Relationship between the Functional and Mental Status and Mortality of Elderly Patients Admitted to the Intensive Care Unit

Thesis
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By
Mohammed Abd El-Fattah Amrousy
M.B., B.ch – M.Sc Geriatric Medicine

Under Supervision of
Prof. Ahmed Kamel Mortagy
Professor of Geriatric Medicine
Faculty of Medicine, Ain Shams University

Dr. Sara Ahmed Hamza
Assistant Professor of Geriatric Medicine
Faculty of Medicine, Ain Shams University

Dr. Manar Mostafa Adel Mamoun
Assistant Professor of Geriatric Medicine
Faculty of Medicine, Ain Shams University

Faculty of Medicine
Ain Shams University
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Dedication

Thank to ALLAH

Thank you **Allah** for your support
and guidance throughout my life
asking you for your forgiveness and merci

This work is dedicated to …

My beloved Parents, for always being there for me.

My wife and my lovely children for being the light of my life

My brothers and my sister for their *love and care*

My colleagues for their support

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List of Abbreviations

AAN	American Academy of Neurology
AD	Alzheimer's disease
ADLs	Activities of daily living scale
AIDS	Acquired Immune Deficiency Syndrome
ANZICS	Australian New Zealand intensive care society
APACHE II	Acute physiology and chronic health evaluation score 2
APACHE III	Acute physiology and chronic health evaluation score 3
BPSD	Behavioral and psychological symptoms of dementia
CAM	Confusion assessment method
CAPMAS	Central agency for public mobilization and Statistics
ChEIs	Choline estrase inhibitors
CT	Computerized tomography
CVS	Cerebrovascular stroke
DLB	Dementia with lewy bodies
DM	Diabetes mellitus
DSM-III	Diagnostic and statistical manual of mental disorders, third edition
DSM-III-R	Diagnostic and statistical manual of mental disorders, third edition revised
DSM-IV	Diagnostic and statistical manual of mental disorders, fourth edition
FDA	U.S Food and drug administration agency
FIM	Functional independence measure

FTD	Frontotemporal dementia
GFR	Glomerular filtration rat
GIT	Gastrointestinal tract
HAQ	Health Assessment questionnaire
HTN	Hypertension
IADLs	Instrumental activities of daily living scale
ICS	Intensive care society
ICU	Intensive care unit
MCI	Mild cognitive Impairment
MMSE	Minimental status examination
MPM	Mortality probability model
MRI	Magnetic resonance imaging
NFTs	Neurofibrillar tangles
NICE	National Intensive Care Evaluation
POCD	Postoperative cognitive dysfunction
RDRS	Rapid disability rating scale
SAPS	Simplified acute physiology score
SCCM	Society of critical care medicine
SD	Standard Deviation
TS	Trauma score
US	United states
VaD	Vascular dementia
VDRL	Veneral disease research laboratory

INTRODUCTION

Advanced age is associated with increased mortality in intensive care unit (ICU) patients *(Wood and Ely, 2003).*

Age was not an independent predictor of mortality and it appears that it is not advanced age per se but other factors associated with advanced age that determine prognosis in elderly patients *(Bo et al., 2003).*

Factors that influence the outcome in elderly patients admitted to the ICU includes age, diagnosis, co morbidity, functional status (including cognitive functioning) before hospital admission, delirium, malnutrition, dehydration, acute renal failure, length of stay and complications such as nosocomial infections and pressure ulcers *(de Rooij et al., 2005).*

Morbidity and mortality in elderly patient admitted to the ICU are higher than in younger patients and the most important factors independently associated with the highest risk of death are severity of illness, impaired level of consciousness and infection *(Vosylius et al., 2005).*

The prognosis of older patients hospitalized in medical intensive care units depends not only on the acute physiological impairments, but also on a series of pre existing conditions such as loss of functional independence,

severe and moderate cognitive impairment and low body mass index *(Bo et al., 2003).*

Functional status including physical, cognitive and social functioning has been shown to be an important predictor of the hospital outcomes of older patients *(Inouye et al., 1998).*

The prognosis of elderly patients hospitalized in a medical ICU depended not only on the Acute Physiology and Chronic Health Evaluation (APACHE II) score but also on the loss of functional independence and on the presence of moderate to severe cognitive impairment before ICU admission *(Bo et al., 2003).*

Low body mass index has been shown to be an independent predictor of in hospital mortality among young and old hospitalized patients *(Landi et al., 2000).*

Delirium, an often overlooked complication in older ICU patients, is an independent predictor of prolonged hospital stay and mortality *(Ely, 2003).*

Other factors that may have an effect on prognosis of ICU patients are adverse drug events, nosocomial infections and pressure ulcers *(Kane and Weber, 2003).*

HYPOTHESIS

The prognosis of elderly patients admitted to the Intensive Care Unit depends not only on the acute physiological impairments but also on the functional and mental status of the patients.

AIM OF THE WORK

To find the relation between the functional and mental status of the elderly patients admitted to the Intensive Care Unit and mortality.

Chapter One

CRITICALLY ILL ELDERLY PATIENTS IN THE ICU

Epidemiology

The aging of the world's population

The global population is aging. This trend results from a process referred to as demographic transition, characterized by declines in both fertility and mortality rates *(Bagshaw et al., 2009)*. The probability of survival to older age has improved and the absolute number and proportion of older persons is projected to increase in the next few decades *(Bagshaw et al., 2009)*.

The fastest growing age proportion is made up of those aged ≥ 80 years, increasing at an estimated 3.8% per year and projected to represent one-fifth of all older persons by 2050 *(Bagshaw et al., 2009).*

Projections by the US Census Bureau suggest that the population aged 85 years and older is likely to grow from about 4 million in 2000 to 19 million by 2050 *(de Rooij et al., 2005)*.

In Egypt, Elderly people (65 years and more) number reached 3.3 millions in 2010 with ratio 4.2% of total population and the ratio is expected to reach 5.8% in the

year 2020 and 8% in 2030 according to Central Agency for Public Mobilization and Statistics *(CAMPAS, 2011)*

Aging of patients admitted in the ICU

Ageing of the population increases the proportion of people with chronic conditions, with corresponding expectations of decline in the functional status *(de Rooij et al., 2005)*. Elderly patients make up between 26% and 51% of patients who are admitted to ICUs *(Rockwood et al., 1993).*

Older age is associated with an increased prevalence of chronic illness and functional impairment *(Song et al., 2007).* As a result, the rate of hospitalizations for acute illness among older persons is increasing *(Boumendil et al., 2004).* Also, the demand for critical care services and admissions to intensive care units (ICUs) is also projected to dramatically rise in the next decade *(Angus et al., 2004).*

Data from the United States estimates approximately 55% of all ICU bed-days are occupied by patients aged ≥ 65 years and an estimated 14% of those patients aged ≥ 85 years die in the ICU *(Angus et al., 2004)*.

In a large multicenter cohort study that gathered the data of 57 ICUs across New Zealand and Australia, *Bagshaw et al. (2009)* reported an increasing number of admissions of elderly patients aged 80 years and older of

roughly 6% per year between 2000-2005. In this cohort, the rate of admission of elderly aged 80 years and older represented approximately 14% of total admissions in 2005.

Bagshaw et al. (2009) also predicted that by 2015 the rate of elderly aged 80 years and older admitted to the intensive care unit (ICU) will increase by 72%, representing roughly 1 in 4 admissions to the ICU.

Differences in care between old versus young patients

There are conflicting data on the short-term and long-term survival for older patients admitted to the ICU *(Somme et al., 2003).* This may reflect differences in the severity and type of illness, length of follow-up, definitions for old age, and treatment intensity for older patients *(Boumendil et al., 2004).*

There is an urgent need to understand the implications on outcomes for older patients after ICU admission, including not only survival but also cognitive impairment, quality-of-life, and functional autonomy *(Martin et al., 2006).*

Rodríguez-Molinero et al. (2010) found that the decision to admit an elderly patient to the ICU was essentially based on age and the physician's estimation of