Postprocedural echocardiographic data—comparison with preprocedural findings (*Table S1*)

Tricuspid valve function

Significant/severe TR was detected in 220 (23.504%) patients before TLE, and in 222 (23.718%) patients (P=0.957) after the procedure. Similarly, there were no differences in mild and moderate TR before and after the procedure. Severe LDTD was confirmed in 58 patients.

After TLE the severity of regurgitation remained unaltered in 80.235% of patients. Exacerbation of TV dysfunction was observed in 85 (9.081%) patients, in most cases (n=52) it was a mild increment in TR. TV function improved after TLE in 100 patients (P=0.278 as compared to increased TR by the same grade). After the procedure increment in TR by one grade was seen in 52 patients, and improvement by one grade in 90 patients (P<0.001). Increment in TR by 2 or 3 grades occurred in 33 patients, improvement by 2 or 3 grades in 10 patients (P<0.001). Severe tricuspid valve damage was detected in 6 (0.641%) patients after TLE. TEE revealed that tricuspid valve damage in 12 (1.389%) individuals may require surgical repair, 8 patients were selected for tricuspid valvuloplasty, including one urgent (during the same procedure). Rupture of the tendinous chords was found during 29 (3.098%) TLE procedures (*Table 2*).

Vegetations

Out of 151 (16.132%) patients with LRIE detected in preprocedural TEE 119 (78.80% of LRIE) were diagnosed with having vegetations. The average size of the vegetation was 1.533±1.137 cm. Lead-associated vegetations were most common being detected in 114 (75.496% of LRIE) patients. Multiple vegetations were seen in more than half of LRIE patients (82; 54.304%), in most cases they were below 2 cm in size (62.913%). There were 10 (6.622%) large (2.1–3.0 cm in size) and 14 (9.271%) very large (>3 cm in size) vegetations. In the latter case special devices were used during TLE for prevention of pulmonary embolism. In case of 3 vegetations >4 cm in size it was decided to carry out surgical treatment (hybrid). After lead extraction vegetation remnants were seen in cardiac cavities in 50 (33.112% of LRIE) patients, the average size of remnants was 2.520±1.703 cm and was larger than at baseline (P<0.001). A total of 69 (45.695% of LRIE) patients had no vegetation remnants after lead removal (*Table 2*).

Residual fibrosis

Overall, 549 (there were multiple manifestations in single patients) fibrous encapsulation sheaths were detected in 437 (46.688%) patients before TLE. Adhesive interactions between leads and various anatomical structures were diagnosed in 236 (25.213%) patients, binding to right atrial (RA) wall in 65 (6.944%), to superior vena cava (SVC) in 56 (5.983%), and lead-to-lead adhesions in 172 (18.376%) patients (*Table 2*).

After TLE residual fibrosis was found in 310 patients, being almost twice as frequent as before TLE. Floating connecting tissue scar was detected as a single focus in 219 (23.39%) patients, multiple foci in 91 (9.722%). Their average length and width were 21.015±15.446 and 4.411±1.590 mm, respectively. They were most often found in RA (182; 19.444%) and SVC (93; 9.935%), less often in RV (61; 6.517%), on the tricuspid apparatus (46; 4.914%), incidentally in CS. Floating connecting tissue scar was found at more than one site in 8.653% of patients (*Table 2*).

Pericardial effusion

Preoperatively, pericardial effusion was found in 54 (5.770%) patients, including 40 (4.274%) with "wet" perforation, mainly of the RV wall. In 151 (16.132%) patients perforation was "dry" i.e., the tip of the lead was beyond the RV wall contour without signs of fluid in the pericardium, sometimes with a pericardial reaction and a drop of fluid near the lead tip. A total of 34 (3.632%) patients were monitored for the presence of effusion, including 12 (1.282%) with signs of tamponade during or after TLE (*Table 2*).

Retained lead fragments

The lead was broken during 50 (5.342%) extraction procedures, in 6 (0.641%) cases the lead fragment could not be removed, in the remaining 44 (4.701%) procedures pieces of the lead were successfully extracted using additional tools (lassos and sheaths). In 7 (0.0749%) cases there were fragments of silicon tube demonstrable only in TEE (invisible under fluoroscopy), which in 5 patients were removed transvenously, in the remaining two patients during operations for other reasons (*Table 2*).

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Table S1 TEE findings before and after TLE

TEE findings	*Before TLE	*After TLE	Wilcoxon paired test, χ^2 test
TR (0–IV), mean ± SD	*1.689±1.009	*1.708±0.991	0.959
TR absent/ mild (0–I), n (%)	*543 (58.013)	*541 (57.799)	0.963
TR moderate (II), n (%)/LDTD, n	*173 (18.483)/2	*173 (18.438)	1.000
TR significant/severe (III–IV), n (%)/LDTD, n (%)	*220 (23.504)/58	*222 (23.718)	0.957
Tricuspid regurgitation change after TLE			
TR without change after TLE, n (%)		751 (80.235)	
TR change after TLE (+1) *vs.* (–1), n (%)	52 (5.556)	90 (9.615)	0.001
TR change after TLE (+2 or 3) *vs.* (–2 or 3), n (%)	33 (3.526)	10 (1.068)	0.001
TR change (all) (+) *vs.* (–), n (%)	85 (9.081)	100 (10.684)	0.278
TLE-associated damage to tricuspid valve apparatus			
Increment in TR after TLE by 2 degrees, n (%)	NA	33 (3.526)	
Increment in TR after TLE by 2 degrees to IV degree, n (%)	NA	6 (0.640)	
Damage to tendinous chords, n (%)	NA	29 (3.098)	
Flail tricuspid leaflet initially requiring intervention after TLE, n (%)	NA	12 (1.389)	
Vegetations			
Presence of vegetations (TTE or and TEE), n (%)	*119 (12.714)	*50 (5.342)	P<0.001
Max. diameter of vegetation (if present) mean ± SD	*1.533±1.137	*2.520±1.703	P<0.001
Presence of vegetations <2 cm, n (%)	*95 (10.150)	*37 (3.953)	0.261
Presence of vegetations >2 cm, n (%)	*24 (2.564)	*13 (1.389)	0.261
Single vegetation, n (%)	*37 (3.953)	*45 (4.808)	P<0.001
Multiple vegetations, n (%)	*82 (8.761)	*5 (0.534)	P<0.001
Vegetations associated with leads, n (%)	*114 (12.179)	NA	
Vegetations not associated with leads, n (%)	*3 (0.321)	*4 (0.427)	1.000
Vegetations associated with leads and heart structures, n (%)	*2 (0.214)	NA	
Tissue scars—AMEL, 549 (58.654%) in 437 patients			
Lead thickening, n (%)	277(29.594)	NA	
Clot on the lead, n (%)	75 (8.013)	NA	
Vegetation-like masses, n (%)	37 (3.953)	NA	
Fibrous tissue encasing the lead/floating connecting tissue scars, n (%)	160 (17.094)	310 (33.120)	P<0.001
Single floating connective tissue scars after TLE, n (%)	NA	219 (23.397)	
Multiple floating connective tissue scars after TLE, n (%)	NA	91 (9.722)	
Average length of floating connective tissue scars after TLE, mean ± SD	NA	21.015±15.446	
Average width of floating connective tissue scars after TLE, mean ± SD	NA	4.411±1.590	
Fibrous tissue binding the lead to the superior vena cava and heart structures			
Fibrous tissue binding the lead to the SVC, n (%)	56 (5.983)	NA	
Fibrous tissue binding the lead to the RA wall, n (%)	65 (6.944)	NA	
Fibrous tissue binding the lead to the heart structures (all), n (%)	90 (9.615)	NA	
Fibrous tissue binding the lead to the RV wall, n (%)	106 (11.325)	NA	
Lead–to–lead adhesion	172 (18.377)	NA	
Pericardial fluid after or during TLE			
Appearance of fluid during TLE causing cardiac tamponade (complication), n (%)	NA	12 (1.282)	
Appearance of fluid during TLE without hemodynamic disturbances (clinically asymptomatic), n (%)	NA	22 (2.350)	
Pericardial fluid surrounding the tip as a symptom of “wet” cardiac wall perforation during TLE, n (%)	40 (4.274)	NA	
Asymptomatic pericardial fluid before and after TLE not caused by TLE or lead perforation, n (%)	14 (1.496)	NA	
Lead fracture			
Lead fracture during extraction	NA	50 (5.342)	
Broken lead insulation with successful extraction	NA	7 (0.749)	
Broken lead with unsuccessful extraction of metal remnant	NA	6 (0.641)	

AMEL, asymptomatic masses on endocardial leads; LDTD, lead-dependent tricuspid dysfunction; RA, right atrium; RV, right ventricle; SVC, superior vena cava; TEE, transesophageal echocardiography; TLE, transvenous lead extraction; TR, tricuspid regurgitation; TTE, transthoracic echocardiography.

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