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Permanent Epicardial Pacing in Children: Long-Term Results and Factors Modifying Outcome

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Objectives: We sought to evaluate the results of permanent epicardial pacing in children with respect to risk factors modifying long-term outcome.
Methods: All consecutive pts from one country (N=119, period 1977–2009) undergoing permanent epicardial pacemaker implantation below 18 yrs of age (median 1.8, inter-quartile range (IQR) 0.3–6.4 yrs) were retrospectively studied. A total of 207 pulse generators, 89 atrial and 153 ventricular pacing leads were implanted with a median patient follow up of 6.4 (IQR 2.9–11.1) yrs. Atrioventricular block was the prevailing indication (86.6 %). Structural congenital heart disease was present in 76.5 %. Pacing system dysfunction was defined by any of the following endpoints: generator and/or lead replacement/revision/abandonment due to exit block, major increase in pacing threshold, fracture or insulation break, patient outgrowth, infection and premature (<3 yrs) battery depletion.
Results: Probability of absence of pacing system dysfunction was 79.0/52.1 % at 5/10 yrs after implantation. Probability of continued epicardial pacing was 92.8/76.1/58.2 % at 5/10/15 yrs and increased in recent implantation era (2000-2009, HR 4.17, CI 1.15–16.67, P=0.030). The use of steroid-eluting leads decreased the risk of exit block (HR 0.25, CI 0.11–0.55, P<0.001) with an actuarial probability of exit block absence at 5 yrs of 95.3 % as compared to 76.2 % in non-steroid leads (P<0.001). The use of bipolar Medtronic 4968 leads significantly reduced the risk for surgical reintervention because of fracture, insulation break or outgrowth as compared to the unipolar 4965 lead design (96.6 % vs 84.2 % at 5 years; HR 0.19, CI 0.07–0.46, P <0.001 for both). The use of the AutoCapture™ feature (HR 14.29, CI 2.94–50.00, P<0.001) and steroid-eluting leads (HR 3.70, CI 1.22–11.11, P=0.020) significantly increased battery longevity. No patient has died because of pacing system failure/infection.
Conclusions: The probability of continued epicardial pacing in children was as high as ~75/60 % at 10/15 yrs after implantation and allowed to defer transvenous pacing to a significantly higher age. The use of bipolar steroid-eluting leads and of the AutoCapture™ feature significantly increased pacing system longevity and decreased the need for surgical re-interventions.