Feature Article

Changes of geriatric syndromes in older adults survived from Intensive Care Unit

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ABSTRACT

Nearly 90% of the older adult patients discharged from hospital with a cluster of geriatric syndromes. The patterns of geriatric syndromes in older adult ICU survivors are to be further explored. The aim of this study was to examine the risk factors and patterns of geriatric syndromes among older adult patients before admitting to ICU and throughout their hospitalization.

A total of 137 older adult patients (age 76.9 ± 6.6; 52.6% male) participated in the study. The results showed significant increase in the occurrence of geriatric syndromes from T0 (upon ICU admission) to T1 (transition to inpatient care unit), with improvement at T2 (hospital discharge), but did not return to the baseline. The three most prevalent geriatric syndromes were: functional decline, urination incontinence, and defecation incontinence. Polypharmacy was associated with functioning decline. Patients with delirium were six times more likely to be re-admitted to ICU.

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Introduction

Patients 65 years or older account for more than half of the Intensive Care Unit (ICU) admissions.[1] Physical functioning decline and chronic comorbidities in older adults are the risk factors for ICU admission, high mortality rate during hospitalization, and the loss of function for independent living after hospital discharge.[2–6] Approximately 35%–50% of older adults were discharged directly from the ICU to long-term care facilities due to the functioning loss of daily activities.[7,8] Geriatric syndrome is a major contributing factor for functioning loss in older adults,[9,10] although its pattern and trajectory among ICU older adult patients have not been fully understood.

Geriatric syndrome often presents with a complicated clinical manifestation which is often overlooked in critical care unit where the focus is on medical stability. The definition of geriatric syndrome has been inconsistent across studies. Commonly discussed conditions include: delirium, insomnia, hearing and vision loss, lower extremity problems, falls, pressure ulcer, urinary incontinence, dizziness, syncope, cognitive impairment, polypharmacy and functional dependence.[11–13]

The most adopted conceptual model of geriatric syndromes in the literature is by Inouye et al (2007)[14]; that it describes the progress of geriatric syndromes, including risk factors, disability and mortality. The conceptual framework identified the shared risk factors of geriatric syndromes, and the feedback mechanism that enhances the influence of risk factors. Inouye's model showed that uncontrolled geriatric syndromes lead to poor prognosis including disability dependence, frailty and ultimately death. In this study, the operational definition of geriatric syndromes is based on the six most common geriatric syndromes identified in the literature: falls, pressure ulcers, delirium, urination incontinence, defecation incontinence and functional decline.[14,15]

The prevalence of geriatric syndromes is high. Nearly 50% of the older adult patients exhibited one or more geriatric syndromes during hospitalization[12,16] and the numbers of geriatric syndromes tend to double by the time of a hospital discharge, reaching 90%.[17,18] Studies with older adults admitted to general medical units have shown preadmission functional decline being a risk factor for post-hospitalization functional outcome and mortality, and the

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in-hospital mobility level is associated with functional decline in older adults at discharge and even more so at follow up.[19,20] Functional decline during hospitalization has also been linked to readmission.[21]

The aims of this study were to 1) understand the changes of the six most common geriatric syndromes (falls, pressure ulcers, delirium, urination incontinence, defecation incontinence and functional decline) among older adult patients at ICU admission (including two weeks period prior), during hospitalization and at the hospital discharge, 2) understand the patterns of newly developed and resolved geriatric syndromes during hospitalization, and 3) identify baseline risk factors for medical outcome in older adults ICU patients.

Materials and methods

Participants

This was a prospective descriptive study. Convenient sampling method was used to recruit participants from two Medical ICUs of a medical center in southern Taiwan, between May 2014 and January 2015. The inclusion criteria were 1) age $\geq$ 65 years old, 2) within 48 h of admission to a Medical ICU, 3) Glasgow Coma Scale (GCS) score 10 or higher and oriented (score 5 on GCS verbal response subscale), 4) able to or have a legal guardian to provide consent, and 5) able to provide information and/or have a primary caregiver to provide collateral information. Participants who died during the hospitalization were excluded in the analyses.

Measurements

Three main categories of data collected in this study were: 1) demographic data, 2) health-related information, and 3) geriatric syndromes assessment.

Health-related information

Health-related factors included numbers and classes of medications, recent hospitalization, comorbidities, ICU primary diagnosis, and severity of illness within 24 h of the ICU admission.

Age-adjusted Charlson Comorbidity Index (ACCI)

In this study, comorbidities were measured by the Age-adjusted Charlson Comorbidity Index (ACCI) which is a well-validated modified version of Charlson Comorbidity Index (CCI) adjusting for patient age. The Charlson Comorbidity Index predicts the 10 years survival based on a range of 19 comorbid medical conditions (e.g. myocardial infarction, diabetes). Each condition is assigned a weighted score, depending on the risk of dying associated with each condition. Higher total score indicates increased comorbidity and mortality.[22,23]

Acute Physiology and Chronic Health Evaluation (APACHE II)

Severity of the illness within 24 h of ICU admission was measured using the Acute Physiology and Chronic Health Evaluation (APACHE II). APACHE II is a commonly used assessment tool in ICU with newly admitted (within 24 h of admission) patients to determine prognosis and to predict mortality. The score ranged from 0 to 71 points, higher scores suggests more disease severity and higher mortality rate.[24]

Geriatric syndromes

A Geriatric syndromes dichotomous (yes/no) checklist was calculated to assess the occurrence of the 6 most common geriatric syndromes (fall, pressure ulcer, delirium, urination incontinence, defecation incontinence and functional decline) two weeks prior to the ICU admission and upon hospital discharge. In this study, "fall" was defined as an event which resulted in a person coming to rest inadvertently on the ground or floor or other lower level.[25] "Pressure ulcer" was defined as an area of localized injury to the skin and/or underlying tissue, usually over a long prominence, as a result of pressure or pressure in combination with shear and/or friction.[26] "Urination incontinence" was defined as the frequency and amount of unintentional loss of urine that is sufficient enough to cause physical and/or emotional distress in the person experiencing it[27]; and "defecation incontinence" is the involuntary passage of stool or the inability to control stool from expulsion.[28] The Diagnostic and Statistical Manual of Mental Disorders (DSM-V) criteria were used to describe "delirium",[29] which included inattention, impaired consciousness, disturbance of cognition, and acute onset and fluctuating course of symptoms. If two or more of these symptoms were reported, the occurrence of delirium is considered. In addition to participants' self-report of conscious and cognitive level, information was also solicited from caregivers who lived with the participants prior to the ICU admission.

Katz's Function Index

Katz's Function Index[30] was used to assess the "functional decline" aspect of the geriatric syndromes. Katz's Function Index contains seven basic activities of living, such as feeding, dressing, transferring (from bed to chair), walking, going to the toilet, continence and bathing. Each item was graded by three scores, 0 means dependent; 1 refers to having some difficulties and need assistance, and 2 means totally independent. The total score ranged from 0 to 14 points, with lower scores indicating greater dependence. The function decline was defined as negative change in Katz's Function Index at two consecutive points during the data collection time.

Procedure

Before data collection, human subject approval was obtained from the Regional Ethics Committee of the medical center. Data collection was conducted by a trained clinician. Patients who met the inclusion/exclusion criteria were informed about the study. Those who were interested in participating, and met the criteria were enrolled in the study.

Data were collected at three points: (T0) within 48 h of ICU admission with participants and/or primary caregivers' subjective report of symptoms over the two weeks period prior to admission, (T1) the day leaving ICU in transition to an inpatient care unit, and (T2) the hospital discharging day. Demographic data, health-related data; ACCI and APACHE II were collected from medical records upon admission. The geriatric syndromes checklists including Katz's Function Index were evaluated through face to face interview of the patients and/or with their primary caregivers at T0 and T2.

Statistical analysis

Descriptive analysis including mean, standard deviation, frequency, and percentage were used to describe participants' demographic characters, health-related factor, geriatric syndromes and functioning level. Repeated measure of Cochran's Q test was used to determine individual changes for each geriatric syndrome across 3-time points. Repeated measures ANOVA was used to assess within-subject changes of Katz's functional score across three-time points. Paired-sample t-test was used to detect interval changes of Katz's score between each two-time points (T1—, T2—, and T2—T0). Chi-square analysis was used to examine the baseline risk factors and overall prognosis. The odds of risk factors were calculated using χ^2 and Mantel-Haenszel Common Odds Ratio (OR) Estimate tests.