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ORIGINAL ARTICLE

Clinical Profile and Outcomes of Elderly Patients in an Asian Intensive Care Unit: A Retrospective Observational Study

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Introduction

Over the last decade an increasing number of elderly patients are being admitted to the intensive care units across the World [1]. With a rapidly ageing population Asian countries face a tremendous burden of care for these patients [2]. Family expectations have also increased with more demanding aggressive life support even in the older patients [3]. Patients are generally getting less frail as they age and with the improvement in technology and advancements in medical science the outcomes of these patients are improving. There are papers that review outcomes and prognoses from Europe and USA that show improving outcomes in this cohort however, little is reported in literature from Asia [4].

Studies have shown that in most of the developed world elderly patients overwhelmingly die in hospitals and often during and immediately after an ICU admission. This is related to the “medicalisation of ageing” with end of life care occurring in the ICUs more than in general wards, hospices or homes [5]. Generally, it is believed that older patients have a poorer outcome based on their co-morbid conditions, yet many studies have shown that elderly patients should not be denied ICU care based on their age alone [6]. In a review done in 2007, Boumendil and colleagues showed that ICU outcomes depend more on the functional status of patients than age for patients older than 80 years, although all-cause mortality was higher in this age group [7]. Various studies from the West have shown a rate of admission of 20-30% of > 70-year-olds in the ICU as well

as a mortality of up to 20-55%. Recently a large study done by Moitra, *et al.* showed that in the US length of ICU stay was associated with worse outcomes for elderly patients although no specific cut off was given [8].

Given the urgency in studying age related practice patterns in Asian countries it becomes imperative to assess what the profile and outcomes of the elderly are in our ICUs. This study describes the profile and outcomes of all > 70 years of age patients admitted to all (CCU, SICU and MICU) patients from Jan-Dec 2016 in a regional tertiary care hospital in Singapore.

Methods

Our data sources were an established databank in the ICU which is already approved by IRB. A retrospective observational cohort study was done on all patients who were admitted to the three ICUs at our regional tertiary 500 bedded hospital in Singapore over a 12-month period. The total beds in each ICU are in descending order, MICU > SICU > CCU. The data was collated and analysed on Stata™. Variables included demographics, severity of illness, outcomes such as length of stay and mortality and interventions used as well as disposition such as ‘do not resuscitate’ orders. Descriptive statistics and chi square, as well as associations were studied. A p value of less than 0.05 was taken as significant.

Results

A total of 816 patients above the age of 70 years were admitted in all three types of ICUs over 2016 (cardiac, medical and surgical ICUs). The age range was 70-93



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years. These made up 25% of the total ICU admission rate. Of these, 36% belonged to the CCU (despite having the smallest number of beds), 27% to the MICU (with the largest number of beds) and 37% to the SICU. The median age was 77.5 years (SD \pm 5.5 years) and there were 58% males and 42% females in the cohort. The commonest admitting diagnoses were STEMI/NSTEMI (ST/non-ST elevation Myocardial infarction), congestive Cardiac Failure, pneumonia, sepsis and upper GI bleeding. The median APACHE II score denoting the severity of illness was 18 and the average length of stay was 2.77 days (SD of \pm 4.13 days). Our overall mortality in ICU was 12% and 19% of the patients were made DNR/DNI (do not resuscitate or do not intubate). 35% of the patients were ventilated at some time during their ICU stay with 3% receiving a tracheostomy. Less than 1% developed new sepsis, 7% were on dialysis and 23% needed vasopressors for shock. Overall our 30-day readmission rate of these patients was 4%. When compared to our average overall statistics over the years in the same ICUs, the mortality (compared to 7-9% overall) and DNR rate (7% overall) in elderly patients was higher, however, the length of stay and readmission rate (2.3 days and 5%) was similar. A head to head comparison of > 70 and < 70-year-olds was not done.

The mean age of those with a DNR order in place was 79.39 years and those with no DNR order was 77.12 years. Using a t-test, the mean difference between positive and negative DNR was -2.276797 (which was statistically significant p-value < 0.0001). The mean age of those who died was 78.67 years and those who did not were 77.37 years. This mean difference was -1.296263 and significant (p-value < 0.0001). We used chi-square test for proportion differences to show that 6.55% of patients with no DNR had died whilst 34.97% of those with a DNR order had died which was also significant (p-value < 0.0001).

Discussion

In this multi ICU single centre retrospective cohort study we describe the profile and outcomes of > 70-year-olds patients admitted over one year. As we approach 2030 our proportion of elderly patients seeking hospital care and ICU admissions will also increase as does our average life expectancy and mean population age [9]. The rate of mortality amongst DNR patients remained low, pointing towards better premorbid conditions and better medical care. Even with better medical technology, a substantial number were made DNR. This could be explained by the older age group and chances of meaningful recovery deemed by physicians for this cohort. Asian countries are facing a faster increase in these numbers rapidly [10]. In order to assimilate these paradigm shifts in logistics, technology and delivery of care models we need to know how we are faring in our outcomes of such patients. Taking a modest elderly age group of over 70-year-olds, our numbers in one such ICU in a developed Asian country shows a higher mortality ratio and a higher rate of DNR orders compared to

overall rates. However, the proportion of patients admitted, and all other outcomes are similar to Western statistics. DNR patients were older and naturally, died more. Although the characteristics of patients in various ICUs may be different, the elderly seemed to have similar profiles in terms of mortality and DNR rates.

These numbers show that there is a comparable increase in the ICU admissions of elderly patients, at least in this Asian hospital. The higher than average mortality and DNR rate should be further analysed for associations with co-morbidities and frailty indices. Also, more research in longitudinal quantitative and qualitative outcomes is needed in Asian countries to assess the need for more critical care resources in a rapidly ageing population. Ethical and moral questions also need to be considered in the light of end of life care and patient and relational autonomy [11]. Our data suggests that older patients have a worse outcome and a higher rate of having a DNR order and dying. The possibility of unnecessary ICU admission and perhaps not setting family goals and expectations in a timely manner need to be further studied in detail by well designed, in depth qualitative methods.

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