



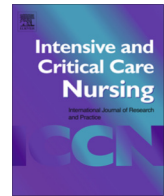
Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.



Contents lists available at ScienceDirect

Intensive & Critical Care Nursing

journal homepage: www.elsevier.com/icc

Editorial

Optimising COVID-19 survivorship after ICU – Don't forget eye care



In this issue of *Intensive and Critical Care Nursing*, Silva et al. highlight the incidence of, and risk factors for, corneal injury in intensive care unit (ICU) patients. This is a timely paper, as with the increased ICU nursing workload associated with COVID-19 patients (Bruyneel et al., 2021; Lucchini et al., 2020a) and the more frequent use of prone positioning in this patient group, there is a fear ocular injury will increase (Sanghi et al., 2021; Sansome and Lin, 2020). Silva et al. provide an apt reminder on factors that contribute to corneal injury and how eye care can improve patients' rehabilitation post ICU discharge.

Research suggests that even prior to COVID-19, eye care was neglected (Cho et al., 2017; Hearne et al., 2018; Selvan et al., 2020), with nurses focusing more on managing patient instability and organ failure (Silva et al., 2021). Before COVID-19, the frequency of corneal injury varied, with some reporting up to 42% of patients developing signs of corneal injury whilst others reporting between 23 and 60% (Hearne et al., 2018). In the COVID-19 era, increased nursing workload associated with donning and doffing personal safety equipment, decontamination procedures, caring for patients with no visitors to support them, and keeping families fully informed add to the nursing workload, further increasing the risk of eye care being overlooked (Lucchini et al., 2020b) and exposing patients to corneal injury.

The problem associated with post intensive care syndrome and its long-lasting limitations related to physical dysfunction, psychological disorders, cognitive impairment and social limitations are well documented (Yuan et al., 2021). For COVID-19 patients discharging from the ICU and hospital, post intensive care syndrome and its long lasting physical, cognitive and mental impairments will significantly impact on their recovery. (Hosey and Needham, 2020; Jaffri and Jaffri, 2020). Many patients will need to contend with critical illness-associated polyneuropathy; laryngeal injury; dysphagia; prolonged delirium; worsening cognitive impairment preventing driving and employment; and mental health issues, such as anxiety and depression (Hosey and Needham, 2020; Jaffri and Jaffri, 2020). Interestingly, visual loss from corneal injury is not mentioned by these authors, although the surge of COVID-19 patients will likely increase its frequency (Sanghi et al., 2021; Sansome and Lin, 2020). Corneal injury and its associated complications can cause irreversible vision loss, resulting in patients' "loss of independence, reduced mobility and poor mental health" (Sansome and Lim, p.1) thus adding to the burden associated with post intensive care syndrome following ICU and hospital discharge.

Intensive care patients are at increased risk of keratopathy (damage to the corneal surface) due to the types of ICU treatment needed. Oxygen delivered via oxygen and non-invasive pressure

ventilation face masks can dry the eye, whilst sedation reduces the blink reflex and can cause incomplete closure of the eyelid, known as lagophthalmos (Hearne et al., 2018; Sansome and Lin, 2020; Silva et al., 2021). Positive pressure ventilation and/or prone positioning elevates venous pressure and contributes to conjunctival oedema (chemosis), contributing further to lagophthalmos. Left untreated, these injuries can lead to visual loss and in severe cases, blindness (Sansome and Lin, 2020). In Silva et al.'s (2021) study, risk factors that were significantly associated with corneal injury in their ICU population were: lagophthalmos, chemosis, periorbital oedema, a blink reflex < 5-time-per-minute and hospitalisation > 7-days.

Research shows that implementing an eye care protocol reduces the incidence of corneal injury (Hearne et al., 2018; Kousha et al., 2018) and positively impacts on patients' rehabilitation and quality of life (Sansome and Lin, 2020). By regularly performing the simple steps, such as those outlined in Table 1, nurses can further contribute to patients' recovery post discharge from ICU.

Whilst we have the ABCDEF bundle to improve the outcome of mechanically ventilated patients that focuses on "Assessing, preventing and managing pain; Both spontaneous awakening and breathing trials; Choice of sedation; Delirium-assess, prevent and manage; Early mobility; and Family Engagement (Boehm et al., 2020), there is no focus on eye care. With the likely increase in corneal injury in our COVID-19 population, adding eye care to a bundle is urgently needed. Unfortunately, for those ICUs with no current embedded eye protocol, the physical and emotional exhaustion associated with caring for the surge in the number of COVID-19 patients, may mean nurses have no capacity to add an increased focus on eyecare. It will only be after the pandemic is over that we will know the true extent a COVID-19 ICU admission has on patients' rehabilitation and recovery.

Table 1
Eye assessment and intervention.

Assessment	Intervention
Assess eye lid closure	
Grade 0 – lid completely closed	No assessment needed
Grade 1 – conjunctival exposure but no corneal exposure	Clean eye with saline and apply lubricant 4-hourly
Grade 2 – any corneal exposure	Clean eye, apply lubricant, and tape lids
Assess corneal and conjunctiva by opening and shining light into the eye. Assess for redness, swelling, discharge or opacities.	If present refer to ICU medical staff and/or ophthalmologist.

Sansome and Lin (2020) and Hearne et al. (2018).

References

- Boehm, L.M., Pun, B.T., Stollings, J.L., Girard, T.D., Rock, P., Hough, C.L., et al., 2020. A multisite study of nurse-reported perceptions and practice of ABCDEF bundle components. *Intensive Critical Care Nursing* 60. <https://doi.org/10.1016/j.iccn.2020.102872>.
- Bruyneel, A., Gallani, M.-C., Tack, J., d'Hondt, A., Canipel, S., Franck, S., Reper, P., Pirson, M., 2021. Impact of COVID-19 on nursing time in intensive care units in Belgium. *Intensive Critical Care Nursing* 62, 102967. <https://doi.org/10.1016/j.iccn.2020.102967>.
- Cho, O.H., Yoo, Y.S., Yun, S.H., Hwang, K.H., 2017. Development and validation of an eye care educational programme for intensive care unit nurses. *J. Clinical Nursing* 26 (13–14), 2073–2082. <https://doi.org/10.1111/jocn.13635>.
- Hearne, B.J., Hearne, E.G., Montgomery, H., Lightman, S.L., 2018. Eye care in the intensive care unit. *J. Intensive Care Society* 19 (4), 345–350. <https://doi.org/10.1177/1751143718764529>.
- Hosey, M.M., Needham, D.M., 2020. Survivorship after COVID-19 ICU stay. *Nat. Rev. Dis. Primers* 6 (1). <https://doi.org/10.1038/s41572-020-0201-1>.
- Jaffri, A., Jaffri, U.A., 2020. Post-Intensive care syndrome and COVID-19: crisis after a crisis?. *Heart Lung* 49 (6), 883–884. <https://doi.org/10.1016/j.hrtlng.2020.06.006>.
- Lucchini, A., Giani, M., Elli, S., Villa, S., Rona, R., Foti, G., 2020a. Nursing Activities Score is increased in COVID-19 patients. *Intensive Crit. Care Nurs.* 59, 102876. <https://doi.org/10.1016/j.iccn.2020.102876>.
- Lucchini, A., Iozzo, P., Bambi, S., 2020b. Nursing workload in the COVID-19 era. *Intensive Crit. Care Nurs.* 61, 102929. <https://doi.org/10.1016/j.iccn.2020.102929>.
- Kousha, O., Kousha, Z., Paddle, J., 2018. Incidence, risk factors and impact of protocolised care on exposure keratopathy in critically ill adults: A two-phase prospective cohort study. *Crit. Care* 22 (1). <https://doi.org/10.1186/s13054-017-1925-5>.
- Sanghi, P., Malik, M., Hossain, I.T., Manzouri, B., 2021. Ocular complications in the prone position in the critical care setting: The COVID-19 pandemic. *Journal of Intensive Care Medicine* 36 (3), 361–372. <https://doi.org/10.1177/0885066620959031>.
- Sansome, S.G., Lin, P.-F., 2020. Eye care in the intensive care unit during the COVID-19 pandemic. *Br. J. Hosp. Med.* 81 (6), 1–10.
- Selvan, H., Pujari, A., Sachan, A., Gupta, S., Sharma, N., 2020. Neglected ocular surface care in critical care medicine: An observational study. *Contact Lens and Anterior Eye* 43 (4), 350–354. <https://doi.org/10.1016/j.clae.2019.08.009>.
- Silva, P., Gimenes, F., Mantilla, N., Silva, N., Pinheiro, C., Lima, M., Amaral, T., Prado, P., 2021. Risk of corneal injury in intensive care patients. *Intensive Crit. Care Nurs.*
- Yuan, C., Timmins, F., Thompson, D.R., 2021. Post-intensive care syndrome: A concept analysis. *Int. J. Nurs. Stud.* 114, 103814. <https://doi.org/10.1016/j.ijnurstu.2020.103814>.

Alison Pirret ^{a,b}^a Middlemore Hospital, Auckland, New Zealand^b Massey University, Auckland, New ZealandE-mail address: Alison.Pirret@middlemore.co.nz