

# Access to Intensive Care Unit Care for Elderly Patients with COVID-19 in Portugal

Filipe S. Cardoso<sup>a</sup> André Borges<sup>a</sup> Isabel Botelho<sup>b</sup> André Real<sup>c</sup>  
Ana C. Araújo<sup>d</sup> Guilherme Domingos<sup>e</sup> Rui Pereira<sup>a</sup> Rui Moreno<sup>f</sup> Luís Bento<sup>g</sup>  
Nuno Germano<sup>a</sup>

<sup>a</sup>Intensive Care Unit, Curry Cabral Hospital, Lisbon, Portugal; <sup>b</sup>Intensive Care Unit, Dr. José de Almeida Hospital, Cascais, Portugal; <sup>c</sup>Intensive Care Unit, Dr. Manoel Constâncio Hospital, Abrantes, Portugal; <sup>d</sup>Intensive Care Unit, Dr. Fernando Fonseca Hospital, Amadora, Portugal; <sup>e</sup>Intensive Care Unit, São Bernardo Hospital, Setúbal, Portugal; <sup>f</sup>Neuro-intensive and Trauma Care Unit, São José Hospital, Lisbon, Portugal; <sup>g</sup>Medical Urgency Unit, São José Hospital, Lisbon, Portugal

## Keywords

COVID-19 · Access to healthcare · Elderly · Portugal

**Acesso a cuidados de UCI para doentes idosos com COVID-19 em Portugal**

## Palavras Chave

COVID-19 · Acesso a cuidados de saúde · Idosos · Portugal

The overstretched intensive care unit (ICU) capacity during the 2019 coronavirus disease (COVID-19) pandemic generated a debate about age being an important criterion for triaging patients with COVID-19 for ICU admission [1, 2].

In Portugal, as of April 30, 2020, there have been 24,987 cases of severe acute respiratory syndrome coronavirus 2 (SARS-CoV2) infection (6,136 [24.5%] patients aged ≥70 years) and 1,007 individuals have died from COVID-19 (878 [87.2%] patients aged ≥70 years) [3, 4].

This was a multicenter retrospective cohort using data retrieved from the ICU databases. For comparisons between variables, we used  $\chi^2$  or Fisher exact tests (SPSS V20; IBM Corp., North Castle, NY, USA).

As of April 30, in 6 hospitals in Lisbon (catchment area of 1.2 million people), 95 (4.8% of a total of 1,988 cases) patients with COVID-19 pneumonia (nasal/pharynx swab or respiratory secretions with positive SARS-CoV2 by real-time polymerase chain reaction) were admitted to the ICU, with 39 (41.1%) patients aged ≥70 years. Overall, 94 (98.9%) patients required invasive mechanical ventilation (IMV). Among those aged ≥70 years, 38 (97.4%) patients required IMV and only 1 (2.6%) patient was managed solely with a high-flow nasal cannula. Overall, the mean ( $\pm$ SD) sequential organ failure assessment (SOFA) score on ICU admission was 7 ( $\pm$ 3), and 16 (16.8%) patients did not survive the ICU stay.

Filipe S. Cardoso and André Borges contributed equally.

**Table 1.** Association between age intervals and patients' characteristics

Age, years ( <i>n</i> = 1,988)	In an ICU ( <i>n</i> = 95)	No ICU ( <i>n</i> = 1,893)	RR (95% CI); NNT (95% CI)
≥70	39 (41.1)	449 (23.7)	2.14 (1.44–3.18);
<70	56 (58.9)	1,444 (76.3)	23 (16–48) <i>p</i> = 0.0002*
Age, years ( <i>n</i> = 95)	With IMV ( <i>n</i> = 94)	Without IMV ( <i>n</i> = 1)	RR (95% CI)
≥70	38 (40.4)	1 (100)	0.97 (0.93–1.03)
<70	56 (59.6)	0 (0)	<i>p</i> = 0.32**
Age, years ( <i>n</i> = 69)	SOFA score ≥10 ( <i>n</i> = 11)	SOFA score <10 ( <i>n</i> = 58)	RR (95% CI)
≥70	5 (45.5)	21 (36.2)	1.38 (0.47–4.07)
<70	6 (55.5)	37 (63.8)	<i>p</i> = 0.58**
Age, years ( <i>n</i> = 95)	ICU death ( <i>n</i> = 16)	ICU survival ( <i>n</i> = 79)	RR (95% CI); NNT (95% CI)
≥70	13 (81.3)	26 (32.9)	6.22 (1.90–20.39);
<70	3 (18.7)	53 (67.1)	4 (2–8) <i>p</i> = 0.0025**

Values are presented as numbers (%) unless otherwise stated. NNT, number needed to treat. \*  $\chi^2$  test ( $\alpha$  = 0.05, 2-tailed). \*\* Fisher exact test ( $\alpha$  = 0.05, 2-tailed).

Four ICU (70.5% of the 95 patients included) were using the Clinical Frailty Scale to help triage patients with COVID-19 for ICU admission, with those having >6 points being generally declined for ICU care [5]. In 5 (12.8%) patients aged ≥70 years, do-not-resuscitate decisions were established during the ICU stay.

In this cohort, patients aged ≥70 years were twice more likely to be admitted to the ICU than others (Table 1; RR = 2.14; 95% CI 1.44–3.18). Moreover, patients aged ≥70 years had access to IMV (RR = 0.97; 95% CI 0.93–1.03) and mean SOFA scores similar to those of others (8 vs. 7; RR = 1.38; 95% CI 0.47–4.07). However, patients aged ≥70 years were 6 times more likely to die in the ICU than others (RR = 6.22; 95% CI 1.90–20.39). Alternatively, of every 4 patients aged ≥70 years admitted to the ICU, 1 derived a survival benefit from ICU care (number needed to treat: 4; 95% CI 2–8).

Our findings suggest that chronological age was not a limitative criterion for ICU admission in patients with COVID-19. More likely, clinicians pondered factors such as the number and severity of comorbidities, the presence and severity of frailty, and the number and severity of acute organ dysfunctions [5].

The following limitations warrant consideration. First, the COVID-19 incidence decreased a few weeks following the lockdown imposed by the Portuguese government on March 18 (from a peak of 1,516 cases on April 10 to 368 cases on April 30) [3]. Second, the peak ICU bed occupancy rate occurred on April 6 (60.1% of the total national capacity) [4]. Finally, data on comorbidities and patients declined for ICU admission were not captured and thus we could not weigh for those potential confounders.

In conclusion, access to ICU care for elderly patients with COVID-19 may be preserved during the pandemic, especially if there is no strained ICU capacity. While patients aged ≥70 years may incur in a higher mortality, those selected by ICU clinicians may benefit from ICU care.

### Acknowledgment

We thank all staff of the participating ICU.

## Statement of Ethics

Informed consent was waived due to the observational nature of this study.

## Conflicts of Interest Statement

The authors have no conflict of interests to declare.

## Funding Sources

The authors have no funding sources to declare.

## Author Contributions

F.S.C., A.B., I.B., A.R., G.D., A.C.A., and R.P. collected the data. F.S.C. analyzed and interpreted the data. F.S.C. and A.B. drafted this paper. All of the authors read and approved the final version of this work.

## References

- 1 Arentz M, Yim E, Klaff L, Lokhandwala S, Riedo FX, Chong M, Lee M. Characteristics and outcomes of 21 critically ill patients with COVID-19 in Washington State. *JAMA*. 2020;323(16):1612–4.
- 2 Grasselli G, Zangrillo A, Zanella A, Antonelli M, Cabrini L, Castelli A, et al.; COVID-19 Lombardy ICU Network. Baseline characteristics and outcomes of 1591 patients infected with SARS-CoV-2 admitted to ICUs of the Lombardy Region, Italy. *JAMA*. 2020 Apr; 323(16):1574–81.
- 3 Ministério da Saúde; Direção Geral da Saúde. *COVID-19* [Internet]. Lisboa: Direção-Geral da Saúde; 2020 [cited 2020 May 15]. Available from: <https://covid19.min-saude.pt>.
- 4 Rhodes A, Ferdinande P, Flaatten H, Guidet B, Metnitz PG, Moreno RP. The variability of critical care bed numbers in Europe. *Intensive Care Med*. 2012 Oct;38(10):1647–53.
- 5 Flaatten H, De Lange DW, Morandi A, Andersen FH, Artigas A, Bertolini G, et al.; VIP1 study group. The impact of frailty on ICU and 30-day mortality and the level of care in very elderly patients ( $\geq 80$  years). *Intensive Care Med*. 2017 Dec;43(12):1820–8.