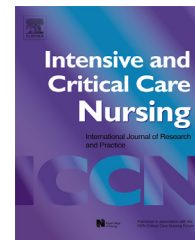




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ORIGINAL ARTICLE

Effective management of exposure keratopathy developed in intensive care units: The impact of an evidence based eye care education programme[☆]



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KEYWORDS

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Summary

Objectives: To assess the impact of eye care education on the incidence of corneal exposure in intensive care units (ICU).

Research methodology/design: Approximately 300 ICU personnel were educated about eye care to reduce the incidence of corneal exposure. The patients were divided into two groups: pre-training (Group 1: Between February 1, 2011 and March 31, 2011 [2 months]) and post-training periods (Group 2: Between April 1, 2011 and April 1 2012 [1 year]). We compared the groups for keratopathy incidence to evaluate the efficacy of this education.

Results: The number of patients were 762 in Group 1 and 6196 in Group 2 ($p=0.335$). Medians of patients followed in pre training ICU and post training ICU for each month were found to be 476 (interquartile range, 433–539) and 515 (interquartile range, 490–528). Exposure keratopathy was identified in 8 eyes of 6 patients (3 males and 3 females) in pre training ICU with the mean age of 27.6 ± 31.8 years and 5 eyes of 3 patients (1 male and 2 females) in post training ICU with the mean age of 41.3 ± 32.1 years. No significant difference was noticed between two groups in terms of the medians of patients followed in ICUs for each month ($p=0.335$). The time of hospitalisation in ICU when the patients were consulted for the first ocular assessment in pre training ICU and post training ICU were found to be 13 ± 8.7 days and 8 ± 1.7 days, respectively. After the training, the decrease in incidence of exposure keratopathy was found to be highly significant ($p < 0.001$).

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Conclusion: We observed a highly significant reduction in the incidence of corneal exposure, following the eye-care education programme.
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Introduction

Corneal complications secondary to exposure are still serious problem in patients admitted to intensive care units (ICU). These complications can have a very negative effect on the visual function of the eye. However, many of the exposure keratopathy complications produce no symptoms in the early stages, and most can be prevented or minimised (Betharia and Kalra, 1985; Girgin et al., 2009; Grixti et al., 2012; Hernandez and Mannis, 1997; Imanaka et al., 1997; Mercieca et al., 1999; Sivasankar et al., 2012).

The most important factors in maintaining the ocular surface regularity are the eyelid, tears and blink reflex. Another reflex called the Bell phenomenon, in which the eyes deviate upward during sleep, is also an important protective mechanism for the eye in patients whose eyelids do not completely close (Betharia and Kalra, 1985). The physical barrier, mechanical lubrication and antimicrobial effects of these protective mechanisms protect the ocular surface. Various levels of ocular surface disorders are caused by eyelid abnormalities that prevent full closure of the eye, decreased or lack of blink reflex, the absence of the Bell phenomenon in patients with the remaining eye open in sleep, and tear secretion deficiency (Girgin et al., 2009; Grixti et al., 2012; Mercieca et al., 1999; Sivasankar et al., 2012).

Some clinical conditions such as, sedative and neuromuscular blocker treatments, mechanical ventilation, head or facial trauma, and cranial nerves paralysis which are usually encountered in intensive care units, are reported to cause loss of the eye protective mechanisms. Therefore, the risk of ocular surface disease is still reported as an important problem for ICU patients (Girgin et al., 2009; Mercieca et al., 1999; Sivasankar et al., 2012).

In some studies, exposure keratopathy was reported to develop in 3.6%–60% of patients who stayed in intensive care units (Grixti et al., 2012; Hernandez and Mannis, 1997; Imanaka et al., 1997; Sivasankar et al., 2012). Eyelid closure and the blink reflex function may be impaired with loss of consciousness, facial paralysis and sedative and muscle relaxant drugs (Hernandez and Mannis, 1997; Imanaka et al., 1997; Kirwan et al., 1997; Suresh et al., 2000). Mercieca et al. (1999) reported that 75% of cases with deep sedation or neuromuscular blocking might not close the eyelids completely. Furthermore, positive pressure mechanical ventilation has been reported to increase the risk of exposure keratopathy by causing ocular oedema and reducing the production of tears (Girgin et al., 2009; Mercieca et al., 1999). The risk is also substantially increased in patients with head and/or ocular trauma and facial paralysis.

There are a number of protocols to help prevent these complications ranging from simple cleaning to suturing the lids to achieve adequate eye closure. However, there is still no consensus on how to perform eye care and how to prevent exposure keratopathy in ICU (Kirwan et al., 1997; Rosenberg

and Eisen, 2008; Sivasankar et al., 2012; Suresh et al., 2000; Wincek and Ruttum, 1989).

In the present study, we did not describe a new or more effective eye care protocol. We aimed to assess the effect of eye care education, therefore, a quite simple eye care protocol was taught to staff in the eye care education programme. Thus, we organized the intensive care personnel and performed visual education about on the eye structure and its care. Then, we evaluated the effect of this eye care education on the incidence of exposure keratopathy in ICUs, retrospectively.

Materials and methods

We planned to provide eye care education for ICU personnel, to reduce the incidence of corneal exposure in ICUs at the Hospital of Inonu University Faculty of Medicine.

This retrospective study was conducted after obtaining the approval of the Human Ethics Committee at Inonu University. All patients, except for the newborn infants, who were followed up in medical and surgical ICUs in our hospital were included in the study. ICU patients, both children and adults, who admitted for consultation at the ophthalmology clinic for various reasons were evaluated retrospectively for exposure keratopathy. The effect of training was then evaluated for incidence.

The patients were divided into two groups: pre- and post-training. Group 1 included patients in the pre-training period, and Group 2 included patients in the post-training period. The pre-training period was 1 February to 31 March 2011 (two months), and in the post-training period, 1 April 2011 to 1 April 2012 (1 year).

The data of the patients that developed exposure keratopathy were recorded, including age, gender, pre-diagnosis and length of stay in ICU at the first ocular assessment, concomitant systemic diseases and trauma (facial and head trauma), sedatives and neuromuscular blocker treatment, survival and final ocular condition. The total numbers of patients followed up in both groups were obtained from the statistical unit of our hospital.

In March 2011, approximately 300 personnel in all intensive care units (40 doctors and 260 nurses) were educated about eye diseases and eye care. Some basic information about the anatomy of the eye and its protective mechanisms was given at these seminars. The importance of the eyelid, tears, eye blink reflex and Bell phenomena for ocular surface protection was emphasised. How to determine higher risk patients requiring eye care and how to perform eye care was then described in a visual presentation. One of the goals was to encourage the ICU personnel to focus on the eyes of patients in intensive care.

In the education programme: first, we explained the examination of the lens, cornea and conjunctiva. For example, the discrimination of keratitis and cataracts was demonstrated with several pictures. The necessity of eyelid

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