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EFFECT OF TYPE OF ADMISSION ON SHORT- AND LONG-TERM OUTCOME OF NONAGENARIANS ADMITTED TO AN INTENSIVE CARE UNIT

To the Editor: Patients aged 90 and older have increasingly been admitted to intensive care units (ICUs),[1] but their baseline characteristics and prognosis may differ from those of elderly people younger than 90 and are poorly understood. An analysis of type of admission (medical or surgical), length of stay (LOS), and mortality was conducted in nonagenarians admitted to a Brazilian ICU.

Elderly patients' admissions to a private ICU of a community hospital with 30 bed, from July 2005 to October 2007 were retrospectively evaluated. Demographic data, primary reason for ICU admission, medical or surgical type of admission, and incidence of nosocomial infections were analyzed. ICU LOS and mortality were compared with those of younger patients: younger than 65 (n = 1,259), 65 to 75 (n = 742), 76 to 89 (n = 636), and 90 and older (n = 85). Severity of acute illness was calculated according to simplified acute physiology score (SAPS II) within 24 hours of admission. ICU and hospital mortality were analyzed, and 6-month survival was checked by telephone interview.

Nonagenarians represented almost 3% of all admissions. ICU LOS was longer for patients aged 90 and older than for any other age group (<65, 2.8 ± 5.9 days; 65–75, 3.5 ± 7.8 days; 76–89, 5.3 ± 15.4 days; ≥ 90, 10.0 ± 19.1 days, $P < .01$). Mortality was also significantly higher in nonagenarian patients (0.8%, 1.1%, 2.8%, and 14.1%, respectively, $P < .001$). Nonagenarians were predominantly female (66%), and mean hospital LOS was prolonged (31.0 ± 54.5 days). Two-thirds of patients had at least one comorbidity (mean 1.6 comorbidity per patient). The most prevalent diseases were systemic arterial hypertension (37 patients), diabetes mellitus (16 patients), coronary artery disease (16 patients), active neoplasia (10 patients), peripheral atherosclerotic artery disease (4 patients), chronic obstructive pulmonary disease (3 patients), stroke (2 patients), and dementia (2 patients). Invasive mechanical ventilation was necessary in 20 patients, and nosocomial infections occurred in 22 patients during ICU stay. SAPS II score was 41.7 ± 11.4 points, with 30% predicted mortality, although hospital mortality was 21% for all nonagenarian patients. Follow-up survival after 6 months was 64%, revealing an excess mortality of 13 patients.

The analysis of subgroups showed different survival rates depending on type of admission (Table 1). Forty-seven patients were admitted for medical causes: acute respiratory insufficiency (11 patients), pneumonia (10 patients), and nonpulmonary sepsis (6 patients). In surgical nonagenarians (n = 38), hip fracture correction was the commonest diagnosis (12 patients), followed by stomach, lung, or kidney cancer resections, gastrointestinal perforation, and acute cholecystitis. Twenty-two (55%) surgeries were performed on an urgent basis, mainly for hip fracture. Other studies with very elderly patients presenting to the emergency department showed that medical reasons and hip fracture were the most common admission diagnosis as well.[2,3]

Medical patients were older than surgical patients (1.4 years older, $P = .02$) and had higher SAPS II score at ICU admission. Nosocomial infections were more common in medical than surgical admitted patients, although there was no significant difference (73 vs 49% ly, $P = .08$). Any order for withholding of therapy was given to six patients (5 medical vs 1 surgical, $P = .12$). Surgical nonagenarians had shorter ICU and hospital LOS and mortality, as well as lower 6-month mortality. Odds ratios for ICU, hospital, and 6-month mortality for surgical nonagenarians compared with medical patients were 0.04 (95% confidence interval (CI) = 0.00–0.65), 0.14 (95% CI = 0.04–0.51), and 0.35 (95% CI = 0.14–0.90), respectively.

A recent prospective analysis of 60 nonagenarian patients admitted to the ICU also confirms that the main reasons for admission are for medical causes or orthopedic or abdominal procedures.[4] Mean ICU and hospital LOS

Table 1. Demographic and Severity of Illness Between Medical and Surgical Nonagenarians Admitted to the Intensive Care Unit (ICU)

Characteristic	Medical (n = 47)	Surgical (n = 38)	*P*-Value
Age, mean ± SD	93.6 ± 3.2	92.2 ± 2.5	.02
Male, n (%)	15 (31.9)	14 (36.8)	.76
Simplified Acute Physiology Score II, mean ± SD	46.2 ± 11.6	36.0 ± 8.2	<.001
Mechanical ventilation, n (%)	14 (29.7)	6 (15.7)	.44
Presence of nosocomial infection, n (%)	16 (34.0)	6 (15.7)	.08
Withholding of therapy, n (%)	6 (12.7)	1 (2.6)	.12
ICU length of stay (days)	15.3 ± 23.6	3.4 ± 7.4	<.001
Hospital length of stay (days)	41.7 ± 64.2	17.7 ± 35.7	.02
ICU mortality, n (%)	12 (25.5)	0 (0.0)	<.001
Hospital mortality, n (%)	18 (38.3)	3 (7.9)	.002
6-month mortality, n (%)	22 (46.8)	9 (23.7)	.03

Continuous variables were analyzed using the Student *t*-test. Categorical variables were compared using the chi-square test.
SD = standard deviation.

were also longer, and hospital mortality was higher (40%). Nevertheless, there was no difference in ICU mortality according to type of admission. Clinical outcomes have been shown to be fairly good in previous studies, with a wide range of admission diagnosis, from medical to cardiovascular and orthopedic surgery.[5–7] The moderately good outcomes observed in the current study must be cautiously interpreted, because elderly patients have long rehabilitation after hospital discharge, mainly because of poor previous functional status.[8] Furthermore, mortality after 6 months was 36%, adding an extra 15% mortality after discharge. A French study of patients aged 85 and older reported similar results, with mortality after 3 months of 29%.[9]

Nonagenarians will become increasingly common in the intensive care setting, and their prognosis must be studied. In this preliminary analysis, surgical type of admission is associated with good outcomes, despite older age and high prevalence of urgent surgeries.

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THE 1-MINUTE MENTAL STATUS EXAMINATION IN THE MEMORY CLINIC

To the Editor: A short standardized mental status examination, such as the Mini-Mental State Examination (MMSE),[1] is helpful for assessment of cognitive function in subjects with memory impairment, but the MMSE has some disadvantages, including insensitivity to the earliest changes in highly educated individuals and lack of ability to measure executive function. Impaired verbal fluency is well documented in patients with Alzheimer's disease (AD).[2–6] The category fluency task is associated with the ability to access semantic memory, whereas letter fluency is considered an index of frontal executive function.[3] Thus, both fluency tasks are looked to for brief neuropsychological assessment in the memory clinic. The diagnostic utility of two 1-minute category fluency and letter fluency tests was examined in subjects with mild cognitive impairment (MCI) and AD.

Thirty-one patients with amnestic MCI and 46 patients with mild AD (MMSE score >20) were recruited from outpatients attending the Tokyo Medical University Memory Clinic. A diagnosis was established in each case using the Petersen criteria[7] for amnestic MCI and National Institute of Neurological and Communication Disorders and Stroke–Alzheimer's Disease and Related Disorders Association criteria[8] for probable or possible AD. The normal control (NC) group consisted of 32 elderly subjects without any history or symptoms of neurological or psychiatric diseases. A trained psychometrist administered the MMSE, Wechsler Memory Scale—Revised (WMS-R) logical memory I and II, Alzheimer's Disease Assessment Scale—Cognitive Subscale Japanese version (ADAS-Jcog), and abbreviated category and letter fluency tasks to all participants. Participants generated animal names within 1 minute for category fluency and then generated words beginning with the syllable "ka" (the Japanese version of phonemic fluency task[9]) within 1 minute for letter fluency. Informed consent was obtained from all subjects or their closest relative. Values were expressed as means ± standard deviations. Neuropsychological tests were analyzed using the nonparametric Kruskall-Wallis test and the Mann-Whitney U test (post hoc analysis). $P<.05$ was accepted as a statistically significant difference.

Table 1 shows demographic and neuropsychological data for the study groups. No significant differences in age, sex, or education were found between the three groups. The duration of symptoms was significantly longer in the AD group than in the MCI group. The AD and MCI groups performed significantly worse than the NC group on the MMSE, WMS-R logical memory I and II, and ADAS-Jcog. The AD group also performed significantly worse than the MCI group on the MMSE, WMS-R logical memory I and II, and ADAS-Jcog. Category fluency scores were significantly lower in the MCI and AD groups than in the NC group and were also significantly lower in the AD group than in the MCI group. Letter fluency scores were significantly lower in the AD group than in the MCI and NC groups, but there were no significant differences between the MCI and NC groups. Category fluency was the best measure to discriminate the AD group from the NC group, with 87% of AD patients correctly classified using an optimal cutoff score of 13, with a sensitivity of 0.91 and a specificity of 0.81, and the best instrument to distinguish the MCI group from the NC group, with 75% of patients with MCI correctly classified using an optimal cutoff score of 14, with a sensitivity of 0.81 and a specificity of 0.69.

Table 1. Demographic and Neuropsychological Data for the Study Groups

Characteristic	NC (n = 32)	MCI (n = 31)	Alzheimer's Disease (n = 46)
Age, mean ± SD	75.2 ± 7.7	75.6 ± 5.1	76.4 ± 5.1
Male/female	14/18	14/17	20/26
Education, years, mean ± SD	12.9 ± 4.0	12.7 ± 2.4	12.2 ± 2.5
Duration, years, mean ± SD	Not applicable	2.3 ± 0.7	3.0 ± 0.9†
Mini-Mental State Examination score, mean ± SD	28.2 ± 1.6	26.1 ± 1.6*	23.0 ± 2.4*‡
Wechsler Memory Scale—Revised score, mean ± SD			
Logical memory-I	18.8 ± 4.8	10.6 ± 3.2*	5.4 ± 3.7*‡
Logical memory-II	15.5 ± 6.8	5.0 ± 3.2*	0.9 ± 2.2*‡
Alzheimer's Disease Assessment Scale—Cognitive Subscale Japanese version score, mean ± SD	6.5 ± 2.6	9.4 ± 2.8*	17.4 ± 4.6*‡
Category fluency score, mean ± SD	14.5 ± 2.6	11.8 ± 2.0*	9.7 ± 2.2*‡
Letter fluency score, mean ± SD	9.0 ± 2.8	8.9 ± 2.5	6.8 ± 2.1*‡

*$P<.001$ compared with the normal control (NC) group.
$P<$ †.05, ‡.001; compared with the mild cognitive impairment (MCI) group.
SD = standard deviation.

It was found that the amnestic MCI group showed impaired performance on category fluency, whereas the AD group had equivalent deficits in both the category and letter fluency tasks. Category, rather than letter fluency, is affected in the preclinical phase of AD, and impaired letter fluency is not seen until the disease progresses, which agrees with previous studies.[4,5] Although category and letter fluency depend on brain area networks, the former has been found to rely on medial temporal lobe regions, whereas the latter has been found to correlate with prefrontal lobe functioning.[6] Differences in anatomical substrates associated with each verbal fluency task support these results. Because 87% of subjects with AD and 75% of those with MCI were correctly classified using each optimal cutoff score, category fluency may detect early changes of AD. In addition, letter fluency may also aid in support for the development of AD.