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Long-term follow-up data reveal the Micra™ leadless cardiac pacemaker to be a safe therapeutic option for octo- and nonagenarians

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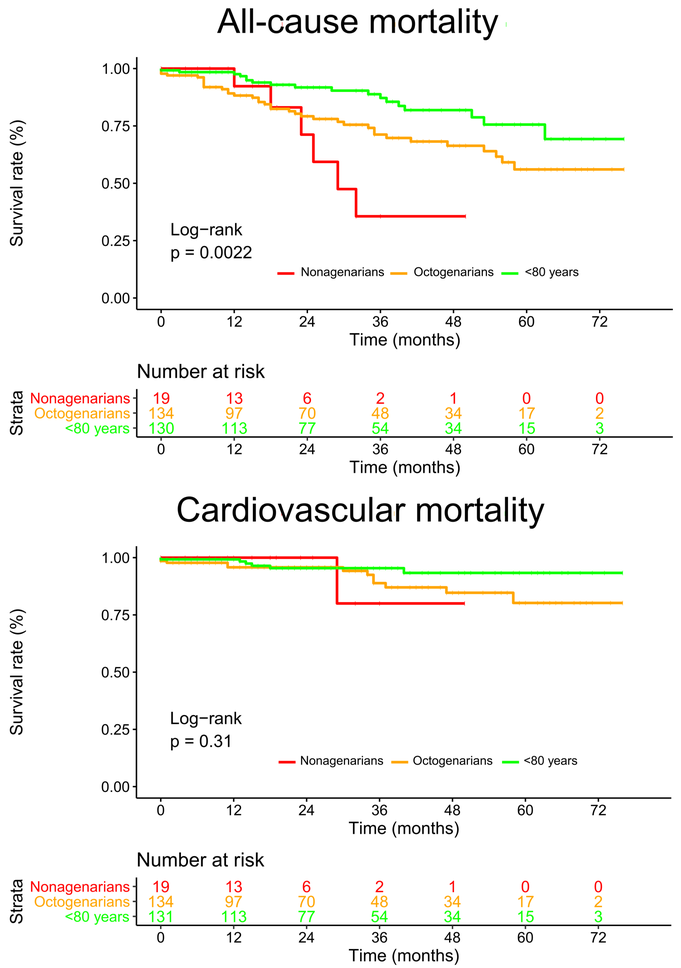
Objective

In an aging population with increasing life expectancy, safe treatment options for octo- and nonagenarians in need of cardiac pacing are becoming increasingly relevant. While conventional pacemaker implantations have been shown to be safe for the elderly, the rate of complications is higher than after leadless cardiac pacemaker (LCP) implantation. In the elderly, the occurrence of peri-procedural complications has been demonstrated to be an important predictor of post-implant death. This study is the first to provide long-term data for nonagenarians who received an LCP and offers a comparison to long-term octogenarian and younger patient data.

Patients and Methods

283 patients who received a Micra™ LCP at our department between 12/2013 and 07/2020, were included in this retrospective data analysis. Patients were grouped according to their age at the date of implantation. Categorical variables were compared with Pearson's chi-square test. Continuous variables were compared with the Kruskal-Wallis test. For post-hoc multiple comparisons Bonferroni correction was applied. Survival analyses were conducted with Kaplan-Meier curves and the log-rank test was employed to test for differences between groups. Cox regression analyses were performed to determine predictors of all-cause death in the investigated population.

Variable	All (n=283)	90+ (n=19)	80-90 (n=134)	<80 (n=130)	p-value
Age	80.00 (76.00-85.00)	91.00 (90.00-93.00)	84.00 (82.00-86.00)	76.00 (71.75-77.25)	**<0.001**
Female Male	103 (36.40%) 180 (63.60%)	8 (42.11%) 11 (57.89%)	44 (32.84%) 90 (67.16%)	51 (39.23%) 79 (60.77%)	0.484
BMI	26.07 (24.18-28.72)	23.97 (22.28-26.38)	26.01 (24.22-28.55)	26.56 (24.25-29.05)	**0.033** (1-3: 0.028)
cha2ds2-vasc score	3.81 ± 1.35 4.00 (3.00-5.00)	4.11 ± 1.45 4.00 (3.00-5.00)	4.02 ± 1.21 4.00 (3.00-5.00)	3.59 ± 1.42 4.00 (3.00-4.00)	0.113
Charlson Comorbidity Index (CCI)	4.52 ± 1.57 4.00 (4-00-5.00)	5.16 ± 1.17 5.00 (4.00-6.00)	5.04 ± 1.24 5.00 (4.00-6.00)	3.92 ± 1.69 4.00 (3.00-5.00)	**<0.001** (3-2: <0.001; 3-1: 0.001)
CCI without age	1.00 (0.00-2.00)	1.00 (0.00-2.00)	1.00 (0.00-2.00)	1.00 (0.00-2.00)	0.654
Follow-up (months)	25.00 (13.25-47.00)	18.00 (8.00-29.00)	24.50 (9.75-48.00)	27.50 (14.75-49.00)	**0.027** (1-3: 0.025)
Indication					
slow conduction AF	117 (41.34%)	8 (42.11%)	64 (47.76%)	45 (34.62%)	0.095
AV block °3	86 (30.39%)	6 (31.58%)	31 (23.13%)	49 (37.69%)	**0.036**
SSS	41 (14.49%)	1 (5.26%)	17 (12.69%)	23 (17.69%)	0.255
Other	39 (13.78%)	4 (21.05%)	22 (16.42%)	13 (10.00%)	0.203
Atrial fibrillation					
None	76 (26.86%)	3 (15.79%)	30 (22.39%)	43 (33.08%)	0.078
Paroxysmal	40 (14.13%)	3 (15.79%)	26 (19.40%)	14 (10.77%)	0.322
Non-par.	167 (59.01%)	13 (68.42%)	81 (58.21%)	73 (56.15%)	0.511
EF (%)	60.00 (52.50-60.00)	60.00 (50.00-60.00)	60.00 (53.50-62.50)	59.00 (55.00-65.00)	0.712



Results

The median age of patients was 80.00 years (for nonagenarians: 91.00 [90.00-93.00], octogenarians: 84.00 [82.00-86.00] and younger patients: 76.00 [71.75-77.25]). The median length of follow-up was 25.00 (13.25-47.00) months. Complications were rare (n=12, 4.24%, with no significant differences between groups). In the nonagenarian group, BMI was significantly decreased and oral anticoagulant use significantly increased compared to the other groups. Comorbidities were not significantly different between groups. Kaplan-Meier analyses revealed significant differences in all-cause (log-rank: p=0.002) but not cardiovascular mortality (p=0.31) between the groups. Cox regression analyses demonstrated age (HR: 1.34, p=0.003) and NT-pro BNP concentrations (HR: 1.0002, p=0.031) to be the most relevant predictors of all-cause death. No significant differences between the groups were found in periprocedural and device-related parameters.

Conclusion

Taken together with previous findings, LCP are a viable alternative to conventional pacemakers for octo- and nonagenarians in need of pacing. The low rates of complications and rare severe adverse device effects associated with the Micra™ LCP pacemaker render it an enticing treatment option for octo- and nonagenarians.

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