Morbidity, mortality and management of acute mitral regurgitation with pregnancy

An Essay

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List of Contents

List of Tables

List of Figures

List of Abbreviations

Abb.	Full term
ACC	American College of Cardiology.
AHA	American Heart Association.
ANP	Atrial Natriuretic Peptide.
AR	Aortic Regurgitation.
AS	Aortic Stenosis.
AV	Atrioventricular.
BNP	Brain Natriuretic Peptide.
CABG	Coronary Artery Bypass Grafting.
CO	Cardiac Output.
CVD	Cardiovascular Disease.
CW	Cardiac Wave.
EACTS	European Association for Cardio-Thoracic Surgery.
ECG	ElectroCardioGram
ERO	Effective Regurgitation Orifice.
EROA	Effective Regurgitation Orifice Area.

ESC	European Society of Cardiology.
EVEREST	Endovascular Valve Edge to Edge Repair Study.
FDA	Food and Drug Administration.
HCM	Hypertrophic Cardiomyopathy.
HR	Heart Rate.
IE	Infective Endocarditis.
LA	Left Atrium.
LAD	Left Anterior Descending.
LCA	Left Coronary Artery.
LCX	Left Circumflex Artery.
LV	Left Ventricle.
LVD	Left Ventricle Dimension.
LVEF	Left Ventricular Ejection Fraction.
LVESD	Left Ventricular End Systolic Dimension.
MIDA	Mitral regurgitation International Database.
MR	Mitral Regurgitation.
MVO2	Myocardial Oxygen Consumption.
MVP	Mitral Valve Prolapse.
NYHA	New York Heart Association.
OM	Obtuse Marginal.
PGI2	Prostaglandin 2 (Prostacyclin).
PISA	Proximal Isovelocity Surface Area.
RA	Right Atrium.
RCA	Right Coronary Artery.
RVD	Right Ventricular Diastolic Dimension.

SD	Standard Deviation.
SV	Stroke Volume.
TEE	Transesophageal Echocardiography.
TR	Tricuspid Regurgitation.
TTE	Transthoracic Echocardiography.
TVI	Time Velocity Integral.
VCF	Velocity of Circumferential Fiber Shortening.
3D	Three Dimensional.

Introduction

INTRODUCTION

The structural interrelationship of the valves of the heart and the dynamic mechanisms involved in their function are fundamental in optimizing valve performance and are dependent upon an intricate, multifaceted central cardiac complex. Each valve within this complex is best considered as a "Functional Unit" built in the fibrous skeleton of the heart, and any interruption of the relationships within this Functional Unit potentially results in valvular dysfunction ***(Caulfield et al., 1990)***.

The degree of hemodynamic deterioration in acute MR depends upon the etiology and degree of MR, which is often dramatic and rapid in onset. An important factor is left atrial compliance, which is usually normal unless the acute regurgitation is superimposed upon chronic MR ***(Bursi et al, 2005)***.

During pregnancy, there is a fall in systemic (peripheral) vascular resistance beginning in week 5 of gestation with a nadir between weeks 20 and 32. After week 32 of gestation, the systemic vascular resistance slowly increases until term. There is a corresponding initial decrease in the systemic arterial pressure, which begins in the first trimester and reaches its nadir at mid-pregnancy. Thereafter, systemic pressure begins to increase again and ultimately reaches or exceeds the pre-pregnancy level. The overall fall in systemic vascular resistance is a result of changes in resistance and flow in multiple vascular beds ***(Clark et al., 2006*)**.

Valvular heart disease in pregnancy is relatively infrequent, with an incidence of less than 1% ***(Siu et al, 1997).***In the developed world, valvular disease in women of childbearing age is often congenitally acquired ***(Soler-Soler and Galve, 2000).*** Rheumatic heart disease, myxomatous degeneration, previous endocarditis, and bicuspid aortic valves

are also encountered. Pregnancy complicated by valvular heart disease tends to have a favorable prognosis if risks are appropriately managed. Management of the pregnant woman with a heart condition requires special expertise, and patients with high-risk conditions should be referred to centers specialized in their care ***(Windram and Colman, 2014).*** Mitral regurgitation in pregnancy is usually due to mitral valve prolapse or rheumatic heart disease ***(Lesniak-Sobelga et al., 2004).*** It is usually well tolerated during pregnancy due to the decrease in systemic vascular resistance. Asymptomatic patients do not require specific therapy during pregnancy. In the presence of symptomatic left ventricular dysfunction with hemodynamic abnormalities, diuretics, digoxin, hydralazine, and nitrates can be administered. Surgery for mitral valve repair or replacement during pregnancy has been associated with a high incidence of fetal loss and should be considered only in patients with severe symptoms not controlled by medical therapy ***(Hameed et al., 2000).***

AIM OF THE WORK

The aim of this work is to facilitate safe and effective management of the patient with acute mitral regurgitation with pregnancy and reduce the incidence of adverse outcomes and mortality.

Chapter 1

Anatomy of the heart