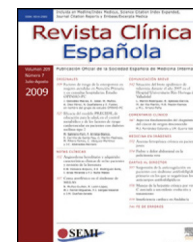


Revista Clínica Española

www.elsevier.es/rce



EDITORIAL

The nuances of age as an outcome predictor

Las sutilezas de la edad como predictor del resultado clínico

Old people die. Young people tend to survive. Our observation of the world around us leads us to this conclusion even before medical training. The influence of age on outcome is quantified in benchmarking tools such as Acute Physiology and Chronic Health Evaluation (APACHE),¹ the Mortality Probability Models (MPM)² and the Simplified Acute Physiology Score (SAPS).³

However, age is not the most important predictor of outcome; a more nuanced approach considers the interactions between chronologic age, physiologic age and comorbidities.⁴ While mortality increases with the passage of time, risk differs significantly by patient subset and even the oldest ICU patients may fare well if other risk factors are absent.⁵ In the present study,⁶ the authors have shown that geriatric patients in the ICU are more likely to die and require tracheostomies and renal replacement therapy but they do not necessarily have longer lengths of stay. It remains unclear to what extent this finding reflects selection bias in ICU admissions or shifts in goals of care over time. In addition, elders are an extremely heterogeneous group and it is likely desirable to focus on smaller subsets of patients rather than the terciles of age examined in this study. Geriatricians typically consider those under 75 the “young old” and those over 85 years the “old old”.

This report adds to the literature by examining a subset of patients hospitalized for 14 or more days in intensive care and tracks outcomes to one year post hospitalization. The authors are quite correct that admissions of elders to critical care will continue to increase; we agree that a careful approach to triage decisions should not be based on age alone but must consider the severity of illness, comorbidities, and the patient’s previous functional state. In short, the best assessment of prognosis from all available sources as well as patient preferences must inform decisions about ICU admissions.

The influence of age on outcome is not linear, and the inflection point at which risk becomes exponential varies by patient. It is possible to see a poorly controlled 45-year-old diabetic with less physiologic reserve than a robust nonagenarian. There is no question that physiologic reserve shrinks

over time; this is termed “homeostenosis” in the geriatrics literature. It is why we seldom see world class athletes in the later decades of life. In essence, a 20-year old dances in a gymnasium and even extreme excursions are unlikely to result in a collision with a wall while the nonagenarian dances in a closet. The rate at which the room shrinks, however, is entirely variable and influenced by genetic factors, declining reserves in major organ systems (pulmonary, renal), damage to the infrastructure (vasculopathy from diabetes) and perhaps changes over time within the populations of mitochondria.⁷ The situation is further complicated by a host of lifestyle choices such as the extent of physical activity, personality structure and even the richness of the patient’s social network.

Age is associated with physiologic decay, but real age and chronologic age are not identical. Unfortunately most databases lack adequate markers of frailty which might elucidate functional and physiologic reserves. Cognitive impairment, diminished activity levels, poor nutrition, and similar measures of preexisting vulnerabilities are rarely tracked, but may be far more useful than chronologic age in predicting outcomes. The challenge for future researchers will be to incorporate geriatric-specific predictors into outcome analysis. This work has begun for medicine and some surgical specialties, an example being Min et al’s study of older adults admitted with trauma.⁸ Those authors showed that the Vulnerable Elders Survey (VES 13) improved prediction of morbidity and mortality when added to existing risk stratification tools.

Finally, mortality is not the only outcome of interest; the authors acknowledge this by examining length of stay, and interventions such as tracheostomies and renal replacement therapy. Future investigation should also examine “geriatrics” outcomes such as functional decline, cognitive impairment, increased dependence and institutionalization following critical illness. Better defining the full range of outcomes meaningful to patients and their loved ones is vitally important. The financial and human “costs” of achieving those results must also be clarified. The latter include not only interventions such as tracheostomies but

also multiple other “geriatrics” outcomes such as delirium, pressure ulcers, falls, incontinence and the onset of frailty and all that implies. Knowledge of expected outcomes and the likely price required to achieve them will help clinicians guide therapeutic choices for critically ill elders and their struggling families.

References

1. Zimmerman JE, Kramer AA, McNair, Malila FM. Acute Physiology and Chronic Health Evaluation (APACHE) IV: hospital mortality assessment for today's critically ill patients. *Crit Care Med*. 2006;34:1297–310.
2. Higgins TL, Teres D, Copes WS, Nathanson BH, Stark M, Kramer AA. Assessing contemporary intensive care unit outcomes: an updated Mortality Probability Admission Model (MPMO-III). *Crit Care Med*. 2007;35:827–35.
3. Iapichino G, Edbrooke D, Capuzzo M, Le Gall JR. Saps 3 – from evaluation of the patient to evaluation of the intensive care unit. Part 2: development of a prognostic model for hospital mortality at ICU admission. *Intern Care Med*. 2005;31:1345–55.
4. Nathanson BH, Higgins TL, Brennan MJ, Kramer AA, Stark M, Teres D. Do elderly patients fare well in the ICU? *Chest*. 2011;139:825–31.
5. Mitnitski AB, Graham JE, Mogilner J, Rockwood K. Frailty, fitness and late-life mortality in relation to chronological and biological age. *BMC Geriatr*. 2002;2, <http://dx.doi.org/10.1186/1471-2318-2-1>.
6. Santana-Cabrera L, Lorenzo-Torrent R, Sánchez-Palacios M, Josefa Delia Martín Santana J, Juan Ramón Hernández Hernández JR. Influence of age on length of stay and on the mortality of patients who remain for an extended period in intensive care units. *Rev Clin Esp*. 2014, en este mismo número.
7. Trifunovic A, Larsson: mitochondrial dysfunction as a cause of ageing. *J Intern Med*. 2008;263:167–78.
8. Min L, Ubhayakar N, Saliba D, Kelley-Quon L, Morley E, Hiatt J, et al. The Vulnerable Elders Survey-13 predicts hospital complications and mortality in older adults with traumatic injury: a pilot study. *J Am Geriatr Soc*. 2011;59:1471–6.

T.L. Higgins*

*Vice Chair - Clinical Affairs, Department of Medicine, Baystate Medical Center, Springfield, Massachusetts, USA.
Professor of Medicine, Surgery & Anesthesiology, Tufts University School of Medicine, Boston, Massachusetts, USA*

M.J. Brennan

Interim Chief, Division of Geriatrics, Palliative Care and Postacute Medicine, Department of Medicine, Baystate Medical Center, Associate Professor of Medicine, Tufts University School of Medicine, Boston, Massachusetts, USA

*Corresponding author.

E-mail address: thomas.higgins@baystatehealth.org
(T.L. Higgins).