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Evaluation of the Conjunctival Swab Culture among Patients admitted in Adult Intensive Care Unit of a Tertiary Care Hospital

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Abstract: ***Background:*** Present study was done to evaluate the Conjunctival Swab Culture among Patients admitted in Adult Intensive Care Unit. ***Material & Methods:*** It was a prospective observational study carried in AICU over period of one year by Department of Ophthalmology, Dr. RPGMC Kangra at Tanda. All the patients who were admitted in AICU greater than 48 hours between ages of 18-65 years were included and evaluated for socio-demographic information like age, gender etc. Thorough ophthalmic examination was also done along with culture of Conjunctival Swab and analysed using epi info v7 software. ***Results:*** A total of 126 patients were included in the study. Mean age of the study participants was 41.8 years. Maximum patients, 23.8% of the patients were in age group of 51 and 60 years followed by 23% between 21 and 30 years and 41 and 50 years each. 64.3% of the patients were males while 35.7% were females. Methicillin resistant *staphylococcus aureus* (MRSA) and Methicillin sensitive *staphylococcus aureus* (MSSA) were the most common bacterial infection at all the time points during the hospital stay of the patients. In the present study, conjunctival culture positivity was 15.1% in the right eyes and 11.1% in the left eyes at 48 hours. 33.3% of the right eyes and 29.6% of the left eyes showed culture positivity at the end of first week. At the end of second week, 63.6% and 54.5% of the right and left eyes respectively had bacterial infection. At the end of fourth and fifth week, none of the eyes had bacterial infection. ***Conclusion:*** Methicillin resistant *staphylococcus aureus* (MRSA) and Methicillin sensitive *staphylococcus aureus* (MSSA) were the most common bacterial infection during the hospital stay among patients admitted in AICU.

Key words: Evaluation, Conjunctival Swab Culture, Patients, Adult Intensive Care Unit.

INTRODUCTION

Ocular surface disorders pose a big challenge for ophthalmologists in an ICU setup. Ocular surface disorders characterized by disorders of the conjunctiva or cornea have been described in the anaesthetized patients.[1,2]

Intensive care unit (ICU) patients are susceptible to a number of ophthalmic conditions that may result in visual loss .Preventative eye care measures are often overlooked since the medical and nursing teams in the ICU are mainly concerned with stabilization of the cardiovascular, respiratory and neurological status, and patients may be unable to convey ocular symptoms. However, visual impairment in those who survive their stay in the ICU can be devastating, largely irreversible, and often preventable and may occur in those who might have otherwise recovered from their primary illness without lasting sequelae.[3-5]

The eye's natural protection is composed of the upper and lower lids, lacrimal film and the conjunctiva. The eyelids and tears help flush organisms and abrasive particles from the eye with each blink. The conjunctiva has lymphoid tissue that provides the eye with immediate immune response.[6]

Examination of the eye along with culture of conjuctival swab yields important information necessary for making accurate differential diagnosis; hence, ocular examination and culture of conjuctival swab should always be considered as important element of the patient's examination.[7]

Several studies around the globe as well as in India had evaluated the culture results of conjuctival swab in ICU admitted patients. However, no such study of its kind has been reported from this hilly region. Hence, we planned the study to evaluate the Conjunctival Swab Culture among Patients admitted in Adult Intensive Care Unit either on mechanical ventilation or on spontaneous respiration.

Aim & Objectives

To evaluate the Conjunctival Swab Culture among Patients admitted in Adult Intensive Care Unit of Dr RPGMC Kangra (Tanda), H.P.

MATERIAL AND METHODS

Study design: It was a prospective observational study
Study area: Department of Ophthalmology, Dr. RPGMC Kangra at Tanda

Study period: After approval by institutional ethical committee (IEC), this study was carried in adult intensive care unit (AICU) at Dr. Rajendra Prasad Government Medical College, Kangra at Tanda (HP) over period of one year.

Study population: This prospective study was carried out in 126 patients, 18-65 years of age in Adult intensive care unit (AICU) at Dr. Rajendra Prasad Government Medical College, Kangra at Tanda (HP).

Inclusion Criteria

1. All patients aged 18-65 years admitted in AICU for a time period >48 hours were included.
2. Prior informed consent was obtained from attendant authorized to do so.

Exclusion criteria

1. Patients who presented with ocular surface disorders prior to admission in AICU.
2. Patients or authorized attendant not willing to participatein the study.

Materials for Eye examination*: Following equipments were used for clinical examination-*

a) For anterior segment examination
- *Hand held Slit lamp examination*

b) Staining procedures
- Fluorescein staining
- Rose Bengal staining

c) For Microbiological examination (if and when required)
- Conjunctival Swab
- Gram stain
- KOH mount
- Culture in Blood Agar, Sabouraud dextrose Agar, Brain Heart Infusion

d) For tear film function
- Schirmer's test

e) For intra ocular pressure measurement
- Schiotz tonometer

f) For posterior segment examination
- Direct ophthalmoscope(Heine beta 200S ophthalmoscope)
- Indirect ophthalmoscopy with 20D aspheric lens(If required)

Methodology of data collection: All the patients who were admitted in ICU greater than 48 hours between age of 18-65 years were included in this observational study. All patients who were on mechanical ventilation or on spontaneous ventilation were taken for this study. Mechanically ventilated patients were those patients who are intubated either by Endotracheal tube (ETT) or Tracheostomy tube (TT) and were on mechanical ventilation. Spontaneous breathing patients were patients who were either on room air or on venti mask.

Patients were evaluated with special reference to Demographic information like name, age (in years), gender (male/female), occupation, address. Socioeconomic class was determined using Kuppuswamy' scale, Past history of ocular infection, surgery, trauma., History of any drugs use like amiodarone, tetracycline etc. and Examination finding including general physical examination, pulse, blood pressure.

Thorough ophthalmic examination including Pupil size and reaction, Relative afferent pupillary defect by swinging flash light examination, External eye examination for conditions like presence of lagophthalmos, exophthalmos, buphtalmos & deviation of eyeball, Hand held Slit lamp examination for complete anterior segment evaluation.

Conjunctival swab was obtained pulling down lower lid exposing the conjunctiva. Gently sweep the sterile swab stick along the lower fornix from inner to outer canthus taking care not to touch the eyelids.

Fundus evaluation using direct ophthalmoscope (Heine beta 200S LED) after pupillary dilatation with 1% Tropicamide eye drop twice, instilled 15 minutes apart.

Follow-up of the patients was done on every alternate day or depending upon the ocular surface involvement.

Ethical consideration: The study was approved by IEC at Dr RPGMC Kangra at Tanda. Consent forms were signed and collected from attendants of all the patients, who were included in the study.

Financial disclosure: There was no any additional financial burden on the subjects because of participation in the study. Investigator did not get any financial benefit from any source for this study.

Statistical analysis: Data were entered in to spreadsheet and analysed using SPSS v21. Data were presented as frequency, percentage, mean, and standard deviation (SD). Normality of data was determined by Shapiro Wilk test. Normally distributed quantitative variables were compared using Student t-test. Categorical variables were compared using Chi square test. P value <0.05 was considered statistically significant.

Observations & Results

A total of 126 patients were included in the study. Out of 126 patients, 102 patients were later shifted to respective wards, 17 patients did not survive while 7 patients were referred to higher centre for further management. The study findings have been presented below:

In the present study, for 78.6% of the patients, duration of stay in AICU was up to one week. For 12.7% of the patients, the hospital stay was between 1 week and 2 weeks. Only 4.8% of the patients were admitted in AICU for more than 3 weeks.

Mean age of the study participants was 41.8 years with a range from 18 years to 65 years. 23.8% of the patients were in age group of 51 and 60 years. 23% of the patients were each aged between 21 and 30 years and 41 and 50 years. 13.5% patients belonged to age-group of 31 to 40 years. 8.8% of the patients were elderly (>60 years). Remaining, 7.9% of the patients aged up to 20 years. In the present study, male to female ratio was 1.8:1. 64.3% of the patients in our study were males while remaining 35.7% of the patients were females.

Table 1: Age & Gender distribution of the study participants (n=126).

		Number of patients	Percentage
Age (Years)	**≤20**	10	7.9
	21-30	29	23.0
	31-40	17	13.5
	41-50	29	23.0
	51-60	30	23.8
	60-65	11	8.8
Gender	**Male**	81	64.3
	Female	45	35.7
	Total number of patients	126	100%

Methicillin resistant *staphylococcus aureus*(MRSA) and Methicillin sensitive *staphylococcus aureus* (MSSA) were the most common bacterial infection at all the time points during the hospital stay of the patients. In the present study, conjunctival culture positivity was 15.1% in the right eyes and 11.1% in the left eyes at 48 hours. 33.3% of the right eyes and 29.6% of the left eyes showed culture positivity at the end of first week. At the end of second week, 63.6% and 54.5% of the right and left eyes respectively had bacterial infection. At the end of fourth and fifth week, none of the eyes had bacterial infection.

Table-2: Conjunctival swab in right and left eyes.

	Right Eyes						**Left Eyes**					
	CONS	**ECOLI**	**MRSA**	**MSSA**	**PS**	**S**	**CONS**	**ECOLI**	**MRSA**	**MSSA**	**PS**	**S**
48 hours (n=126)	0	1	9	9		107		1	6	7		112
1 Week (n=27)	1	1	3	4		18			4	4		19
2 Week (n=11)	1		3	1	2	4	1		2	1	2	5
3 Week (n=5)			2		1	2			1		13	
4 Week (n=2)						2						2
5 Week (n=1)						1						1

CONS, Coagulase negative staphylococcus species; ECOLI, *Escherichia coli*; MRSA, Methicillin resistant *S. aureus*; MSSA, Methicillin sensitive *S. aureus*; PS, Pseudomonas; S, sterile; Data expressed as frequency and percentage.

DISCUSSION

In the present study, conjunctival culture positivity was 15.1% in the right eyes (9 MRSA, 9 MSSA, 1 *E. coli*) and 11.1% in the left eyes (7 MSSA, 6 MRSA, 1 *E. coli*) at 48 hours. 33.3% of the right eyes (4 MSSA, 3 MRSA, 1 CONS, 1 *E. coli*) and 29.6% of the left eyes (4 MRSA, 4 MSSA) out of 27 patients showed culture positivity at the end of first week. In the study by Saritas *et al.*,[8], out of a total of 40 cultures from the conjunctiva, 17 (42.5%) were positive for bacteria: *S. epidermidis*(10), *P. aeruginosa*(2), *A.baumannii*(2),*S. haemolyticus*(1), Klebsiella (1), and *P. mirabilis*(1). Conjunctiva culture positivity did not differ between subjects with and without mechanical ventilation, with and without sedation and with and without inotropes (P > 0.05, all). Corneal and conjunctival culture was positive for *P. aeruginosa* and *A.baumannii* in 2 of the patients with keratitis and both of the subjects had tracheal culture positivity. Blood culture was positive in only one subject without mechanical ventilation and trachea culture was positive in 4 subjects, 2 with mechanical ventilation and 2 without. Sahin *et al.*,[9] reported in ICU patients that the most frequently isolated microorganism from the cultures was coagulase-negative Staphylococcus species (n=210/331, 63.5%), and the others were *Corynebacterium diphtheriae* (n=52/331, 15.7%), *S. aureus* (n=26/331, 7.9%), gram-negative bacilli other than Pseudomonas (n=14/331, 4.2%), Neisseria species (n=8/331, 2.4%), *P. aeruginosa* (n=6/331, 1.8%), *Haemophilus influenzae* (n=7/331, 2.1%), Acinetobacter species (n=6/331, 1.8%), and Streptococcus species (n=2/331, 0.6%).

CONCLUSION

Methicillin resistant *staphylococcus aureus*(MRSA) and Methicillin sensitive *staphylococcus aureus* (MSSA) were the most common bacterial infection during the hospital stay among patients admitted in AICU. With proper care and management at AICU, 10. none of the eyes had bacterial infection at the end of fourth and fifth week.

REFERENCES

1. Ramírez F, Ibarra S, Varon J, Tang R. The neglected eye: Ophthalmological issues in the intensive care unit. Crit Care Shock. 2008 Aug 1;11(3):72-82.
2. White E, Crosse MM. The aetiology and prevention of peri-operative corneal abrasions. Anaesthesia. 1998 Feb;53(2):157-61.
3. Hearne BJ, Hearne EG, Montgomery H, Lightman SL. Eye care in the intensive care unit. Journal of the Intensive Care Society. 2018 Nov;19(4):345-50.
4. Płaszewska-Żywko L, Sega A, Bukowa A, Wojnar-Gruszka K, Podstawa M, Kózka M. Risk Factors of Eye Complications in Patients Treated in the Intensive Care Unit. International Journal of Environmental Research and Public Health. 2021 Jan;18(21):11178.
5. Mercieca F, Suresh P, Morton A, Tullo A. Ocular surface disease in intensive care unit patients. Eye. 1999 Mar;13(2):231-6.
6. Suresh P, Mercieca F, Morton A, Tullo AB. Eye care for the critically ill. Intensive care medicine. 2000 Mar;26(2):162-6.
7. Parkin B, Turner A, Moore E, Cook S. Bacterial keratitis in the critically ill. British journal of ophthalmology. 1997 Dec 1;81(12):1060-3.
8. Saritas TB, Bozkurt B, Simsek B, Cakmak Z, Ozdemir M, Yosunkaya A. Ocular surface disorders in intensive care unit patients. The Scientific World Journal. 2013 Jan 1;2013.
9. Sahin A, Yildirim N, Gultekin S, Akgun Y, Kiremitci A, Schicht M, Paulsen F. Changes in the conjunctival bacterial flora of patients hospitalized in an intensive care unit. Arquivos Brasileiros de Oftalmologia. 2017 Jan;80:21-4.