WHICH INOTROPIC AGENT IS THE CHOICE AT THE BEGINNING OF SEPTIC SHOCK?

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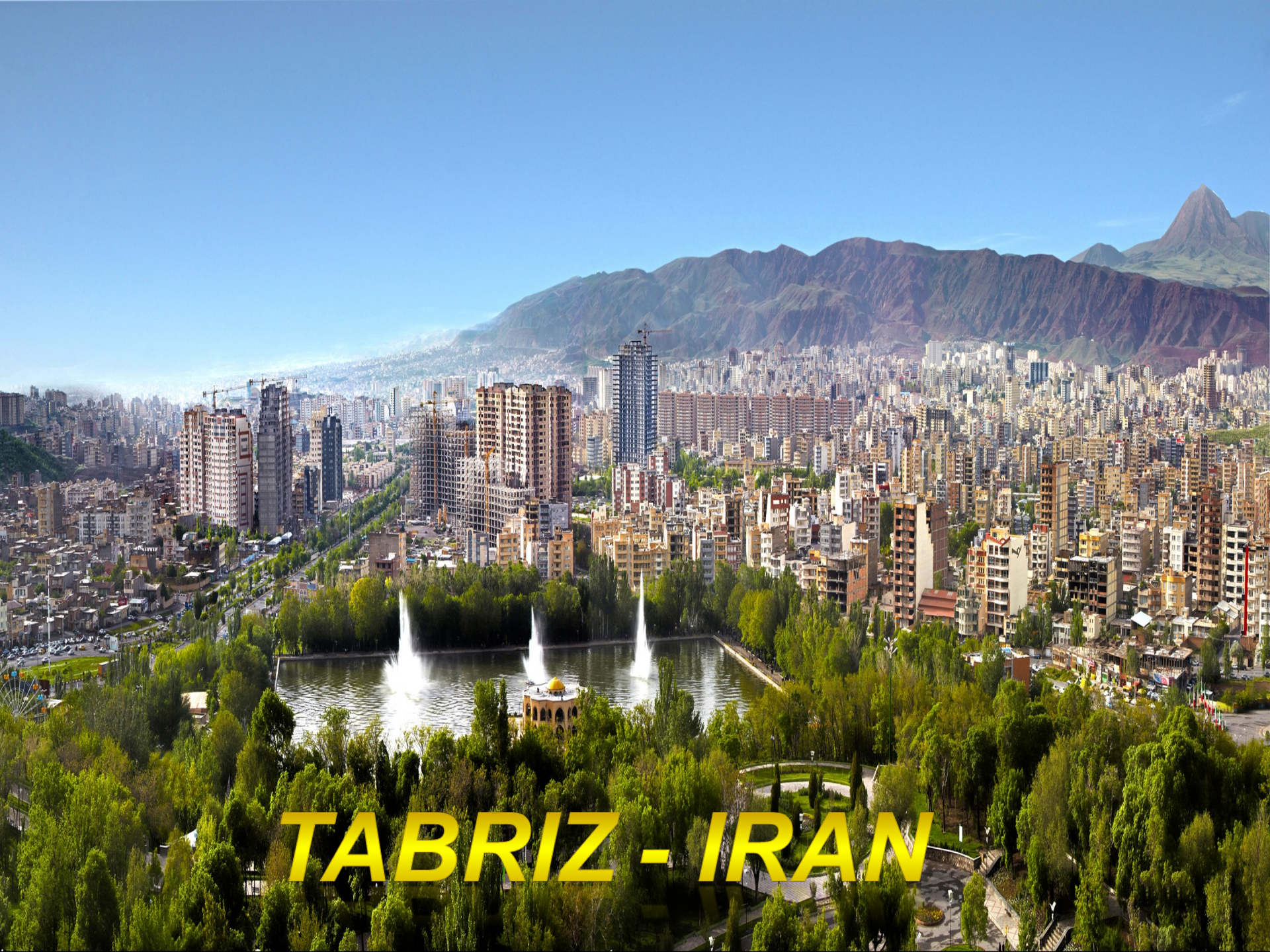
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OBJECTIVES

- Definition of septic shock
- General approach to septic shock
- Vasopressor agents
- Complications of vasopressor agents
- Indications and common use of vasopresor agents in septic shock

DEFINITION

Septic Shock

Septic shock results when infectious agents or infection-induced mediators in the bloodstream produce hemodynamic decompensation.

APPROACH TO SEPTIC SHOCK

- **When fluid administration fails to restore an adequate arterial pressure and organ perfusion in patients with septic shock, therapy with vasopressor agents should be initiated.**

- **There has been longstanding debate about whether one catecholamine vasopressor agent is superior to another, but different agents have different effects on pressure and flow.**

- Four agents with vasopressor activity are commonly used in the treatment of patients with septic shock.

- These are ***Dopamine***, ***Norepinephrine***, ***Epinephrine***, ***Phenylephrine*** and ***Vasopressin***

- ***Corticostroids***

DOPAMIN

- At doses of 5 microg/kg/min, dopaminergic receptors are activated, leading to vasodilation in the renal and mesenteric beds.
- At doses of 5 to 10 microg/kg/min, beta1-adrenergic effects predominate, increasing cardiac contractility and heart rate,
- At doses of more than 10 microg/kg/min, alpha 1-adrenergic effects predominate, leading to arterial vasoconstriction and an increase in BP.

NOREPINEPHRINE

- Norepinephrine is more potent than dopamine and may be more effective at reversing hypotension in septic shock patients.

- At doses ranging from 0.01 to 3.3 micro g/kg/min has been shown to increase mean arterial pressure in patients who remained hypotensive after fluid resuscitation and dopamine.

NOREPINEPHRINE

Norepinephrine can increase BP in patients with septic shock without causing a deterioration in cardiac index and organ function.

PHENYLEPHRINE

- Selective alpha1-adrenergic agonist
- increases BP by vasoconstriction
- rapid onset and short duration

EPINEPHRINE

- Potent α-adrenergic and ß–adrenergic agent
- Increases mean arterial pressure by increasing both cardiac index and peripheral vascular tone
- Increases oxygen delivery

- Randomized clinical trial comparing therapy with epinephrine to that with norepinephrine:

  No significant difference was found in the rates of 28-day mortality, ICU mortality, or hospital mortality.

VASOPRESSIN

- As an alternative vasopressor agent in patients with septic shock.

- Vasopressin (0.03 U/min) added to norepinephrine appears to be as safe and effective as norepinephrine in fluid-resuscitated patients with septic shock.

COMPLICATIONS OF VASOPRESSOR THERAPY

- ***Tachycardia***
- ***Myocardial ischemia and infarction***
- ***Impair blood flow to the splanchnic system: stress ulceration, ileus, malabsorption, and even bowel infarction***

Vasopressor and inotropic support in septic shock: An evidence-based review

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Objective: In 2003, critical care and infectious disease experts representing 11 international organizations developed management guidelines for vasopressor and inotropic support in septic shock that would be of practical use for the bedside clinician, under the auspices of the Surviving Sepsis Campaign, an international effort to increase awareness and to improve outcome in severe sepsis.

Design: The process included a modified Delphi method, a consensus conference, several subsequent smaller meetings of subgroups and key individuals, teleconferences, and electronic-based discussion among subgroups and among the entire committee.

Methods: The modified Delphi methodology used for grading recommendations built on a 2001 publication sponsored by the International Sepsis Forum. We undertook a systematic review of the literature graded along five levels to create recommendation grades from A to E, with A being the highest grade. Pediatric considerations to contrast adult and pediatric management are in the article by Parker et al. on p. S591.

Conclusion: An arterial catheter should be placed as soon as possible in patients with septic shock. Vasopressors are indicated to maintain mean arterial pressure of <65 mm Hg, both during and following adequate fluid resuscitation. Norepinephrine or dopamine are the vasopressors of choice in the treatment of septic shock. Norepinephrine may be combined with dobutamine when cardiac output is being measured. Epinephrine, phenylephrine, and vasopressin are not recommended as first-line agents in the treatment of septic shock. Vasopressin may be considered for salvage therapy. Low-dose dopamine is not recommended for the purpose of renal protection. Dobutamine is recommended as the agent of choice to increase cardiac output but should not be used for the purpose of increasing cardiac output above physiologic levels. (Crit Care Med 2004; 32[Suppl.]:S455–S465)

- ***Does vasopressor support improve outcome from septic shock?***

When an appropriate fluid challenge fails to restore an adequate arterial pressure and organ perfusion, therapy with vasopressor agents should be started.

- ***Which drug has superiority in the treatment of septic shock?***

  Either ***norepinephrine*** or ***dopamine*** (through a central catheter as soon as possible) is the first choice vasopressor agent to correct hypotension in septic shock.

- ***Should vasopressin be administered as vasopressor in septic shock when conventional vasopressor therapy fails?***

- Vasopressin use may be considered in patients with refractory shock despite adequate fluid resuscitation and high-dose conventional vasopressors. (0.01–0.04 units/min)

- There is increasing interest in the possible role of vasopressin as a therapeutic vasopressor in patients with septic shock.

- ***Should epinephrine or phenylephrine be administered as first line vasopressors in septic shock?***

- Both ***Phenylephrine & Epinephrine*** decreases splanchnic blood and oxygen delivery in septic shock patients.

- *Which pharmacologic agent is choice to increase cardiac output in the treatment of septic shock?*

  In patients with low cardiac output despite adequate fluid resuscitation, ***dobutamine*** may be used to increase cardiac output. If used in the presence of low blood pressure, it should be combined with vasopressor therapy.

CONCLUSION

- **An *arterial catheter* should be placed as soon as possible in patients with septic shock.**
- **Vasopressors are indicated to maintain mean arterial pressure of <65 mm Hg, both during and following adequate fluid resuscitation.**
- ***Norepinephrine* or *dopamine* are the vasopressors of choice in the treatment of septic shock.**
- ***Norepinephrine* may be combined with *dobutamine* when cardiac output is being measured.**
- ***Epinephrine*, *phenylephrine*, and *vasopressin* are not recommended as first-line agents in the treatment of septic shock.**
- ***Dobutamine* is recommended as the agent of choice to increase cardiac output but should not be used for the purpose of increasing cardiac output above physiologic levels.**


Thanks