

Safety of transvenous lead removal in adult congenital heart disease: a national perspective

Table 1 of the supplementary data

International Classification of Diseases, Ninth Revision (ICD-9) codes for adult congenital heart disease

ICD-9 code	ICD-9 description	Complex?
745.0	Common truncus	Yes
745.1	Transposition complex	
745.10	Complete transposition of great vessels	Yes
745.11	Double outlet right ventricle	Yes
745.12	Corrected transposition of great vessels	Yes
745.19	Other transposition of the great vessels	Yes
745.2	Tetralogy of Fallot	Yes
745.3	Common ventricle	Yes
745.4	Ventricular septal defect	No
745.5	Ostium secundum type atrial septal defect	No
745.6	Endocardial cushion defect	
745.60	Endocardial cushion defect, unspecified type	Yes
745.61	Ostium primum defect	Yes

745.69	Other endocardial cushion defect	Yes
745.7	Cor biloculare	Yes
745.8	Other bulbus cordis anomaly or septal defect	No
745.9	Unspecified defect of septal closure	No
746.0	Anomalies of pulmonary valve	
746.00	Pulmonary valve anomaly, unspecified	Yes
746.01	Pulmonary atresia	Yes
746.02	Pulmonary stenosis	Yes
746.09	Pulmonary valve anomaly, other	Yes
746.1	Tricuspid atresia and stenosis	Yes
746.2	Ebstein's anomaly	Yes
746.3	Congenital stenosis of aortic valve	No
746.4	Congenital insufficiency of aortic valve	No
746.5	Congenital mitral stenosis	No
746.6	Congenital mitral insufficiency	No
746.7	Hypoplastic left heart syndrome	Yes
746.8	Other unspecified anomalies of the heart	

746.81	Subaortic stenosis	Yes
746.82	Cor triatriatum	Yes
746.83	Infundibular pulmonic stenosis	Yes
746.84	Obstructive anomalies of heart, NEC	Yes
746.85	Coronary artery anomaly	No
746.86	Congenital heart block	No
746.87	Malposition of heart and cardiac apex	Unclassified
746.89	Other congenital anomalies of heart	Unclassified
746.9	Other congenital anomalies of heart	Unclassified
747.0	Patent ductus arteriosus	Yes
747.1	Coarctation of aorta	
747.10	Coarctation of aorta	Yes
747.11	Interruption of aortic arch	Yes
747.2	Anomalies of aorta	
747.20	Anomaly of aorta, unspecified	Yes
747.21	Anomalies of aortic arch	Yes
747.22	Atresia and stenosis of aorta	Yes

747.29	Other congenital anomalies of the aorta	Yes
747.3	Anomalies of pulmonary artery	Yes
747.4	Anomaly of great veins	
747.40	Anomaly of great veins, unspecified	Yes
747.41	Total anomalous pulmonary venous connection	Yes
747.42	Partial anomalous pulmonary venous connection	Yes
747.49	Other anomalies of great veins	Yes
747.9	Unspecified anomaly of circulatory system	Unclassified

ICD, International Classification of Diseases.

Adapted from Opotowsky AR, Siddiqi OK, Webb GD. Trends in hospitalizations for adults with congenital heart disease in the U.S. *J Am Coll Cardiol*. 2009;54:460–467.

These classifications are based on the 32nd Bethesda Conference document and other published reports. Simple diagnoses with coexisting complex diagnoses or pulmonary hypertension were classified as complex.

Values in bold indicate 1 large group (eg, 745.1), followed, in nonbold, by subgroups (eg, 745.11, 745.12).

Table 2 of the supplementary data

Procedural complications by ICD-9 code

Procedural complication	ICD-9 code
<i>Vascular injury</i>	
Injury to blood vessels	900X-904X
Accidental puncture	998.2
Arteriovenous fistula	447.0
Injury to the retroperitoneum	868.04
Vascular complications requiring surgery	39.31, 39.41, 39.49, 39.52, 39.53, 39.56, 39.57, 39.58, 39.59, 39.79
Other vascular complications	999.2, 997.7
<i>Hemorrhage</i>	998.11, 998.12
<i>Hemorrhage requiring transfusion</i>	998.11 or 998.12 AND 99.0 or V58.2
<i>Pericardial complications</i>	
Hemopericardium	423.0
Cardiac tamponade	423.3

Pericardiocentesis	37.0
Pericardiotomy	37.12
<i>Pneumothorax or hemothorax</i>	512.1, 511.8, 511.89, 860.2
<i>Pneumothorax or hemothorax requiring chest tube</i>	512.1, 511.8, 511.89, or 860.2 AND 34.04, 34.05, 34.06, or 34.09
<i>Iatrogenic cerebrovascular infarction or hemorrhage</i>	997.02
<i>Acute renal failure requiring new hemodialysis</i>	584X AND 39.95 AND NOT V45.1
<i>Requiring repair of heart and pericardium</i>	37.4X

ICD, International Classification of Diseases.

Table 3 of the supplementary data

Hierarchical regression modeling of the risk of in-hospital mortality and complications related to transvenous lead removal in patients with and without congenital heart disease in the total study population

	Mortality			Any complication		
	OR	95%CI	P	OR	95%CI	P
<i>Model 1</i>						
No CHD	1.0 (reference)			1.0 (reference)		
Simple CHD	0.82	0.42-1.60	.556	1.71	1.30-2.25	< .001
Complex CHD	1.03	0.38-2.82	.951	2.11	1.38-3.23	.001
Unclassified CHD	1.11	0.41-3.04	.838	1.02	0.57-1.83	.956
Any CHD	0.92	0.56-1.50	.739	1.66	1.33-2.06	< .001
<i>Model 2</i>						
No CHD	1.0 (reference)			1.0 (reference)		
Simple CHD	0.91	0.46-1.78	.773	1.54	1.16-2.05	.003
Complex CHD	1.13	0.41-3.15	.815	2.11	1.37-3.25	.001
Unclassified CHD	1.59	0.57-4.44	.374	1.01	0.55-1.85	.986

Any CHD	1.06	0.64-1.75	.816	1.56	1.24-1.95	< .001
<i>Model 3</i>						
No CHD	1.0 (reference)			1.0 (reference)		
Simple CHD	1.03	0.52-2.02	.940	1.52	1.14-2.03	.004
Complex CHD	1.24	0.44-3.47	.680	2.09	1.35-3.22	.005
Unclassified CHD	1.86	0.67-5.22	.235	0.99	0.54-1.83	.978
Any CHD	1.20	0.72-2.00	.477	1.54	1.23-1.93	< .001

95%CI, 95% confidence interval; CHD, congenital heart disease; OR, odds ratio.

Model 1: unadjusted model.

Model 2: adjusted for age, sex, household income, primary payer, Charlson/Deyo Comorbidity Index, admission type, hospital bed size, hospital region, hospital location, hospital teaching status, hospital volume, and period.

Model 3: adjusted for model 2 and device infection.

Any CHD and the 3 types of CHD were analyzed in 2 separate regression processes with no CHD as the reference.

Figure 1 of the supplementary data

Absolute standardized differences in covariates between patients with and without congenital heart disease, before and after propensity score matching. An absolute standardized difference < 0.1 indicates adequate matching.

