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Ocular Surface Diseases in a paediatric ICU patients in a Tertiary care centre in India

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Introduction:

Extravasation injuries, pressure ulcers (PU), and ocular surface disorders (OSD) like exposure keratitis are common problems that we encounter in critically ill children admitted in Paediatric Intensive Care unit (PICU). There is sparse data regarding these injuries due to under reporting by staffs in intensive care unit. The primary aim of this study was to know the prevalence of, ocular surface disorders in tertiary intensive care unit of south India. The secondary objective of this study was to re-evaluate the prevalence of these injuries after interventions.

Methods:

During pre-intervention period, number of children with extravasation injuries, pressure ulcers and ocular surface disorders were identified. The qualitative improvement practices was implemented to decrease the prevalence of these injuries. This was followed by re evaluation of these injuries during post-intervention period.

Results: During pre-intervention period the overall prevalence of ocular surface disorders was 8/273 (2.9%) During post-intervention period, the prevalence of these reduced to 2/157 (1.3%).

Conclusions: OSD are common problems in critically ill children. The qualitative improvement practices should be implemented and reinforced in intensive care units to prevent these diseases.

Key words: Ocular surface disorder (OSD); dry eye;exposure keratitis; Paediatric intensive care unit (PICU)

INTRODUCTION

Extravasation injuries, pressure ulcers (PU) and ocular surface disorders (OSD) are common

problems that are seen in critically ill children of Paediatric Intensive Care Unit (PICU).

Ocular surface disorders (OSD) have been reported to occur in up to 60% of critically ill patients**.** Critically ill

patients in intensive care unit have impaired ocular defence mechanisms because of different associated

conditions like multi-organ dysfunction syndrome, metabolic disturbances, mechanical ventilation and unconsciousness.7,8 The

use of sedation and muscle relaxants inhibit contraction of the orbicularis oculi muscle that

results in incomplete eyelid closure. Lagopthalmos has been reported to occur in 20% to 75% of sedated patients in intensive care units.7-11 There is drying of the eyes, desiccation of the cornea epithelial cells, corneal ulceration and increased risk of microbial keratitis due to incomplete closure of eye lids. This may lead to corneal thinning and perforation if untreated.

There is sparse data of extravasation, PU and OSD in critically ill children in our settings. This may be due to under reporting of these events in PICU. The primary aim of this study was to know the prevalence of extravasation injuries, PU and OSD in tertiary care PICU of South India. The secondary objective of this study was to re-evaluate the prevalence of these injuries after implementation of qualitative improvement interventions.

METHODS

This was a cross-sectional quality improvement study. This study was done in tertiary care

paediatric critical care unit of India. The pre intervention period was from 1st of October 2020 to 31st December 2020. The post-intervention period was from 1st January 2021to 30th March 2021. The prevalence of ocular surface disorders was seen during first three months. The guidelines and practices which were followed in PICU were implemented and reinforced to reduce the prevalence of these injuries. After intervention of these guidelines, again the prevalence of these disorders were seen to see whether these disorders are decreasing after intervention.

Ocular surface disorders (OSD)

1. Exposure keratopathy represents a dryness of the cornea due to incomplete lid closure.

2. Chemosis is conjunctival edema.

3. Microbial infections: The most common isolated organisms are Pseudomonas aeruginosa, Acinetobacter spp. and Staphylococcus epidermidis.

4. Conjunctivitis: It manifests as eye discharge from serosangunous to mucopurulent

5. Microbial keratitis: The damaged cornea is especially vulnerable to bacterial invasion which can occur very rapidly.The pre-interventional and post-interventional data

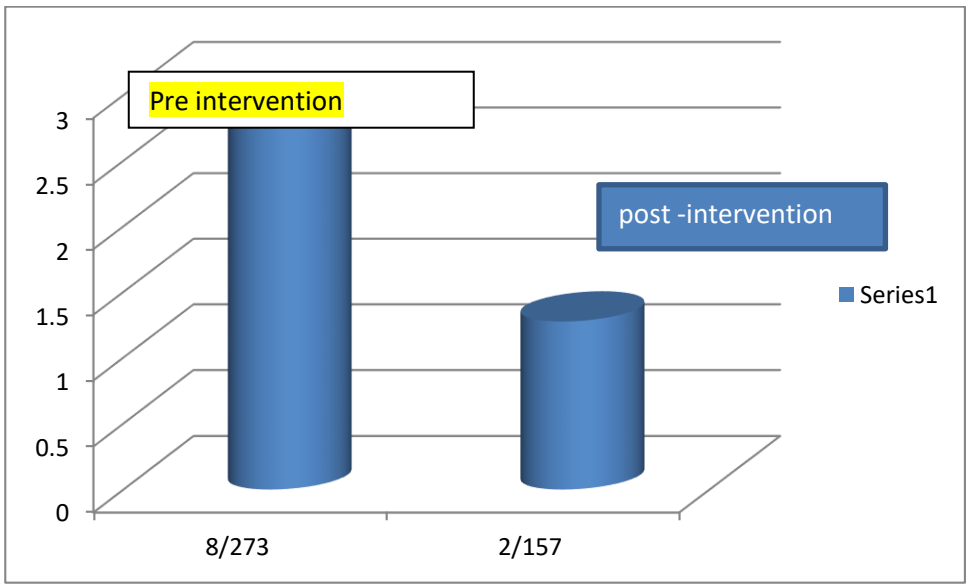
were analysed using Microsoft Excel 2010.

RESULTS

Out of eight OSD, 5/8 (62.5%) had exposure keratitis and 3/8 (37.5%) had conjunctival chemosis. Nobody had conjunctivitis or purulent keratitis. OSD was most common in 6/8 (75%) of children who who were mechanically ventilated, were on sedation and paralysis and stayed for more than one week in PICU.For ocular surface disorders, eye examination was done as a part of checklist in each shift by nurse and doctor. In mechanically ventilated children, artificial tear eye drops was kept hourly and lacrigel ointment was kept every six hours. Eye taping was done routinely in all mechanically ventilated children and this practice was reinforced in unit. The ophthalmological evaluation was done if any signs of OSD was identified and managed according to the ophthalmologist plan.

During post-intervention period, the overall

prevalence of OSD was reduced to 2/157 (1.3%). Out of two OSD, one had exposure keratitis and one had conjunctival chemosis. The prevalence of OSD during pre-intervention and postintervention is summarised.



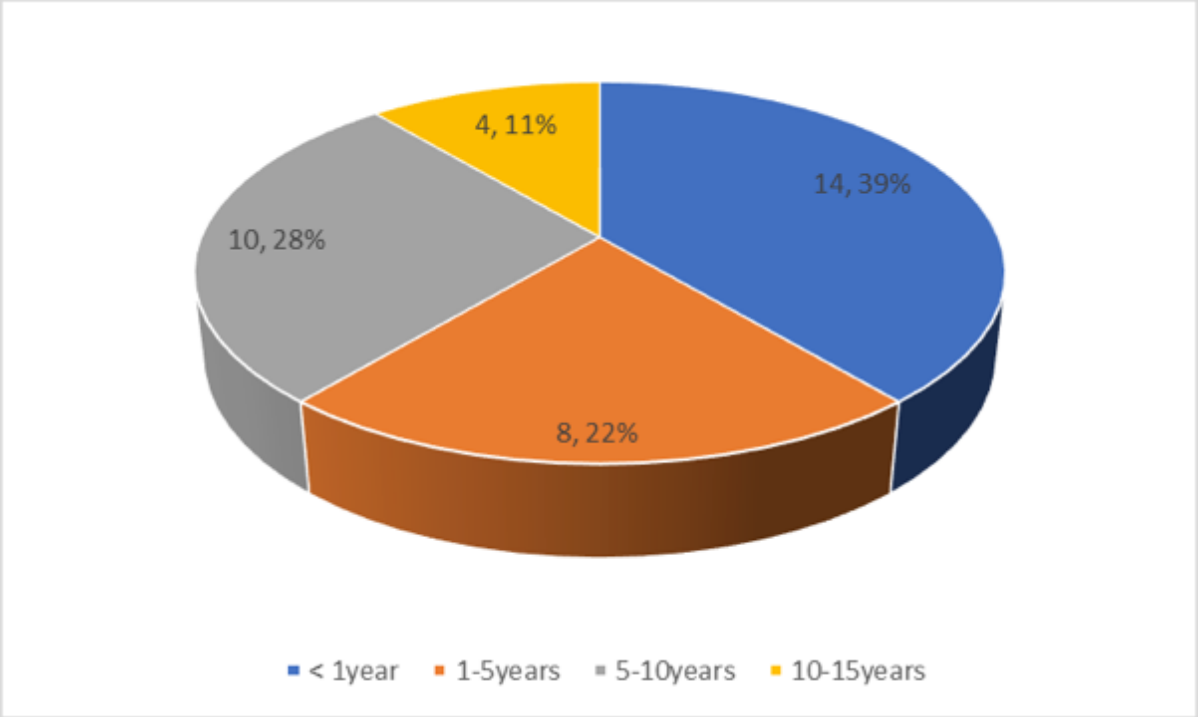


Figure 2: Age Distribution Of children In PICU having ocular surface diseases according to literature review

DISCUSSION

In our study OSD comprises 8/273 (2.9%) which is much less compared to the studies7,8 which have been reported to occur in up to 60% of critically ill patients. Out of eight OSD, 5/8 (62.5%) had exposure keratitis and 3/8 (37.5%) had chemosis.

Nobody had conjunctivitis or purulent keratitis. In our study OSD was found in eight patients who stayed in PICU for more than seven days and who was mechanically ventilated and was on sedation and paralysis which was similar to the findings by the study of Imanaka et al.24 Out of eight patients who had sedatives or muscle relaxants administered continuously for more than 48 hours in the PICU, 5/8 (62.5%) developed keratitis which was comparable to the study by Imanaka et al.22 where it was 60%. The limitation of this study was that prevalence of these diseases was seen only for three months after post-intervention. Hence, there is lacking evidence whether there was persistence decrease of these

diseases after intervention.

CONCLUSIONS

Ocular surface diseases are one of the serious issues in paediatric critical care unit if not treated timely. The implementation and continuous reinforcement of guidelines will definitely help to reduce these injuries in critically ill children.

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