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INTEGRATIVE REVIEW OF THE LITERATURE

Fatores de risco para lesão na córnea em pacientes críticos na terapia intensiva: revisão integrativa

Risk factors for injury in the cornea in critical patients in intensive care: an integrative review

Factores de riesgo para lesiones en la córnea en pacientes críticos en cuidados intensivos: una revisión integradora

Rafaela Silva Oliveira ¹, Ana Paula Nunes de Lima Fernandes ², Fabiane Rocha Botarelli ³, Jéssica Naiara de Medeiros Araújo ⁴, Vanessa Pinheiro Barreto ⁵, Allyne Fortes Vitor ⁶

ABSTRACT

Objective: summarizing the scientific content produced about the risk factors for corneal injury in critically ill patients in intensive care. **Method:** this is an integrative review of the literature conducted by question: "Which risk factors are involved in the development of corneal injury in critically ill patients in intensive care?" We searched the banks of BDNF, LILACS, SciELO and MEDLINE. The collection was performed according to the research protocol from January to April 2014. **Results:** the risk factors found are related to impairment of defense mechanisms, ventilation, and level of consciousness, severity and hemodynamic instability and use of specific medications. **Conclusion:** there was noted the scarcity of scientific papers about the subject in our country, which makes it imperative to urgent investigation into our reality, in order to demonstrate the problems of this disease. **Descriptors:** Corneal ulcer, Intensive care, Nursing.

RESUMO

Objetivo: sumarizar o conteúdo científico produzido sobre os fatores de risco para lesão na córnea em pacientes críticos na terapia intensiva. **Método:** trata-se de uma revisão integrativa da literatura realizada através do questionamento: "Quais fatores de risco estão envolvidos no desenvolvimento da lesão na córnea em pacientes críticos na terapia intensiva?" Pesquisou-se nas bases de dados BDNF, LILACS, SciELO e MEDLINE. A coleta foi realizada segundo protocolo de pesquisa, de janeiro a abril de 2014. **Resultados:** os fatores de risco encontrados relacionam-se ao comprometimento dos mecanismos de defesa, assistência ventilatória, nível de consciência, gravidade e instabilidade hemodinâmica e uso de medicações específicas. **Conclusão:** constatou-se a escassez de produções científicas sobre a temática em nosso país, o que torna imperativo a urgente investigação em nossa realidade para demonstrar a problemática deste agravo. **Descritores:** Úlcera da córnea, Terapia intensiva, Enfermagem.

RESUMEN

Objetivo: resumir el contenido científico acerca de los factores de riesgo de lesión en la córnea en pacientes críticamente enfermos en cuidados intensivos. **Método:** se trata de una revisión integradora realizada por la pregunta: "¿Cuáles son los factores de riesgo que estean implicados en el desarrollo de la lesión en la córnea en pacientes críticamente enfermos en cuidados intensivos?" Se realizaron búsquedas en las orillas del BDNF, LILACS, SciELO y MEDLINE. Fue realizada en el período de enero a abril de 2014. **Resultados:** los factores de riesgo están relacionados con el deterioro de los mecanismos de defensa, ventilación, nivel de conciencia, la gravedad y la inestabilidad hemodinámica y el uso de determinados medicamentos. **Conclusión:** tomó nota de la escasez de trabajos científicos acerca del tema en nuestro país, lo que hace imperativo urgente investigación de nuestra realidad, con el fin de demostrar los problemas de esta enfermedad. **Descritores:** Úlcera corneal, Cuidados intensivos, Enfermería.

¹ Nurse, Graduated at the Federal University of Rio Grande do Norte. Email: rafaelaoliveira@gmail.com ² Nurse, Master, Doctoral Student at the Postgraduation Program of Nursing of the Federal University of Rio Grande do Norte. Email: anapaulanlf@yahoo.com.br ³ Nurse, Master, Doctoral Student at the Postgraduation Program of Nursing and Professor of Graduation of the Federal University of Rio Grande do Norte. Email: fabibotarelli@hotmail.com ⁴ Nurse, Master's Student at the Postgraduation Program of Nursing of the Federal University of Rio Grande do Norte. Email: jessicanaiara_rn@hotmail.com ⁵ Nursing Student at the Federal University of Rio Grande do Norte. Email: vanessabarreto10@gmail.com ⁶ Nurse, Doctor, Professor of the Graduation and Postgraduation Program of Nursing of the Federal University of Rio Grande do Norte. Email: allynefortes@yahoo.com.br

INTRODUCTION

Currently, nurses working in intensive care units (ICUs) have taken the care to patients in health situations increasingly critical, which, in turn, require individual and complex interventions able to meet their care needs.¹

In response to technological innovations in these services and the needs of their clientele, nurses develop managerial and organizational nature activities in a shared manner to the care activities, requiring many skills and abilities, which causes constant changes in their work process.¹

In this sense, the nurse receives the challenging role of integrating scientific and technological knowledge to care in order to provide care at the bedside and thus early detection of potential organic alterations that can cause serious dysfunctions.² Therefore, nursing work in this context should occur reflective, integral and participatory form a dynamic process, which is paramount in a holistic view covering all the patient's needs, be they biological, physical, psychological or spiritual.³

In a space dominated by hard technologies, nursing has relevant participation in the processes to ensure the safety and excellence in quality of care.⁴ Studies show that due to the high technology linked to the practice of care, procedures considered of low complexity, such as hygiene and eye protection, are neglected in the context of intensive care, predisposing the patient to risk of ophthalmic adverse events.^{5,6}

Patients with serious medical conditions are at high risk of eye injury, characterized as an inflammatory or infectious process that occurs from surface layers to the deepest of the eyeball through the commitment of its natural protective mechanisms.⁷ Production of the tear film, corneal reflex eyelid and eyelid closure are reduced or even abolished in these patients, which makes the cornea - the outer layer, avascular and surface of the eye - exposed to factors that promote its dryness facilitating the development of lesions, which in severe cases lead to ulceration.⁸

Studies reveal that, globally, the incidence of corneal injury varies widely from 3% to 60% in hospitalized patients in the ICU.⁹ In the national literature, it was identified that 59.4% of hospitalized patients developed lesions, with a mean onset 8-9 days.⁵

Thus, there are considerable losses generated in the physical realm, emotional and social patient, since its involvement can extend the length of stay and cause more serious complications such as vision loss and compromise considerably daily activities and labor.

Regarding the role of nursing with the critical patient at risk for eye injury, you see the need for a carefully guided a specific body of knowledge regarding the prevention of injury. Thus, a skilled nursing staff on the subject in question has the opportunity to play an important role in the risk factors detection process and implementation of preventive strategies corneal injury, based on the best available evidence in the scientific literature.

Pursuant to Decree 529 of 1st April, 2013, establishing the Patient Safety National Program (PNSP) and in Article 4 defining Patient's Safety as "reduction to an acceptable minimum, the risk of unnecessary harm associated with health care" through the study in question aims to spread knowledge about the corneal injury at the national level where there is dearth of research in the area and to promote the inclusion of this issue, critical to patient safety, the technical education and graduate and postgraduate programs in health.¹⁰

Faced with high incidence of eye injury in critically ill patients and the risk factors involved in the development of corneal injury in critically ill patients in intensive care, it is essential to identify the predisposing factors for the development of adverse events in this scenario. Given the above, it was delimited as theme of this integrative literature review, the risk factors that contribute to the development of corneal injury in critically ill ICU patients.

Summarize the scientific content produced about the risk factors for corneal injury in critically ill patients in intensive care.

METHOD

This is an integrative review of literature on the knowledge produced about risk factors for corneal injury in critically ill patients in the ICU. This type of study consists of a survey that allows the synthesis of knowledge from the analysis of published in scientific studies, supporting the elaboration of general conclusions of knowledge in a particular area of study.¹¹

For the preparation of this review, it was recommended six steps that have been taken: the development of the research question; establishment of inclusion and exclusion criteria; definition of information to be extracted from the selected studies; assessment of included studies; interpretation of results and presentation of the review with the synthesis of knowledge.¹¹

From the delimitation of the subject research we sought to answer the following research question: “Which risk factors are involved in the development of corneal injury in ICU patients?”

Data collection was performed during the months from January to April 2014 in the following databases: Bank of Nursing Database (BDNF), Latin American and Caribbean Center on Health Sciences (LILACS), Scientific Electronic Library Online (SciELO) and Medical Literature Analysis and Retrieval System Online (MEDLINE).

The descriptors by the Virtual Health Library were used (BIREME) through the Descriptors in Health Sciences (DeCS) relevant to the construction of the search: corneal ulcer/cornealulcer/corneal ulcer, intensive care, nursing; being used two combinations - corneal ulcer/intensive care and corneal ulcer/nursing.

Inclusion criteria Articles were relevant publications to the questioning of the study, available for free and electronically, in the form of full text, available in Portuguese, English or Spanish. We excluded editorials, letters to the editor, reviews, abstracts and articles of dissonant theme in question. Data collection was conducted, according to the research protocol, from January to April 2014.

For data collection, the research protocol was used, encompassing item identification, study design, assessment of methodological rigor, results found and intersections. To evaluate the articles that met the inclusion criteria there was used summary table with the title of the research, authors, date and place of realization, study design and results found that concern for the purpose of this review.

After analyzing and interpreting the results, the risk factors for corneal injury were categorized into groups: change in defense mechanisms, mechanical ventilation, and level of consciousness, hemodynamic instability and use of specific medications.

To present the results there were built tables describing the properties of articles and discussion was elucidated in a descriptive manner, enabling the reader to evaluate the applicability of the developed integrative review, in order to achieve the objective of this method.

RESULTS AND DISCUSSION

According to the above in Table 1, 14 articles were selected for the sample that address the corneal injury in critically ill patients, highlighting some risk factors for the development of the injury. However, it was found that the central theme of the articles based on a comparison of prophylactic strategies and seeking eye care most recommended level of scientific evidence to implement care protocols in practice.

Regarding the year of publication, there was distribution of studies in the years 2004, 2005, 2006, 2008, 2010, 2011 and 2013, evidencing largest scientific production in 2008, followed by the year 2013 which was taken over the interest of researchers for theme.

Regarding the studies of conducting local, we see production in China, England, Australia, Riyadh (Saudi Arabia), India, Greece, Nigeria, New York, Turkey, and Brazil. There was higher number of publications in the first four mentioned countries, with only 01 article produced in Brazil.

As regards journal publication, we have: The Scientific World Journal, HBI Journals, Saudi journal of anesthesia, Latin American Journal of Nursing, International journal of ophthalmology, Int J Nurs Stud, Eye, Australian Critical Care, Critical Care Medicine, Intensive Care Medicine, The Internet Journal of Emergency and Intensive Care Medicine, Anaesth intensive Care, Indian Journal Critical Care Medicine, British Journal of Ophthalmology, Intensive Care Medicine. As regards the language, 13 articles were written in English and 01 in Portuguese.

From this analysis, it can highlight how much is scarce Brazilian production about the theme in question, which is contrary to the fact that the incidence of this event is greatly significant reaching 59.4% in Cambodia.⁵ Thus, it is imperative the need for more theoretical work to investigate the national reality.

Table 1 - Distribution of studies according to author, year, and title of the research, journal and place studied.

Author/Year	Title of research and study design	Journal/Place
Koroloff et al., 2004	A randomised controlled study of the efficacy of hypromellose and Lacri-Lube combination versus polyethylene/Cling wrap to prevent corneal epithelial breakdown in the semiconscious intensive care patient. Controlled clinical trial and randomized with 110 patients.	Intensive Care Medicine / Austrália
Ezra et al., 2005	Preventing exposure keratopathy in the critically ill: a prospective study comparing eye care regimes. Comparative prospective study with 47 patients.	British Journal of Ophthalmology / Inglaterra
Sivasankar et al., 2006	Eye Care in ICU. Randomized and controlled clinical trial in 124 patients.	Indian Journal Critical Care Medicine / Índia
Desalu et al., 2008	Ocular Surface Disorders In Intensive Care Unit Patients In A Sub-Saharan Teaching Hospital. Prospective study with 38 patients.	The Internet Journal of Emergency and Intensive Care Medicine / Nigéria

McHugh et al., 2008	Screening for ocular surface disease in the intensive care unit. Prospective study with 18 patients.	Eye/ Inglaterra
So et al., 2008	Comparing the effectiveness of polyethylene covers (Gladwrap) with lanolin (Duratears) eye ointment to prevent corneal abrasionsw in critically ill patients: a randomized controlled study. Clinical randomized and controlled trial with 120 patients.	Int J Nurs Stud / China
Shan; Min, 2010	Prevention of exposure keratopathy in intensive care unit. Clinical randomized trial with 84 patients.	International Journal of Ophthalmology/ China
Mela et al., 2010	Ocular surface bacterial colonization in sedated intensive care unit patients. Prospective study with 134 patients.	Anaesth Intensive Care/ Grécia
Werli-Alvarenga et al., 2011	Lesões na córnea: incidência e fatores de risco em Unidade de Terapia Intensiva. Prospective cohort study with 254 subjects.	Revista Latino-Americana de Enfermagem/Brasil
Azfar; Alzeer; Khan, 2013	Protocolized eye care prevents corneal complications in ventilated patients in a medical intensive care unit. Prospective cohort study with 400 patients.	Saudi journal of anaesthesia/ Riad (Arábia)
Ahmadi-Nejad et al. 2013	Comparing the Effectiveness of Two Methods of Eye Care in the Prevention of Ocular Surface Disorders in Patients Hospitalized in Intensive Care Unit. Clinical trial with 42 patients.	HBI_Journals/ Arábia
Saritas et al., 2013	Ocular Surface Disorders in Intensive Care Unit Patients. Retrospective study with 272 patients.	The Scientific World Journal/ Turquia

Arranged in Table 2 it presents the risk factors for corneal injury and their authors, the main focus of this review. These risk factors are varied mostly and reveal the diversity of actors involved in the process of eye injury relating to the level of patient awareness, eye opening, mechanical ventilation, use of drugs, length of stay in the unit, associated diseases. However, there is agreement among many authors about the risk factors present, which means the claim that this injury is associated with multiple variables.

Table 2- Distribution of studies according to the author and risk factors for corneal injury.

Author	Risk factors for corneal injury in critical patients
Koroloff et al., 2004	Reduction or absence of blinking reflex.
Ezra et al., 2005	Incomplete eyelid closure, sedation and use of muscle relaxants.
Sivasankaret al., 2006	Low scores on the Glasgow scale, conjunctival edema and use of muscle relaxants.
Desaluet al., 2008	Decreased level of consciousness, sedation, mechanical ventilation, muscle relaxants, respiratory tract infection, organ failure, hospital stay, reflecting reduced eyelid, vasoactive drugs, electrolyte disturbance, high PEEP, endotracheal suctioning.
Soet al., 2008	Decreased level of consciousness, mechanical ventilation.
McHugh et al., 2008	Sedation, reduced blink reflexes, loss of muscle tone of the eyelid, fluid imbalance, high PEEP, mechanical ventilation.
Shan; Min, 2010	Mechanical ventilation, reduced mental awareness, reduced eyelid reflex less than five times a minute, antihistamines, atropine, phenothiazines and tricyclic antidepressants.
Mela et al., 2010	Eye opening, sedation, lowering the level of consciousness, mechanical ventilation, muscle relaxation, reduced eyelid reflex, lagophthalmus.
Werli-Alvarenga et al., 2011	Prolonged hospital stay, use of mechanical ventilation devices, mechanical ventilation, reduced blinking reflex and use of muscular blocking, presence of edema, exposure of the eye, the Glasgow Coma Scale.
Azfar; Alzeer; Khan, 2013	Lack of eye care, mechanical ventilation, sedation, tracheal suctioning.
Ahmadi-Nejad et al., 2013	Mechanical ventilation, the level of consciousness relegation, sedation, neuromuscular blockers.
Saritaset al., 2013	Eye opening to corneal exposure, decreased blinking reflex, length of stay in ICU.

The survey reveals that the articles were found and selected in different magazines. This is worrying, because the magnitude of the eye injury observed in the available literature is significant and needs to be further discussed and explored in clinical nursing practice, especially within the Brazilian intensive practice.

In the analysis of 14 studies included in the review, all showed that the changes found in the corneal tissue of patients in critical condition are associated with multiple risk factors. Therefore, these factors were categorized into groups according willing in Table 3.

Table 3 - Risk factors for injury of cornea in intensive care

Risk factors for corneal injury in intensive care
Impairment of ocular defense mechanisms
Absence or reduction of blink reflex
Incomplete eyelid closure with ocular exposure (lagophthalmus)
Reflecting decreased eyelid
Loss of tone of the eyelid muscle
Conjunctival edema
Reduced sleep
Ventilatory assistance
Invasive mechanical ventilation
High flow of O ₂ with poorly adapted mask
Endotracheal suctioning
PEEP elevated
Respiratory tract infection
Fixing shoelaces tight endotracheal tube
Level of consciousness reduced
Sedation use
Decrease in the score of Glasgow Coma Scale
Gravity/Hemodynamic instability
Increased hospital stay
Hydroelectrolyte disturbances
Conjunctival edema
Vasoactive drugs
Organ failure
Use of specific medications
Antihistamines, atropine, phenothiazines, tricyclic antidepressants
Relaxants or muscle blockers

On the results found, there was convergence in the statement that the cause of greater importance is the exposure of the eyes, due to the loss of the natural mechanisms of eye protection. It was found also that the reduced eyelid reflex at least five times per minute is an important risk factor associated with the prolonged use of sedatives and muscle relaxants that can lead to lagophthalmos with consequent prolonged eye opening that predisposes to dryness and corneal abrasion.¹¹⁻¹² Other studies confirm these findings.^{13,17} It was observed, so, that the muscular relaxation promoted by the action of neuromuscular blocking causes the decrease of the tonus of the eyelid which favors the incomplete closure.^{6,16,18,20}

The lowering of the low score evidenced awareness level on the Glasgow Coma Scale is identified in several studies as a risk factor that contributes significantly to the development of the injury, since patients with neurological deficits have their natural reflexes and protection mechanisms committed.^{5, 8, 14, 17, 19,21.}

Patients with decreased level of consciousness and hemodynamically unstable require mostly invasive ventilatory support and equipment to stabilize and preserve the vital functions. Studies showed that electrolyte imbalances combined with the accumulated water balance above + 2000/24 hours can contribute to the appearance of the eyelid and/ or conjunctival edema. The tight braid and excessive fastening of the endotracheal tube may also cause swelling which in turn aggravates the incomplete lid closure.¹⁵

Most scientific researches show that intubation and mechanical ventilation patients are at risk for corneal injury, with variable factors involved in this process.^{5,6,13,14,16,18,20}

The respiratory tract infection associated with prolonged use of mechanical ventilation settles frequently in these patients so that bacterial translocation respiratory tract eyewear during tracheal aspiration without eye protection patient was identified as an aggravating factor, because in many cases there are accidental spills of tracheal aspirates during the procedure. The PEEP above physiological values can considerably raise the intraocular pressure causing damage to the cornea.^{5,15-16}

A study points out that the patient's left eye has greater infection when compared to the right.¹⁴ This is explained by the fact that most professionals who perform endotracheal aspiration are positioned on the right side of the patient, and withdraw the probe aspirated region tend to distance her for protection thereof, directing it to the left region accidentally, which increases the risk of contamination of the patient. In patients conscious and responsive where there is spontaneous eye opening, but not completely preserved to keep the exposed cornea, studies show that the use of masks O₂ with high flow and sometimes poorly adapted causes considerable dryness.^{5,14,16} Therefore, also, it was highlighted that conscious patients with disturbed sleep pattern and who have trouble sleeping in the intensive care unit are predisposed to prolonged eye opening and risk of abrasion and eye dryness.⁶

Some authors report that some metabolic disorders are involved in eye injury process. The failure of vital organs in critically ill patients involves the use of vasoactive drugs and medicines to stabilize the clinical picture.⁵⁻⁶ Some medications decrease the production and secretion of the tear film and therefore at high risk for corneal injury as Antihistamines, atropine, phenothiazines and tricyclic antidepressants.¹⁶

The length of stay in the intensive care unit constitutes another factor of extreme relevance.^{5,13-14} Studies show that corneal abrasion may develop between 48 hours to a week, with a high risk of infection and may evolve in more severe cases ulcerations.¹⁶

It was found also that the lack of eye care prophylaxis of corneal injury in the intensive care setting compromise patient health and aggravates the existing exposure to risk factors.²⁰ These patients are susceptible to dehydration corneal abrasion, perforation and infection, and therefore rely on the nursing care to maintain the integrity of the ocular surface. Therefore, the role to be played by nursing is influential and instrumental

in the adoption of eye damage prevention measures from the eyes of the clinical evaluation, monitoring of ophthalmic complications and provision of eye care.^{8,15}

CONCLUSION

Identifying risk factors for corneal injury in critically ill patients in intensive care is the first step of major importance for eye care protocols being established, and interventions are outlined to reduce the risk and the development of this disease rarely discussed in clinical practice.

Thus, in order to facilitate safe patient care in the context of intensive care, intensive care staff, and in particular the nursing must be able to identify risk factors for the development of eye injury and empowered to apply based preventive strategies the best scientific evidence available today.

The corneal injury as well as prolonging the patient's hospital stay, may affect his reintegration into the family and social context, and in his interpersonal relationships, so to compromise considerably the daily and work activities and may even submmite him to the waiting list for a future corneal transplant.

Losses and disabilities caused due to eye injury may reflect negatively on the quality of life and integration of the individual in his social and family background. Therefore arises the need to encourage nurses and other health team members to dignify the eye care from their incorporation into clinical practice of intensive care, in order to prevent complications and avoid undesirable effects of omitted or neglected care.

Thus, there was a shortage of scientific publications about the subject, especially in our country, which reports on the urgent investigation into our reality in order to demonstrate the problem of this disease and bring contributions to teaching, research and, above all, to practice care in these units.

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Contact of the corresponding author:
Jéssica Naiara de Medeiros Araújo
Rua Dom Joaquim de Almeida, 2076 aptº 202/ Lagoa Nova.
CEP: 59056140 - Natal - RN. Telefone: (84) 9955-1796
E-mail: jessicanaiara_rn@hotmail.com