MEDIBEATS
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In Hypertension

Hypertension leading to organ hypo perfusion and other complications in critically ill patients is common and often requires vasopressors. They need to be managed according to certain principles.

1. ***Set goals of mean or diastolic blood pressures:*** Mean arterial blood pressure (MAP) represents the pressure for perfusion for most organs. The diastolic blood pressure is key for coronary perfusion pressure whereas systolic blood pressure is greatly impacted by large blood vessels compliance. Defining targets of MAP prevents organ hypo perfusion, ensures oxygen delivery and avoids unnecessary exposure to vasopressors. Different trials suggest MAP of 65 mmHg is appropriate most patients.

2. ***Individualize the arterial pressure targets goals:*** Targeting higher blood pressure may be associated with increased risk of adverse events. Interpatient variability however exists regarding organ perfusion pressure. Organ perfusion assessment is difficult and most often rely on functional surrogates like glomerular filtration rate, urine output etc. Bedside ultrasound can help assessing optimal perfusion pressure. Reassessing these targets on a regular basis (e.g. every 4–6 h), to avoid unnecessary exposure to higher doses of vasopressors is a good strategy.

3. ***Vasopressors induce an endogenous fluid recruitment and may limit positive fluid balance:*** Vasopressors increase blood pressure through the increase of systemic vascular resistance and effect on venous system to increase venous return and subsequently increases cardiac output, so simulating a fluid bolus through endogenous fluid recruitment, resulting in limiting the positive fluid balance. Norepinephrine decreases inflammation induced capillary permeability also. So it is recommended to rule out hypovolemia before starting vasopressors for severe hypotension.

4. ***Reassess fluid status and cardiac output after initiation of vasopressors:*** Higher doses can cause excessive vasoconstriction, resulting in coronary, mesenteric, and digital ischemia and can also alter cardiac output due to a reduced myocardial perfusion or an increased afterload. So it's always better to re-assess cardiac function and cardiac output in hypotensive patients after starting vasopressors.

5. ***Consider agents with a different mechanism of action as a second line agent:*** Norepinephrine is recommended as the first line vasopressor for patients with sepsis or distributive shock. Adding a second vasopressor agent with a different vasoconstrictive mechanism of action might limit the side effects of catecholamines. Low doses of vasopressin decrease the risk of atrial fibrillation, and may improve renal function in patients with vasodilatory shock.

6. ***Consider adding hydrocortisone in patients on high doses of vasopressors:*** Trials suggests that hydrocortisone with fludrocortisone decreases doses of vasopressors in patients with septic shock requiring high doses of vasopressors (e.g. norepinephrine equivalent ≥ 0.25 µg/kg/min) and who have multiple organ failures. Impact of hydrocortisone on outcome is unclear.

7. ***Vasopressin in patients with right ventricular failure:*** Due to the lack of V1-receptors in the pulmonary arteries, vasopressin does not increase pulmonary vascular resistance. Norepinephrine was shown to slightly increase pulmonary vascular resistance and also improves right ventricle function through its inotropic effects. Among patients with systemic vasodilation and altered right ventricle function norepinephrine represents the first line agent but vasopressin with inotropes is an alternative.

8. ***There is no maximal dose of vasopressors:*** Though high doses of vasopressors have been associated with a higher risk of death given the higher severity of illness of these patients. Auchet et al. reported 90 days' survival of 40% in patients receiving vasopressor > 1 µg/kg/min underlining fair survival on very high doses of vasopressors.

9. ***Enteral tube feeding can be initiated while under vasopressors:*** Norepinephrine and low dose vasopressin have been shown to improve mesenteric perfusion and gut microcirculation. Whereas impaired gut micro perfusion was reported with epinephrine. Enteral nutrition is safe among patients receiving lower doses of norepinephrine. At higher doses, risk of mesenteric ischemia increases with enteral nutrition but remains very low.

10. ***Vasopressors can be safely administered through a peripheral catheter:*** Randomized trials showed it is safe to administer vasopressors (i.e. norepinephrine) through a well-functioning peripheral catheter. Central venous access should not delay the initiation of vasopressors in the critically ill patients.

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