Drugs for Bugs:

What's the Rationale, Benefit, and Downside of EMS Administered Antibiotics

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Are antibiotics in your scope of practice?



Another "Time-sensitive" Disease



J Orthop Trauma. 2015; 29(1).

Infection Risk Increases with Delays in Antibiotic and Wound Coverage



Timing of Antibiotics and Wound Coverage Predict Infection

J Orthop Trauma. 2015; 29(1).

Open Fractures: Gustilo-Anderson Classification

Type I

 Skin wound < 1 cm in length and clean

Type II

 Laceration > 1 cm but < 10 cm without extensive soft tissue damage, flaps or avulsions

Type III

 Wound > 10 cm with extensive soft tissue injury or traumatic amputation



Type III

Type II





Type I

EAST Guideline Recommendations

- Systemic antibiotic coverage directed at gram-positive organisms initiated <u>as soon</u> <u>as possible after injury</u>
- Additional gram-negative coverage for type III fractures
- Additional added for any fecal or potential Clostridial contamination

ACS 2015 Quality Guideline Recommendations

 Intravenous (IV) antibiotics should be started within 60 minutes of presentation to hospital.





Indianapolis EMS Pilot Time from 911 call to Antibiotic Administration (mins)



Type I and II: Cefazolin

- Cover normal flora on the skin
 - Staphylococcus aureus
 - Coag-neg
 Staphylococcus
 - Streptococcus bacteria
- Best for small skin wounds & simple fractures



Type III: Cefazolin and additional antibiotics at hospital

- Cefazolin covers many common grampositive bacteria in fracture-related infections.
- Contaminated "dirty" wounds will require additional antibiotics.



Antibiotic of Choice for EMS

- Cefazolin
- Simple, inexpensive, safe
- Additional antibiotics can be added in ED for complicated fractures

PA Pilot EMS Protocol #6093

Protocol #6093 Patient Criteria



Inclusion Criteria

- Apparent fracture (bony deformity or crepitus)
 AND
- Laceration over fracture

Exclusion Criteria

- Wt. < 30 kg (approx. < 9 y/o)
- Allergy to cephalosporin antibiotics
- History of anaphylaxis to penicillin

Pilot Protocol #6093 Cefazolin Dosing



Summary

- Osteomyelitis/infections from open fractures are a time-sensitive illness.
 - Administer antibiotic as close to time of injury as possible (ideally < 1 hr.)
- EMS accurately identifies open fractures
- Antibiotics by EMS are Safe



The Many Faces of Sepsis





Now There is a New Tool for Early Detection



ANTIBIOTIC

decreases the likelihood of death by

7.6% HOUR

Sepsis Mortality



Time to Antibiotics Matters

Sepsis is a medical emergency ⁸



made for World Sepsis Day by lindgruen-gmbh.com

What Do We Know about Sepsis and Antibiotics ?

□ Antibiotics must be given as soon as Sepsis is recognized

Every 1-hour delay in antibiotic administration = \7.8% hospital mortality in septic shock patients

Broad-spectrum antibiotics should be administered as quickly as possible in these patients with septic shock

□ We chose Rocephin...3rd generation cephlasporin

Why Rocephin...1g IV / IM ?

I WILL LOOK FOR YOU, I WILL FIND YOU

Antibiotics in the Field ?



 $\hfill\square$ We are already doing that

Rocephin 2g IV / IM for open Tib
 / Fib fractures in Trauma patients

□ Rocephin 1g IV / IM for Sepsis Alert patients with a MAP \leq 70

Remember !!!

Antibiotics in Sepsis

Every **60** min DELAY

* SIDP

7.6% increase in

MORTALITY

Kumar A, et al. Crit Care Med 2006; 34(6):1589-96.

TIME to Antibiotics Matters !



- A delay in the initiation of antibiotics (e.g., by 4-8 h) has not been shown to be associated with worse outcome in patients with mild to moderate disease.
- If uncertain diagnosis, wait for results of biomarkers, radiology, rapid microbiological analyses and clinical reassessment.
- When clinical signs and diagnostics indicate bacterial infection, initiate antibiotic therapy targeted to the probable infection site and pathogen.

What about Blood Cultures ?

MENA



If Blood Cultures Were Not Done Before Starting Antibiotics, Is It of Any Value to Obtain Them Later?

- Hourly Effect of Pretreatment With IV Antibiotics on Blood Culture (BC) Positivity Rate in Emergency Department Patients
- Adult patients (>18) admitted from the UFHealth Shands ED between August 2012 and December 2016 (N = 30,743)
 Open Forum Infect Dis. 2019 May; 6(5): ofz179.



Published online 2019 May 20. doi: 10.1093/ofid/ofz179

The percentage of BC with significant growth was <u>unchanged during the first hour</u> after starting IV antibiotics but declined significantly in the period 1–12 hours after IV antibiotics were started

Polk County Fire Rescue Sepsis Protocol

Medical patient \geq 18 years old \geq (2 Positive SIRS Criteria + qSOFA) ┿ Modified Shock Index or Shock Index \rightarrow **Positive Sepsis Alert** Administer IV NS 30ml /Kg If MAP \leq 70 : Septic Shock ADD Rocephin 1g IV/IM



	SECTION	GUI	DELINE	CATEGORY	7	
	IV	4.	12	Μ		
	Items in thi	Level (EMT-B)				
	Items in this color require provider refer to appropriate guideline					
	Initial N	Лedica	l Care			
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	IV Access	; (Larg	e Bore)			
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	DOPAMIN	E 5 — 2	20mcg/k	kg		
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	ROC	EPHIN IVP	l 1g			
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	IF MAP REN	AINS	<70mm	Hg		
	Epinephrin	ie or L	evophe	d		
		ACT MEDIC	AL DIRECTIC TREATMENT	W.		

CLINICAL CARE GUIDELINES



Polk County Fire Rescue Adult Sepsis Alert

POLK COUNTY FIRE RESCUE

MEDICAL GUIDELINES

SIRS/SEPSIS

Items in this color are Advance Level (Paramedic)

Items in this color require provider make a decision



OFFICE OF MEDICAL DIRECTIO

R

Dr. Banerjee

Н

Items in this color are genera

information Items in this color require a physicia

order

Case No.	Patients PCP:	
Date:	Family Contact Name:	
Unit:	Family Contact No.:	
PMD:	Temp:	
Rocephen Time:	Heart Rate:	
Total Fluid Bolus:	Blood Pressure:	
Cooling Start Time:	MAP:	
-		

Criteria	Yes (1)	No (0)			
Temp <96.8'F or >100.4'F					
HR >90 BPM					
Respiratory Rate >20 or PaC02 <32 mmHg					
SBP <90 or MAP <70					
AMS or GCS <15 from normal					
Risk Factors: Nursing Home, Cancer,					
Immunocompromised, Indwelling Foley Catheters					
Two (2) or More Positive Criteria					
Shock Index >1 or Modified Shock Index of <0.7 or >1.3					
IF POSITIVE = SEPSIS ALERT		-			
SEPSIS ALERT TREATMENT					
IV BOLUS	30mL/kg	Until MAP ≥70			
Pressers	To maintain MAP of ≥70				
Rocephen	lgm				
COMMENTS					

· The use of the life-flow device is acceptable way of administering fluid boluses.

Polk County : 2015 - 22 Sepsis Alert Data

ALL Polk County	Number of Cases 2015 - 2021	Number of Cases 2022
Total Sepsis Alerts	3995	253
% Diagnosed with Sepsis	56%	64%
% Admitted		93%
Positive lactate Levels		50%
Mortality 2017-21	Download from Creamstime.com Creamstime.com Creamstime.com Creamstime.com Creamstime.com Creamstime.com Creamstime.com	7.9%

Polk County Fire Rescue Septic Shock Mortality vs. National Average



QUESTIONS ? PaulBanerjee@Polk-County.Net



Mariana Bridi Costa, Brazilian model All of them died secondary to sepsis



Pope John-Paul II



Etta James, singer