VASOPRESSORS IN COVID-19

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COVID TRAINING CELL, UCMS & GTBH

TREATMENT FOR HYPOTENSION IS NOT ALL ABOUT VASOPRESSORS!

IV FLUIDS HAVE A VERY IMPORTANT ROLE TO PLAY!

Spectrum of Clinical Presentation of COVID-19- When to use Vasopressors?

1. Uncomplicated Illness
2. Mild Pneumonia
3. Severe Pneumonia
4. Acute Respiratory Distress Syndrome
5. Sepsis
6. **Septic Shock- (requirement of VASOPRESSORS)**

HOW TO IDENTIFY SEPTIC SHOCK?

1. TAKE BP → CALCULATE MAP
2. SEND ABG FOR LACTATE LEVELS

- FULFILL THE CRITERIA FOR SEPSIS AND
- **DESPITE ADEQUATE FLUID RESUSCITATION, REQUIRE VASOPRESSORS TO MAINTAIN MEAN ARTERIAL PRESSURE (MAP) >65MMHG AND LACTATE >2MMOL/L.**

Reference: Singer M, Deutschman CS, Seymour C, Shankar-Hari M, Annane D, Bauer M, et al. The third international consensus definitions for sepsis and septic shock (sepsis-3). Vol. 315, JAMA - Journal of the American Medical Association. American Medical Association; 2016. p. 801–10.

MANAGING SEPTIC SHOCK

5 THINGS TO DO WITHIN 1 HOUR OF RECEIVING THE PATIENT.

Hour-1 Bundle

Initial Resuscitation for Sepsis and Septic Shock

Surviving Sepsis Campaign

MEDICAL EMERGENCY

Initiate bundle upon recognition of sepsis/septic shock.

May not complete all bundle elements within one hour of recognition.

1 Measure lactate level.

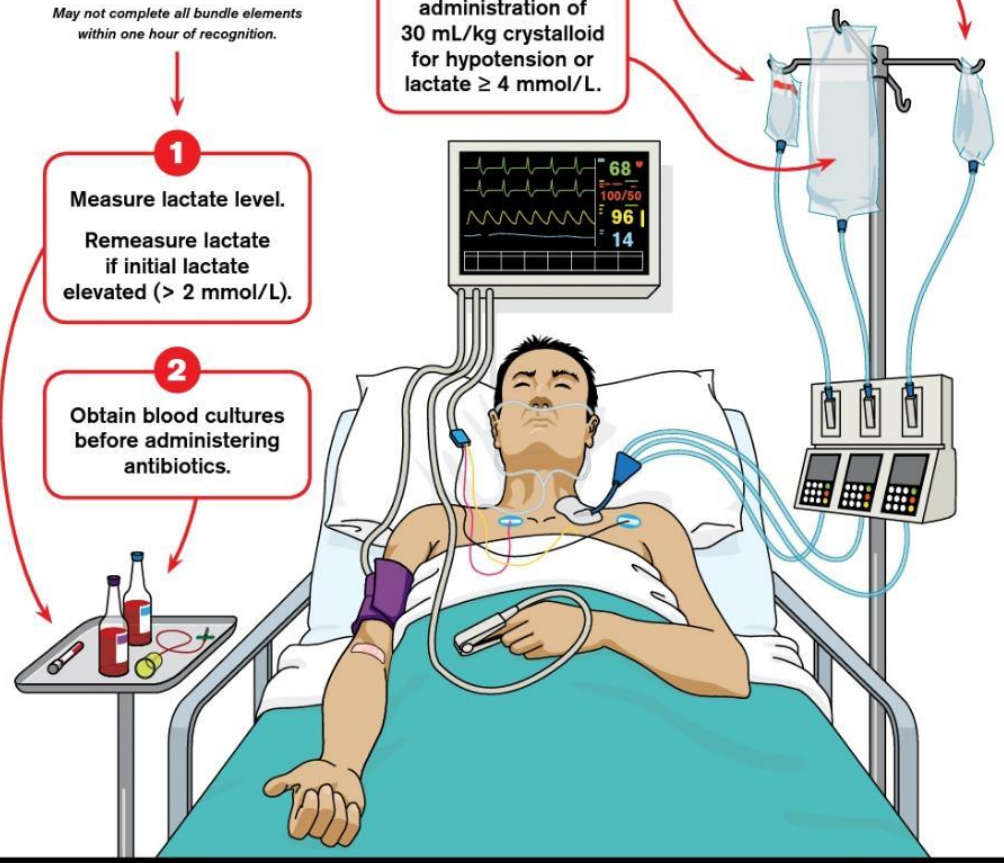
Remeasure lactate if initial lactate elevated (> 2 mmol/L).

2 Obtain blood cultures before administering antibiotics.

3 Administer broad-spectrum antibiotics.

4 Begin rapid administration of 30 mL/kg crystalloid for hypotension or lactate ≥ 4 mmol/L.

5 Apply vasopressors if hypotensive during or after fluid resuscitation to maintain a mean arterial pressure ≥ 65 mm Hg.



Bundle: SurvivingSepsis.org/Bundle **Complete Guidelines:** SurvivingSepsis.org/Guidelines

Society of Critical Care Medicine

ESICM

INITIAL MANAGEMENT- HOUR 1 BUNDLE

- Measure lactate level. Remeasure if initial lactate is >2 mmol/L.
- Obtain blood cultures prior to administration of antibiotics.
- Administer broad-spectrum antibiotics.
- Begin rapid administration of 30ml/kg crystalloid for hypotension or lactate ≥4 mmol/L.
- Apply vasopressors if patient is hypotensive during or after fluid resuscitation to maintain MAP ≥65 mm Hg.

**"Time zero" or "time of presentation" is defined as the time of triage in the Emergency Department or, if presenting from another care venue, from the earliest chart annotation consistent with all elements of sepsis (formerly severe sepsis) or septic shock ascertained through chart review.*

CHOICE OF CRYSTALLOID?

WHAT TO GIVE → NS/RL
HOW MUCH TO GIVE → 30ML/KG IN 1 HOUR

- ***"WE SUGGEST USING EITHER BALANCED CRYSTALLOIDS (RINGER'S LACTATE) OR NORMAL SALINE FOR FLUID RESUSCITATION OF PATIENTS WITH SEPSIS OR SEPTIC SHOCK" (WEAK RECOMMENDATION, LOW QUALITY OF EVIDENCE).***

Reference: Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign. Crit Care Med [Internet]. 2017 Mar 1 [cited 2020 Jun 10];45(3):486–552.

AFTER CRYSTALLOID ADMINISTRATION..

- DETERMINE NEED FOR ADDITIONAL FLUID BOLUSES (25
  IN ADULTS OR 10-20 ML/KG IN CHILDREN) BASED ON
  RESPONSE AND IMPROVEMENT OF PERFUSION TARGE
- **PERFUSION TARGETS:**
  - **MAP (>65 MMHG OR AGE-APPROPRIATE TARGETS IN CHILDREN),**
  - **URINE OUTPUT (>0.5 ML/KG/HR IN ADULTS, 1 ML/KG/HR IN CHILDREN)**
  - ***IMPROVEMENT OF SKIN MOTTLING, CAPILLARY REFILL, LEVEL OF CONSCIOUSNESS, AND SERUM LACTATE.***

1. MEASURE BP
2. MEASURE URINE OUTPUT
3. CLINICAL FEARURES

ALWAYS REMEMBER..

- If there is **NO RESPONSE TO FLUID LOADING** and **SIGNS OF VOLUME OVERLOAD** appear:
  - **JUGULAR VENOUS DISTENSION,**
  - **CRACKLES ON LUNG AUSCULTATION,**
  - **PULMONARY OEDEMA ON IMAGING OR**
  - **HEPATOMEGALY IN CHILDREN**

THEN REDUCE OR DISCONTINUE FLUID ADMINISTRATION.

MONITORING RESPONSE

1. CLINICAL PARAMETERS
2. MONITORING CATHETERS
3. LABORATORY PARAMETERS

MONITORING- CLINICAL PARAMETERS

- **MAP {[(2x DBP) + SBP]/3}**
- **URINE OUTPUT**
- Heart rate
- Respiratory rate
- Skin colour
- Temperature
- Mental status

MONITORING CATHETERS

- Central Venous Catheter- Target CVP 8-12 mmHg

(MAY BE USED IN ICU SETTING)

LABORATORY VALUES

- ABG:
  - Lactate clearance (<2MMOL/L)
  - P/F ratio (>300)
- Routine investigations: Platelet count, TLC, RFT, LFT, Electrolytes.

VASOPRESSORS

1. When to give?
2. How to give?
3. What to give?
4. How much?

WHEN TO ADMINISTER VASOPRESSORS?

- Administer vasopressors when **SHOCK PERSISTS DURING OR AFTER FLUID RESUSCITATION.**
- The initial **BLOOD PRESSURE TARGET IS MAP ≥65 MMHG IN ADULTS** and age-appropriate targets in children.

How to administer vasopressors

- Route: intra-venous
- Which vein?
  - **Preferably via central venous catheter**
  - Large peripheral vein (Look for signs of extravasation and tissue necrosis. If any present, **STOP IMMEDIATELY**)

WHICH DRUG TO USE?

NOR-EPINEPHRINE

"We recommend norepinephrine as the first-choice vasopressor (strong recommendation, moderate quality of evidence)."

Reference: Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign. Crit Care Med [Internet]. 2017 Mar 1 [cited 2020 Jun 10];45(3):486–552.

DOSAGE AND TITRATION: NOR-EPINEPHRINE

- INITIAL DOSE: 8-12 MICROGRAM/MIN
- HOW TO WRITE THE ORDER: **2 AMPUOLE IN 100ML DNS @ 16 MICRODROPS/MIN** (CORRESPONDS TO 10MICROGRAM/MIN).
  CAN GO UPTO 5 MICRODROPS/KG/MIN.
- TITRATE TO EFFECT: MAP >65MMHG, URINE OUTPUT >0.5ML/KG/MIN, CLINICAL IMPROVEMENT

Role of Dopamine

May be used in patients with:

- Bradycardia
- Low risk of tachyarrythmias

Why is Dopamine not preferred as initial therapy?

- Increased risk of adverse outcomes (like tachy-arrythmias and death at day 28) compared to Nor-epinephrine.

Reference: De Backer D, Biston P, Devriendt J, Madl C, Chochrad D, Aldecoa C, et al. Comparison of dopamine and norepinephrine in the treatment of shock. N Engl J Med. 2010 Mar 4;362(9):779–89.

PATIENTS WHO FAIL INITIAL THERAPY- ADD INOTROPE

"IF SIGNS OF POOR PERFUSION AND CARDIAC DYSFUNCTION PERSIST DESPITE ACHIEVING MAP TARGET WITH FLUIDS AND VASOPRESSORS, ***CONSIDER AN INOTROPE SUCH AS DOBUTAMINE.***"

Reference: Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis Campaign. Crit Care Med [Internet]. 2017 Mar 1 [cited 2020 Jun 10];45(3):486–552.

DOSAGE AND TITRATION- DOBUTAMINE

- DOSE: 1 MICROGRAM/KG/MIN → 2-40 MICROGRAM/KG/MIN
- 1 AMPUOLE IS 5ML (250MG)
- HOW TO WRITE THE ORDER: **1 AMPUOLE IN 500ML 5% DEXTROSE @ 6 MICRODROPS/MIN. (50MICROGRAM/MIN)**
  CAN GO UPTO 240 MICRODROPS/MIN.
- TITRATE TO EFFECT: MAP >65MMHG, URINE OUTPUT >0.5ML/KG/MIN, CLINICAL IMPROVEMENT

Patients who respond to therapy

- Identification and control of septic focus
- De- escalate vasopressors
- De- escalate fluids
- Complete course of antibiotics

AN INITIATIVE OF:

- COVID Training cell and
- Medical Education Unit

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THANK YOU.