Eye Care for Corneal Transplant Donors in the ICU: What We Didn’t See Coming

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Our mission

Above all else, we are committed to the care and improvement of human life.
Quality Improvement

Disclaimer:

"This project was undertaken as a Quality Improvement Initiative at Grand Strand Medical Center, and as such was not formally supervised by the IRB per their policies."
Why did we pick this QI project?

• Mechanically ventilated patients generally have decreased tear production with minimal to no blink reflex as a result of sedation or depressed neurological status, placing them at high risk for corneal epithelial damage.

• Review of national data shows 20-42% [1,2] of mechanically ventilated patients in the ICU develop corneal epithelial defects that disqualify them for transplantation.

• A retrospective analysis of potential donors from our intensive care units over a 12 month timeframe found that 6 out of 20 (30%) corneas from these potential donors did not meet the threshold for procurement due to corneal desiccation. This places our rejection rate near the median of the national rate.
Phase I - Plan

• After review of the local and national data, we developed an intervention aimed to diminish epithelial defects that would otherwise disqualify corneas for procurement.

• The primary outcome for our intervention was to reduce total corneas rejected below our institutional rejection rate of 30%.

• Liberal use of lubricants, in the form of ointments, have shown a reduction in the incidence of corneal epithelial defects [3]; we planned an intervention centered around using ointments as part of mandated, improved eye care in the ICUs.
Phase II - Do

• The eye care protocol consisted of Lacri-lube ophthalmic ointment applied twice daily to our subset of patients.

• With the assistance of our IT department, a mandatory eye care protocol was created. It was automatically linked to the mechanical ventilation order set in the EMR.

• We also implemented verbal quarterly nursing education to reinforce proper eye care measures.

• Our intervention spanned a course of 12 months, across 56 ICU beds.
Phase III – Study

• During the 12 month period of implementation of the protocol (January 2023-December 2023) there were a total of 31 donors (62 corneas) with a rejection rate of 0%. This is in contrast to the previous 12 month numbers of 6 rejections out of 20 corneas (rejection rate of 30%) and is also well below the national averages of 20-40%.[1,2]

• In addition to the remarkable reduction in annual corneal rejections, well below our target (<30%), the improvement was seen in the face of a more than 200% increase in total number of attempted donors.

• It was noted that there was one unforeseen complication. We observed many extubated patients leaving the ICU without discontinuation of their eye care orders.
Phase IV – Act

• Given the success rate after our first cycle of planned interventions, the next phase would be to apply these same interventions across a larger set of patients. This could be done by collaboration with other HCA Healthcare facilities to understand if the success rate would continue to be seen, when applied on a larger scale.

• An automated “discontinue eye care” order that would be linked to an extubation order in the EMR could be implemented in the next cycle. This would reduce the rate of unnecessary, ongoing eye care in extubated patients.
Conclusion

• Our intervention through one cycle, greatly exceeded our expectations. Given the dramatic initial results, it will be important to see if a rate of less than 5% rejection can be maintained as we broaden the scope of the QI project.

• We had the unforeseen complication of continued eye care orders for extubated patients. It did not pose a significant risk to our patients.

• In 2021, there were 117,177 corneas recovered for transplant in the US. At a rejection rate of 30% (the national average), this would represent 35,153 corneas that could not be used due to epithelial defects[4]. If our intervention is able to show the same level of promise as we expand the scope, it would have enormous implications for thousands of patients across the country.
References


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Thank you!