

Incidence and Frequency Rate of Cardiac Pacemaker Insertions in an Ageing Population

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ABSTRACT

Objective:The purpose of this study is to determine the incidence and frequency rate of cardiac pacemaker insertions in an ageing population.

Study Design:Observational study

Place and Duration: Conducted at Hayatabad Medical Complex Peshawar during from March, 2019 to August, 2019.

Methods: There were 210 patients of both genders had ages >20 years were presented in this study. All the included patients had cardiovascular disease were hospitalized. After obtaining informed written permission, the demographics of enrolled patients included age, sex, BMI, comorbidities, education status, and place of residence. Incidence of cardiac pacemaker insertions among cases was determined. Frequency of PPM among all cases was recorded among sex and different age groups. SPSS 23.0 was used to analyze all data.

Results:In our study, males were higher in numbers 130 (61.9%) than females 80 (38.1%). Included patients had mean age 71.8±11.56 years with mean BMI 25.4±11.42 kg/m². There were 170 (80.9%) patients married and 150 (71.4%) cases were from urban areas. We found HTN was the most common comorbidity followed by diabetes mellitus and hyperlipidemia. We found that incidence rate of pace maker (PM) among patients with ages >75 years were higher found in 115 (54.8%) cases. Frequency of double chamber and triple chamber pacing was found in 98 (46.7%) cases. Frequency of cardiac resynchronization defibrillator was found in 120 (57.1%) cases.

Conclusion:We concluded that ageing has a direct impact on the need for cardiac pacing, resulting in increased rates of incidence and prevalence. A growing number of elderly people will require electrophysiology and pacing services.

Keywords:Cardiac Pace Maker, Cardiovascular disease, Comorbidities, Old Age

INTRODUCTION

Most nations' populations are becoming older. There were more persons over 65 in 2011 than at any point in our country's history, with 15% of the population [1]. Among those over 90, cognitive impairment affects more than a quarter (27 percent) of those who are alive [2]. One of the few pharmacological strategies that may enhance the quality of life for people with this illness is cholinesterase inhibitors (donepezil, rivastigmine, and galantamine) [3-5]. That and the growing elderly population will lead to an increase in their use.

Medication that inhibits cholinesterase may result in a cholinergic overproduction, causing a variety of symptoms such as nausea, diarrhoea, and cramping in the muscles, among other things. By raising vagal tone, these actions have the potential to produce bradycardia as well. The medication monograph for donepezil lists a 1-2 percent incidence of cardiac conduction problems. The use of cholinesterase inhibitors has been linked to bradycardia in many cases [6].

Men and women with cardiovascular disease exhibit clinically and have diagnostic and treatment requirements that are distinct from one another. It's commonly known that women have a lower incidence of permanent pacemaker installation than males do when it comes to cardiac arrhythmias [7].

It has been shown that there are clinically significant differences in cardiac arrhythmia studies between men and women. Prospectively recording all patients undergoing device treatment is standard procedure in most countries [8]. Clinical and survival data and functional monitoring of PM systems may be missing from these databases. In earlier investigations, demographic data, sex, baseline PM data, or comorbidities [9,10] were coupled with survival. Compared to prospective studies, where patients with substantial co-morbidities must be excluded, retrospective databases have the benefit of reflecting real-world conditions.

There has been no research to date that has examined the long-term survival of PM patients with sex differences and clinically

significant comorbidities and functional PM lead characteristics, to our knowledge. Specifically, we wanted to see whether there were differences in survival rates between men and women who received a PM for bradycardic arrhythmia and those who received a dual-chamber PM.

MATERIAL AND METHODS

This observational study was conducted at Hayatabad Medical Complex Peshawar during from March, 2019 to August, 2019 and comprised of 210 patients. After obtaining informed written permission, the demographics of enrolled patients included age, sex, BMI, comorbidities, education status, and place of residence. Patients did not give any written consent were excluded from this study.

Only those patients who were regularly under control at the PM outpatient clinic were included in this study. Implantation dates, indications for implantation, as well as functional data of PM leads (pacing threshold and lead impedance) were gathered. If a device or lead needed to be replaced because the generator was running low or there was a lead disturbance such endocarditis, thrombosis, sensory or pacemaker defect, it was classified as a device or lead replacement for this reason. There are just two types of single-chamber PMs: atrial and ventricular. Dual-chamber PMs were defined as devices that have both atrial and ventricular leads. Atrioventricular block, sick sinus syndrome, persistent bradycardic atrial fibrillation, and bundle branch block were all considered indications for implanting a device. To calculate lead impedance and pacing threshold, we utilized data from the patient's initial and final PM implantations. In patients with single-dual or triple-chamber PM, multivariate COX regression was used to adjust survival for comorbidities and initial implantation age. This study's hazard ratio and 95% Confidence Interval were published. P 0.05 was judged statistically significant. All of the data was processed with SPSS 23.0.

RESULTS

According to the study population, males were higher in numbers 130 (61.9%) than females 80 (38.1%).(fig 1)

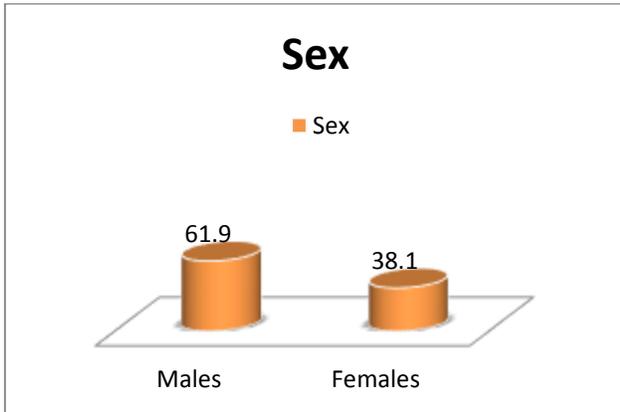


Figure-1: Enrolled cases with gender distribution

Patients had mean age 71.8±11.56 years with mean BMI 25.4±11.42 kg/m². There were 170 (80.9%) patients married and 150 (71.4%) cases were from urban areas. Literacy rate among all cases were 95 (45.2%).(table 1)

Table-1: Characteristics of presented cases

Variables	Frequency	Percentage
Mean age (years)	71.8±11.56	
Mean BMI (kg/m ²)	25.4±11.42	
Marital Status		
Yes	170	80.9
No	40	19.1
Residency		
Rural	60	28.6
Urban	150	71.4
Literacy		
Yes	95	45.2
No	115	54.8

We found HTN 90 (42.9%) was the most common comorbidity followed by diabetes mellitus 65 (30.9%) and hyperlipidemia 55 (26.2%).(fig 2)

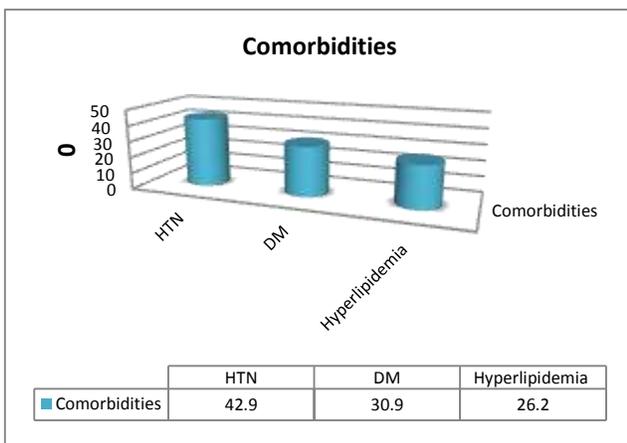


Figure-2: Comorbidities among all cases

We found that incidence rate of pace maker (PM) among patients with ages >75 years were higher found in 115 (54.8%) cases and majority were females in this group, followed by 70 (33.3%) cases had ages 45-74 years and 25 (11.9%) cases had ages 20-44 years.(table 2)

Table-3: Pacemaker insertion with respect to age and sex

Variables	Male	Female
Age group (years)		
20-44	20 (9.5%)	5 (2.4%)
45-74	60 (28.6%)	10 (4.8%)
>75	50 (23.8%)	65 (31%)
Total	130	80

Frequency of double chamber and triple chamber pacing was found in 98 (46.7%) cases. Frequency of cardiac resynchronization defibrillator was found in 120 (57.1%) cases.(table-3)

Table-3: Frequency pace maker chambers and cardiac resynchronization in all cases

Variables	Frequency	Percentage
Double/triple chamber		
Yes	98	46.7
No	112	53.3
Cardiac resynchronization defibrillator		
Yes	120	57.1
No	90	42.9

DISCUSSION

All individuals over the age of 75 had the greatest incidence and prevalence rates for PPM insertion in this research. The increases were particularly pronounced in this group of patients. As in other nations, males outnumbered females in all age groups, even the elderly (those above the age of 85). [11,12] In Western Australia, the standardised mortality rate decreased from 6.5 deaths per 1,000 people in 1995 to 5.5 deaths per 1,000 people in 2010 while the number of PPM insertions increased (a decrease of 26 percent). [13]

In our study 210 cases were presented with cardiac pacemaker. Males were higher in numbers 130 (61.9%) than females 80 (38.1%). Patients had mean age 71.8±11.56 years with mean BMI 25.4±11.42 kg/m². There were 170 (80.9%) patients married and 150 (71.4%) cases were from urban areas. Literacy rate among all cases were 95 (45.2%).As people become older, their risk of arrhythmias and conduction abnormalities rises. [14]The growth in the number of aged people in the population has been linked to an increase in the number of cases for more than 30 years in research from the United States[15] and Denmark. [16] The median age of Western Australians continues to rise, with no clear evidence from our data that the accompanying rates of PPM usage among the elderly have plateaued, although there was an apparent slowing in increase in the prevalence-corrected rate of new insertions among those aged 75–84 years.

We found HTN 90 (42.9%) was the most common comorbidity followed by diabetes mellitus 65 (30.9%) and hyperlipidemia 55 (26.2%).[17]Because diabetes seems to damage the conduction system, more PMs are implanted. [18] The longevity of males in our research was unaffected by diabetes, however the survival of women with diabetes was markedly reduced in comparison to those who did not have it, suggesting a major sex gap.

We found that incidence rate of pace maker (PM) among patients with ages >75 years were higher found in 115 (54.8%) cases and majority were females in this group, followed by 70 (33.3%) cases had ages 45-74 years and 25 (11.9%) cases had ages 20-44 years. In WA, incidence rates of PPM usage were greatest among people over the age of 85, which is consistent with earlier research on age-specific incidence rates.[19] About 80% of PPMs are placed in patients 70 and older, with half of those placed in individuals 80 and beyond, according to other studies, some of which are from Europe.[20] An increasing proportion of the world's 60-plus population is already in their 80s, which suggests that incidence rates may not have yet peaked in this Australian group or others where the median age is increasing.[21]

Frequency of double chamber and triple chamber pacing was found in 98 (46.7%) cases. Frequency of cardiac

resynchronization defibrillator was found in 120 (57.1%) cases. These findings were comparable to the previous studies. [22,23] When compared to other research, we found some intriguing similarities. Study author Gill identified a marginally elevated incidence of pacemaker implantation (HR 1.49; 95 percent confidence interval, 1.12-2.00) among demented individuals who had had experienced a recorded syncopal incident [24]. Study participants with and without dementia might have a lower risk of pacemaker insertion if cholinesterase inhibitor exposure was shown to reduce the chance of pacemaker placement. All dementia patients exposed to cholinesterase inhibitor medicines are included in our research. Similarly to earlier research, [25] we observed that individuals on amiodarone and/or digoxin were much more likely to have pacemakers inserted. The combination of complicated pharmacodynamics and the predominance of 'tachy-brady' syndrome (i.e. atrial fibrillation with co-existing conducting system illness) in this group is likely to be the cause. [26-28]

CONCLUSION

We concluded that ageing has a direct impact on the need for cardiac pacing, resulting in increased rates of incidence and prevalence. A growing number of elderly people will require electrophysiology and pacing services.

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