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OBJECTIVE

In complicated monochorionic diamniotic (MCDA) twin gestation exists cardiac dysfunction most likely due to remodelling of the fetal heart. However, it is unclear whether cardiac function may be affected due to transient hemodynamic imbalances in uncomplicated monochorionic twin gestation. The aim of the study was to compare cardiovascular function in both uncomplicated and complicated monochorionic twin pregnancies with uncomplicated dichorionic gestation.

METHODS

A prospective observational study was conducted based on three twin groups: dichorionic diamniotic twins (DCDA), uncomplicated MCDA twins and complicated MCDA twins with twin-to-twin transfusion syndrome (TTTS). In each group an echocardiography was performed at 28 weeks of gestation assessing parameters of systolic function, diastolic function and global cardiac function

RESULTS

Table 1. Demographic features and perinatal outcome of the three twin groups.

Variable	DCDA pregnancies (n= 37)	Uncomplicated MCDA pregnancies (n=26)	Complicated MCDA pregnancies with TTTS (n=10)
Maternal data			
Age (years)	35,2 (4,7)	34,9 (3,3)	37,3 (5,9)
Type of conception (%)			
Spontaneous	56,8	57,7	60
Ovulation induction/artificial insemination	2,7	0	0
In vitro fecundation	40,5	42,3	40
Gestational age at ultrasound (weeks)	28,4 (0,6)	28,1 (0,3)	28,4 (0,5)
Perinatal data			
Delivery (%)			
Cesarean section	59,4	50	60
Vaginal	40,5	50	30
Gestational age at birth (weeks)	36,2 (1,6)	35,8 (1,7)	34,9 (1,4)
Birthweight (g)	Fetus 1: 2517 (388) Fetus 2: 2290 (383)	Fetus 1: 2388 (333) Fetus 2: 2160 (295)	Recipient: 2101 (275) Donor: 1894 (266)
Neonatal weight discordance (%)	8,9	8,9	9

Fetus 1: larger twin; Fetus 2: smaller twin

Table 2. Sonographic characteristics and statistically significant parameters of cardiac function in DCDA group, uncomplicated MCDA group and recipient twins.

Variable	DCDA twins (n=74)	Uncomplicated MCDA twins (n=52)	Recipient twins (n=10)	P value
DVP of amniotic fluid	5,7 (1,4)	5,5 (1,4)	4,8 (2,1)	0,132
Estimated fetal weight at ultrasound (g)	1252 (154)	1166 [†] (115)	1093 [†] (169)	<0,001
Estimated fetal weight centile	38 (23,2)	33 (19,7)	19 [†] (22,8)	0,024
Doppler				
Umbilical artery PI	1,09 (0,19)	1,10 (0,19)	1,13 (0,21)	0,81
Middle cerebral artery PI	2,14 (0,48)	1,91 [†] (0,38)	1,90 (0,39)	0,026
MCA-PSV (cm/s)	37,9 (6,23)	36,1 (8,48)	40,5 (9,82)	0,15
Ductus venosus PI	0,56 (0,19)	0,47 (0,18)	0,55 (0,25)	0,25
Cardiac data				
Cardiothoracic index	0,54 (0,043)	0,56 [†] (0,034)	0,53 (0,045)	0,002
Left ventricular free wall (mm)	4,01 (0,87)	4,12 (1,07)	5,1 ^{††} (1,51)	0,006
Biventricular shortening fraction (%)	35	29,8 [†]	34,4	0,007
MPI	0,46 (0,11)	0,49 [*] (0,1)	0,49 (0,09)	0,19
IRT	44,49 (7,85)	46,98 [*] (7,93)	42,6 (7,5)	0,08
Mild/moderate tricuspid regurgitation (%)	8,1	19,2 [†]	0,1	0,007

DVP: deepest vertical pocket; PI: pulsatility index; MCA-PSV: middle cerebral artery peak systolic velocity; MPI: myocardial performance index; IRT: isovolumetric relaxation time.

[†]p<0,05 vs DCDA; ^{††}p<0,05 vs uncomplicated MCDA

A significant higher cardiothoracic index was observed in uncomplicated MCDA pregnancies.

Biventricular shortening fraction was decreased in the monochorionic group.

A higher number of fetuses with mild to moderate tricuspid regurgitation was observed in the uncomplicated MCDA group.

***A trend to a worse left myocardial performance index at the expense of isovolumetric relaxation time (IRT) was observed in the uncomplicated MCDA group, comparing with DCDA group.**

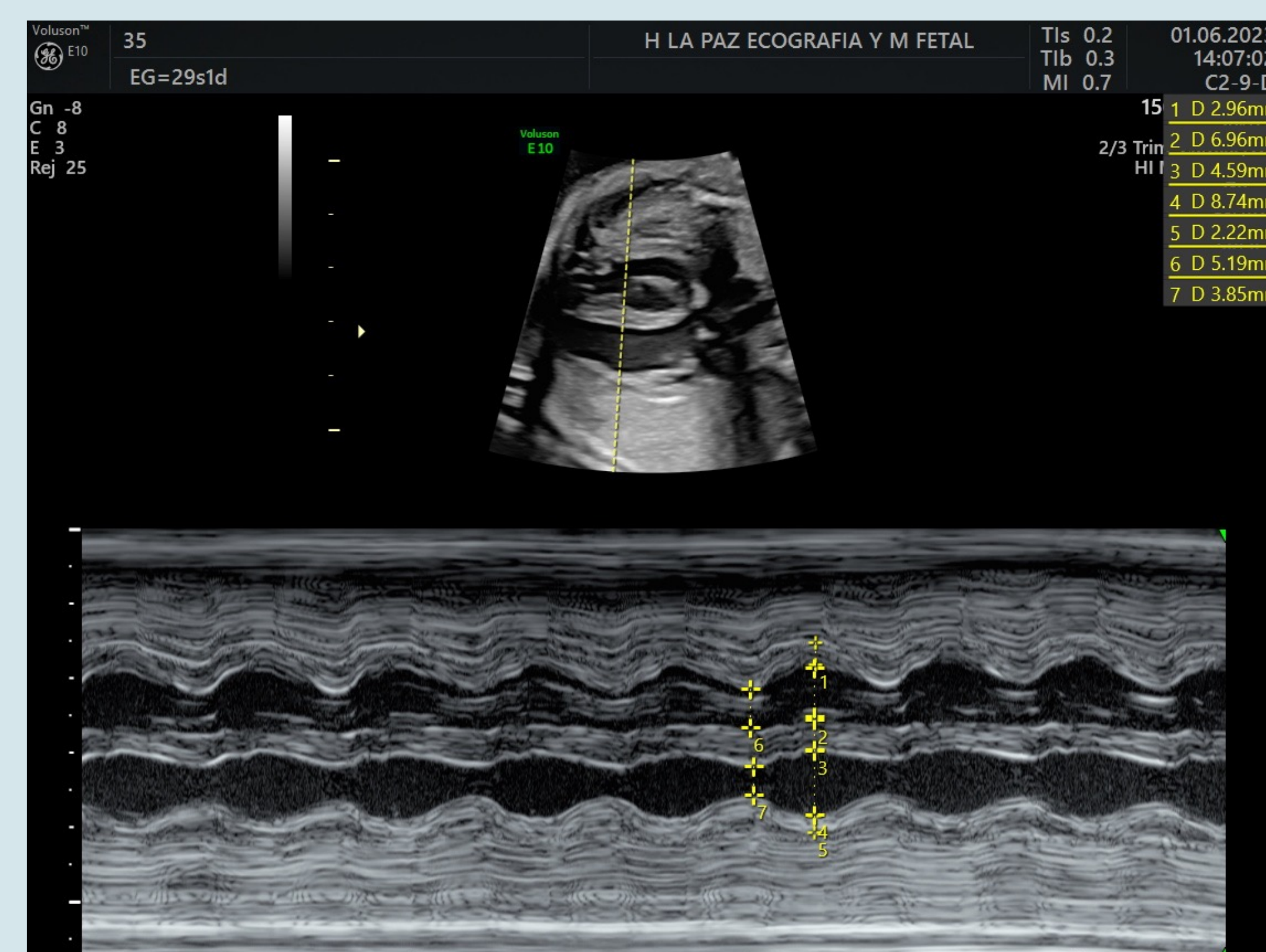
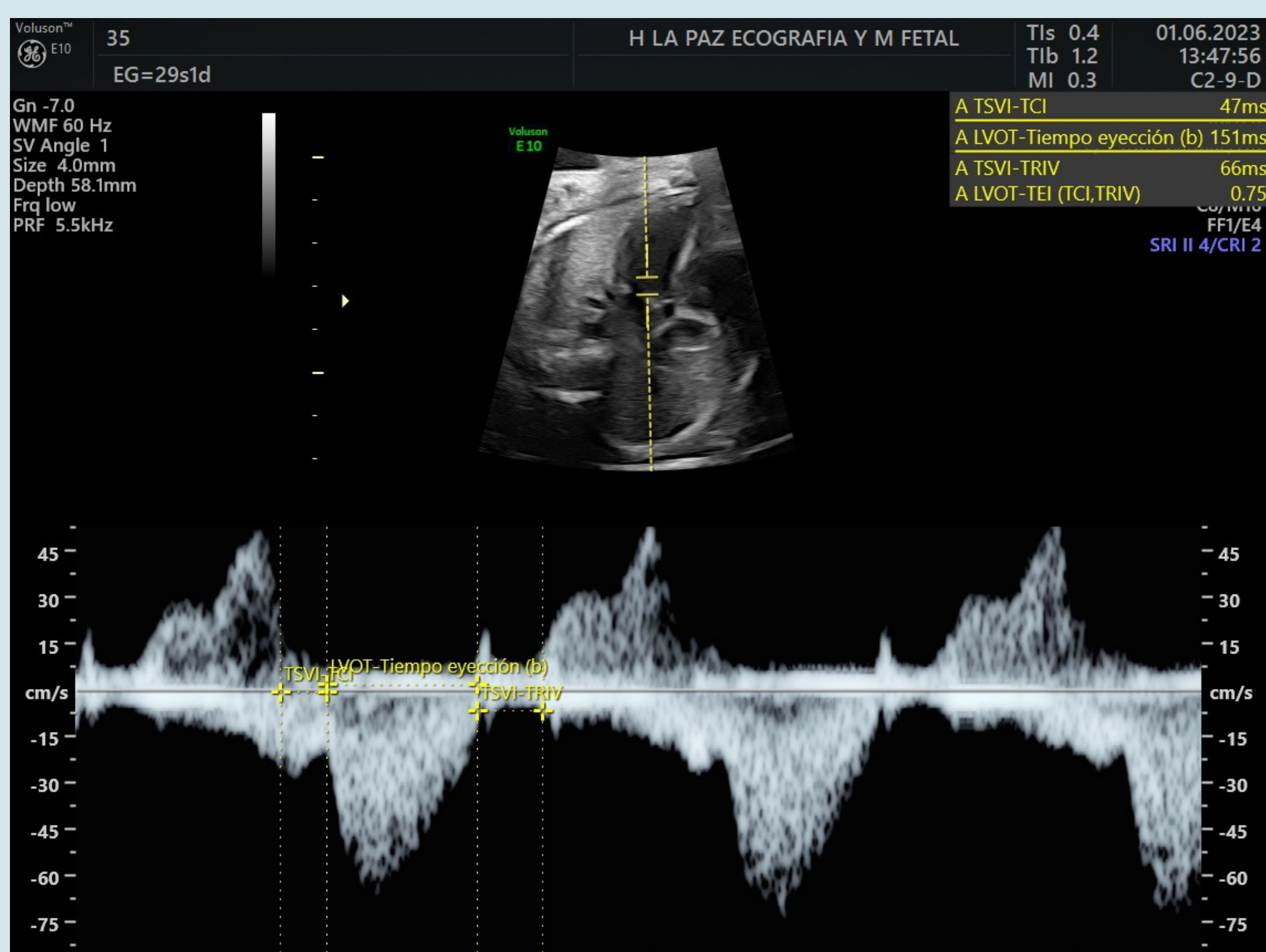
Table 3. Sonographic characteristics and statistically significant parameters of cardiac function in DCDA group, uncomplicated MCDA group and donor twins.

Variable	DCDA twins (n= 74)	Uncomplicated MCDA twins (n=52)	Donor Twins (n=10)	P value
DVP of amniotic fluid	5,7 (1,4)	5,5 (1,4)	5,1 (1,4)	0,28
Estimated fetal weight at ultrasound (g)	1252 (154)	1166 [†] (115)	939 ^{††} (169)	<0,001
Estimated fetal weight centile	38 (23,2)	33 (19,7)	5,2 ^{††} (4,9)	<0,001
Doppler				
Umbilical artery PI	1,09 (0,19)	1,10 (0,19)	1,6 ^{††} (1,01)	0,001
Middle cerebral artery PI	2,14 (0,48)	1,91 [†] (0,38)	1,88 (0,27)	0,021
VSACM (cm/s)	37,9 (6,23)	36,1 (8,48)	39,9 (7,19)	0,2
Ductus venosus PI	0,56 (0,19)	0,47 (0,18)	0,53 (0,19)	0,25
Cardiac data				
Biventricular shortening fraction (%)	35	29,8 [†]	24,9 [†]	0,005

DVP: deepest vertical pocket; PI: pulsatility index; MCA-PSV: middle cerebral artery peak systolic velocity.

[†]p<0,05 vs DCDA; ^{††}p<0,05 vs uncomplicated MCDA

A reduced biventricular shortening fraction was observed in both the uncomplicated MCDA group and the donor twins.



CONCLUSION

Although cardiac function in uncomplicated MCDA twin gestation is preserved, some parameters, compared to dichorionic gestation, indicate the existence of adaptive cardiac changes. In recipient twins, myocardial hypertrophy persists after laser therapy.