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Centro de Referencia Perinatal Oriente
Facultad de Medicina, Universidad de Chile



Score de perfil cardiovascular fetal

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Evaluación prenatal de la hemodinamia fetal



- Falla cardíaca Fetal
- Súbita e inesperada
- Riesgo elevado de falla cardíaca
- Ecocardiografía fetal

Parameters	Abnormal Changes	Interpretation
Dimension		
Cardiothoracic area ratio	Increased >35%	Cardiac enlargement
Cardiothoracic diameter ratio	Increased >95th centile	Cardiac enlargement
Inflow characteristics		
Filling time fraction	Decreased	Diastolic dysfunction
E/A ratio	Monophasic	Diastolic dysfunction
	Decreased	Diastolic dysfunction
	Increased	Volume loading/External compression
Venous PW Doppler		
Inferior vena cava	Reversed A-wave >20 cm/s	Diastolic dysfunction /increased venous pressure
	Decreased S-wave	Tricuspid regurgitation
Ductus venosus	Absent or reversed A-wave	Diastolic dysfunction/increased venous pressure
Performance		
Shortening fraction	Decreased (<28%)	Systolic dysfunction
	Increased	Reduced afterload/increased contractility
Ejection fraction	Decreased (<50%)	Systolic dysfunction
	Increased	Reduced afterload/increased contractility
Cardiac output (Stroke volume)	Decreased (Z < -2)	Systolic dysfunction/poor filling
	Increased (Z > +2)	Reduced afterload/volume load
Tei index	Increased > 0.50	Global cardiac dysfunction
ICT: 28 (22-33) ms	Prolonged	Systolic dysfunction
IRT: 34 (26-41) ms	Prolonged	Diastolic dysfunction

Srisupundit, K., Luewan, S., & Tongsong, T. (2023). Prenatal Diagnosis of Fetal Heart Failure. *Diagnostics (Basel, Switzerland)*, 13(4), 779

Cardiovascular profile score



- Descrito en 2001
- Permite
- Caracterización
- Evaluación de la severidad
- Seguimiento
- Total de 10 puntos

	Normal	-1 Point	-2 Points
Hydropic signs	Absence of effusion	Abdominal or pleural, or pericardial effusion	Skin edema
Venous Doppler (umbilical vein: UV & ductus venosus: DV)	Normal Doppler UV DV	Reversed ductus venosus flow UV DV	Pulsatile flow in the umbilical vein UV
Heart size (Cardio-thoracic ratio)	≤35%	35-50%	>50% or <20%
Cardiac function	Normal function	Holosystolic TR, or ventricular shortening fraction < 28%	Holosystolic MR or TR dP/dt < 400, or monophasic inflow
Arterial Doppler (umbilical artery)	Normal Doppler 	Absent end-diastolic flow 	Reversed end-diastolic flow

Table 12 Cardiovascular profile score*

Category	Subscale points		
	2	1	0
Hydrops	None	Ascites or pleural or pericardial effusion	Skin edema
Heart size (CA/TA ratio)	0.20-0.35	0.35-0.50	>0.50 or <0.20
Cardiac function	Normal biphasic AV inflow, RV and LV SF > 0.28	Holosystolic TR or RV/LV SF < 0.28	Holosystolic MR or TR dP/dt < 400 or monophasic AV inflow
Venous Doppler	Nonpulsatile UV and normal DV	Nonpulsatile UV and negative A wave in DV	Pulsatile UV
Arterial Doppler	Forward diastolic flow in UA	Absent end-diastolic flow in UA	Retrograde end-diastolic flow in UA

Cardiovascular profile Score

Severidad de la falla cardiaca



Table 3 Groups of congenital heart defects

<i>Single ventricle (n = 56)</i>
Hypoplastic left heart syndrome (28)
Hypoplastic right heart syndrome (10)
Tricuspid atresia (4)
Double inlet left ventricle (4)
Double outlet right ventricle, mitral atresia (4)
Single inlet left ventricle (2)
Aortic atresia (1)
Aortic stenosis, pulmonary stenosis (1)
Atrioventricular canal defect, pulmonary atresia (2)
<i>Conotruncal malformations (n = 37)</i>
Tetralogy of Fallot (19)
Transposition of great arteries (11)
Double outlet right ventricle (7)
<i>Shunts (n = 13)</i>
Atrioventricular canal defect (5)
Ventricular septal defect (5)
Secundum atrial septal defect (2)
Total anomalous pulmonary venous return (1)
<i>Right heart defects (n = 8)</i>
Ebstein's anomaly (3)
Pulmonary stenosis (4)
Tricuspid valve dysplasia (1)
<i>Left heart defects (n = 13)</i>
Coarctation of aorta (7)
Aortic stenosis (5)
Interrupted aortic arch (1)
<i>Complex heart defects (n = 4)</i>
Right atrial isomerism (4)

Numbers of fetuses are given in parentheses.

Table 5 Mortality for different cardiovascular profile (CVP) score categories

CVP category	No. of cases			Mortality (%)
	Total	Alive	Dead	
Hydrops	6	1	5	83†
Arterial Doppler	3	1	2	67
Heart size (HA/CA)*	22	15	7	32
< 0.20	0	0	0	0‡
0.35–0.50	15	12	3	20
> 0.50	7	2	5	71†
Venous Doppler	6	4	2	33
Cardiac function	19	14	5	26

- 8-9 ptos
- Leve

- 6-7
- Moderado

- 5 o menos
- Severa

JWieczorek, A., Hernandez-Robles, J., Ewing, L., Leshko, J., Luther, S. and Huhta, J. (2008), Prediction of outcome of fetal congenital heart disease using a cardiovascular profile score. *Ultrasound Obstet Gynecol*, 31: 284-288

Human fetal cardiovascular profile score and neonatal outcome in intrauterine growth restriction

K. Mälikallio, J. Räsänen, T. Mälikallio, O. Vuolteenaho, J. C. Huhta

First published: 11 December 2007 | <https://doi.org/10.1002/uog.5210> | Citations: 74

- Hipótesis
- Fetos con resultados adversos perinatales (Muerte o parálisis cerebral) presentarán signos de disfunción cardíaca
- Grupo 1: 6 muertes perinatales y 2 neonatos que desarrollaron parálisis cerebral

Characteristic	Group 1 (n = 8)	Group 2 (n = 67)
Maternal age (years)	28.8 ± 6.6	29.6 ± 5.2
Cesarean section (n (%))		
Maternal indication	1 (13)	9 (13)
Fetal indication	5 (63)	32 (48)
GA at delivery (weeks)	28 (24–35) [*]	35 (26–40)
Birth weight (g)	892 ± 460 [*]	1743 ± 746
Apgar score at 5 min	2 (1–6) [†]	9 (3–10)
UA pH	7.21 ± 0.06	7.25 ± 0.05
UA base excess	- 5.2 ± 2.1	- 5.0 ± 2.9
UA NT-proANP (pmol/L)	7326 (966–16 030) [†]	1646 (402–7500)

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Table 3 Cardiovascular profile (CVP) score and its subscale scores in 75 growth-restricted fetuses, grouped as in Table 1

	Group 1 (n = 8)	Group 2 (n = 67)	P
CVP score	4 (2–6)	9 (5–10)	< 0.0001
Hydrops			
No hydrops	2 (25)	63 (94)	0.003
Pleural/pericardial effusion, ascites	6 (75)	4 (6)	
Skin edema	0 (0)	0 (0)	
Heart size			
≤ 0.35	1 (13)	48 (72)	0.008
0.35–0.50	6 (74)	18 (27)	
> 0.50 or < 0.20	1 (13)	1 (1)	
Cardiac function			
Normal	3 (37)	36 (54)	< 0.0001
Holosystolic TR or RVFS/LVFS < 0.28	1 (13)	26 (39)	
Holosystolic MR or TR dP/dT < 400 or monophasic AV filling	4 (50)	5 (7)	
Venous Doppler			
Normal UV and DV	0	60 (90)	< 0.0001
DV A-wave negative and non-pulsatile UV	1 (13)	0	
Atrial pulsations in UV	7 (87)	7 (10)	
Umbilical artery Doppler			
Forward diastolic flow	4 (50)	52 (78)	0.031
Absent end-diastolic velocity	0 (0)	6 (9)	
Retrograde end-diastolic velocity	4 (50)	9 (13)	
RVCO (mL/min/kg)	201 ± 157	374 ± 128	0.026
LVCO (mL/min/kg)	242 ± 87	239 ± 60	0.905
CCO (mL/min/kg)	503 ± 230	613 ± 173	0.108

Values given are median (range), mean ± SD or n (%). Categorical data were compared by chi-square analysis. CCO, combined cardiac output; DV, ductus venosus; LVCO, left ventricular cardiac output; MR, mitral regurgitation; RVCO, right ventricular cardiac output; RVFS/LVFS, right to left ventricular fractional shortening; TR, tricuspid regurgitation; TR dP/dT, change in pressure over time in TR waveform; UV, umbilical vein.

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Table 4 Hazard ratios for neonatal mortality before and after adjustment for gestational age with Cox regression analysis

	<i>Unadjusted hazard ratio (95% CI)</i>	<i>P</i>	<i>GA-adjusted hazard ratio (95% CI)</i>	<i>P</i>
CVP score < 6	27.6 (5.5–138.0)	0.001	11.7 (2.1–63.7)	0.004
Pericardial effusion	14.5 (3.4–60.8)	0.0001	6.2 (1.4–27.8)	0.018
CA/TA > 35%	14.3 (1.8–116.4)	0.013	13.9 (1.7–114.3)	0.014
Monophasic AV filling or holosystolic TR	12.0 (1.9–76.1)	0.008	9.5 (2.3–38.4)	0.002
Pulsatile UV	17.5 (3.5–87.3)	0.0001	7.7 (1.4–41.2)	0.017
Retrograde UA	4.9 (1.2–19.1)	0.025	2.3 (0.6–9.3)	0.243

AV, atrioventricular; CA/TA, cardiac/thoracic area ratio (heart size); CVP, cardiovascular profile; TR, tricuspid regurgitation; UA, umbilical artery; UV, umbilical vein.

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Table 5 Cardiovascular profile (CVP) score and its subscale scores in 32 growth-restricted fetuses delivered prior to 32 + 0 gestational weeks, divided according to outcome

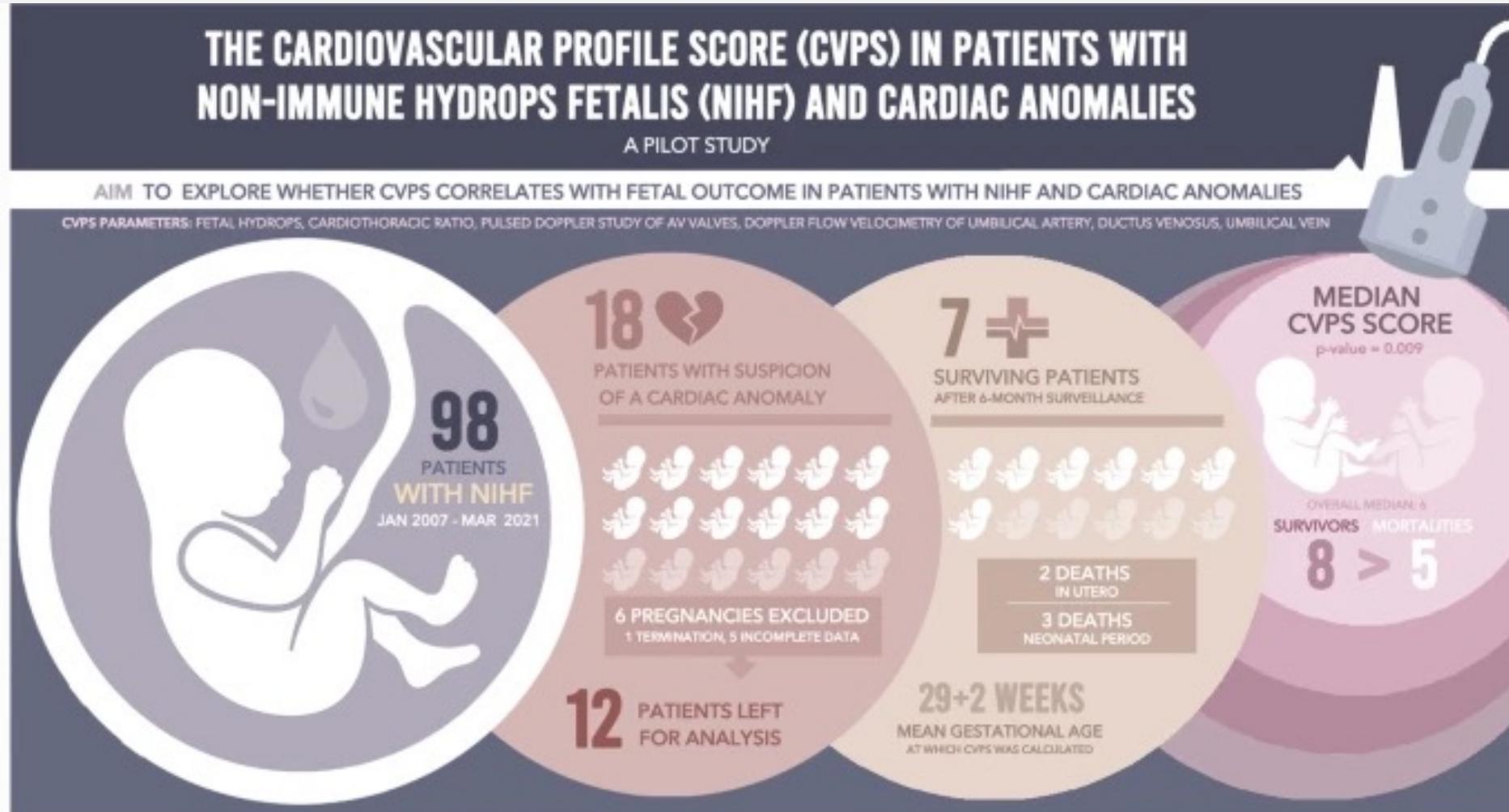
	<i>Adverse outcome</i> (n = 7)*	<i>Discharged home</i> (n = 25)	P
CVP score	5 (2–6)	8 (4–10)	0.0001
Hydrops			
No hydrops	2 (28)	23 (92)	< 0.0001
Pleural/pericardial effusion, ascites	5 (72)	2 (8)	
Skin edema	0 (0)	0 (0)	
Heart size			
≤ 0.35	1 (14)	20 (80)	0.003
0.35–0.50	5 (72)	5 (20)	
> 0.50 or < 0.20	1 (14)	0 (0)	
Cardiac function			
Normal	3 (43)	13 (52)	< 0.0001
Holosystolic TR or RVFS/LVFS < 0.28	0 (0)	12 (48)	
Holosystolic MR or TR dP/dT < 400 or monophasic AV filling	4 (57)	0 (0)	
Venous Doppler			
Normal UV and DV	0 (0)	21 (84)	< 0.0001
DV A-wave negative and non-pulsatile UV	1 (14)	0 (0)	
Atrial pulsations in UV	6 (86)	4 (16)	
Umbilical artery Doppler			
Forward diastolic flow	4 (57)	13 (52)	0.241
Absent end-diastolic velocity	0 (0)	5 (20)	
Retrograde end-diastolic velocity	3 (43)	7 (28)	
RVCO (mL/min/kg)	164 ± 98	325 ± 95	0.003
LVCO (mL/min/kg)	208 ± 90	234 ± 58	0.426
CCO (mL/min/kg)	372 ± 168	555 ± 138	0.017

- CPS < 6
- S 100%
- E 84%
- VPP 67%
- VPN 100%
- Para resultados perinatales adversos

The Cardiovascular Profile Score in Patients with Non-immune Hydrops Fetalis and Cardiac Anomalies — a Pilot Study

Anna Dionysopoulou¹ · Etienne Pirih² · Doris Macchiella¹ · Anja Fruth¹ · Antje Jahn-Eimermacher³ · Christoff Kampmann⁴ · Eva Mildemberger² · Catharina Whybra²

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Results point to a positive association between CVPS & fetal outcome in fetuses with NIHF and cardiac anomalies. The CVPS appears to be a useful marker in the assessment of heart failure in utero



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Table 1 Information on perinatal course


	GA at which the CVPS was calculated	GA at delivery	Apgar score (1, 5, 10 min)	Diagnosis	CVPS	Outcome 1 = survived 0 = FNM
1	24 + 1w	26 + 0w	0/0/0	AV atresia, restrictive FO	5	0
2	31 + 6w	34 + 4w	0/0/0	Common arterial trunk	4	0
3	23 + 4w	36 + 4w	4/3/4	LVNC	4	0
4	30 + 2w	32 + 2w	3/6/7	LVNC	6	0
5	26 + 4w	30 + 2w	5/7/8	DORV with pulmonary stenosis, 22q11.2 deletion syndrome	5	0
6	28 + 5w	31 + 0w	4/7/9	PSVT	9	1
7	33 + 5w	36 + 1w	7/5/8	Pseudo-atresia of the PV, TV dysplasia	6	1
8	25 + 0w	39 + 5w	9/10/10	CMV myocarditis, dilatative cardiomyopathy	9	1
9	32 + 6w	32 + 6w	2/3/6	Left pulmonary artery stenosis, Trisomy 21	6	1
10	31 + 5w	35 + 5w	4/7/8	PSVT	7	1
11	30 + 0w	30 + 1w	1/3/4	DORV, Noonan syndrome	8	1
12	32 + 1w	32 + 2w	5/6/8	Suspicion of heart defect was not confirmed postnatally	9	1

- CPS Sobrevivientes
- Mediana 8

- CPS Fetos fallecidos
- Mediana 5

- p=0.009

Cardiovascular profile score as a predictor of acute intrapartum non-reassuring fetal status in infants with congenital heart defects

Takekazu Miyoshi , Shinji Katsuragi, Reiko Neki, Ken-ichi Kurosaki, Isao Shiraishi, Michikazu Nakai, ... show all

Pages 2831-2837 | Received 20 Jul 2016, Accepted 24 Nov 2016, Accepted author version posted online: 28 Nov 2016, Published online: 14 Dec 2016



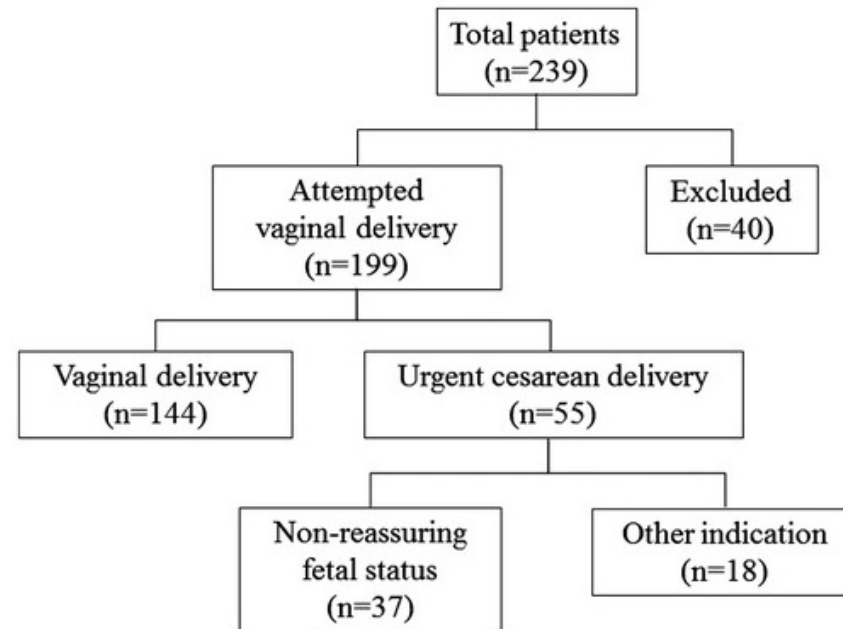
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CERPO

- 199 intentos de parto vaginal
- 144 Partos vaginales
- 37 cesáreas por estado fetal no tranquilizador
- Diferencia en último CPS
- 6.4 vs 9.2



Last CVP score

6.4 ± 3.0

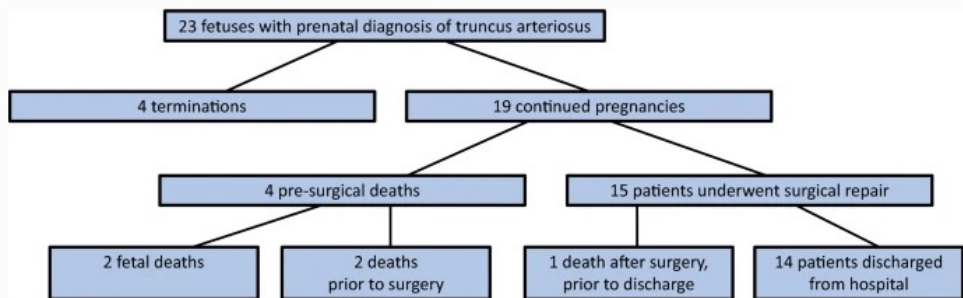
9.2 ± 1.2

<0.001

Fetal Echocardiographic Variables Associated with Pre-Surgical Mortality in Truncus Arteriosus: A Pilot Study

Kelly Cox , Nazia Husain, Simone Jhaveri, Miwa Geiger, Haben Berhane & Sheetal Patel

Pediatric Cardiology (2023) | [Cite this article](#)



• 23 casos de TA entre 2010 y 2020

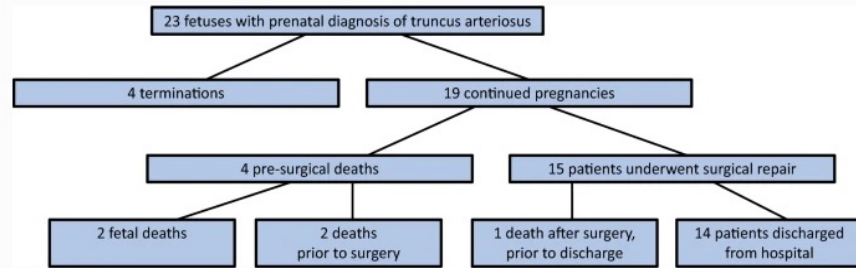
Patient outcomes

Type	Number of fetuses (n = 21)	Pregnancy outcomes
Any genetic abnormality	12 (57%)	
22q11.2 deletion	4 (19%)	3 Living patients, 1 death after discharge from initial hospitalization
15q13.3 duplication	1 (4.8%)	1 Living patient
10p15.3 microdeletion	1 (4.8%)	1 Living patient
4q34 microdeletion	1 (4.8%)	1 Living patient
Chromosome 2 parametric inversion	1 (4.8%)	Death prior to surgical intervention
11q14.3 duplication	1 (4.8%)	1 Living patient
CDH7 mutation	1 (4.8%)	1 Living patient
Cat eye syndrome	1 (4.8%)	Termination
Triploidy	1 (4.8%)	Fetal death

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Patient outcomes

Echocardiographic variable	Pre-surgical mortality (n = 4)	No mortality (n = 15)	Unadjusted <i>p</i> value
Truncal valve regurgitation (all degrees)	3 (75%)	5 (33.3%)	0.08
Truncal valve stenosis	3 (75%)	5 (33.3%)	0.08
Pericardial effusion	1 (25%)	0 (0%)	0.09
Ascites	1 (25%)	0 (0%)	0.09
Skin edema	2 (50%)	0 (0%)	0.01
Cardiomegaly	2 (50%)	1 (7%)	0.1
Abnormal umbilical artery spectral Doppler	1 (25%)	0* (0%)	0.1
Abnormal umbilical vein spectral Doppler	3 (75%)	0* (0%)	0.002
Abnormal ductus venosus spectral Doppler	1 (25%)	0* (0%)	0.099
Qualitative LV systolic dysfunction	2 (50%)	0 (0%)	0.01
Qualitative RV systolic dysfunction	3 (75%)	0 (0%)	0.002
CVP score less than 7	3 (75%)	0 (0%)	0.01

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