hospitalizations and in-hospital mortality - United States, 2000–2014. Centers for Disease Control and Prevention. March 29, 2018. Accessed December 26, 2023. https://www.cdc.gov/mmwr/volumes/67/wr/mm6712a3.htm.
- Gosmanov AR, Gosmanova EO, Dillard-Cannon E. Management of adult diabetic ketoacidosis. Diabetes Metab Syndr Obes. 2014 Jun 30;7:255-64. doi: 10.2147/DMSO.S50516. PMID: 25061324; PMCID: PMC4085289.

IGNITE Rx LET'S TAKE ACTION

Thank you!!

Safe Sedation and Paralytic Practices

Megan Moore, PharmD, BCPS, BCCCP

Pharmacist

Sanford Medical Center Fargo

SANFORD HEALTH

Disclosures

Dr. Moore has no relevant financial relationships with any ineligible companies to disclose.

The off-label use of medications will not be discussed during this presentation.

Learning Objectives

At the completion of this activity, the learner will be able to:

1. Define the key changes introduced in the 2023 Urinary Tract Infection (UTI) guidelines.
2. Discuss strategies for implementing the new UTI guidelines into your current professional practice.
3. Develop a comprehensive approach to diabetic ketoacidosis (DKA) treatment by synthesizing knowledge of pathophysiology, laboratory parameters, and treatment pathways to optimize patient care.
4. Review the pharmacology of paralytics.
5. Discuss acceptable sedation strategies post-rapid sequence intubation (RSI).

Goals for this session

- Compare sedatives for use in RSI
- Review the pharmacology of paralytics
- Develop adequate sedation strategies post-RSI
- Recognize the impact of sedation practices on long term patient care

What should you review?

Reason for intubation/HPI

Weight

Allergies

Recent labs (K+, SCr)

Vitals

Patient Case #1

- H.P. is a 25 yom who presented to the Emergency Department after a traumatic fall from multiple stories.
  - GCS 5
  - Extensive skull and facial fractures
  - Allergies: PCN
  - K+ 4.0mEq/L, SCr 0.6mg/dL

Patient Case #2

- K.M. has been hospitalized for 17 days
  - Stay is complicated by development of hospital acquired pneumonia
  - Allergies: statins
  - Wt: 64kg
  - VBG: 7.04/69/45/17
  - K+ 5 mEq/L, SCr 1.88mg/dL (increased by 0.8mg/dL over last 48 hours)

Shock Index

- Useful and easy to use tool to identify peri-intubation decompensation

Shock index =

HR / SBP

Shock Index ≥ 0.9 associated with cardiac arrest

Heffner AC, et al . *Resuscitation.* 2013; 84(11): 1500-04.

Sedation

Etomidate

Mechanism of Action

Indirect GABA agonism

Dosing

0.3 mg/kg IV

0.2mg/kg IV in hemodynamically unstable

Max dose 40mg

Onset of Action

5-15 seconds

Duration of Action

5-15 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Etomidate

Adverse effects

- Adrenal suppression
- Myoclonus (22-63%)

Considerations for use

- Minimal cardiovascular effects
- Lowers ICP
- No histamine release

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Ketamine

Mechanism of Action

NMDA antagonism

Antagonism of the NMDA receptor provides analgesia

Dosing

1-2 mg/kg

1 mg /kg in hemodynamically unstable

Max dose 200mg

Onset of Action

30-90 seconds

Duration of Action

10-30 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Ketamine

Adverse effects

- Hypertension
- Tachycardia
- Emergence reactions

Considerations for use

- Use in reactive airway disease
- Avoid in:
  - Severe hypertension
  - Cardiac ischemia
  - Severe eye injury

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Propofol

Mechanism of Action

GABA agonism

Dosing

1-1.5 mg/kg

Max dose 200mg

Onset of Action

15-30 seconds

Duration of Action

5-10 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Propofol

Adverse effects

- Hypotension
- Bradycardia

Considerations for use

- Use in seizure, head injury
- Avoid in hemodynamically unstable

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Midazolam

Mechanism of Action

GABA agonism

Dosing

0.1-0.3 mg/kg

5-10 mg

Onset of Action

1-3 min IV

Duration of Action

10-30 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Midazolam

Adverse effects

- Hypotension (dose dependent)

Considerations for use

- Use in seizure, no IV access (IM)

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Patient Case #1

- H.P. is a 25 yom who presented to the Emergency Department after a traumatic fall from multiple stories.
  - GCS 5
  - Extensive skull and facial fractures
  - Weight: 98kg
  - Allergies: PCN
  - K+ 4.0mEq/L, SCr 0.6mg/dL

Patient Case #1

- Select an appropriate induction agent and dose for H.P.
  a. Propofol 200mg
  b. Midazolam 2mg
  c. Etomidate 20mg
  d. Ketamine 100mg

- GCS 5
- Extensive skull and facial fractures
- Weight: 98kg
- Allergies: PCN
- K+ 4.0mEq/L
- SCr 0.6mg/dL
- SBP: 120mmHg
- HR: 110 bpm

Neuromuscular Blocking Agents

Succinylcholine

Mechanism of Action	Depolarizing NMBA
Dosing	1-1.5 mg/kg
Onset of Action	30-45 seconds
Duration of Action	5-15 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Succinylcholine

Adverse Effects

- Hyperkalemia
- Malignant hyperthermia

Considerations for Use

- Use if needing a neurological exam after intubation
- Avoid in:
  - Hyperkalemia
  - History of malignant hyperthermia
  - Spinal cord injury, burn or crush injury >24h, muscular dystrophy, demyelinating neuromuscular disease, severe immobility, sepsis >7 days

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Rocuronium

Mechanism of Action	Non-depolarizing NMBA
Dosing	0.6-1.2 mg/kg Max dose 150mg (use IBW)
Onset of Action	60-90 seconds
Duration of Action	45-120 minutes

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Rocuronium

Adverse Effects

Inadequate sedation leading to awareness with paralysis

Ensure sedation is ordered to achieve RASS – 5 for duration of paralysis

Considerations for Use

Use when succinylcholine not appropriate

Longer duration of paralysis necessary

Engstrom K, et al. *Am J Emerg Med.* 2023; 70: 19-29.
Stolling JL, et al. *Ann Pharmacother.* 2014; 48(1): 62-76.

Patient Case #2

- K.M. has been hospitalized for 17 days
  - Stay is complicated by development of hospital acquired pneumonia
  - Allergies: statins
  - Wt: 64kg
  - VBG: 7.04/69/45/17
  - K+ 5 mEq/L, SCr 1.88mg/dL (increased by 0.8mg/dL over last 48 hours)

Patient Case #2

- Select an appropriate paralytic for K.M.
  a. Vecuronium 6mg
  b. Rocuronium 70 mg
  c. Succinylcholine 70mg
  d. Rocuronium 30 mg

- Allergies: statins
- Wt: 64kg
- VBG: 7.04/69/45/17
- K+ 5 mEq/L
- SCr 1.88mg/dL (increased by 0.8mg/dL over last 48 hours)
- HR: 110 bpm
- SBP:

Post-Intubation Sedation

Awareness During Paralysis

The ED-AWARENESS Study. Pappal RD, et al. *Ann Emerg Med*, 2021.

- Prospective cohort study from 2019-2022 in St. Louis MO
- 383 mechanical ventilated patients in the ED
- 10 patients (2.6%) recalled awareness with paralysis

Recall of Awareness During Paralysis Among ED Patients Undergoing Tracheal Intubation. Driver BE, et al. *Chest*, 2023.

- Prospective observational study from 2018-2021 at Hennepin County Medical Center
- 866 patients in the ED undergoing emergency intubation
- 66 patients (7.4%) experienced and recalled awareness of paralysis

Early Sedation Goals

SPICE study. Shehabi Y, et al. *Am J Respir Crit Care Med*. 2012.

- Multicenter prospective longitudinal study
- 251 critically ill patients
- Deep sedation within 4 hours of intubation was an independent negative predictor of time to extubation, hospital death, and 180-day mortality

ED-SED. Fuller BM, et al. *Crit Care Med.* 2019.

- Multicenter, prospective cohort study
- 324 intubated patients in the ED
- Deep sedation in the ED resulted in lower RASS scores in the ICU on day 1 and day 2 compared to light sedation in the ED

Patient Case #2

- K.M. received etomidate 20mg and rocuronium 70mg during his RSI. Please select an appropriate sedation regimen immediately following his intubation.
  a. Dexmedetomidine and fentanyl infusions titrated to RASS goal -1
  b. Dexmedetomidine and fentanyl infusions titrated to RASS goal -5
  c. PRN midazolam and fentanyl if patient becomes agitated
  d. Propofol and fentanyl infusions titrated to RASS goal -5 until residual paralysis is absent then decrease RASS goal to 0 to -1

Summary

Selection of induction agent

- Hemodynamics
- Patient specific factors

Selection of paralytic agent

- Duration of effect

Post-intubation sedation

References

1. Heffner AC, Swords DS, Neale MN, Jones AE. Incidence and factors associated with cardiac arrest complicating emergency airway management. *Resuscitation*. 2013;84(11):1500-4. DOI: 10.1016/j.resuscitation.2013.07.022
2. Engstrom K, et al. Pharmacotherapy optimization for rapid sequence intubation in the emergency department. *Am J Emerg Med.* 2023; 70: 19-29.
3. Stolling JL, et al. Rapid-sequence intubation: A review of the process and considerations when choosing medications. *Ann Pharmacother.* 2014; 48(1): 62-76.
4. Pappal RD, et al. The ED-AWARENESS study: A prospective observational cohort study of awareness with paralysis in mechanically ventilated patients admitted from the emergency department. *Ann Emerg Med.* 2021; 77:532-544.
5. Diver BE, et al. Recall of awareness during paralysis among ED patients undergoing tracheal intubation. *CHEST.* 2023; 163(2): 313-323.
6. Shehabi Y, et al. Early intensive care sedation predicts long-term mortality in ventilated critically ill patients. *Am J Resp Crit Care Med.* 2012; 186 (8): 724-731.
7. Fuller BM, et al. The ED-SED study: A multicenter, prospective cohort study of practice patterns and clinical outcomes associated with emergency department sedation for mechanically ventilated patients. *Crit Care Med.* 2019; 47(11): 1539–1548.

Thank you!

SANFORD HEALTH