

Mechanisms of Tricuspid Valve Regurgitation in Hypoplastic Left Heart Syndrome: A Case-Matched Study

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Background

Tricuspid valve (TV) insufficiency is associated with poor outcomes in patients with hypoplastic left heart syndrome (HLHS) undergoing staged palliation. Mechanisms of valvar regurgitation in these patients are poorly understood.

Methods

We reviewed all patients with HLHS undergoing staged palliation and TV repair from 1998-2008. 2D echocardiograms were retrospectively reviewed by two blinded observers. Structural abnormalities of the TV, including annular dilatation, prolapse, chordal elongation/deficiency, restriction, dysplasia and papillary muscle abnormalities were assessed. Mechanisms of TV insufficiency were categorised. Each patient ("Case") undergoing TV repair was matched to a control patient, using diagnosis, ventricular function, palliation type, weight and BSA. Variables were analysed in a logistic regression analysis. Level of agreement between observers was evaluated using kappa coefficient.

Results

Thirty-four HLHS patients underwent TV repair at median age 6.8 (range 0.3-209) months and median weight 5.8 (range 3.0 – 50.7) kg. Every valve repair patient had abnormalities of \leq leaflet versus 14 (44%) controls ($p < 0.001$). The most important cause of TV was leaflet prolapse, followed by leaflet restriction (Table 2). Most commonly affected leaflet was the anterior in 33 patients (97%), the septal was abnormal in 31 (91%) and the posterior leaflet in 23 (68%). Interobserver agreement was excellent (κ values 0.64 - 0.88). Using the logistic regression analysis, no individual abnormality was predictive of TV repair.

Table 1

	TV repair patients n (%)	Controls n (%)
Leaflet prolapse	23 (67.6)	14 (41.2)
Leaflet restriction	21 (61.8)	11 (32.4)
Leaflet dysplasia	13 (38.2)	0
Valvar/subvalvar thickening	16 (47.1)	6 (17.6)
Chordal elongation	20 (58.8)	8 (23.5)
Chordal deficiency	1 (2.9)	0
Papillary muscle abnormality	3 (8.8)	1 (2.9)
Endocardial fibroelastosis	6 (17.6)	14 (41.2)
Ventricular dilatation	34 (100)	17 (50.0)
Annular dilatation	23 (67.6)	14 (41.2)

Table 2

	Primary Mechanism of Regurgitation n (%)	Secondary Mechanism of Regurgitation n (%)
Leaflet prolapse	20 (58.8)	5 (14.7)
Leaflet restriction	2 (5.8)	13 (38.2)
Annular dilatation	9 (26.5)	5 (14.7)
Leaflet dysplasia	3 (8.8)	5 (14.7)

Conclusions

Important structural abnormalities of the TV are common in patients with HLHS and TV insufficiency, and may be readily identified using 2D echocardiography.