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A study to evaluate urine albumin-creatinine ratio (UACR) for albuminuria in patients with sepsis admitted to medicine department in RL Jalappa Hospital and its correlation with Sequential Organ Failure Assessment (SOFA) score

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ABSTRACT

Background

In critical care, it is crucial to anticipate death in critically ill sepsis patients early and to start aggressive therapy as soon as possible. This study is to demonstrate the potential function of UACR as a measure of renal dysfunction and total organ failure by comparing it with the SOFA score in septic patients.

Material and Methods

A cross sectional study was undertaken in 30 patients admitted to intensive care. At the time of admission, the Glasgow coma scale was used to evaluate each patient's level of consciousness. The GCS scores were used to grade the severity of the condition. Urine microalbumin was measured using the immunoturbidometric method and creatinine was measured using the Jaffe method from spot urine samples that were taken within six hours of admission. When each patient was admitted, their qSOFA was calculated along with their urine microalbumin: creatinine ratio, or UACR.

Results

Average albumin levels in urine 50% of the cases in this study had UACRs between 30 and 300, and the creatinine ratio at admission was 92.93. At 24 hours, the urine albumin creatinine ratio was 96.97, and 56.7% of the cases had a UACR between 30 and 300. In this study, there was a substantial positive connection between SOFA scores at admission and 24 hours later and UACR at admission and 24 hours.

Conclusion

According to this study, the UACR test can predict the survival of sepsis patients admitted to the critical care unit. Additionally, it can track how well therapy interventions are working.

Keywords: *Urine albumin creatinine ratio, intensive care, Sepsis, Prognosis, severity*

1. INTRODUCTION

Patients requiring intensive care frequently have some degree of systemic inflammatory response syndrome (SIRS), which, when severe, places them at risk of multiple organ failure.[1]

Early prediction of mortality among critically ill sepsis patients and early institution of intensive therapy are of paramount importance. Various scoring systems like SOFA score, the Acute Physiology and Chronic Health Evaluation (APACHE) II, APACHE IV, and Simplified Acute Physiology (SAPS II) which predict mortality are in current use. These scoring systems

require a large number of variables derived from the patient's history, examination, and initial laboratory data.[2]

In the first 48hrs if the SOFA increases in the septic patients, it predicts mortality of at least 50%.[3]

An early feature of the acute inflammatory process is capillary endothelial cell activation accompanied by a rapid increase in capillary permeability to plasma proteins such as albumin.

Studies showed an association between urine albumin and albumin transcapillary escape rate and evidence of systemic endothelial dysfunction.[4]

Urine Albumin Creatinine Ratio (UACR) may be useful in predicting mortality and morbidity in septic patients. UACR is mainly done to detect the albumin in urine early in the disease course and to prevent the further process of the disease.[1]

The glycocalyx layer which usually acts a barrier to protein permeability gets affected leading to the increase excretion of albumin in the urine from the Glomerulus. Urine albumin measurements have good specificity and sensitivity for the changes in the glomerular permeability. Many studies have shown that even small amount of albumin in urine (30-300 mg/day) have a prognostic significance.[3]

The findings of this study could contribute to the understanding of the role of albuminuria in critically ill patients. If a strong correlation is found between UACR and SOFA score, it suggests that albuminuria may be a valuable marker of disease severity.

By correlating UACR with the SOFA score in septic patients, this study aims to highlight the potential role of UACR as a marker of kidney dysfunction and overall organ failure. This information could be crucial for improving the monitoring and treatment of sepsis in intensive care settings.

Tracking Changes: Regular measurement of UACR can help track the progression or improvement of renal function over time. This is crucial in adjusting treatments, such as fluid management or renal replacement therapy.

Guiding Therapy: Knowledge of UACR trends can aid in optimizing sepsis management strategies, including adjustments to medications, fluid balance, and other supportive measures.

2. MATERIAL AND METHODS

A cross sectional study was undertaken in Department of General Medicine of R L Jalappa Hospital, Sri Devaraj Urs Medical College, Tamaka, Kolar. Clearance from institutional ethics committee was obtained before the study was started. An informed consent was obtained from all the cases before including them in to the study. Sample size was estimated by using correlation between UACR and qSOFA (r =0.740) and UACR and SOFA (r =0.932) from the study by Mahashabde et al. Using these values at 95% confidence level and 90% power and substituting in the below formula, sample size of 27 was obtained. Considering 10% Non-response rate a sample size of 27+ 2.7 = 30 subjects were included in the study.

All the cases were subjected for assessment of consciousness level, Glasgow coma scale at the time of admission. The severity of GCS was graded according to the GCS scores.

Spot urine samples were collected within 6 hours of admission and used to quantify urine microalbumin using the immunoturbidometric method and creatinine using the Jaffe method. The urine microalbumin: creatinine ratio, also known as UACR at admission was calculated, and qSOFA was computed for each patient upon admission. The data was entered into MS-Excel and analysed using the pertinent statistical tests previously mentioned.

3. RESULTS

Table 1. Distribution of the study group according to demographic factors

Characteristics		Frequency	Percent
Age group	10 – 20 years	1	3.3
	21 – 30 years	1	3.3
	31 – 40 years	3	10.0
	41 – 50 years	7	23.3
	51 – 60 years	4	13.3
	More than 60 years	14	46.7

Gender	Male	17	56.7
	Female	13	43.3
Smoking	No	19	63.3
	Yes	11	36.7
Alcohol	No	24	80.0
	Yes	6	20.0

This study had shown that, about 46.7% of the cases were aged more than 60 years. About 56.7% of the cases were males and 36.7% were smokers. About 20.0% of the cases in this study were consuming alcohol.

Table 2. Distribution of the study group according to Biochemical parameters

	N	Minimum	Maximum	Mean	Std. Deviation
CRP	30	1.1	45.3	19.14	10.70
HDL	30	10.0	48.0	23.07	11.92
Haemoglobin	30	8.0	15.0	11.23	1.92
TLC	30	6000.0	15000.0	9210.00	2212.09
PLT	30	70000.0	309000.0	173066.67	51272.05
Bilirubin	30	0.7	12.4	3.34	2.69
PT INR	30	1.1	2.8	1.76	0.48
Urea	30	13.0	56.0	29.5	8.39
Creatinine	30	0.8	7.2	2.91	1.92

This study had shown that, mean CRP was 19.14 mg/dl, HDL was 23.07 mg/dl, Hemoglobin was 11.23 gms%, TLC was 9210/mm^3, Platelet was 173066/mm^3, PT INR was 1.76, Urea was 29.5 mg/dl and creatinine was 2.91 mg/dl.

Table 3. Distribution of the study group according to UACR levels

	< 30	30 - 300	Mean	Std. Deviation	Minimum	Maximum
UACR at admission	15	15	92.93	95.18	4.0	276.0
UACR at 24 hours	13	17	96.8	96.97	6	283

Mean Urine albumin Creatinine ratio on admission was 92.93 and 50% of the cases had UACR between 30 – 300 in this study. The Urine albumin creatinine ratio at 24 hours was 96.97 and 56.7% of the cases had UACR between 30 – 300.

Table 4. Distribution of SOFA scores of study group

	< 9	9 - 11	> 11
SOFA (on admission)	17 (56.7)	7 (23.3)	6 (20.0)
SOFA (24 hours)	17 (56.7)	5 (16.7)	8 (26.7)

About 56.7% of the cases had SOFA scores of less than 9 in this study and 20.0% had more than 11 on admission. After 24 hours of admission, about 26.7% had SOFA scores of more than 11.

Table 5. Distribution of SOFA and qSOFA scores

	N	Minimum	Maximum	Mean	Std. Deviation
SOFA (on admission)	30	1.0	14.0	6.7	5.04
SOFA (24 hours)	30	2.0	15.0	7.8	4.61

Mean SOFA scores in this study on admission was 5.04 and after 24 hours was 7.8.

Table 6. Correlation between SOFA, qSOFA and Urine albumin creatinine ratio

Correlations

		UACR	UACR 24 hours
SOFA on admission	Pearson Correlation	.924**	.908**
	Sig. (2-tailed)	.000	.000
	N	30	30
SOFA (24 hours)	Pearson Correlation	.930**	.917**
	Sig. (2-tailed)	.000	.000
	N	30	30

**. Correlation is significant at the 0.01 level (2-tailed).

SOFA scores on admission and after 24 hours had significant positive correlation with UACR on admission and at 24 hours in this study.

4. DISCUSSION

This study was undertaken in order to study the urine albumin creatinine ratio with the SOFA and qSOFA scores in prognosis of patients with sepsis. The identification of sepsis play important role in management of cases. A number tools are available in order predict the prognosis of the sepsis cases include APACHE scores, SOFA, qSOFA scores etc.

This study had shown that, about 46.7% of the cases were aged more than 60 years. About 56.7% of the cases were males and 36.7% were smokers. About 20.0% of the cases in this study were consuming alcohol. In a study by Mahashabde et al majority of the cases were aged between 18 – 40 years in contrary to this study results.[1] A study by Todi et al had shown a mean age of 58.17 years similar to these study results.[5] With respect to sex this study findings were in concordance with the study conducted by Mahashabde et al and Todi et al.[1, 5]

TLC was 9210/mm3, platelet was 173066/mm3, PT INR was 1.76, creatinine was 2.91 mg/dl, urea was 29.5 mg/dl, and the mean CRP was 19.14 mg/dl, HDL was 23.07 mg/dl, and haemoglobin was 11.23 gms%, according to this study.

About 50% of the cases in this study had UACRs between 30 and 300, and the mean urine albumin creatinine ratio was 92.93. In a study by Mahashabde et al, UACR ranged from 11 ro 210 µg/mg with a mean of 79.72 µg/mg.[1]

In this study, 20.0% of the cases had more than 11 SOFA scores upon admission, whereas 56.7% of the cases had scores below 9. Approximately 26.7% of patients had SOFA values greater than 11 within 24 hours after admission. The study's mean SOFA scores were 5.04 at admission and 7.8 24 hours later. In a study by Mahashabde et al, mean qSOFA scores were 1.3 and mean SOFA at admission was 5.37.[1]

In this study, there was a significant relationship between SOFA scores on admission and after 24 hours and UACR at admission and after 24 hours.

5. CONCLUSION

This study had shown that, UACR test predicts the survival of patients with sepsis who are admitted to the intensive care unit. It can also monitor the effectiveness of therapeutic interventions including adequate antibiotics, fluid resuscitation, vasopressors, and endothelium-affecting inotropes.

REFERENCES

[1] Mahashabde DM, Lavanya DC, Chaudhary DG, Voora DNS. To evaluate Urine Albumin-Creatinine Ratio (UACR) for albuminuria in patients with Sepsis admitted to Medicine Intensive Care Unit (MICU) and its correlation with SOFA score. Journal of Pharmaceutical Negative Results. 2022: Dec: 31;13(6):3989-97.

[2] Tayeh O, Taema KM, Eldesouky MI. Urinary albumin/creatinine ratio as an early predictor of outcome in critically-ill septic patients. The Egyptian Journal of Critical Care Medicine. 2016 Aug;4(2):47-55.

[3] Thorevska N, Sabahi R, Upadya A, Manthous C, Amoateng-Adjepong Y. Microalbuminuria in critically ill medical patients: prevalence, predictors, and prognostic significance. Critical care medicine. 2003 Apr 1;31(4):1075-81.

[4] Pedrinelli R, Dell'Omo G, Penno G, Mariani M. Non-diabetic microalbuminuria, endothelial dysfunction and cardiovascular disease. Vasc Med 2001;6(4):257–264.

[5] Todi S, Chatterjee S, Bhattacharyya M. Epidemiology of severe sepsis in India. Crit Care. 2007; 11:65.

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