Functional Echocardiography in the Preterm infant

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Rotunda Hospital

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Declaration

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# Table of Contents

<table>
<thead>
<tr>
<th>Chapter</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Declaration</td>
<td>ii</td>
</tr>
<tr>
<td>Table of contents</td>
<td>iii</td>
</tr>
<tr>
<td>List of figures</td>
<td>ix</td>
</tr>
<tr>
<td>List of tables</td>
<td>xii</td>
</tr>
<tr>
<td>Abbreviations</td>
<td>xiv</td>
</tr>
<tr>
<td>Summary</td>
<td>xvi</td>
</tr>
<tr>
<td>Dedication</td>
<td>xvii</td>
</tr>
<tr>
<td>Acknowledgements</td>
<td>xviii</td>
</tr>
<tr>
<td>Research Output</td>
<td>xix</td>
</tr>
</tbody>
</table>

## 1. Chapter 1: General Introduction

1.1 Preamble 1

1.2 Cardiovascular physiology of preterm infants 3

1.3 Transitional Circulation 7

1.4 Clinical assessment of haemodynamics in preterm infants 10

1.5.1 Current techniques of assessing systolic and diastolic function 13

1.5.2 Assessment of Systolic function 13

1.5.3 Assessment of Diastolic function 14

1.6.1 New Methods of Assessment of Myocardial Performance 16

1.6.2 Tissue Doppler Velocities 17

1.6.3 Strain imaging 18

1.6.4 Tissue Doppler Derived deformation imaging 25

1.6.5 Speckle tracking imaging 26

1.7 Twist/torsion 30
1.8.1 Right Ventricular dysfunction and its role in prematurity
1.8.2 RV specific functional parameters
1.8.3 Fractional Area Change and Tricuspid annular plane systolic excursion
1.9 Use in Paediatrics
1.9.2 Role in neonates
1.10 Reference values
1.11 Knowledge gap
1.12 Pulmonary hypertension
1.13 Patent Ductus Arteriosus (PDA)
1.14 Bronchopulmonary Dysplasia
1.15 Desirable Qualities of the measurement
1.16 Conclusion
1.17 Aim
1.18 Study Objectives
1.19 Hypothesis to be examined

2 Chapter 2: Materials and Methods
2.1 Patient population and study setting
2.2 Clinical parameters
2.3 Antenatal History
2.4 Delivery details
2.5 Measurements at time of Echo
2.6 Echocardiography parameters
2.6.1 Conventional Echocardiographic parameters
2.6.2 RV functional assessment
2.6.3 Tissue Doppler Velocities
4.3.5 Influence of CLD on LV and RV Function at 36 weeks PMA 124
4.4 Discussion 126
4.5 Conclusion 130

5 Chapter 5: Rotational Mechanics 131
5.1 Introduction 131
5.2 Methods 132
5.2.1 Terminology 133
5.2.2 Measurements of Twist, LV twist and untwist rates 135
5.2.3 Statistical Analysis 138
5.3 Results 139
5.3.1 Feasibility and Reproducibility of Twist measurements 141
5.3.2 Longitudinal Rotation, Twist, Torsion, Twist and Untwist values 141
5.3.3 Effect of Clinical Parameters and Correlation between Torsion and LVUTR 147
5.4 Discussion 149
5.4.1 Feasibility and Reproducibility of LV Rotational Mechanics in Preterms 149
5.4.2 Comparison of Rotational Mechanics between Preterm and older Population 150
5.4.3 Effect of Loading Conditions on LV Twist in Preterm Infants 154
5.4.4 Clinical Implications 156
5.5 Limitations 156
5.6 Conclusion 156

6 Chapter 6: RV Fractional Area Change and Systemic blood flow 158
6.1 Introduction 158
6.2 Methods 159
6.2.1 Clinical Demographics 160
6.2.2 Echocardiography 160
<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>8.2.2 Echocardiography Assessment</td>
<td>202</td>
</tr>
<tr>
<td>8.2.3 Statistical Analysis</td>
<td>204</td>
</tr>
<tr>
<td>8.3 Results</td>
<td>204</td>
</tr>
<tr>
<td>8.4 Discussion</td>
<td>210</td>
</tr>
<tr>
<td>8.5 Conclusion</td>
<td>212</td>
</tr>
<tr>
<td><strong>Chapter 9: Conclusion</strong></td>
<td>213</td>
</tr>
<tr>
<td>9.1 Introduction</td>
<td>213</td>
</tr>
<tr>
<td>9.2 Reliability</td>
<td>214</td>
</tr>
<tr>
<td>9.3 Longitudinal changes</td>
<td>214</td>
</tr>
<tr>
<td>9.4 Rotation</td>
<td>216</td>
</tr>
<tr>
<td>9.5 Patent Ductus Arteriosus</td>
<td>216</td>
</tr>
<tr>
<td>9.6 Magnesium Sulphate</td>
<td>217</td>
</tr>
<tr>
<td>9.7 Fractional area change and Systemic blood flow</td>
<td>218</td>
</tr>
<tr>
<td>9.8 Future Direction</td>
<td>219</td>
</tr>
<tr>
<td>9.9 Summary</td>
<td>219</td>
</tr>
</tbody>
</table>
List of Figures

1.1 Diagram of a myocyte in the term and preterm infants. 4
1.2 Graphic depiction of the relationship between ventricular function and afterload. 6
1.3 Foetal and Postnatal circulations 9
1.4 Doppler imaging of the Mitral valve showing the E and A waves 15
1.5 Tissue Doppler derived Strain of the intraventricular septum showing the peak systolic Strain (S) 21
1.6 Tissue Doppler derived strain rate of the septal wall 23
1.7 Speckle Tracking derived Strain of the Left Ventricle 29
1.8 Apical rotation of the Left Ventricle (LV) using Speckle tracking echocardiography 31
1.9 Basal rotation of the Left Ventricle (LV) using Speckle tracking echocardiography 32
1.10 Graphical representation of the net twist of the Left Ventricle (LV) 33
1.11 RV focussed 4 chamber view showing measurement of right ventricular fractional area change 38
1.12 M-mode imaging of the tricuspid valve to give the Tricuspid Annular Plane Systolic Excursion (TAPSE) 39
2.1 M mode imaging through the parasternal long axis of the heart giving Left Ventricle cavity dimensions from which the shortening fraction can be calculated 60
2.2 4-chamber view of the Left ventricle at end systole and end-diastole. 2 chamber view of the Left ventricle at end-systole and end-diastole 62
2.3 Pulsed wave Doppler of the Aortic Valve showing the Velocity Time Integral (VTI) 64
2.4 Pulmonary valve and the Right ventricular outflow tract (RVOT) with corresponding pulsed wave Doppler signal of the RVOT 66
2.5 Mitral Doppler flow pattern 68
2.6 Tricuspid Doppler flow pattern. 70
2.1 Pulmonary venous drainage to the Left Atrial.

2.2 Four chamber view of the heart.

2.3 Direction of flow across the Patent Ductus Arteriosus (PDA).

2.4 Left atrial to aortic ratio (LA:Ao) as measured from the parasternal long axis view.

2.5 Colour Doppler through the tricuspid valve with tricuspid regurgitation.

2.6 Tricuspid annular plane systolic excursion (TAPSE).

2.7 Right Ventricular Three-chamber view and Right Ventricular dimension measurement in the four chamber view.

2.8 Tissue Doppler velocities of the Left Ventricle, Right ventricle and interventricular septum.

2.9 Tissue Doppler-derived measurement of strain and strain Rate.

2.10 Apical and Basal rotation of the Left Ventricle.

2.11 Graphic representation of the Twist of the Left Ventricle.

3.1 Intra- and Inter-observer variability of Left Ventricle, Septal and Right Ventricle Strain.

3.2 Bland-Altman graphs for LV torsion twist and untwist.

4.1 Longitudinal strain of the Left ventricle (LV), septum and Right ventricle (RV).

4.2 Comparison of RV Longitudinal Strain (RV BLS) and RV late diastolic strain rate (RV SRa) in infants with and without Chronic Lung Disease (CLD).

5.1 Graphical display of apical rotation, basal rotation and the resultant net torsion of the left ventricle.

5.2 Left ventricle (LV) twist and untwist rate.

5.3 Bland-Altman graphs for LV torsion twist and untwist.

5.4 Apical and Basal rotation and LV torsion over the three time points.

5.5 LV twist and untwist rate over the three time points.

5.6 Relationship between Systolic torsion and diastolic untwist rate across the three timepoints.
<table>
<thead>
<tr>
<th>Section</th>
<th>Title</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.1</td>
<td>Measurement of right ventricular fractional area change.</td>
<td>162</td>
</tr>
<tr>
<td>6.2</td>
<td>Correlation between RV FAC and LVO and RV FAC and SVR during the first day of age.</td>
<td>166</td>
</tr>
<tr>
<td>6.3</td>
<td>RV FAC in infants with and without P/IVH and infants with and without a PDA on Day 5 – 7.</td>
<td>170</td>
</tr>
<tr>
<td>7.1</td>
<td>Echocardiography parameters measured across the three time points between the two groups.</td>
<td>187</td>
</tr>
<tr>
<td>7.2</td>
<td>Difference in the PDA severity score between infants with and without CLD/Death (A) and the relationship between the score and the predicted probability of CLD/Death in the entire cohort (B).</td>
<td>190</td>
</tr>
<tr>
<td>7.3</td>
<td>Receiver operating characteristics curve of the ability of PDAsc to predict CLD/death.</td>
<td>192</td>
</tr>
</tbody>
</table>
List of Tables

Table 3.1  Reliability of parameters of left, septal and Right Ventricular function and dimensions  99
Table 3.2  Intra- and inter-observer reliability data for the parameters  102
Table 4.1  Clinical parameters at the time of the echocardiogram over the first week of life  112
Table 4.2  Conventional Echocardiography parameters and Markers of pulmonary vascular resistance  113
Table 4.3  LV and Septal Function values over the four time points  115
Table 4.4  RV Function values over the four time points  116
Table 4.5  Longitudinal Changes in Deformation parameters  117
Table 4.6  Longitudinal Changes in Dimension parameters  119
Table 4.7  Correlation between Systemic Vascular Resistance and functional parameters on day 1 of life  121
Table 5.1  Cardiorespiratory characteristics of the infants across the three time points.  140
Table 5.2  Intra- and inter-observer reliability data for the parameters.  142
Table 5.3  Rotation, torsion, twist and untwist rate over the three time points.  143
Table 5.4  Comparison of Rotational Mechanics across different age groups.  152
Table 6.1  Infants Perinatal Characteristics and Outcomes divided by the presence or absence of peri- intraventricular haemorrhage.  169
Table 7.1  Demographics and antenatal details in the two groups.  183
Table 7.2  Distribution of other outcomes between the two groups.  185
Table 7.3  Results of the regression model used to devise the PDA severity score.  189
Table 8.1  Infant Characteristics and Clinical Outcomes.  206
Table 8.2  Difference in cardiorespiratory characteristics and echocardiography parameters between infants with and without MgSO₄ on days 1 and 2.  208
Table 8.3  Independent effect of MgSO₄ and antenatal steroids on outcome parameters using logistic and linear regression.
**Abbreviations**

PDA: Patent Ductus Arteriosus  
CLD: Chronic Lung Disease  
NEC: Necrotising Enterocolitis  
ROP: Retinopathy of Prematurity  
RDS: Respiratory Distress Syndrome  
PVL: Periventricular Leukomalacia  
PFO: Patent Foramen Ovale  
VLBW: Very Low Birth Weight  
PPHN: Persistent Pulmonary Hypertension of the Newborn  
IVH: Intraventricular Haemorrhage  
PMA: Post Menstrual Age  
BP: Blood Pressure  
MAP: Mean Airway Pressure  
EF: Ejection Fraction  
SF: Shortening Fraction  
VCFc: Velocity of Circumferential Fibre Shortening  
PAAT: Pulmonary artery acceleration time  
RVET: Right ventricular ejection time  
LVEDD: LV end diastolic diameter  
LVESD: LV end systolic diameter  
LVPWD: LV posterior wall diameter in diastole  
VTI: Velocity Time Integral  
LVO: Left Ventricular Output  
RVO: Right Ventricular Output  
TDI: Tissue Doppler Imaging  
STE: Speckle Tracking Echocardiography  
SR: Strain rate  
BLS: Basal Longitudinal Strain  
TAPSE: tricuspid annular plane systolic excursion  
FAC: Fractional Area Change  
LVTR: LV twisting rate  
LVUTR: LV untwisting rate
MRI: Magnetic Resonance Imaging
NICU: Neonatal Intensive Care Unit
LV: Left Ventricle
RV: Right Ventricle
MV: Mitral valve
TV: Tricuspid Valve
PA: Pulmonary Artery
IVS: Interventricular Septum
PVR: Pulmonary Vascular Resistance
SVR: Systemic Vascular Resistance
RVSp: RV systolic pressure
TR: Tricuspid Regurgitation
FPS: Frames per Second
FR/HR: Frame rate: Heart Rate ratio
SD: Standard Deviation
IQR: Interquartile Range
ROI: Region of Interest
MgSO₄: Magnesium Sulphate
Summary

From our research we have shown that myocardial function assessment using tissue Doppler derived strain, strain rate, torsion and fractional area change is both feasible and reliable. We applied these novel echocardiographic markers to assess certain disease states such as assessment of a patent ductus arteriosus, chronic lung disease, treatment with antenatal magnesium sulphate as well as longitudinal follow up over the early neonatal period and found that they may be a useful tool as part of a comprehensive functional myocardial assessment in the preterm population. With the advancement in echocardiography and the continued widespread use for the assessment of the preterm infant these tools may pave the way forward for its clinical use in aiding the diagnosis and management of pathological conditions of preterm infants to improve both morbidity and mortality.
Dedication

I would like to dedicate this thesis to my wife Karen and my three kids Conor, Lily and Ciara
Acknowledgement

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Research Output from Thesis


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