INCIDENCE OF LEFT VENTRICULAR SYSTOLIC DYNAMIC OBSTRUCTION IN NON-CARDIGENIC SHOCK TREATED WITH POSITIVE IONOTROPIC AGENTS.

Background: Systolic dynamic obstruction of the left ventricle is classically seen in patients with hypertrophic cardiomyopathy but can also be induced by administration of positive ionotropic agents. Patients with non-cardiogenic shock may be vulnerable to developing obstruction because the left ventricular end-diastolic and end-systolic volumes are often small due to hypovolemia and peripheral vasodilatation. Treatment of non-cardiogenic shock with vasopressors possessing positive ionotropic properties could induce obstruction in this group, possibly limiting their efficacy. We investigated whether this occurs and determined its incidence.

Methods: We included 62 consecutive patients admitted with non-cardiogenic shock and treated with pressors with positive ionotropic properties. Only subjects without obstruction by echocardiography at baseline were included. Two-dimensional echocardiographic parameters included left ventricle end-diastolic and end-systolic diameters and ejection fraction. Dynamic systolic obstruction was defined by a characteristic “dagger” shaped Doppler velocity profile. The subjects were divided into three groups: 1) no obstructive physiology; 2) any degree of dynamic systolic obstructive physiology; and 3) dynamic systolic obstruction with peak pressure gradient >10 mmHg.

Results: Mean age of the study population was 58 +/- 16 years (Mean +/- SD); fifty six percent were males. Norepinephrine was received by 56 % of subjects, dopamine by 47 %, dobutamine by 23 % and epinephrine by 10 %. We observed dynamic systolic obstruction in 27.4 % (Group 2) and obstruction with pressure gradient >10 mmHg in 11.3 % (Group 3). Mean pressure gradient was 12.1 +/- 1.0 mmHg in Group 2 and 21.9 +/- 14.4 mmHg in Group 3. Subjects in Group 3 had a significantly lower end diastolic diameter (4.1 +/- 0.9 vs. 4.6 +/- 0.6; p<0.05) and a higher ejection fraction (64 +/- 8 % vs. 48 +/- 17 %; p<0.004) than those without obstruction.

Conclusion: Systolic dynamic obstruction often occurs in patients with non-cardiogenic shock treated with common pressors possessing ionotropic properties. This effect may limit the desired, pressor-induced increase in cardiac output and blood pressure.