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CLINICAL RESEARCH

Pacemaker replacement in nonagenarians: Procedural safety and long-term follow-up

Remplacement de stimulateur cardiaque chez les nonagénaires : sécurité de la procédure et suivi à long terme

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KEYWORDS
Pacemaker;
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Summary
Background. — The rate of pacemaker implantation is rising. Given that the life expectancy of the population is projected to increase, a large number of elderly patients are likely to be implanted in the future. As pacemaker batteries can last for 8—10 years, an increasing number of pacemaker recipients will require replacement of their devices when they become nonagenarians.
Aims. — To analyse the short- and long-term outcomes after device replacement in nonagenarians.
Methods. — Patients aged ≥ 90 years referred to a tertiary centre for pacemaker replacement from January 2004 to July 2014 were included retrospectively. Clinical follow-up data were obtained from clinical visits or telephone interviews with patients or their families. The primary clinical endpoint was total mortality. Secondary endpoints included early and delayed procedure-related complications and predictive risk factors for total mortality.

Abbreviations: AF, atrial fibrillation; AV, atrioventricular; BMI, body mass index; CI, confidence interval; CRT, cardiac resynchronization therapy; CRT-P, cardiac resynchronization therapy-pacemaker; HR, hazard ratio.

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Results. — Sixty-two patients were included (mean age 93.3 ± 2.9 years at time of pacemaker replacement). Mean procedure duration was 35.7 ± 17.2 minutes. Mean hospital stay was 2.2 ± 1.1 days. One patient died from a perioperative complication. Thirty-seven patients (59.7%) died during a median follow-up of 22.1 months (interquartile range, 11.8—39.8 months). Survival rates were 84.2% (95% confidence interval [CI] 71.8—91.5%) at 1 year, 66.9% (95% CI 51.8—78.2%) at 2 years and 22.7% (95% CI 10.6—37.7%) at 5 years. Atrial fibrillation (hazard ratio 2.47, 95% CI 1.1—5.6) and non-physiological pacing (i.e. VVI pacing in patients in sinus rhythm) (hazard ratio 2.20, 95% CI 1.0—4.9) were predictors of mortality.
Conclusions. — Pacemaker replacement in nonagenarians is a safe and straightforward procedure. These data suggest that procedures can be performed securely in this old and frail population, with patients living for a median of 30 months afterwards.

MOTS CLÉS
Stimulateur cardiaque ;
Remplacement ;
Nonagénaire

Résumé
Contexte. — Le taux d'implantation de stimulateurs cardiaques est en croissance constante. L'espérance de vie augmentant, de nombreuses personnes âgées seront implantées dans le futur. L'autonomie des batteries des stimulateurs étant de 8 à 10 ans, de nombreux patients nécessiteront le remplacement de leur appareil à > 90 ans.
Buts. — Étudier le devenir à court et à long terme des nonagénaires après remplacement de leur stimulateur cardiaque.
Méthodes. — Tous les patients nonagénaires adressés pour un changement de stimulateur cardiaque entre janvier 2004 et juillet 2014 ont été inclus de façon rétrospective. Les données cliniques étaient obtenues lors des consultations de suivi ou par téléphone auprès des patients ou de leurs familles. Le critère primaire de jugement était la mortalité toutes causes. Les critères secondaires comprenaient les complications immédiates et à long terme, ainsi que les facteurs prédictifs de mortalité toutes causes.
Résultats. — Soixante-deux patients ont été inclus (93,3 ± 2,9 ans, durée de procédure 35,7 ± 17,2 minutes). Un patient est décédé d'une complication périopératoire. Durant le suivi, 37 patients (59,7 %) sont décédés. Le taux de survie était respectivement de 84,2 % (IC 95 % 71,8—91,5 %), 66,9 % (IC 95 % 51,8—78,2 %) et 22,7 % (IC 95 % 10,6—37,7 %) après 1, 2 et 5 ans. La fibrillation atriale (HR 2,47, IC 95 % 1,1—5,6) et la stimulation cardiaque non physiologique (mode VVI chez les patients en rythme sinusal) (HR 2,20, IC 95 % 1,0—4,9) étaient des facteurs prédictifs indépendants de mortalité.
Conclusions. — Le remplacement de stimulateurs cardiaques est une procédure simple pouvant être réalisée sans risques majeurs chez les nonagénaires. Après la procédure, la survie médiane est de 30 mois.

Background

In Europe, 933 pacemakers per million inhabitants are implanted every year [1]. The implantation rate is rising continuously, partly because of the ageing of general population, resulting in an increased risk of developing atrioventricular (AV) block and sinus node dysfunction, but also related to the expansion of indications for cardiac resynchronization therapy (CRT). The average age at device implantation is currently 80 years [2].

In 2012, life expectancy in Europe was 80.3 years for the general population (83.1 years for women; 77.5 years for men), a 2.6-year increase since 2002 [3]. By 2060, life expectancy is projected to be 89.1 years for women and 84.6 years for men [4]. A 163.4% increase in the number of patients aged ≥ 80 years is expected. To date, only a few studies have specifically reported the long-term outcome of very elderly patients implanted with a cardiac pacemaker. In a recent study, Udo et al. evaluated the outcome of pacemaker recipients aged > 80 years, and reported a cumulative 5-year survival of around 50% after implantation, with a complication rate of 18.1% [5].

As pacemaker batteries can last for as long as 8—10 years, an increasing number of pacemaker recipients will probably require replacement of their devices when they are nonagenarians. No studies specifically reporting the outcome and survival of nonagenarians referred for pacemaker replacement have been published. Therefore, we aimed to analyse the short- and long-term outcomes after device replacement in these very elderly patients. Procedural characteristics,