

EARLY GOAL DIRECTED THERAPY IN SEPTIC SHOCK

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Why

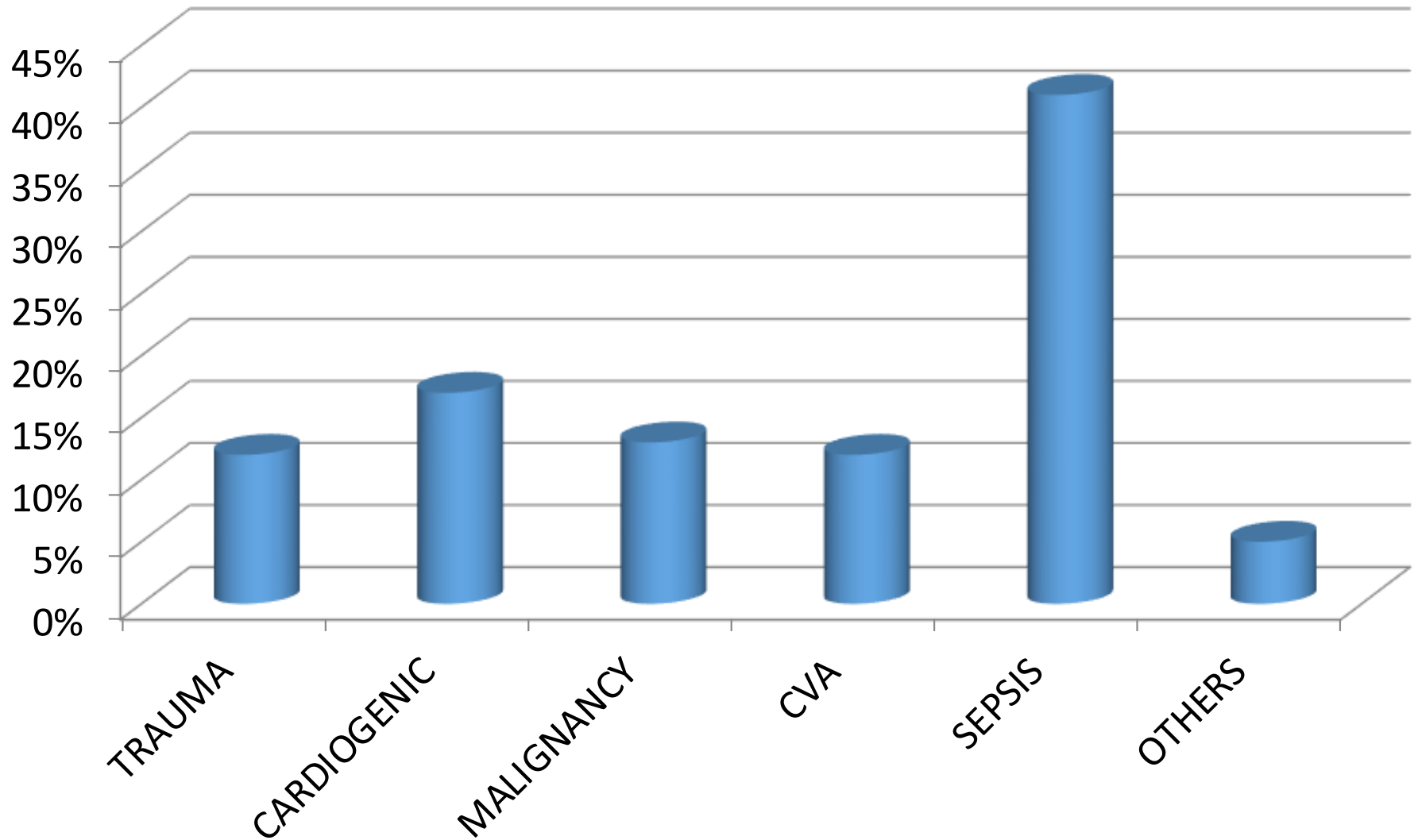
- Sepsis kills.

Leading cause of in-hospital mortality (20-50%)

Data is inadequate in many countries.

- Speed and appropriateness of therapy administered in the first few hours
- Low compliance to recommended guidelines
- Patients spend their first few hours in the ED

Hospital Data



Patients in ER



Definition

Sepsis

Infection + Systemic manifestations

Fever, hypothermia

Tachycardia

AMS

Leucocytosis

Objective Criteria

Temp > 100.4

Pulse > 110

TLC > 12000

Definition

Severe Sepsis

Sepsis + Organ dysfunction

Elevated lactate

Renal failure

Thrombocytopenia

Coagulopathy

Acute lung injury

Objective Criteria

Lactate > 4

Creatinine > 1.5

Platelets < 50000

Septic Shock

Hypotension unresponsive to fluid bolus

Objective Criteria

Systolic <90 after crystalloid fluid bolus of 30ml/kg

Category Of Sepsis

(Circle one)

SEPSIS

(SIRS + Suspected or Confirmed infection or Positive blood cultures)

SEVERE SEPSIS

(Sepsis + Two or more organ dysfunction or Lactate > 4mmol/L)

SEPTIC SHOCK

(Sepsis + SBP < 90 despite fluid bolus of 20ml/kg)

Zero Time**Apollo Sepsis
Action Plan**If not initiated, mention
reason for excluding
patient from ASAP (Time of first diagnosis of sepsis)

ASAP initiated?

Yes

No

Criteria for SIRSAny two of the four signs of
inflammation

T > 100.9°F or < 96.8°F

HR > 90 / minute

Resp. > 20/minute or PaCO₂ < 32

WBC > 12000 or < 4000

or > 10% bands

Definition of organ dysfunctionPaO₂ / FiO₂ < 300

Creatinine > 2.0mg/dL

Creatinine increase > 0.5mg/dL

INR > 1.5

aPTT > 60 secs

Platelets < 100000/uL

Total Bilirubin > 2mg/dL

**Investigations
* Sepsis Profile**

*RP - II

*Serum Lactate

*LFT

*Coagulation Profile

ABG

Chest X-Ray

Others

Problems in Diagnosis

Sepsis missed easily

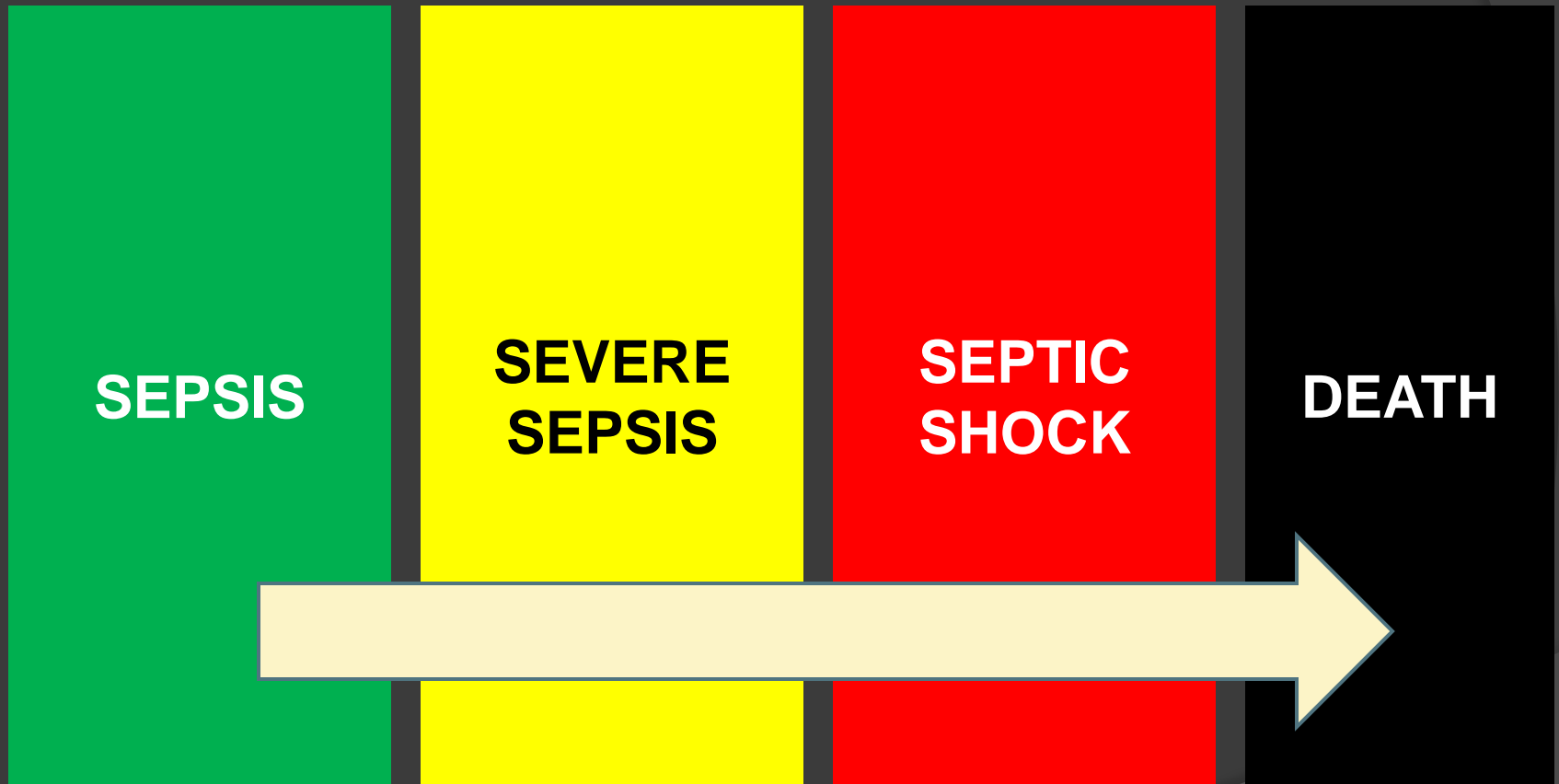
Primary diagnosis distracts

Failed recognition of severe sepsis & shock


Masked patients – Partially treated

Unwarranted debate & discussions

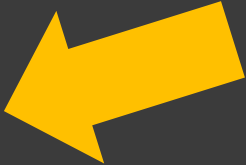
Categorization of Sepsis



Case 1

- 54 yr diabetic with history of pain & redness in the right leg since 5 days
- P-120, BP-80/50, RR-28, T-101
- TLC - 16800
- Soft tissue cellulitis 
- Creat – 0.9, Bilirubin – 1.1, Platelet – 1.6
- Lactate – 1.2, INR – 1.1

Case 2

- 34 yr with history of right abdominal pain
- P-112, BP-70 sys, RR-30, T-100
- TLC - 20800
- Splenic abscess 
- Creat – 2.3, Bilirubin – 4.1, Platelet – 0.6
- Lactate – 5.2, INR – 1.1

Treatment of Sepsis

- ⦿ Recommended guidelines
- ⦿ Cannot replace clinical decision making

It is recommended that routine screening be regularly done to identify patients with sepsis

Resuscitation Goals (ER)

Antibiotics

Cultures

MAP > 65

Lactate

Urine > 0.5ml/kg/hr

CVP 8 – 12

ScvO₂ > 70%

1

Treatment Goals (ICU)

Source control

Steroids

Blood products

Mechanical ventilation

Sedation & paralysis

Glucose control

Hemodialysis

DVT & stress ulcer prophylaxis

2

Early Goal Directed Therapy

- ⦿ Shown to improve survival for ED patients (49.2% vs 33.3%)
- ⦿ Reproduced in multiple studies

EGDT

1. Antibiotics

- ⦿ Appropriate IV antibiotics
- ⦿ Broad spectrum
- ⦿ Within the first hour

Each hour delay is associated with measurable increase in mortality.

1b. Source Control



2. Cultures

- Should be taken before antibiotic administration
- At least two sites



One culture to be taken through vascular access device if present.

Other imaging studies.

3. Central Venous Pressure

- Fluid resuscitation
 - Crystalloids as a 30ml/kg bolus
 - Target CVP 8-12
-
- Common mistake is writing 100mL /hr.
 - Colloids are no longer recommended.
 - Central line is not superior if timely antibiotics and fluid resuscitation is done.



4. Mean Arterial Pressure

- ◉ Fluids
- ◉ Vasopressors
- ◉ Noradrenaline is first choice
- ◉ Target MAP > 65

Always optimize CVP first!

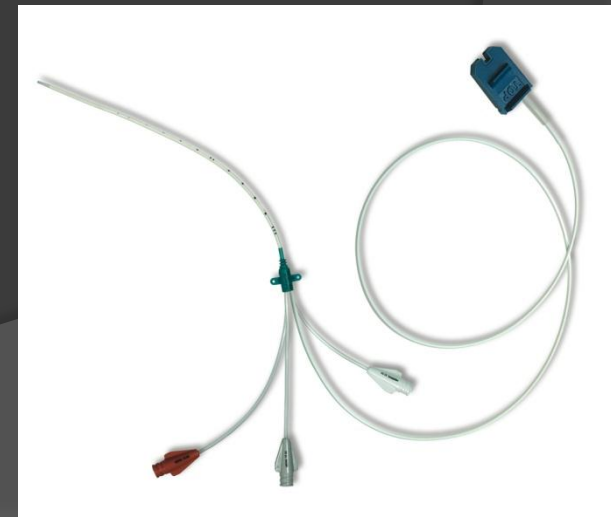


5. Central Venous Oxygen Saturation (ScvO₂)

- Intermittent or continuous measurements

- Target is > 70%

- Fluids, oxygen, blood, dobutamine
- Target Hemoglobin 7 – 9



6. Lactate

- ⦿ Indicator of resuscitation
 - ⦿ 4mmol/L = Septic shock
 - ⦿ Target
 - 6 hour lactate must be lower than first lactate
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- First lactate must be measured within 3 hours
 - Repeat lactate at the end of 6 hours

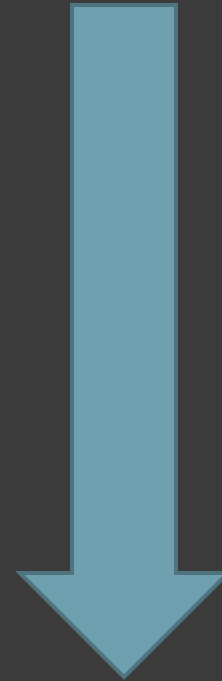
Timelines

ZERO TIME – Diagnosis of sepsis

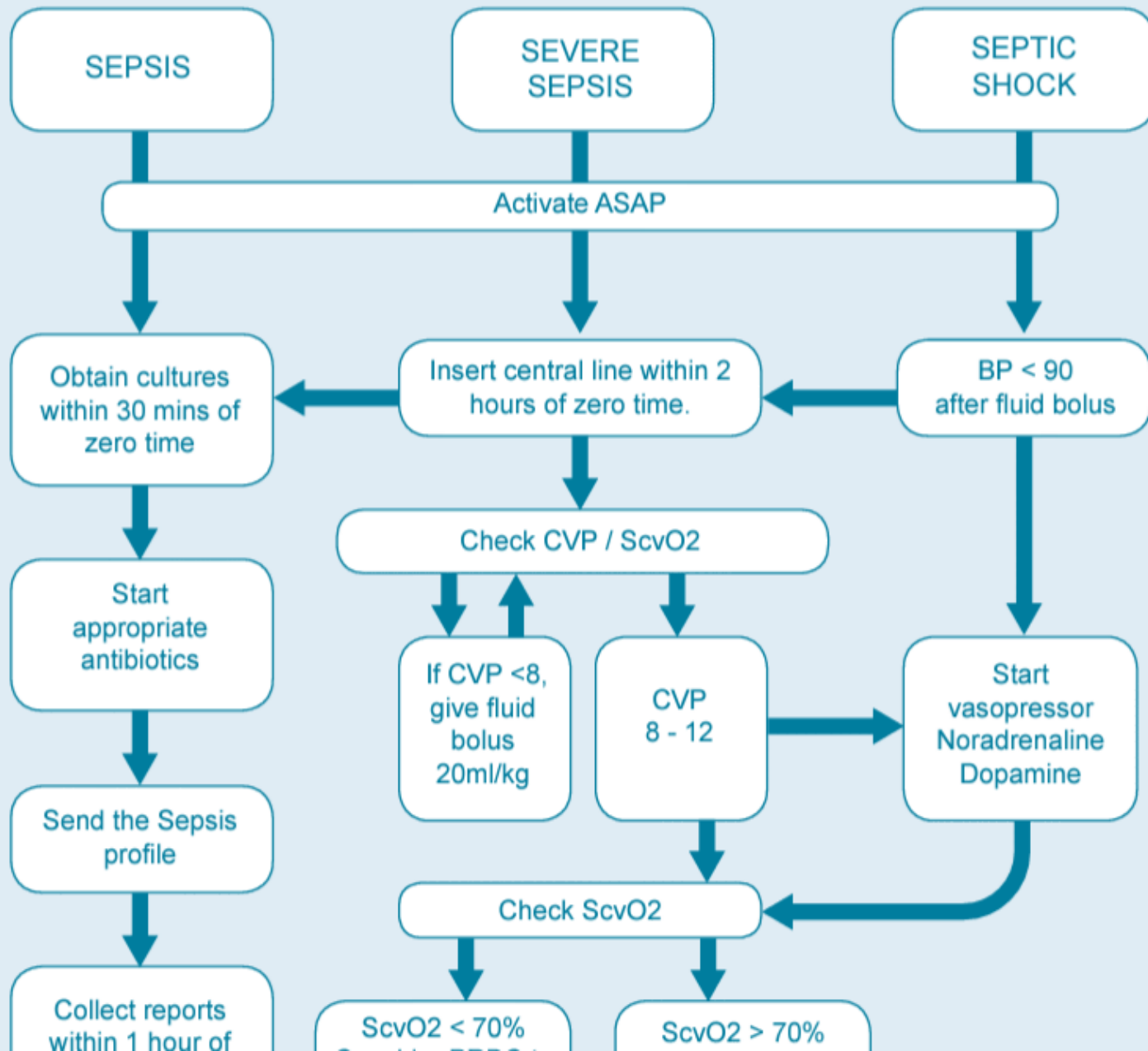
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|------------------------|---------|
| ⦿ Antibiotics | 1 hour |
| ⦿ Lab reports | 1 hour |
| ⦿ Insertion of CV line | 2 hours |
| ⦿ EGDT goals | 6 hours |

Components of EGDT

- ⦿ Antibiotics
- ⦿ Cultures before antibiotics
- ⦿ CVP 8-12
- ⦿ ScvO₂ > 70%
- ⦿ MAP > 65
- ⦿ Decreasing Lactate



Severe Sepsis & Septic Shock Resuscitation Algorithm



After ER

- Continued care in the ICU



Intensive Care Unit

DAY 1

If Option Is Not
Applicable, Circle 'NA'

Goals Maintained?	CVP > 8 (Q4H)	Yes	No	
	Systolic BP > 90 mmHg or MAP > 65	Yes	No	
	ScvO2 > 70% (Q12H)	Yes	No	
	Lactate < 2mmol/L (OD)	Yes	No	
	SpO2 > 90%	Yes	No	
VASOPRESSORS		Yes	No	NA
INOTROPES		Yes	No	NA
STERIODS		Yes	No	NA
		Yes	No	NA
VENTILATION	Plateau pressures < 30 ?	Yes	No	NA
SEDATION		Yes	No	NA
RENAL REPLACEMENT		Yes	No	NA
DIAGNOSIS				
ANTIBIOTIC THERAPY		Yes	No	
SOURCE IDENTIFICATION	Focus of infection ?	Control measure		
FLUID THERAPY	Adequate ?	Yes	No	

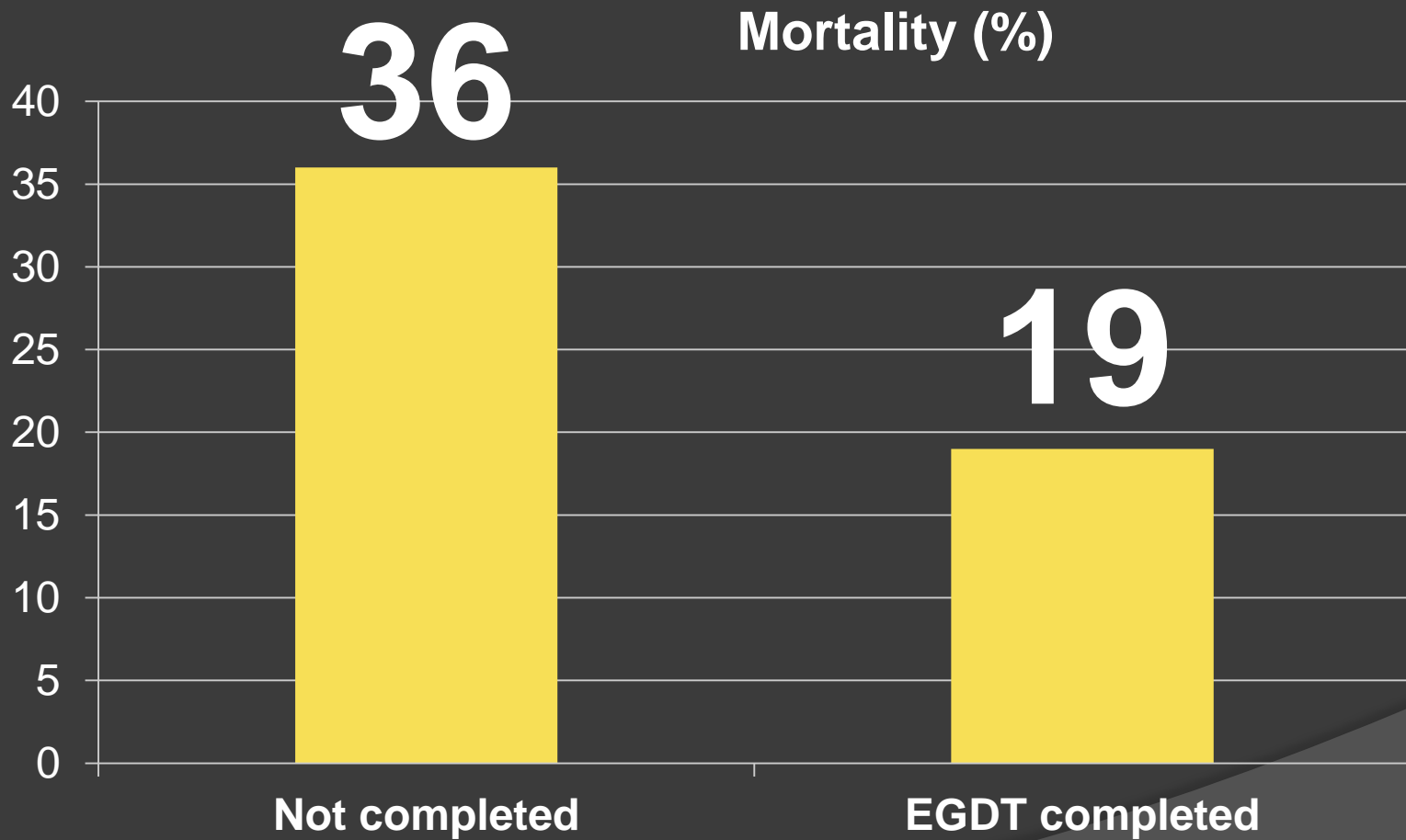
ATLAS Study

Asia Network to Regulate Sepsis Care

Apollo Health City Hyderabad, India
Ruigin Hospital, China
Fortis Healthcare, India
Gangaram Hospital, India
Severance Hospital, Korea
National University Hospital, Singapore
National Taiwan University, Taiwan
Chang Gung Hospital, Taiwan
Loma Linda University, USA

557 patients

ATLAS Study



ATLAS Study

- *“ Implementation of a 6-hour severe sepsis bundle in multiple Asian countries is associated with decreased mortality ”*
- *“ Team implementation model resulted in high compliance to achieving targets ”*

Implementation of a 6-hour severe sepsis bundle in multiple Asian countries is associated with decreased mortality

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Emergency Medicine Department
National University Hospital, Singapore

H. Bryant Nguyen, MD
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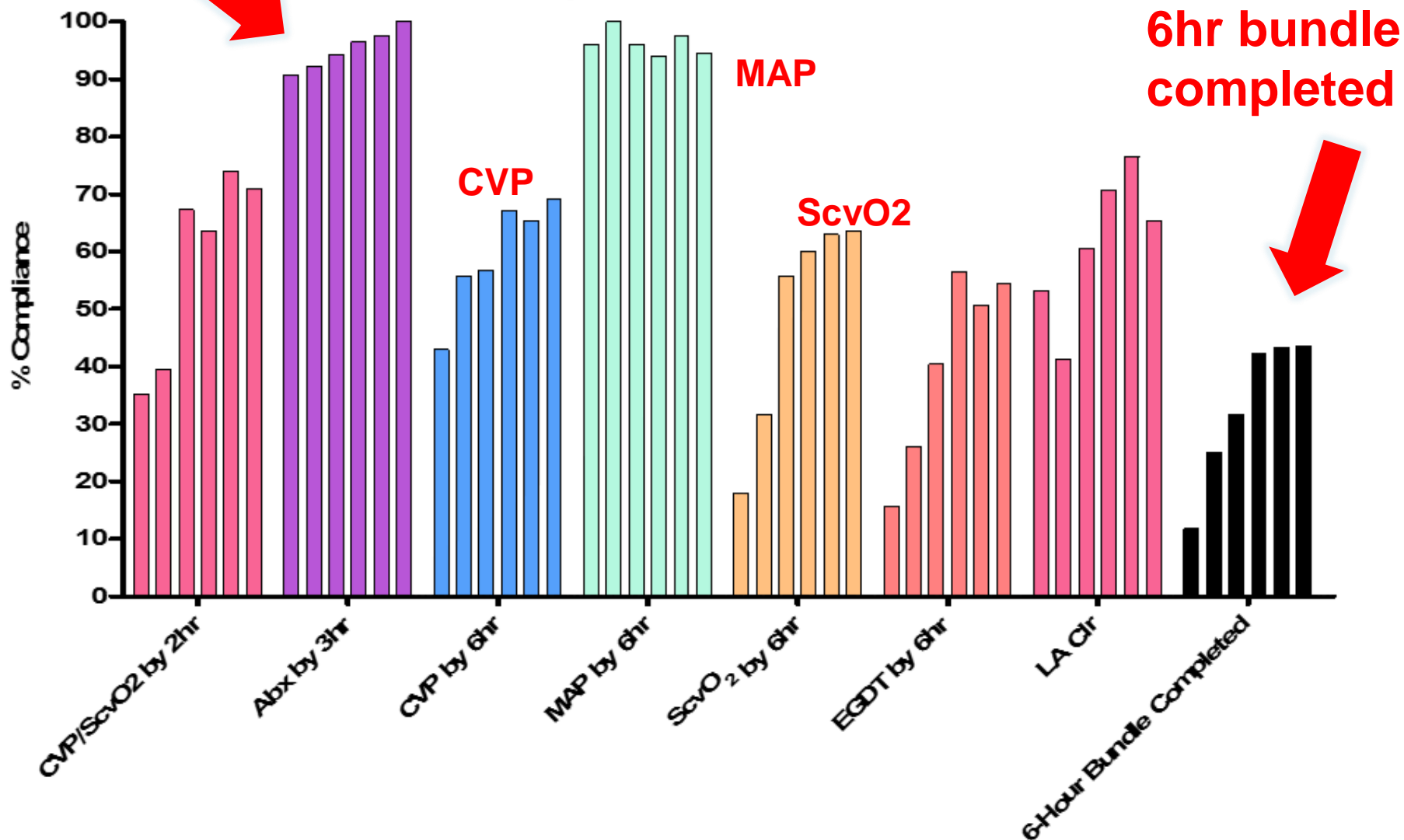
For the ATLAS Investigators
Asia neTwork to reguLate Sepsis care



Antibiotic
in 3hr

Bundle Compliance

All Sites Compliance over 18 months



Choose with care

- ⦿ Antibiotics / Times / Cultures
- ⦿ Times / Volume – Fluid bolus
- ⦿ CVP / PAWP / ScvO₂ / IVC collapsibility
- ⦿ MAP / SBP
- ⦿ Lactate / CD64 index
- ⦿ Activation Criteria
- ⦿ Resus / Treatment Goals

Take Home - Follow EGDT

Make sure all goals are met.
And for all eligible patients.

Track your own data.

Treatment evidence related to sepsis is changing very frequently. Cannot be generalized. Keep a close watch.

Summary

- ⦿ Definition & Categorization
- ⦿ Treatment
- ⦿ Goals
- ⦿ EGDT
- ⦿ Timelines
- ⦿ Patient examples
- ⦿ ATLAS
- ⦿ Importance of completing goals







Thank you for your time

Special thanks to

Dr. Basar Candar

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Medicine Congress, Antalya