

Increasing Cardiac Interventions among the Aged

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Abstract

Ireland's over 65 year population is growing. As incidence of coronary events rises with age, there is a growing population of elderly patients with cardiac disease. The changing age profile of patients treated by a tertiary hospital's Cardiology service was quantified using Hospital Inpatient Enquiry data. 53% of CCU admissions were aged \geq 65 years, with admissions aged \geq 85 years in 2008 four times greater than in 2002. Percentages of patients undergoing diagnostic coronary angiography and percutaneous coronary interventions in 1997 aged \geq 70 years were 19% and 18% respectively. By 2007, these percentages had risen to 31% and 34% respectively - greatest increases were in the very elderly age categories. The proportion of ICD recipients aged $>$ 70 years increased from 8% in 2003 to 25% by 2008. The proportion of elderly patients receiving advanced cardiac care is increasing. This trend will continue and has clear resource implications. Outcomes of interventions in the very old need further investigation, since the \geq 80 old are under-represented in clinical trials.

Introduction

Ireland is rapidly growing older. In 2006, there were 467,926 people over the age of 65 years living in the Republic of Ireland - 11% of the total population [1]. This represented a 12% increase in this demographic group over the decade since 1997, with rapid growth projected to continue, rising to 1.4 million or 25% of the population by 2041. A fourfold increase in the population over the age of 85 is projected over the same timeframe from 110,000 to 440,000 persons [2]. The average life expectancies for a 75 year old male and female living in Ireland are 8.9 and 11.2 years respectively [3]. Those aged 65 or over are our greater health consumers accounting for 48.7% of all acute hospital bed days and 28% of all hospital day cases in 2005 [4]. The average length of stay in hospital increases with advancing age (see Figure 1). The mean length of stay in hospitals for persons aged 65 years or over of 11.5 days is more than double the mean for persons under 65 years of 4.6 days [5].

The incidence of both coronary artery disease (CAD) and heart failure rise steeply with age and thus the prevalence of these diseases increases in an ageing population [6]. The current and projected treatment burden for the Irish health system of cardiac disease among elderly patients is significant, particular when increasingly expensive treatment advances such as drug eluting stents, implantable cardioverter defibrillators (ICDs) and cardiac resynchronization therapy (CRT) are considered. There are limited trial data to guide the care of elderly patients presenting with cardiac disease, as this patient subgroup has been under-represented in trials. In particular, the very elderly are under-represented in randomised trials [7]. Available data are often from retrospective studies involving small number of patients. This has led to uncertainty about benefits and risks of invasive treatment strategies in the setting of advanced age and a traditional tendency to favour conservative management for older patients. Given the population change of the past decade and increasing use of invasive treatment strategies among elderly patients, we set out to quantify the temporal change that has occurred in the age profile of patients admitted to the Coronary Care Units (CCU) and undergoing cardiac interventions in an Irish tertiary referral, teaching hospital.

Methods

The numbers of patients in each age category admitted to CCU, receiving implantable cardioverter defibrillators (ICDs) and undergoing diagnostic coronary angiography and percutaneous coronary intervention (PCI) each year from 1997 until 2008 were obtained from Hospital Inpatient Enquiry (HIPE) data of the Mater Misericordiae University Hospital Dublin. The trends over time in age profiles of patients admitted to CCU or undergoing cardiac interventions were analysed.

Figure 1: Average length of stay in hospital by age group in 2003. [Modified from Health Statistics 2005: Section H \hat{a} Acute Hospital Services, Figure 3; Department of Health and Children].

Figure 2: Percentage of annual CCU admissions by age category

Results

In 2008, 53% (297 of 564) of all patients admitted to CCU were aged \geq 65 years, and 28% (160 of 564) were aged \geq 75 years. The percentages of total CCU admissions in the so called \hat{a} very old \hat{a} age categories have increased in recent years. For example, the percentage of total CCU admissions aged \geq 85 years in 2008 (44 of 564, 8%) was four times greater than in 2002 (13 of 616, 2%) as is illustrated in Figure 2. In 1997, 19% (341 of 1820) of patients undergoing diagnostic coronary angiography were aged \geq 70 years. 31% (636 of 2079) of all diagnostic coronary angiograms in 2007 were performed in patients \geq 70 years.

Figure 3: Percentage of annual diagnostic coronary angiograms and annual PCIs by age group in 1997 and in 2007

Figure 4: Percentage of patients receiving ICDs aged \geq 70 years by year. For each year, the number of patients aged \geq 70 years (n) and the total number of patients receiving ICDs (N) is shown (n of N)

This represents a 63% increase over a single decade in the proportion of all patients undergoing diagnostic coronary angiograms who are over the age of 70. Similarly, the percentages of all patients undergoing PCI in 1997 and 2007 who were aged ≥ 70 years were 18% and 34% respectively - an increase of 89% over one decade. When the breakdown of coronary angiograms and PCIs for 1997 and 2007 by age category is reviewed, it is evident that the greatest increases are seen in the proportion of patients in the 'very old' age categories undergoing these procedures (Figure 3). There has been an increase in the proportion of patients receiving ICDs annually who are over the age of 70 in recent years (see Figure 4).

Discussion

The proportion of patients admitted to CCU and undergoing cardiac interventions who are age 70 years is significant. These findings are in keeping with international observations - 36-43% of patients admitted to CCUs with non-ST elevation ACS (NSTEMI-ACS) are reported to be over the age of 70 years^{10,11}; while 32% and 11% of patients undergoing PCIs are reported to be aged ≥ 70 years and ≥ 80 years respectively^{12,13}. Over the past decade, the greatest increases have been seen in the proportion of patients admitted to CCU and undergoing cardiac interventions who are in the so called 'very elderly' age categories i.e. > 75 year age categories. Patients with cardiovascular disease in these age categories represent a higher risk cohort due to greater comorbidities^{6,7} and have been under-represented in clinical trials. Conservative management is traditionally preferred for cardiac disease in the 'very old'. An age of 75 years or more has been identified as a strong negative predictor of the use of cardiac catheterisation and early PCI among patients with NSTEMI-ACS^{8,9}. However, this age bias in selecting patients for invasive cardiac interventions is being challenged as increasing evidence emerges to support the benefits of such interventions in the elderly. Elderly patients with both stable CAD as well as ACS have been shown to benefit from an early invasive approach with relatively low morbidity and mortality^{14,15,16}; however, post-procedure morbidity and mortality do appear higher among octogenarians and nonagenarians requiring emergent rather than elective interventions^{6,20}.

The proportion of annual recipients of ICDs aged > 70 years is increasing - 25% of all patients receiving ICDs in 2008 were over the age of 70 years. The mean patient age in the ICD and CRT trials was only 60-65 years, with few patients in these trials aged > 75 years. To date, available evidence to suggest benefits of these therapies are independent of age come largely from small, retrospective studies^{21,22}. There is a recognised need for prospective trials of contemporary invasive and non-invasive cardiac therapies to enroll elderly subjects proportionate to their prevalence among the treated population to clarify risk, benefit and cost effectiveness of such therapies in the various elderly age categories.

In conclusion, elderly patients account for a significant proportion of the workload of an acute Irish Cardiology service and the proportion of patients in the 'very elderly' age categories receiving advanced cardiac care has increased over the past decade. This trend is set to continue given the projected growth for elderly age groups in Ireland over coming decades. Satisfying the care needs of a growing population of elderly patients with cardiac disease will challenge a stretched health service. Furthermore, this population represents a very heterogeneous subgroup of patients ranging from the remarkably robust to very frail, and so challenge their physicians by necessitating individualised decisions on management rather than age-governed treatment strategies.

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