

Ageing Population

Lessons From the “Very Old Intensive Care Patients” (VIP) Project, *H. Flaatten, B. Guidet, D. deLange*

In Search of a Crystal Ball: Predicting Long-term Outcomes in Critically Ill Older Adults, *S. Jain, L. Ferrante*

Nutritional Management of the Critically Ill Older Adult, *O. Tatucu-Babet, K. Lambell, E. Ridley*

Unmasking the Triumphs, Tragedies, and Opportunities of the COVID-19 Pandemic, *J. Patel, D. Heyland*

What Intensivists Can Learn From Geriatric Medicine, *A. Reid, P. Young*

Ageing and Critical Illness: What Does Quality Care Look Like? *C. Subbe, C. Thorpe, R. Pugh*

Lessons from COVID-19: ICU Preparedness, Ethical Issues and Digital Congresses, *JL Vincent*

Predicament Prevention for Pandemics, *A. Michalsen*
Challenges in the Management of Severe SARS-CoV2 Infection in Elderly Patients, *O. Perez-Nieto, E. Zamarron-Lopez, M. Guerrero-Gutierrez et al.*

Vitamin D in Critical Illness – Fifty Shades of VIOLET, *K. Amrein, P. Zajic, M. Hoffman et al.*

Angiotensin II in Post Cardiopulmonary Bypass Vasoplegia - The Experience So Far, *N. Cutler, J. Signorelli, P. Wieruszewski et al.*

Promising Techniques in Sepsis After Cardiac Surgery, *G. Paternoster, Á. Nagy*

Microtools to Identify and Resuscitate Microcirculatory Dysfunction in Critically Ill Patients, *M. Hilty, C. Ince*

The Future of Critical Care: The Human Capital, *S. Ho, A. Wong, A. Butnar, M. Malbrain*





Christian Subbe
Senior Clinical Lecturer in Acute
and Critical Care Medicine
School of Medical Sciences
Bangor University

christian.subbe@wales.nhs.uk



Chris Thorpe
Consultant Intensive Care/
Anaesthetics
Ysbyty Gwynedd
Bangor, UK

chris.thorpe@wales.nhs.uk



Richard Pugh
Consultant Intensive Care/
Anaesthetics
Glan Clwyd Hospital
Bodelwyddan
Denbighshire, UK

richard.pugh@wales.nhs.uk

Ageing and Critical Illness: What Does Quality Care Look Like?

This article explores a system for assessing quality of care in critically ill elderly patients.

The Institute of Medicine's [IoM] "Crossing the quality chasm: a new health system for the 21st century" was published nearly twenty years ago (Institute of Medicine 2001). Its intention was to provide perspective on the aims of healthcare systems, the inter-relation between clinicians and patients, responsiveness to individual needs, and the structures and processes within which clinical services operate. Facing an ageing population with increasingly complex clinical needs, the Society of Critical Care Medicine have argued that the need for change set out in "Crossing the quality chasm..." has only increased (Nates et al. 2016). The IoM dimensions of quality - safety; effectiveness; patient centred care; timeliness; efficiency; and health equity - remain a relevant framework for considering the organisation of healthcare systems: they are referenced within the latest UK Guidelines for the Provision of Intensive Care Services (Faculty of Intensive Care Medicine/Intensive Care Society 2019), for example. We now begin to consider some specific examples of how these dimensions relate to critical illness in an older population.

Safety

Risk of deterioration increases with age, co-morbidity, frailty and severity of acute illness. Very recent data from ICNARC in the UK indicates that in the short-term, hospital mortality has improved over every

age cohort for those admitted to critical care over the last twenty years (Jones et al. 2020). In the wider hospital setting, however, outcomes following in-hospital cardiac arrest are improving at different rates among different age cohorts; this may of course reflect underlying reserve, but despite having a greater proportion with underlying cardiac disease, older cohorts were less likely to have arrested in a higher acuity ward or to have had telemetry in situ (Wiberg et al. 2020). Similarly, the METHOD study found that frail acute hospital admissions (who triggered the attendance of a rapid response team) had a significantly lower nurse:patient ratio than non-frail counterparts, despite their greater vulnerability and illness severity (NEWS and qSOFA) (So et al. 2018). Facing lack of certainty over treatment benefits, quality care needs to look at a wider understanding what is important to the individual patient in terms of treatments, priorities and goals. Elderly and frail patients are more vulnerable to physiological and psychological disturbance, both as an inevitable result of the illness and therapies, but also as a consequence of adverse incidents. This needs to be taken into account when planning care, with meticulous attention over everything from medications through to family interactions. From a professional perspective, we also need to be able to communicate not just the long-term outcomes, and chance of

Decision-making processes around the admission of critically ill elderly patients have been put into sharp focus in 2020. The urgent need to meet the demands associated with large numbers of acutely ill patients during the COVID-19 pandemic has quickened discussions about prioritisation of resources with a focus on objective benefits. In providing high quality care to the elderly we certainly need to look at hard evidence on mortality and morbidity, arguments that have been widely debated during recent months, but it is also essential to look at the many other important aspects that affect the patient experience. In interrogating these aspects, it is helpful to have a framework where we can explore the many aspects of care that go beyond simple mortality figures.

survival but also the critical care environment the patient is likely to experience during their illness.

Effectiveness

Individuals in many countries around the world can expect to live longer and to survive with chronic illness and functional dependency. In some healthcare settings, there is evidence that static critical care capacity is leading to rationing, and subsequent exclusion of older patients and those with significant levels of comorbidity; in other settings, critical care expansion appears to allow critical care admission trends to follow national demographic trends; indeed, in relatively resource-rich environments, where critical care beds are conjectured to create their own demand, debate has moved on to the consideration of critical care bed reductions as “a safe and effective way to reduce ICU-related spending” (Wallace et al. 2015).

The Eldicus study demonstrated that older patients have greater mortality, and are also less likely to be admitted to critical care. The study however also found a greater reduction in mortality for admitted vs. rejected patients in the elderly compared with the young, suggesting that critical care admission appears to have greatest “mortality benefit” for the elderly (Sprung et al. 2012). Systematic admission might be considered to help, but in one study of patients aged 75 years or more (who were cancer-free, with preserved nutrition and functional status) had a similar risk of death at six months to those subject to conventional admission processes (Guidet et al. 2017). Furthermore, long-term outcomes among older patients who have required significant organ support in critical care can be disheartening (Biston et al. 2014).

Although age is clearly important when anticipating outcomes from critical illness, the interaction of age with comorbidity, the nature and severity of acute illness, and frailty, necessitate more nuanced clinical consideration for the individual. For critical

care clinicians interested in “physiological reserve,” the concept of frailty has been a leading development in the last decade. Frailty is considered the consequence of a decline of physiological systems during a lifetime, and a vulnerability to poor resolution of homeostasis after a stressor event (Clegg et al. 2013). It can be reliably assessed in the critically ill, has strong predictive validity in the short-term, and provides a platform on which to investigate longer-term outcomes from critical illness. However, it must be remembered that frailty is not a dichotomous state, and

■ ■ in some healthcare settings, there is evidence that static critical care capacity is leading to rationing, and subsequent exclusion of older patients and those with significant levels of comorbidity ■ ■

that it may be relatively dynamic.

Clearly, there is a need to personalise in order to identify likely benefit of critical care admission, which takes into account longer-term outcomes, and those outcomes of particular value to the individual patient.

Patient-Centred Care

Recent evidence would suggest that only a minority of critical care patients have been asked about their treatment preferences; furthermore, many families (when asked) have not discussed their relative’s treatment options with the clinical team. As Darren Heyland and colleagues have pointed out, shortfalls in communication and decision-making may lead to prolonged use of intensive care treatments in elderly critically ill patients, many of whom ultimately die (Heyland et al. 2015). Frailty

is associated with a lower life-expectation and towards the end of life the priorities of patients might not be the same as those of younger patients. Many frail patients if confronted with the perspective of critical illness and possible death will answer “I had a good innings;” indeed Fried and colleagues’ exploration of the health outcome priorities of older patients with multiple chronic conditions suggests that many would rank the preservation of independence and symptom relief above staying alive (Fried et al. 2011).

Timeliness

The window of opportunity to influence outcome from acute illness is short among patients who are frail. Prolonged periods of instability are poorly tolerated in the context of limited physiological reserve, and the balance between likely benefit and burden of invasive therapy shifts with progression from single to multiple organ dysfunction. Recent international guidelines for the metric of Rapid Response Systems stipulate decisions about escalation of care within 24 hours of triggering a local track and trigger tool as a quality metrics (Subbe et al. 2019).

Efficiency

Healthcare efficiency can be defined as the ratio of system output to input; an efficient system achieves high output (e.g. survival to hospital discharge) with low input (e.g. in terms of bed days). Numbers needed to treat is another common representation of efficiency. Efficiency of critical care might be lower in frail patients than in less frail patients. For patients admitted with low levels of frailty at comparable level of illness, as measured by APACHE II or comparable score, the chance of surviving with a minimal level of disability is significantly greater than that of a patient with mild or moderate frailty (though long-term outcome data is currently limited). Furthermore, the resource (e.g. in terms of length of stay) required to achieve this outcome may

be substantially less. By necessity, critical care services operating within resource constraints will tend to take an efficient approach and will be inclined to admit and provide ongoing care for those most likely to benefit. Bench-marking processes (which do not take account of frailty within the case-mix) have historically tended to reinforce this. However, in an efficient system, individuals who may have benefitted from critical care intervention in another healthcare setting suffer as a consequence of reduced access. This brings us to the final dimension of equity.

Health Equity

“Health equity” or “equity in health” implies that ideally everyone should have a fair opportunity to attain their full health potential and that no one should be disadvantaged from achieving this potential (World Health Organization 2020). During the COVID-19 pandemic this principle of care has been a cause for passionate debate between healthcare providers and policy makers. While frail patients might deserve similar access to critical care, decision-making has focused strongly on the full future health potential of deteriorating patients. With severe mismatch of supply

and demand, concerns shift from the individual patient to a utilitarian objective of “equitable concern for all.” Beyond critical care, this benefit looks different for a patient with a life-expectancy of 1-3 years and a patient with a life-expectancy of 40-50 years. Faced with extraordinary demands, UK professional ethical guidance considered that “the capacity to benefit quickly” would represent “a proportionate means of achieving a legitimate aim” – appreciating that although “everyone matters and everyone matters equally... this does not mean that everyone will be treated the same” (British Medical Association 2020).

Conclusion

We have used the IoM framework to explore a number of issues relating to the provision of quality care to an ageing population. The issues are wide-ranging: from the prioritisation of resources within healthcare systems, through public and patient expectations, the organisation of healthcare services to enable timely identification of those at risk, knowledge of clinical outcomes, transparent discussion, and shared decision-making. To borrow from Professor Ken Rockwood and colleagues, “Frailty is not synonymous with end-of-life” (Hubbard et al. 2020). We

have come some way over the last decade in our understanding of the impact of frailty on critical care – and its interaction with comorbidity and severity of acute illness – but we need to adapt further to meet the needs of an ageing population, and we need to be clear that we understand the consequences of ageing and frailty from the perspectives of those who may use our services and those close to them.

Conflicts of Interest

None. ■

Key Points

- Risk of patient deterioration increases with age, comorbidity, frailty and severity of acute illness.
- Elderly and frail patients are more vulnerable to physiological and psychological disturbance, both as an inevitable result of the illness and therapies, but also as a consequence of adverse incidents.
- Although age is clearly important when anticipating outcomes from critical illness, the interaction of age with comorbidity, the nature and severity of acute illness, and frailty, necessitate more nuanced clinical consideration for the individual.
- Our understanding of the impact of frailty on critical care has increased but we need to adapt further to meet the needs of an ageing population.

References

Biston P et al. (2014) Outcome of elderly patients with circulatory failure. *Intensive Care Med*, 40(1): 50-56. doi: 10.1007/s00134-013-3121-7

British Medical Association. (2020) COVID-19 – ethical issues. A guidance note. BMA. Available from bma.org.uk/media/2360/bma-covid-19-ethics-guidance-april-2020.pdf

Clegg A et al. (2013) Frailty in elderly people. *Lancet* 381(9868): 752-762. doi: 10.1016/S0140-6736(12)62167-9

Faculty of Intensive Care Medicine/ Intensive Care Society. (2019) Guidelines for the Provision of Intensive Care Services. London: Intensive Care Society.

Fried TR et al. (2011) Health outcome prioritization as a tool for decision making among older persons with multiple chronic conditions. *Archives of Internal Medicine* 171(20): 1854-1856. doi: 10.1001/archin-termed.2011.424

Guidet B. et al. (2017) Effect of Systematic Intensive Care Unit Triage on Long-term Mortality Among Critically Ill Elderly Patients in France: A Randomized Clinical Trial. *JAMA* 318(15): 1450-1459. doi: 10.1001/jama.2017.13889

Heyland DK et al. (2015) Admission of the very elderly to the intensive care unit: family members' perspectives on clinical decision-making from a multi-center cohort study. *Palliat Med*, 29(4):324-335. doi: 10.1177/0269216314566060

Hubbard RE et al. (2020) Frailty in the face of COVID-19. *Age & Ageing*, 49(4): 499-500. doi: 10.1093/ageing/afaa095

Institute of Medicine. (2001) Crossing the Quality Chasm: A New Health System for the 21st Century. Washington (DC): National Academy Press.

Jones A et al. (2020) Demographic Shifts, Case Mix, Activity, and Outcome for Elderly Patients Admitted to Adult General ICUs in England, Wales, and Northern Ireland. *Crit Care Med* 48(4): 466-474. doi: 10.1097/CCM.0000000000004211

Nates JL et al. (2016) ICU Admission, Discharge, and Triage Guidelines: A Framework to Enhance Clinical Operations, Development of Institutional Policies, and Further Research. *Crit Care Med*, 44(8): 1553-1602. doi: 10.1097/CCM.0000000000001856

So RKL et al. (2018) The association of clinical frailty with outcomes of patients reviewed by rapid response teams: an international prospective observational cohort

study. *Crit Care*, 22(1): 227. doi: 10.1186/s13054-018-2136-4

Sprung CL et al. (2012) The Eldicus prospective, observational study of triage decision making in European intensive care units. Part II: intensive care benefit for the elderly. *Crit Care Med*, 40(1):132-138. doi: 10.1097/CCM.0b013e318232d6b0

Subbe CP et al. (2019) Quality metrics for the evaluation of Rapid Response Systems: Proceedings from the third international consensus conference on Rapid Response Systems. *Resuscitation*, 141: 1-12. doi: 10.1016/j.resuscitation.2019.05.012

Wallace DJ et al. (2015) Critical care bed growth in the United States. A comparison of regional and national trends. *American Journal of Respiratory & Critical Care Medicine*, 191(4): 410-416. doi: 10.1164/rccm.201409-1746OC

Wiberg S et al. (2020) Age-dependent trends in survival after adult in-hospital cardiac arrest. *Resuscitation*, 151: 189-196. doi: 10.1016/j.resuscitation.2020.03.008

World Health Organisation. 2020. Health Equity. WHO. Available from who.int/topics/health_equity/en/