Comparison of Four Doppler Echocordiographic Methods for Calculating Pulmonary-To- Systemic Shunt Flow Ratios in Patients With Ventricular Septal Defect

Thesis
Submitted for Partial Fulfillment of the Master Degree
M.Sc. in Cardiology

by
AHMED KHALIFA ISMAIL

M.B.B.Ch.

wenyed wanyed

Supervised by: سنت المريخ بالتت

Prof.Dr. Mohamad Tarek Zaki
Prof. of Cardiology
Faculty of medicine
Ain Shams University

Prof.sDr. Osama Abdel-Aziz Rifaie

Ass. Prof. of Cardiology Faculty of medicine Ain Shams University

Dr. Ekram Masoud
Consultant of Cardiology
National Heart Institute

Faculty of Medicine Ain Shams University 1998 6.9t5







TO MY PARENTS

ACKNOWLEDGEMENT

All thanks to ALLAH.

I would like to express my deep appreciation and gratitude to **Prof.Dr.Mohamad Tarek Zaki,** professor of cardiology, faculty of medicine, Ain Shams University, for his kind supervision and great help.

I'll remain always greatly indebted and much obliged to **Prof.Dr.Osama Abdel-Aziz Rifaie,** assisstant professor of cardiology, faculty of medicine, Ain Shams University, for his scientific guidance, his fruitful discussion and for his assistance during the work.

No word can express my feeling of gratitude and respect to **Dr.Ekram El-Sayed Masoud**, head of pediatric cardiology department, National Heart Institute, for her great direction and advice all through this work.

Finally, thanks to all my senior staff and my colleagues in the National Heart Institute, for thier nice help and advice.

į

Patients and Methods	53
Results	72
Discussion	99
Summary	107
Conclusion and Recommendation	108
References	109
Appendix	A,B,C,D,E,F
Arabic Summary	

List of tables

- **Table (1)**: Angiocardiographic findings of VSD.
- **Table (2)**: General Characteristics of the studied patients.
- **Table (3)**: Summary of clinical features of the studied patients.
- **Table (4)**: Type of VSD of all patients.
- **Table (5)**: Size of VSD of all patients as calculated by the size index depending on colour flow Doppler echocardiographic study.
- **Table (6)**: Correlation between the different methods of assessment of the Qp : Qs.
- **Table (7):** Results of clinical history, symptoms and clinical examinations of all the studied patients.
- **Table (8)**: Results of clinical signs and X-ray findings.
- **Table (9)** : Results of echocardiographic and cardiac catheterization findings of all the studied patients.

List of figures

:Diagram illustrating the anatomy of the ventricular septum.
:Diagram illustrating different typs of VSD.
:Diagram illustrating different typs of VSD when viewed using 2-DE.
:Diagram illustrating different typs of VSD in the apical 4 chamber view.
:Diagram illustrating different typs of VSD in the parasternal short axis view.
:Diagram illustrating difinition of Doppler measurements.
:Diagram illustrating different views of 2-DE examination of the studied patients.
:Diagram illustrating different views used in method I of echocardiographic examination.
:Diagram illustrating different views used in method III of echocardiographic examination.
:Types of VSD among all the studied patients
:Size of VSD of all patients by size index depending on colour flow Doppler.
:Muscular VSD by colour flow mapping.
:Determination of VSD diameter by colour flow mapping.
:Doppler study for the AO flow in the apical 4-chamber with aortic root plane.
:Doppler study for the LVOT flow in the apical 4-chamber with aortic root plane.
:Doppler study for the PA flow in the parasternal short axis view.
:PA diameter in the parasternal short axis view by 2-DE.

- Fig (18) :AO diameter in the parasternal long axis view by 2-DE.
- Fig (19) :LVOT diameter in the parasternal long axis view by 2-DE.
- Fig (20) :Doppler study for the VSD flow.
- Fig (21) :Doppler study for the MV flow in the apical 4-chamber view.
- Fig (22) :Doppler study for the TV flow in the apical 4-chamber view.
- Fig (23) :MV and TV diameters by 2-DE in the apical 4-chamber view.
- Fig (24) :Shunt estimation by cardiac catheterization and four methods of echocardiography study.
- Fig (25) : Correlation between method I echocardiography and cardiac catheterization in assessment of Qp:Qs
- Fig (26) :Correlation between method II echocardiography and cardiac catheterization in assessment of Qp :Qs
- Fig (27) :Correlation between method III echocardiography and cardiac catheterization in assessment of Qp :Qs
- Fig (28) :Correlation between method IV echocardiography and cardiac catheterization in assessment of Op :Qs
- Fig (29) :Correlation between method I and method II echocardiography in assessment of Qp :Qs
- Fig (30) :Correlation between method I and method III echocardiography in assessment of Qp :Qs .
- Fig (31) :Correlation between method I and method IV echocardiography in assessment of Qp :Qs.
- Fig (32) :Correlation between method II and method III echocardiography in assessment of Qp :Qs .
- Fig (33) :Correlation between method II and method IV echocardiography in assessment of Qp:Qs.
- Fig (34) :Correlation between method III and method IV echocardiography in assessment of Qp :Qs .

Abbrevitions

AO : Aorta

A-V Valves : atrioventricular valves

AT : acceleration time BSA : body surface area

CHD : congenital heart disease
CTR : cardiothorathic ratio
ECG : electrocardiogram
EBF : effective blood flow

ET : ejectiontime

IVC : inferior vena cava
IVS : inter ventricular septum

LT : left

LA : left atrium LV : left ventricle

LVD : left ventricle dilatation
LVH : left ventricle hypertrophy
LVOT : left ventricular outflow tract

MV : mitral valve

MVP : mitral valve prolpse

Qp:Qs : pulmonary to systemic blood flow

PA : pulmonary artery

PBF : pulmonary blood flow PDA : patent ductus arteriosus

PEP : prejection period Pkv : peak velocity PV : pulmonary vein

PVR : pulmonary vascular resistance

RT : right

RA : right atrium

RBBB : right bundle branch block

RV : right ventricle

RVD : right ventricular dilatation RVOT : right ventricular outflow tract

SBF : systemic blood flow

SV : stroke volume

SVC : superior vena cava

VSD : ventricular septal defect VTI : velocity time integral

2-DE : two dimensional echocardiography

TV : tricuspid valve

