Methylene Blue as Adjuvant for Distributive Shock

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Distributive shock is a condition of inadequate tissue perfusion from the decrease of systemic vascular resistance. One pathophysiology of excessive vasodilation in distributive shock is excessive nitric oxide production, which further stimulates guanylate cyclase causing vascular smooth muscle relaxation¹.

Methylene blue is an antidote for methemoglobinemia. It is available in Thailand through the National Antidote Project. Methylene blue inhibits vascular smooth muscle relaxation by the inhibition of guanylate cyclase and inducible nitric oxide synthase (iNOS)²-³. Methylene blue may also increase cardiac output by the increase of L-type calcium channel activity cyclic AMP⁴-⁵. Methylene blue has been studied for treatment of distributive shock, including septic shock, anaphylactic shock, vasoplegic syndrome, and refractory shock from drug overdose. Despite varieties of the study design, population, and regimen of methylene blue, the majority of studies report an increase in mean arterial blood pressure and hemodynamic improvement.

Side effects of methylene blue include the risk of drug interaction that causes serotonin syndrome, hemolysis in G-6-PD deficiency patients or with high dose administration, rebound methemoglobinemia with high dose administration, and increase of pulmonary artery pressure. Until now, there has still been a gap of knowledge such as 1) Which methylene blue regimen is the most benefit in distributive shock?, and 2) When is the appropriate time, or how much refractory is the appropriate point to use methylene blue as adjuvant for distributive shock?

References

Keywords: Methylene blue, Distributive shock, Septic shock, Anaphylactic shock, Vasoplegic syndrome