

Preoperative hemodynamic evaluation in recipient twin following fetoscopic laser surgery for twin-to-twin transfusion syndrome

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Objective

Analysis the preoperative hemodynamic and circulatory function characteristics in cases of twin-to-twin transfusion syndrome (TTTS) treated with fetoscopic laser surgery (FLS), focusing on recipient twins who experienced adverse pregnancy outcomes.

Methods

A retrospective analysis was performed on cases of TTTS that underwent FLS in our center between October 2021 and October 2024. Cases were categorized into adverse outcome group and control group based on whether the recipient twin experienced intrauterine demise within seven days postoperatively. Clinical characteristics and preoperative hemodynamic in one day before operation were analyzed.

Results

8 cases were in the adverse outcome group and 73 cases in the control group. The incidence of abnormal duct venous and umbilical venous pulsation was significantly higher in the adverse outcome group [87.5% (7/8) vs. 49.3% (36/73), and 12.5% (1/8) vs. 0%, respectively (all $P < 0.05$)].

In terms of cardiac function, the tricuspid inflow duration of cardiac cycle length was significantly lower in the adverse outcome group [0.28 ± 0.58 vs. 0.35 ± 0.81 ($P < 0.05$)]. The proportions of the ratio of pulmonary artery to aortic diameter < 1 , pericardial effusion, and skin edema were significantly higher in the adverse outcome group [25.0% (2/8) vs. 2.7% (2/73), 25.0% (2/8) vs. 5.4% (4/73), and 37.5% (3/8) vs. 11.0% (8/73), respectively ($P < 0.05$)].

Conclusion

The recipients in TTTS cases with adverse outcomes exhibited markedly worsened preoperative hemodynamic status.

Variable		Adverse outcome group (n=8)	Control group (n=73)	P
Age		27.5±3.85	30.33±4.86	> 0.05
GA at operative		21.3±3.3	21.3±3.2	> 0.05
sIUGR (%)		62.5% (5/8)	43.8% (32/73)	> 0.05
Quintero stage (%)	I	0	5.5% (4/73)	< 0.05
	II	37.5% (3/8)	64.4% (47/73)	
	III	12.5% (1/8)	20.5% (15/73)	
	IV	50% (4/8)	9.6% (7/73)	
PPROM		37.5% (3/8)	0	< 0.05
Pericardial effusion		2	4	< 0.05
Seroperitoneum		2	8	> 0.05
Pleural effusion		1	3	> 0.05
Umbilical edema		3	10	> 0.05
Hydroderma		3	8	< 0.05

PPROM: premature rupture of membranes

Table 1. The baseline characteristics of the recipient twins following FLS for TTTS between adverse outcome and control group.

Variable		Adverse outcome group (n=8)	Control group (n=73)	P
UA-PI		1.45±0.45	1.40±0.30	> 0.05
MCA-PSV		25.27±5.48	27.61±6.93	> 0.05
MCA-PI		1.17 (0.97-1.39)	1.25 (1.07-1.42)	> 0.05
CPR value		0.74 (0.60-1.26)	0.95 (0.71-1.12)	> 0.05
CPR abnormality		5/8	51/73	> 0.05
DV abnormality		7/8	36/73	< 0.05
Umbilical vein pulsation		1/8	0	< 0.05
Tricuspid inflow duration/ cardiac cycle length		0.280±0.577	0.352±0.812	< 0.05
CTR		0.39±0.06	0.34±0.07	> 0.05
PA/AO		2	2	< 0.05
RVOT obstruction		1	6	> 0.05
Pulmonary regurgitation	mild	0	5	> 0.05
	moderate	0	3	
	serious	1	5	
Tricuspid regurgitation	mild	1	19	> 0.05
	moderate	1	11	
	serious	5	27	

CTR: Cardiothoracic Ratio; RVOT: Right ventricular outflow tract

Table 2. The preoperative hemodynamic and echocardiographic parameters of the recipient twins following FLS for TTTS between adverse outcome and control group