

Nomograms of Fetal Right Ventricular Fractional Area Change by 2D Echocardiography

Por: [Guirado, L](#) (Guirado, Laura)^[1,2]; [Crispi, F](#) (Crispi, Fatima)^[1,2]; [Soveral, I](#) (Soveral, Iris)^[1,2]; [Valenzuela-Alcaraz, B](#) (Valenzuela-Alcaraz, Brenda)^[1,2]; [Rodriguez-Lopez, M](#) (Rodriguez-Lopez, Merida)^[1,2,3]; [Garcia-Otero, L](#) (Garcia-Otero, Laura)^[1,2]; [Torres, X](#) (Torres, Ximena)^[1,2]; [Sepulveda-Martinez, A](#) (Sepulveda-Martinez, Alvaro)^[1,2,4]; [Escobar-Diaz, MC](#) (Clara Escobar-Diaz, Maria)^[5]; [Martinez, JM](#) (Maria Martinez, Josep)^[1,2] [...Más](#)

[Ver número de ResearchID y ORCID de Web of Science](#)

FETAL DIAGNOSIS AND THERAPY

Volumen: 47

Número: 5

Páginas: 399-410

DOI: 10.1159/000503228

Fecha de publicación: MAY 2020

Tipo de documento: Article

[Ver impacto de la revista](#)

Abstract

Objectives: Fetal right ventricular (RV) function assessment is challenging due to the RV geometry and limitations of in utero assessment. Postnatally, 2D echocardiographic RV fractional area change (FAC) is used to assess RV global systolic function by calculating the percentage of change in RV area from systole to diastole. Reports on FAC are scarce in prenatal life, and nomograms throughout pregnancy are not available. Our aims were (1) to study prenatal RV FAC feasibility and reproducibility and (2) to construct nomograms for RV FAC and end-diastolic (ED) and end-systolic (ES) RV areas from 18 to 41 weeks of gestation. **Methods:** Prospective cohort study including 602 low-risk singleton pregnancies undergoing a fetal echocardiography from 18 to 41 weeks of gestation. RV ED and ES areas were measured following standard recommendations for ventricular dimensions and establishing strict landmarks to identify the different phases of the cardiac cycle. RV FAC was calculated as: $([ED \text{ area} - ES \text{ area}] / ED \text{ area}) \times 100$. RV FAC intra- and inter-observer reproducibility was evaluated in 45 fetuses by calculating the intraclass correlation coefficient (ICC). Parametric regressions were tested to model each parameter against gestational age (GA) and estimated fetal weight (EFW). **Results:** RV areas and FAC were successfully obtained in similar to 99% of fetuses with acceptable reproducibility throughout gestation (RV ED area inter-observer ICC [95% CI] 0.96 [0.93-0.98], RV ES area 0.97 [0.94-0.98], and FAC 0.69 [0.44-0.83]). Nomograms were constructed for RV ED and ES areas and FAC. RV areas showed a quadratic and logarithmic increase with GA and EFW, respectively. In contrast, RV FAC showed a slight quadratic decrease throughout gestation (mean RV FAC ranged from 36% at 18 weeks of gestation [10-90th centiles: 25-47%, respectively] to 29% at 41 weeks [10-90th centiles: 18-40%, respectively]). The best models for RV areas and FAC were a second-degree polynomial. **Conclusions:** RV FAC is a feasible and reproducible parameter to assess RV global systolic function in fetal life. We

provide reference ranges adjusted by GA and EFW that can be used as normal references for the assessment of RV function in prenatal conditions.

Palabras clave

Palabras clave de autor:[Cardiac function](#); [Right ventricular](#); [Fetal echocardiography](#); [Fractional area change](#); [Prenatal](#)

KeyWords Plus:[MYOCARDIAL TISSUE DOPPLER](#); [EUROPEAN ASSOCIATION](#); [CARDIAC DIMENSIONS](#); [PULSATILITY INDEX](#); [AMERICAN SOCIETY](#); [REFERENCE RANGES](#); [GESTATIONAL-AGE](#); [RIGHT HEART](#); [PRETERM](#); [DISEASE](#)

Información del autor

Dirección para petición de copias: Crispi, F (corresponding author)

- + Hosp Clin Barcelona, Barcelona Ctr Maternal Fetal & Neonatal Med, BCNatal, Fetal Med Res Ctr, Sabino de Arana St 1, ES-08028 Barcelona, Spain.

Dirección para petición de copias: Crispi, F (corresponding author)

- + Hosp St Joan Deu, Sabino de Arana St 1, ES-08028 Barcelona, Spain.

Direcciones:

- + [1] Univ Barcelona, Ctr Biomed Res Rare Dis CIBER ER,BCNatal, Inst Invest Biomed August Pi I Sunyer,Fetal Med R, Inst Clin Ginecol Obstet & Neonatol,Hosp Clin,Bar, Barcelona, Spain
- + [2] Univ Barcelona, Ctr Biomed Res Rare Dis CIBER ER, Inst Invest Biomed August Pi I Sunyer, Inst Clin Ginecol Obstet & Neonatol,Hosp St Joan, Barcelona, Spain
- + [3] Pontificia Univ Javeriana Secc Cali, Cali, Colombia
- + [4] Univ Chile, Dept Obstet & Gynecol, Fetal Med Unit, Hosp Clin, Santiago, Chile
- + [5] Hosp St Joan Deu, Pediat Cardiol, Barcelona, Spain
- + [6] Hosp Sick Children, Labatt Family Heart Ctr, Div Cardiol, Toronto, ON, Canada
- + [7] Univ Toronto, Toronto, ON, Canada

Direcciones de correo electrónico:fcrispi@clinic.cat

Financiación

Entidad financiadora Mostrar más información	Número de concesión
European Union (EU)	2013-0040
Hospital Clinic de Barcelona (Ajut Josep Font, Barcelona, Spain)	
La Caixa Foundation	LCF/PR/GN14/10270005 LCF/PR/GN18/10310003
Instituto de Salud Carlos III	PI14/00226

	PI15/00263 PI15/00130 INT16/00168 PI17/00675
integrados en el Plan Nacional de I+D+I y cofinanciados por el ISCIII-Subdirección General de Evaluación y el Fondo Europeo de Desarrollo Regional "Una manera de hacer Europa"	
Cerebra Foundation for the Brain Injured Child (Carmarthen, Wales, UK)	
AGAUR 2017 SGR grant	1531
Agencia de Gestio D'Ajuts Universitaris de Recerca Agaur (AGAUR)	2016FI_B01184
La Caixa Foundation	
AGAUR 2014 SGR grant	928
Instituto de Salud Carlos III	PI14/00226 PI15/00263 PI15/00130 INT16/00168
ISCIII-Subdirección General de Evaluación y el Fondo Europeo de Desarrollo Regional "Otra manera de hacer Europa" (Spain)	

[Ver texto de financiación](#)

Editorial

KARGER, ALLSCHWILERSTRASSE 10, CH-4009 BASEL, SWITZERLAND

Información de la revista

- **Impact Factor:** [Journal Citation Reports](#)

Categorías / Clasificación

Áreas de investigación: Obstetrics & Gynecology

Categorías de Web of Science: Obstetrics & Gynecology

Información del documento

Idioma: English

Número de acceso: WOS:000537866600007

ID de PubMed: 31822009

ISSN: 1015-3837

eISSN: 1421-9964