AEMP Newsletter Spring 2026

Academy of Emergency Medicine Pharmacists

President's Message

I am finding it hard to believe that my tenure as AEMP President is coming to a close. When we launched AEMP in 2023, Kyle DeWitt, Lance Ray, and I did not know who would join us. What we did know was that we needed a professional home: a place where emergency medicine pharmacists could have a seat at the proverbial table and help shape the future of our specialty. Three years later, what began as a group of three has grown into a community of more than 500 members.

Leading this Academy has been one of the most meaningful professional highlights of my career, along with being one of the greatest challenges and honors. I am deeply grateful for the opportunity, your trust in me, the friendships formed along the way, and the lessons learned. The strength of our Academy rests squarely on the commitment of our members and leaders, who generously give their time and expertise to advance our mission and build a culture of leadership and innovation within the Society. Beyond fostering meaningful connections, our members have developed resources and work products, launched mentorship initiatives, and created programming that strengthens our skills as emergency medicine clinicians. Here are just a few highlights from the work of our eight AEMP Committees in the last year to demonstrate the breadth and depth of commitment to the profession:

- Obtained a $10,000 grant from the SAEM Board of Directors for Continuing Pharmacist Education Activities
- Planned seven webinars that offer continuing education credits for pharmacists
- Created a pipeline from student and trainee to practitioner by founding RxSTAT
- Initiated the first seven RxSTAT chapters at colleges of pharmacy, with nearly 100 new pharmacy student members
- Hosted an RxSTAT townhall and established ties with SAEM's RAMS
- Elected first RxSTAT executive committee led by a PGY2 EM Pharmacy Resident
- Initiated two new research work products
- Endorsement of two work product on the EM pharmacist role in boarding patients and acute ischemic stroke
- Made and distributed over 200 naloxone kits at the community outreach event in Philidelphia
- Grew our social media presence substantially, expanding into an AEMP LinkedIn
- Producing three AEMP Newsletters and four Pulse Newsletters articles
- Established an "Ask the Pharmacist" Column within EM News
- Created a mentor-mentee program that paired 4 members, with more underway
- Planned 10 hours of programming, networking events and other activities at AEMP26/SAEM26!

Many thanks to our 2025-26 leaders this year to bring these professional accomplishments to fruition!

Executive Committee	Committee Chairs
President-elect: Kyle DeWitt, PharmD, BCPS, BCEMP Treasurer: Lance Ray, PharmD, BCPS, BCEMP Secretary: Evan Zahn, PharmD, BCCCP, BCEMP At-Large Members: Fernanda Bellolio, MD, MS Zlatan Coralac, PharmD Ryan Feldman, PharmD, DABAT Brett Faine, PharmD, MS Heather Hartman, PharmD, BCPS, BCCCP Alicia Mattson, PharmD, BCCCP Aimee Mishler, PharmD, BCEMP Luke Neff, PharmD BCEMP Erin Reichert PharmD, BCPS Liz Van Wert PharmD, BCPS Kyle Weant PharmD, BCPS, BCCCP, FCCP SAEM Board Liaison: Nicolas Mohr, MD, MS	Career Development Committee: Kara Goddard, PharmD Communications Committee: Kimmie Won, PharmD, APH, BCCCP Education Committee: Alli Cowett, PharmD, BCEMP Membership Committee: Tara Flack, PharmD, BCCCP, FCCM Program Committee: Deepika Sivakumar PharmD, BCPS Research Committee: Kyle Weant PharmD, BCPS, BCCCP, FCCP RxSTAT Committee: Kevin Mercer, PharmD, BCPS, BCCCP, BCEMP; Deepika Sivakumar PharmD, BCPS **SAEM Staff Partners** Erin Campo, CAE, Director, Governance & Interim CEO Holly Byrd-Duncan, MBA, Director, Membership & Meetings

I hope you will join us **May 18-21, 2026 (Monday - Thursday) in Atlanta, GA** at the Atlanta Marriott Marquis for the **2026 SAEM and AEMP Annual Meeting**! Our Academy leaders and Program Committee worked tirelessly to plan a number of exciting advancements planned for this year, including two additional hours of continuing pharmacist education and a new Opening Session! We had another year of record-breaking submissions, and we look forward to seeing many of you present! Below is a tentative schedule (of AEMP events ONLY – see SAEM's Schedule-at-a-Glance for more details about SAEM overall) to look forward to:

Printable AEMP26 Agenda →

AEMP at SAEM26		
Date	**Time**	**Details**
Monday, May 18	1 - 4 pm	SAEM Program Committee & AEMP Community Service Event
Tuesday, May 19	12 - 5:20 pm	AEMP Programming @ SAEM
	6 - 8 pm	AEMP Happy Hour & Networking Event at Max Lager
Wednesday, May 20	12 - 5:30 pm	AEMP Programming @ SAEM
	6 - 8 pm	Dodgeball
	10 pm - 2 am	RAMS Party (AEMP party!)
Thursday, May 21	9 - 950 am	AEMP Business Meeting (all welcome & encouraged to attend)
	10 am - 1 pm	AEMP Programming @ SAEM

Finally, the first annual **AEMP elections** are complete. Please join me in welcoming our new leaders as they step into their roles at the AEMP Business Meeting at the Annual Meeting: President: Kyle DeWitt, PharmD, BCEMP

- President-Elect: Lance Ray, PharmD
- Treasurer: Evan Zahn. PharmD
- Secretary: Elizabeth VanWert, PharmD
- Immediate Past President: Megan A. Rech, PharmD, MS
- Members-at-Large:
  - Allison L. Cowett, PharmD
  - Anne Zepeski, PharmD

Congratulations! I am confident they will bring fresh perspectives, thoughtful leadership, and continued momentum to the important work ahead!

Thank you for the opportunity to serve such a talented, diverse, and committed group of professionals. Please feel free to reach out any time with questions, concerns, or to share new ideas for our group (megan.a.rech@gmail.com). I hope to see many of you soon in Atlanta!

Follow us on social media!
IG & X: @SAEM_AEMP
Bluesky: @saemaemp.bsky.social

Join us on Linkedin: Academcy of Emergency Medicine Pharmacists (AEMP) - Society for Academic Emergency Medicine

Committee Updates

Communication Committee Updates

Chair: Kimberly Won (kiwon@health.ucsd.edu)

Are you looking for ways to get more involved with AEMP? Consider joining the Communications Committee! There are opportunities to write and review articles for the SAEM Pulse Magazine and AEMP Newsletter, and develop clinical pearls and infographics for social media posts! We also have open Charge Lead positions if you're looking to take on a leadership role. Contact the Chair for questions and committee meetings.

Scan the QR code if you have any ideas or requests for a social media post.

Career Development Updates

Chair: Kara Goddard (goddardk@health.missouri.edu)

Join AEMP's Preceptor Resources Team Group

Education Committee Updates

Chair: Alli Cowett (allison.cowett2@nm.org)

- Reach out to the Chair if you are interested in writing/editing for AEMP's "Ask the Pharmacist" section in EM news
- We are excited to share that a new self-paced home study opportunity is coming soon. Stay tuned for details on our upcoming research webinar series!

Membership Committee Updates

Chair: Tara Flack (tflack2@iuhealth.org)

AEMP Member Interest Survey

If you have not yet done so, we encourage you to complete the newly updated newly updated member interest survey available here: AEMP Membership Survey. Your responses help us better understand our membership demographics and allow you to indicate interest in AEMP committees, educational programming, the mentor-mentee program, along with many other opportunities.

AEMP26 Networking

If you are attending SAEM Annual Meeting in Atlanta, here are a couple ways to connect with EM colleagues from throughout the country and and maximize your conference experience:

- **Join the AEMP26 GroupMe chat:** A link to join the GroupMe will be posted on the AEMP community discussion board approximately one week prior to the conference. This forum provides an excellent platform to ask questions, share helpful information, and coordinate informal meetups.
- **Attend the AEMP Networking Event:** Please join us at Max Lager's Wood Fired Grill & Brewery on Tuesday, May 19th at 6pm following the conclusion of the AEMP programming. This informal gathering provides an opportunity to connect with emergency medicine pharmacists from across the country.
- **Connect with a Membership Committee Member:** Be on the lookout for an AEMP membership committee table inside or near the AEMP26 programming conference room. Please stop by to introduce yourself and share your ideas to make AEMP the best place for community and collaboration.

JOURNAL CLUB CORNER

Ketamine or Etomidate for Tracheal Intubation of Critically Ill Adults

Written by: Cecilia Schowe, PharmD, MS, BCPS, BCEMP
Edited By: Judah Brown, PharmD, BCCCP, BCEMP

Ketamine 

Etomidate

Abbreviations: ED: Emergency department; ICU: Intensive care unit; SOFA: Sequential organ failure assessment; RCT: Randomized controlled trial; SBP: Systolic blood pressure; IQR: Interquartile range; CI: Confidence interval; APACHE II: Acute physiology and chronic health evaluation

Background

- Etomidate is most commonly utilized for intubation and is a sedative-hypnotic that works by inhibiting the γ-aminobutyric acid receptors. Due to its hemodynamic stability and rapid onset, it is an ideal agent for intubation
- Etomidate also inhibits 11β-hydroxylase in the adrenal glands resulting in a decrease in cortisol level, which has led some clinicians to consider its applicability in critically ill patients
- Ketamine is a dissociate agent that works on the N-methyl-d-aspartate receptors to produce sedation.
- Due to ketamine's increase in plasma catecholamines, ketamine has been utilized for its possible positive effects on hemodynamics. Of note, when catecholamines are already depleted, ketamine may actually decrease hemodynamics in these patients.
- Etomidate and ketamine are two commonly utilized induction agents for rapid sequence intubation within the ED and ICU settings
- The risk of death, cardiovascular collapse and other safety outcomes has been questioned between the two agents and conflicting evidence has been documented in retrospective literature
- Several previous studies have evaluated the use of etomidate vs ketamine for intubation with mixed results:

Jabre et al (2009)[1]	• Randomized controlled, single-blinded trial • Etomidate 0.3 mg/kg (n=328) vs ketamine 2 mg/kg (n=327) for intubation • No difference was found in mean maximum SOFA score post intubation (10 in the etomidate group vs 9.6 in the ketamine group; p=0.056)
Matchett et al (2021)[2]	• Prospective, randomized, open-label, single-center trial • Etomidate 0.2-0.3 mg/kg (n=400) vs ketamine 1-2 mg/kg (n=401) for sedation prior to intubation • 7-day survival was significantly lower in the etomidate group compared to the ketamine group (77.3% vs 85.1%; p=0.0005) • No difference in survival between groups at 28 days
Greer et al (2025)[3]	• Meta-analysis of 7 RCTs (n=2,384) • Included studies that compared ketamine to etomidate for intubation • In the pooled analysis, ketamine resulted in higher rates of hemodynamic instability in the peri-intubation phase (RR 1.29; 95% CI 1.07-1.57)
Maia et al (2025)[4]	• Multicenter, observational study conducted across Brazil • Etomidate (n=1,296) vs ketamine (n=514) used for intubation • Etomidate resulted in higher 28-day mortality compared to ketamine (60.5% vs 54.4%; RR 1.14 [95% CI 1.03-1.27]) and higher 7-day mortality (35.2% vs 30.1%; RR 1.19 [95% CI 1.04-1.35]) • Ketamine resulted in higher rates of hemodynamic instability within 30 minutes of intubation (24.2% vs 18.9%; RR 0.78 [95% CI 0.64-0.95])

- Given the mixed results seen in previous studies, the authors set out to determine the effects of ketamine compared to etomidate for endotracheal intubation and hypothesized that ketamine would result in a decreased risk of death.

Study Design[5]

- Pragmatic, multicenter, unblinded, randomized trial conducted at 14 sites (6 ED's and 8 ICU's) across 6 medical centers within the United States
- Randomly assigned 1:1 to ketamine vs etomidate for induction of emergency intubation of critically ill adults
- Clinicians and research personnel were aware of trial groups following randomization
- Dosing:
  - For the ketamine group, providers were provided a nomogram with doses based on patient weight that corresponded with 2.0 mg/kg (full dose), 1.5 mg/kg (intermediate dose) or 1 mg/kg (reduced dose) and clinicians then selected a dose
  - For the etomidate group, providers were provided a nomogram with doses based on patient weight that corresponded with 0.3 mg/kg (full dose), 0.25 mg/kg (intermediate dose) or 0.2 mg/kg (reduced dose) and clinicians then selected a dose

Inclusion Criteria	Exclusion Criteria
• Age ≥18 years old • Undergoing emergency tracheal intubation with use of ketamine or etomidate	• Vulnerable populations (pregnancy, prisoner) • Primary diagnosis of trauma • Immediate need for intubation that prevented randomization • Treating clinician determine use of ketamine or etomidate was either necessary or contraindicated

Outcomes[5]

Primary

In-hospital death from any cause by day 28

Secondary

Cardiovascular collapse during intubation: defined as any of the following events between induction of anesthesia and 2 minutes after tracheal intubation; SBP <65 mmHg, New or increased dose of vasopressors, Cardiac arrest

Results[5]

Study Sample

- Enrollment
  - 3,439 patients identified (most common exclusion criteria: Underwent intubation too urgently, clinician declined enrollment because a specific induction agent was required [etomidate n=134; ketamine n=102)
  - 2,367 (68.8%) patients enrolled

- Baseline Characteristics

Baseline Characteristic	Ketamine (n=1,176)	Etomidate (n=1,189)
Age, year, median (IQR)	60 (45-69)	60 (44-69)
Female sex, n (%),	498 (42.3)	492 (41.4)
Location of intubation, n (%)		
Emergency department	663 (56.4)	655 (55.1)
Intensive care unit	513 (43.6)	534 (44.9)
Acute conditions, n (%)		
Acute cardiac condition*	216 (18.4)	223 (18.8)
Acute respiratory condition**	678 (57.7)	683 (57.4)
Acute neurologic condition‖	125 (10.6)	121 (10.2)
Sepsis or septic shock	539 (45.8)	565 (47.5)
Median lowest SBP within 1 hour of enrollment, mmHg (IQR)	115 (96-136)	114 (94-135)
Receipt of vasopressors within 1 hour of enrollment, n (%)	246 (20.9)	274 (23.0)
APACHE II Score, median (IQR)	18 (13-24)	18 (13-24)

*cardiac arrest, cardiogenic shock, congestive heart failure, cardiogenic pulmonary edema, pulmonary hypertension, or myocardial infarction

**acute respiratory distress syndrome, hypercapnic respiratory failure, hypoxemic respiratory failure, or pneumonia

‖intracranial bleeding, meningitis, encephalitis, or stroke

- Medication doses utilized for induction

Medication	Ketamine (n=1,176)	Etomidate (n=1,189)
Ketamine, dose, mg, median (IQR)	140 (100, 150)	—
Ketamine, dose, mg/kg, median (IQR)	1.6 (1.4, 2.0)	—
<1 mg/kg, n (%)	68 (5.8)	—
1-1.49 mg/kg, n (%)	346 (29.6)	—
1.5-1.99 mg/kg, n (%)	482 (41.3)	—
2.0-2.5 mg/kg, n (%)	233 (20.0)	—
>2.5 mg/kg, n (%)	38 (3.3)	—
Etomidate, doses, mg, median (IQR)	—	20 (20,25)
Etomidate, dose, mg/kg, median (IQR)	—	0.28 (0.24, 0.31)
<0.2 mg/kg, n (%)	—	96 (8.1)
0.2-0.249 mg/kg, n (%)	—	252 (21.3)
0.25-0.299 mg/kg, n (%)	—	415 (35.1)
0.3-0.35 mg/kg, n (%)	—	292 (24.7)
>0.35 mg/kg, n (%)	—	129 (10.9)

- Characteristics of intubation procedure

Characteristic	Ketamine (n=1,176)	Etomidate (n=1,189)	Difference (95% CI)
Neuromuscular blocking agent, n (%)			
Rocuronium	810 (69.0)	819 (69.0)	0 (-3.7 to 3.7)
Succinylcholine	362 (30.8)	365 (30.7)	0.1 (-3.6 to 3.8)
None	3 (0.3)	3 (0.3)	0.0 (-0.4 to 0.4)
Median SBP, mmHg (IQR)	127 (110-147)	127 (110-148)	0 (-3 to 3)
Vasopressor bolus or increased infusion rate, n (%)	207 (17.6)	234 (19.7)	-2.1 (-5.2 to 1.1)

- Key Results

Outcome	Ketamine (n=1,176)	Etomidate (n=1,189)	Difference (95% CI)
Primary: In-hospital death for any cause by day 28, n (%)	330 (28.1)	345 (29.1)	-0.8 (-4.5 to 2.09)
Secondary: Composite*	260 (22.1)	202 (17.0)	5.1 (1.9 to 8.3)
SBP <65 mmHg	73 (6.4)	64 (5.5)	0.9 (-1.0 to 2.8)
Receipt of new or increased dose of vasopressor	251 (21.3)	189 (15.9)	5.4 (2.3 to 8.6)
Cardiac arrest	12 (1.0)	10 (0.8)	0.2 (-0.6 to 1.0)

*In patients with sepsis or septic shock, cardiovascular collapse occurred in 30.6% of patients in the ketamine group vs 20.9% of patients in the etomidate group (Risk difference 9.7% [95% CI 4.6 to 14.9])

*In patients with an APACHE II score of ≥20, cardiovascular collapse occurred in 31.4% of patients in the ketamine group vs 20.7% of patients in the etomidate group (Risk difference 10.7% [95% CI 5.5 to 16.0])

- No statistically significant difference was found in safety endpoints of mean SBP at 24 hours or ongoing receipt of vasopressors at 24 hours

Discussion & Conclusions[5]

- Author's Conclusion
  - In critically ill patients undergoing tracheal intubation, ketamine did not result in a significant lower incidence of in-hospital death at 28 days
- Strengths
  - Large sample size
  - Multicenter study design and inclusion of both ED and ICU settings
  - High volume of critically ill patients (Large % of sepsis patients (~46% of patients), large % of death at 28 days, large vasopressor requirement) allowing to ample evaluation of the use of ketamine and etomidate in this patient population
  - Baseline characteristics well balanced between groups
- Limitations
  - Unblinded trial design leading to potential bias towards subsequent treatment decisions (ie dose used, earlier vasopressor administration)
  - Exclusion of trauma patients limiting generalizability to this group of patients
  - Dosing of ketamine based on actual body weight vs ideal body weight (especially in overweight and obese patients)
    - Relativity large number of patients with higher doses of ketamine (>2 mg/kg), which may have contributed to larger rates of cardiovascular collapse seen

Applicability to Practice

- Results of this trial help solidify that the selection of induction agents for intubation remain patient specific and careful consideration should be made based on the hemodynamic and characteristics of each patient, including indication for intubation/mechanical ventilation

Battle of the Beta-Lactams: Ceftriaxone versus Ampicillin-Sulbactam for Community Acquired Pneumonia

Written by: Lisa Hayes, PharmD, BCCCP, BCEMP

Edited By: Holly Westerkamp, PharmD, MBA, BCEMP; Nick Pugliese, PharmD, BCCCP

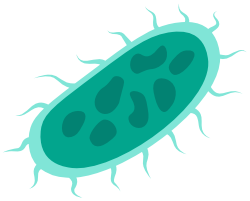
Ceftriaxone VS Ampicillin-Sulbactam

Background

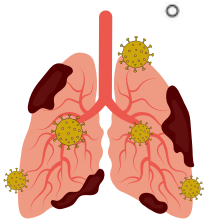
- Community acquired pneumonia (CAP) is encountered commonly in the emergency department with approximately 25 cases per 10,000 adults requiring hospitalization.[1] Older patients generally have a higher risk for hospitalization associated with CAP, and compared to patients aged 18-49 years, patients 50-64 years, 65-79 years and > 80 years have a 4, 9, and 25 times, respectively, higher risk of hospitalization.[1]
- Outside of viral infections, CAP is typically associated with the following bacterial pathogens[2]:
  - *Streptococcus pneumoniae, Haemophilus influenzae, Mycoplasma pneumoniae, Staphylococcus aureus, Legionella species, Chlamydia pneumoniae,* and *Moraxella catarrhalis.*
- The IDSA recommends the following antibiotics for patients hospitalized with CAP without Pseudomonas or MRSA risk factors.[2]
  - Non-severe
    - B-lactam + macrolide (azithromycin or clarithromycin)
    - Respiratory fluroquinolone (moxifloxacin or levofloxacin)
  - Severe
    - B-lactam + macrolide
    - B-lactam + respiratory fluroquinolone
- B-lactam options (assuming normal renal function) are defined as one of the following[2]:
  - Ampicillin-sulbactam (SAM) 1.5-3 g every 6 hours
  - Ceftriaxone (CRO) 1-2 g daily
  - Cefotaxime 1-2 g every 8 hours
  - Ceftaroline 600 mg every 12 hours

The Battle

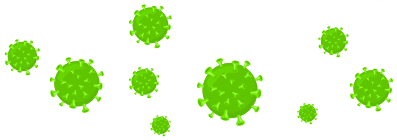
- Beta-lactam therapy has generally been considered interchangeable depending on patient-specific factors such as allergies, renal function, cost, and general logistics (ex – dosing frequency). The most common beta-lactam medications used in the US tend to be ampicillin-sulbactam or ceftriaxone.
  - The 2019 IDSA/ATS guidelines do not offer robust literature to support a choice of beta-lactam but instead offer these insights on appropriate spectrum of activity.[2]



    - Ceftriaxone has limited anaerobic activity when compared to ampicillin-sulbactam. As such, ampicillin-sulbactam may be beneficial in those with CAP secondary to aspiration but may increase the incidence of adverse effects such as *C. difficile* infection.
    - Ampicillin-sulbactam is likely more effective in patients with B-lactamase positive pathogens as the cause of CAP.
    - Ceftriaxone has better efficacy compared to ampicillin-sulbactam when used for the treatment of penicillin-resistant pneumococci and *H. influenzae* based on in-vitro susceptibility.[3]
- A meta-analysis (Kato et al) published in 2022 sought to compare ceftriaxone v ampicillin-sulbactam therapy in CAP; four studies were included totaling ~1000 patients.[3]
  - **Mortality and clinical cure rates** were **similar** between patients who received ceftriaxone versus ampicillin-sulbactam (mortality, odds ratio [OR]: 1.85, 95% confidence interval [CI]: 0.57–5.96; clinical cure rate, OR: 1.08, 95% CI: 0.18–6.44).
  - This finding bolsters the idea that ampicillin-sulbactam and ceftriaxone are interchangeable therapies for CAP, but this was a fairly small and retrospective review.
- A recent publication (Yamamoto et al) has started to challenge the belief that beta-lactams are easily interchangeable without significant changes in patient outcomes.[4]
  - This study included patients > 65 years of age and was designed as a target trial emulation.
  - 26,633 patients were included; 14,906 received ampicillin-sulbactam and 11,727 received ceftriaxone.



    - 65.3% of patients were >81 years old in the ampicillin-sulbactam group compared with 59.1% in the ceftriaxone group. Therapy received on day 1 determined group enrollment and no data was provided on rates of crossover or switches to alternative therapy.
    - Rates of severe CAP were similar between groups (19.6% v 20.3%)
    - Higher rates of aspiration were noted in the ampicillin-sulbactam group (10.4% v 3.5%)
    - Dosing for either agent was not reported.
  - **Ampicillin-sulbactam** was associated with a **higher in-hospital mortality** rate (10.5% v 9%) (adjusted risk difference, 1.5% [95% confidence interval, 0.7%–2.4%]; adjusted odds ratio, 1.19 [1.08–1.31].
  - *C. difficile* infection was also more common in those receiving ampicillin-sulbactam (0.6% v 0.4%, aOR 1.45 (0.99-2.11).
  - Furthermore, mortality remained high in patients with >1 aspiration risk factor who received ampicillin-sulbactam (14.2% v 11.5%, aOR 1.27 (1.14-1.40) which brings into question the necessity and safety of broad anaerobic coverage in CAP that may be caused by aspiration.
  - Interpretation of this study is limited by several factors: higher rates of aspiration in the ampicillin-sulbactam group may signal these patients have a higher rate of chronic illness not identified, dosing was not recorded and may be relevant in determining true risk for adverse effects (i.e. CDI), and the possibility that patients in either group may have received alternative antibiotic therapy due to the inclusion criteria of day 1 therapy.
- These findings may push providers to utilize more ceftriaxone. As such, optimizing the dosing of ceftriaxone may be pertinent.[5]
  - A retrospective study (Taniguchi et al) examined patients with CAP who received 1 g v 2 g of ceftriaxone.
  - 471,694 patients were enrolled; 63.3% received 2 g daily and 36.7% received 1 g daily.
  - Propensity score matching showed **no difference in 30-day mortality** between the two regimens as a whole.
    - Mortality was **lower** in the 2 g cohort within a subgroup analysis of patients requiring **mechanical ventilation** (17.2% v 20.4%) (RD, -3.2%; 95% CI, -5.6% to -0.9%; P = 0.006).
  - Adverse events were higher in the 2 g cohort (composite of biliary complications, *C. difficile* infection and allergic reactions (1.9% v 1.8%, p=0.007). Rates of *C. difficile* infection were more common in the 2 g cohort (1.2% v 1.1%, p=0.014).



Take-Away/Considerations

- More prospective trials are needed to truly confirm if ampicillin-sulbactam or ceftriaxone should be preferred in the management of CAP in various populations including younger patients who were not included in the Yamamoto study.
- Consider risk factors and logistics in deciding the most appropriate beta-lactam in CAP.
  - Age
    - In older adults (>65 years) consider the use of ceftriaxone over ampicillin-sulbactam due to possible increased mortality with ampicillin-sulbactam.[4]
  - Allergy
    - Penicillin allergies are quite common; as such, ceftriaxone may be the optimal choice for these patients due to low risk of cross reactivity and dissimilar side chains.
  - Concurrent or at high risk for *Clostridium difficile*
    - Ampicillin-sulbactam was associated with higher rates of *C. difficile* in the Yamato study but as noted above limitations in trial design may limit the validity of this finding.[4]
    - Traditionally, ceftriaxone has been more widely associated with C. difficile infection than ampicillin-sulbactam.[6] The IDSA recommends restriction of cephalosporins as a method to reduce *C. difficile* infections.[7] Many hospitals have prioritized ampicillin-sulbactam to try and reduce rates of *C. difficile*.
    - Ceftriaxone 2 g dosing has been associated with higher rates of *C. difficile.* Consider 1 g daily dosing in CAP if mechanical ventilation not required.[5]
  - ED Boarding/High Patient to Nurse Ratios
    - Ceftriaxone may be favorable due to once daily dosing and decreased nursing resources compared to ampicillin/sulbactam which is typically dosed four times daily.
  - Mechanical Ventilation
    - Consider the use of ceftriaxone 2 grams instead of 1 gram daily due to possible decreased mortality with this dosing scheme as defined by Taniguchi et al.[5]
  - Renal Dysfunction
    - Ceftriaxone may be favorable in patients with changing renal function due to the need to renally dose adjust ampicillin-sulbactam.
- Consider optimization of the duration of antibiotics.
  - 2025 ATS guidelines comment on the duration of antibiotic therapy in CAP patients who reach clinical stability. They recommend 3-5 days for inpatients hospitalized with non-severe CAP and 5 or more days for patients hospitalized with severe CAP as conditional recommendations.[8]
    - Utilizing shorter durations of therapy in appropriate patient populations may decrease the incidence of adverse effects and development of resistance.

Who are your winners?

Tell us here

Scan me for references for journal club and clinical pearl!

Early Long-Acting Subcutaneous Insulin (LAI) for Diabetic Ketoacidosis (DKA)

2009 American Diabetes Association Guidelines

Initiate long-acting subcutaneous (LAI) insulin after resolution of DKA, overlapping for 2 hours prior to discontinuation of insulin infusion to prevent rebound hyperglycemia

Rationale:

- Traditional 2-hour LAI overlap after DKA resolution based on older practice
- Driven by use of neutral protamine Hagedorn insulin (NPH) which was the primary "long-acting" insulin at the time and has onset of action of 1-2 hours

Joint British Diabetes Society (JBDS) Guidelines

Continue patient's own long-acting basal insulin at usual schedule during DKA management with IV insulin infusion

If newly diagnosed, start long-acting basal insulin at 0.25 units/kg SC once daily

Rationale:

- Newer LAI agents like glargine and detemir have an estimated onset of action of 3-4 hours making a 2-hour overlap potentially insufficient
- Potential benefits of early LAI in DKA treatment:
  - lower rates of rebound hyperglycemia
  - subsequent reduced hospital and intensive care unit (ICU) length of stay (LOS)
  - faster time to DKA resolution

(main study cited in JBDS guidelines)

Evidence for Early LAI

Hsia E et al. Subcutaneous administration of glargine to diabetic patients receiving insulin infusion prevents rebound hyperglycemia (PMID: 22685233)

- **Design:** Prospective RCT
- **Primary Outcome:** Rate of rebound hyperglycemia in patients with type 1 and type 2 diabetes being transitioned from IV to subcutaneous (SC) insulin
- **Intervention group:** insulin glargine 0.25 units/kg SC insulin initiated as early as possible within 12 hours
- **Control group:** insulin initiated >12 hours after initiation of IV insulin infusion initiation
- **Results:** Significantly lower rates of rebound hyperglycemia (33 vs 903%, p<0.001)

Early LAI for DKA Literature Summary

- Available evidence supports benefit of early LAI in
  - mild to moderate DKA in adult patients
  - moderate to severe DKA in pediatric patients
- Early LAI is not associated wtih increased rates of hypoglycemia
- Early LAI may be associated with:
  - decreased rates of transition failure
  - shorter duration of IV insulin infusion
  - shorter time to DKA resolution

Want to read more? check our our SAEM Pulse Article!

- PMIDs: 22685233, 26013711, 31069278, 36479786, 33655870, 38629164, 17508198, 37139251, 39778214

Swipe for a table summary of the literature!

Studies evaluating early long-acting subcutaneous insulin for DKA

Study	Design	Intervention (early SC insulin)	Control (non-early SC insulin)	T1DM No (%)	DKA severity	Hypo-glycemic events	Hypo-kalemic events	Rebound hyper-glycemia	Duration of insulin infusion	Total IV insulin dose	Time to DKA Resolution	ICU LOS	Hospital LOS	Cerebral edema incidence
Adult Studies														
Hsia et al. 2012.	Prospective RCT	SC insulin **glargine** 0.25 units/kg within 12h of infusion (n=30)	SC insulin 12 hours after insulin initiation (n=31)	22 (52.5)	Mixed/ Included patients without DKA	=	N/A	Decreased In early SC group	=	=	N/A	N/A	N/A	
Doshi et at. 2015.	Prospective pilot RCT	SC insulin **glargine** 0.3 units/kg within 2 hours of DKA diagnosis (n=20)	SC long-acting insulin upon closure of anion gap (n=20)	16 (40)	Moderate	=	N/A	N/A	N/A	N/A	=	=	=	
Rappaport et al. 2019.	Retrospective cohort of patients ≥16 years old admitted to ICU	Home dose SC basal insulin prior to DKA resolution (n=33)	Home dose SC basal insulin after DKA resolution (n=73)	N/A	Moderate to Severe	=	N/A	=	Decreased in early SC group	N/A	=	=	=	
Thammakos al et al. 2022.	Single center open label RCT of patients ≥18 years old	SC insulin **glargine** 0.3 units/kg within 3 hours of DKA diagnosis (n=30)	SC insulin glargine after DKA resolution (n=30)	10 (16.7)	Mild to moderate	=	=*	=	N/A	=	Decreased in early SC group	N/A	Decreased in early SC group	
Mohamed et al. 2021.	Retrospective cohort of patients >18 years old admitted to ICU	SC insulin **glargine** prior to DKA resolution (n=45)	SC insulin glargine after DKA resolution (n=335)	262 (70)	Moderate to severe	N/A (not evaluated between groups in this study)					Decreased in early SC group	N/A (not evaluated between groups in this study)		
Murray et al. 2024.	Retrospective, single-center pilot study in patients ≥18 years old	SC basal insulin prior to anion gap closure (n=40)	SC basal insulin after anion gap closure (n=68)	N/A	Mild to moderate	=	=	=	=	N/A	Increased in early SC group	=	=	
Pediatric Studies														
Shankar V et al. 2007.	Retrospective cohort of children age >6 years admitted to the pediatric ICU	SC insulin **glargine** 0.3 units/kg initiated within first 6 hours of IV insulin infusion (n=12)	SC insulin **glargine** 0.3 units/kg initiated after first 6 hours of insulin infusion (n=59)	N/A	Moderate to Severe	=	=	=	Decreased in early SC group	Decreased in early SC group	Decreased in early SC group	N/A	=	=
Welter KJ et al. 2023.	Retrospective cohort of children aged 2 to 21 years	Home SC insulin **glargine** initiated within 6 hours of pediatric ICU admission (n=58)	Home SC insulin **glargine** initiated greater than 6 hours from pediatric ICU admission (n=132)	100 (100)	Moderate to Severe	=	=	N/A	Decreased in early SC group	Decreased in early SC group	Decreased in early SC group	=	=	N/A
Elhawary A et al. 2025	Prospective RCT of children aged 6 to 18 years	Home dose basal insulin at time of IV insulin infusion initiation (n=50)	SC basal insulin after DKA resolution (n=50)	100 (100)	Moderate to Severe	Decreased in early SC group	=	N/A	Decreased in early SC group	Decreased in early SC group	N/A	N/A	N/A	=

N/A: not reported or unable to determine

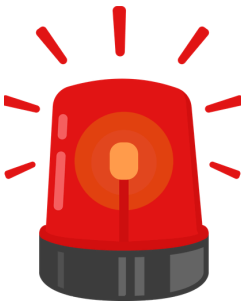
"=": denotes no statistically significant difference between intervention and control groups

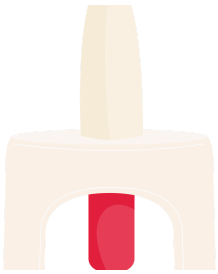
* Rate of hypokalemic events similar, but potassium levels during hypokalemia in early SC group were lower

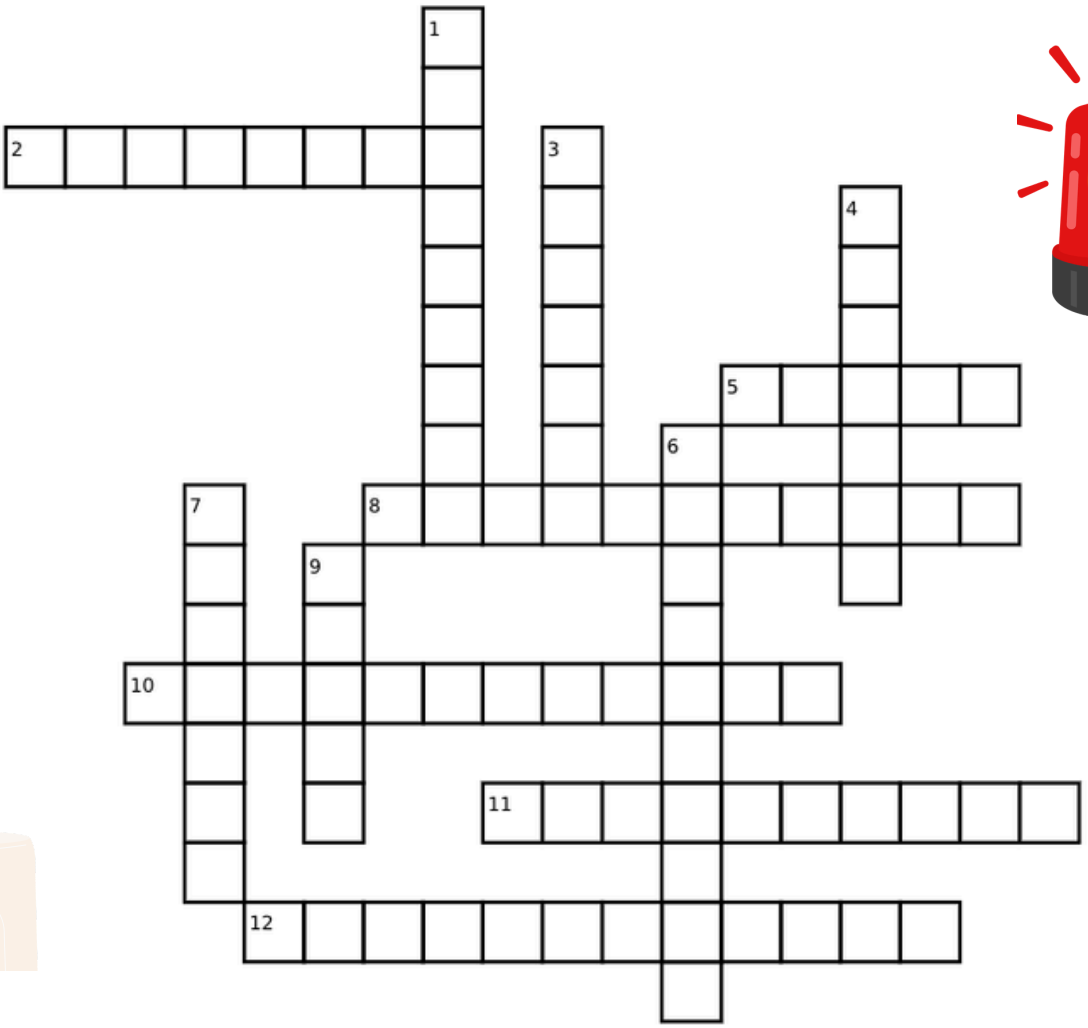
Link to PDF file:

AEMP Pharmacotherapy Crossword

Created By: Sejal Patel-Francis, PharmD, MS, BCPS, BCCCP and Lyuba Benin, P3 Student







Down:

1. Narcan's long lasting cousin who is not new and will be considered second best for use
3. I am recently approved medication to be treated for uncomplicated urinary tract infection in adults and young women as well as approved for urogenital gonorrhea
4. Medication causing xanthopsia and linked to a beautiful, toxic plant, the foxglove
6. I am a medication that should not be used except for kiddos when in need and recently labeled the wrong recommended dose, 10x more
7. This medical antidote once had the "clot" for your heart, but as of 2026, it's officially ghosted the US market because the risks just didn't feel right anymore

Across:

2. I am considered a "universal antidote" that historically referred to in the original context for saving lives but considered bleak
5. An antiviral that starts with a golf peg
8. The weekly 'shot' that might be the reason your trauma patient has a full stomach despite fasting.
10. I am a medicine that just got expanded to treat more patients in a longer time period with one single push
11. I am an antidote for the secondary overdose treatment for a controversial drug used in pregnancy
12. An animal tranquilizer often "mixed" with the wrong crowd and difficult to treat

AEMP Pharmacotherapy Crossword Key