

Low systemic vascular resistance: differential diagnosis and outcome

ABSTRACT

At least a quarter of patients with hypotension and a low SVR have nonseptic etiologies. The patients with nonseptic etiologies have a similar mortality to septic patients. Clinicians should be aware of the wide spectrum of conditions that induce a low SVR.

INTRODUCTION

Introduction As initially described by Poiseuille's law, resistance to flow is that resistance provided by a vessel or circulatory bed which permits a given pressure differential to produce a unit flow. Transcribed to human hemodynamics, systemic vascular resistance (SVR) can be measured from the differential pressure between the mean arterial pressure (MAP) and the central venous pressure (CVP) divided by the flow, ie cardiac output (CO). Although many clinical conditions can cause a low SVR, septic shock remains the most common cause and usually results in a severe decrease in SVR. In more than 90% of patients with septic shock who are aggressively volume loaded, the CO is initially normal or elevated. Therefore, hypotension results from reduced vascular resistance with normal or elevated CO. This form of shock results from maldistribution of blood flow to tissues, usually from acute vasodilatation without concomitant expansion of the intravascular volume. While distributive shock can also be caused by anaphylaxis, drug ingestion, neurogenic injury, and adrenal insufficiency, these conditions are seen with less frequency in the intensive care unit. Therefore, a hemodynamic state with low SVR is often considered synonymous of sepsis, and other conditions associated with a low SVR may not be considered. There are minimal data in the medical literature assessing the frequency or outcome of patients with distributive shock that is unrelated to sepsis or the sepsis syndrome. Since we could find no prior studies in the literature assessing the etiology and outcome of hypotensive patients with a low SVR, we reviewed our experience with patients undergoing hemodynamic monitoring in the medical intensive care unit of a large university hospital. The purpose of this study was to determine the different causes of low SVR, identify prognostic factors, and analyze the mortality of these various groups of patients.

CONCLUSION

In summary, we describe a group of 55 patients with a SVR below 800 dynes/cm⁵, and a subgroup of 13 non-septic patients (24%) with a similar mortality. This study emphasizes the importance of considering other conditions besides sepsis in patients presenting with hypotension and a low SVR.