USE OF INOTROPIC DRUGS IN PATIENTS UNDERGOING OPEN HEART SURGERY

Essay

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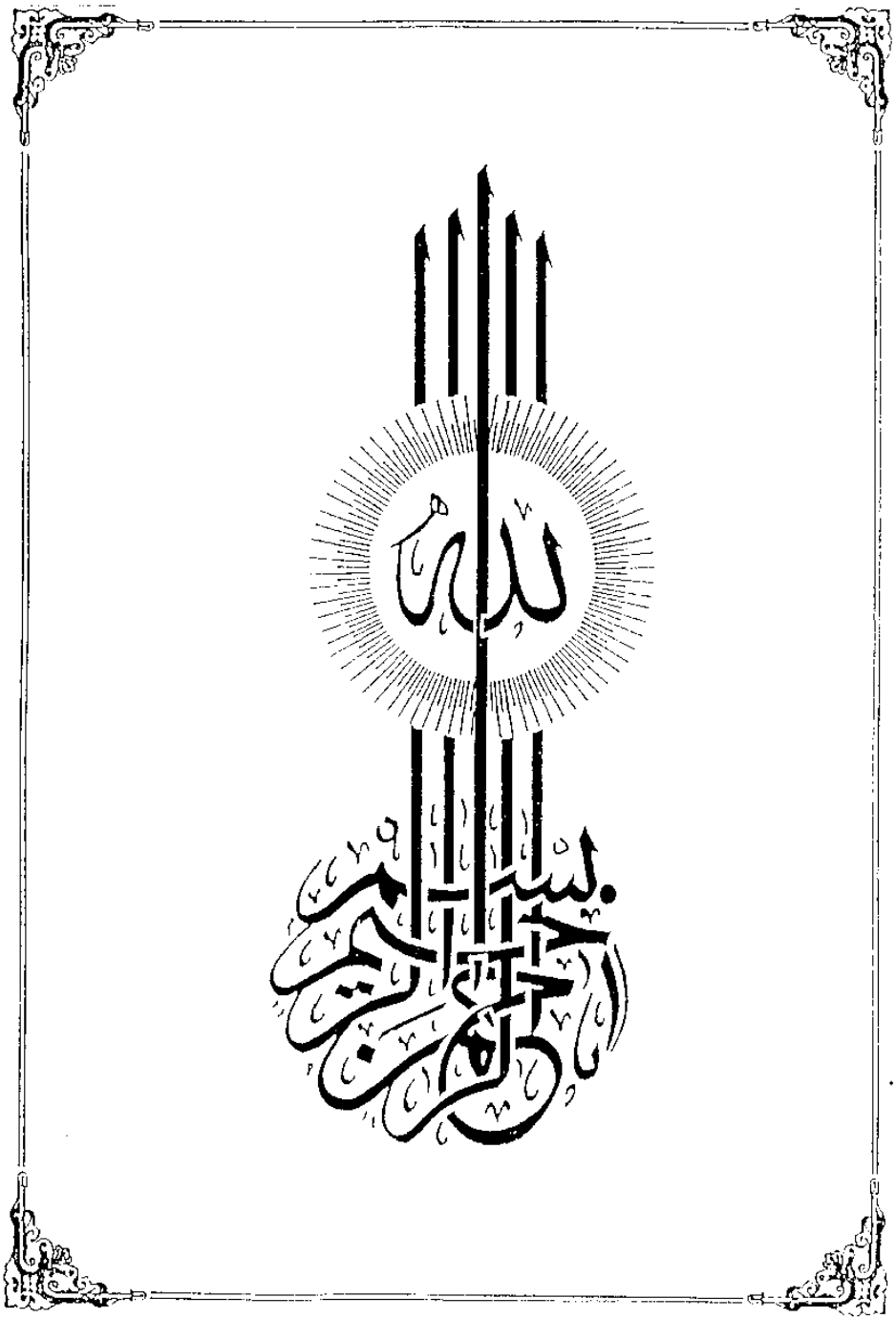

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INTRODUCTION

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The inotropic drugs are large group of compounds that increase the myocardial contractility but also have some effects on heart rate, rythm, systemic vascular resistance and myocardial oxygen consumption.

Each drug has a different effect on the cardiovascualr system, so according to the available haemodynamic data we select the proper drug with special care to the side effects of this drug.

Besides the old well known inotropic drugs, new sympathomimetic drugs and phosphodiesterase inhibitors are available. They can be used a lone or in combination.

Therapeutic doses must be adjusted according to haemodynamic data.

The inotropic drugs are widely used in cases of open heart surgery either before, during or after surgey.

Chapter I

PHYSIOLOGY OF THE CARDIAC PUMP

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The heart is actually two separate pumps; a right heart that pumps the blood through the lungs, and a left heart that pumps the blood through the peripheral organs. In turn, each of these two separate hearts is a pulsatile two-chamber pump composed of an atrium and a ventricle.

The atrium functions principally as a blood reservoir and as entryway to the ventricle, but it also pumps weakly to help movement of the blood into the ventricle.

The ventricle in turn, supplies the main force that propels the blood through either the pulmonary or the peripheral circulation ***[Guyton, 1991].***

Determinants of cardiac performance :

1) Preload: This load is best defined as end-diastolic volume (EDV), which is the volume that causes the initial passive stretch on the myocardium prior to active contraction.

2) Afterload is the load (or force) that opposes ventricular ejection.

3) Contractility is the intrinsic strength of the heart muscle.

4) Compliance is the ratio of a change in volume to a change in pressure.

Compliance is increased in aortic stenosis and hypertension but decreased in valvular insufficiency ***[Kramer and Thomas, 1993].***

The mechanical behaviour of the heart muscle is therefore determined by four distinct forces (Preload, afterload , contractility, and compliance). These forces act on the muscle either in the resting condition or during active muscle contraction, during rest, the muscle is influenced by the preload that is imposed and the elastic properities (compliance) of the tissue elements, the contracting muscle is influenced by the contractile behaviour of the muscle (contractility) and the load that must be moved (afterload) ***[Marino, 1991].***

Starling law of the heart:

Starling stated that "within limit the energy of contraction is proportional to the initial length of the cardiac muscle fiber". This is named the starling's law of the heart or the Frank-Starling law.

For the heart, the length of the muscle fibers (i.e, the extent of preload) is proportionate to the end-diastolic volume. The relation between ventricular performance and end-diastolic volume (the Frank-Starting mechanism) is shown in **Fig. (1).** This figure also lists the principal factors that affect the end diastolic volume ***[Ganong, 1991].***