Study of Outcome of Adult Cases Admitted to the Intensive Care Unit (I.C.U) in Baghdad Teaching Hospital

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ABSTRACT:

BACKGROUND:

Patients at Intensive care unit (I.C.U) admitted from different hospital departments (Medical, surgical and obstetrics), with different presentations to the I.C.U., some of these cases need sophisticated management and some of them need just monitoring and supportive therapy.

OBJECTIVE:

To evaluate the cases in the I.C.U regarding the gender, age and smoking status, and to assess their clinical status and to predict their prognosis and outcome.

PATIENTS AND METHODS:

A cross-sectional study of 50 case from I.C.U of Baghdad Teaching Hospital. The period of patients' admission from first of January 2013 to 31 of December 2013. Patients 18 year of age and above (adults) were included in the study.

RESULTS:

From 50 case involved in the study, there was 29 (58%) male and 21 (42%) female, among 29 males there was 14 case (48.3%) survived and 15 case (51.7%) Died, while female 11 case (52.4%) survived and 10 cases (47.6%) died. The survival rate lower among smokers; male (25%), while non-smoker male was 64.7%, however the survival rate was higher (100%) for those with hypoxemia without respiratory failure, but patients (especially male cases) who received mechanical ventilation showed very low survival rate (37.5%) compared to those on oxygen therapy with survival rate (72.2%).

CONCLUSION:

Smoker patients showed lower survival than non- smokers. Patients who received mechanical ventilation showed very low survival rate in comparison with those on oxygen mask therapy.

KEYWORDS: *I.C.U.*

INTRODUCTION:

Intensive care, a recognized form of treatment since the early of 1950s, and has gone through considerable change [(1)].

The performance of each I.C.U needs to be assessed within the overall context of medical care, as well as by the institution which the I.C.U. form part of it. Evaluation mechanisms in the field of intensive care been developed that are recognized worldwide within the scientific literatures [(1)] .The modern I.C.U is the highest mortality unit in any hospital [(2)].

Since patient population is severely ill and undergoes multiple complex interventions at the same time, these patients are extremely vulnerable to experiencing adverse outcomes [(3)].

Sepsis, respiratory failure (hence, respiratory failure is a syndrome rather than a disease [(4)]) and care of the complicated postoperative patient are now perceived as the purview of the intensivist [(5)].

The common situations in which the I.C.U is required include: [(6)]

1-Respiratory failure

2-Sepsis requiring organ support.

3-More than one organ failure.

4-Inotropic support like in case of shock [(7)].

Smoking is a risk factor for intra-operative pulmonary complications and a wide range of postoperative pulmonary, cardiovascular, infection and wound- related complications. These may all lead to unplanned postoperative intensive care admission [(8)].

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Smoking is recognized as a risk factor for thromboembolic events, respiratory compromise and need for prolonged mechanical ventilation [9,10]. Smoking causes reduced closing capacity, poorer clearing of pulmonary secretions and chronic obstructive lung diseases, as well as impaired collagen synthesis, and impaired cardiovascular and immune functions [8].

Acute lung injury is a major cause of mortality and morbidity in intensive care unit. Recent studies indicate that tobacco use is also a risk factor for acute lung injury [11].

Mechanical ventilation is instrumental in the rescue and maintenance of patient with failing cardiorespiratory function. With passing time, the goals of ventilator support have been refined to include not only effective life support, but also minimized iatrogenesis and improved coordination between patient needs or demand and machine-delivered breathing cycles [12].

PATIENTS AND METHODS:

This study is cross-sectional and descriptive. The study conducted from first of January 2013 to 31 of December 2013.

The sample of the study was 50 case from the I.C.U. (Intensive care unit) of Baghdad Teaching Hospital, from these 50 case there was 29 case (58%) male and 21 case (42%) female, patients 18 year of age and above(adult) were included in the study, and patients with incomplete information in their files were excluded from the study.

Some of these cases were medical cases like, sepsis, asthma or neuromuscular disorder and some were postoperative patients. The study focus on those patients who received mechanical ventilation or those who received oxygen therapy only.

The variables used in this study including age, gender, smoking status and duration of stay in I.C.U. The cases classified according gender, age (60 years and blow or more than 60 year), smoking status and the mode of therapy regarding mechanical ventilation or oxygen therapy.

The statistical analysis used in this study Statistical Analysis Package for Social Science-version 20 (SPSS V. 20) was used for data input and analysis. Variables presented as numbers and percentages. Chi-square test and fisher exact tests used to verify the significance of observed associations. All P values were asymptotic and two sided. Finding with P value < 0.05 considered significant.

RESULTS:

The total number of patients was (50); 29 were males (58%) and 21 were females (42%). Regarding the outcome for each gender, from male patients14 cases was survived (48.3%) and 15 case was died (51. 7%).From female patients11case was survived (52.4%), and 10 cases were died (47.6%).

According to outcome, age and gender, there were 36 case ≤ 60 years, and 14 case > 60 year, there were 17 female ≤ 60 year, 4 female > 60 year, 11 female cases (64.7%) from total number of females ≤ 60 year, was survived, table (1).

The relation of smoking status & outcome to both gender, there were 12 male smoker & four female smoker, the survival was lower among smoker male, table (2).

Regarding the outcome and the degree of respiratory insufficiency; there were 25 case type I respiratory failure (13cases died 52%) & 12 case type II respiratory failure (10 cases died 84.3%) & 13 case just Hypoxemia without respiratory failure (zero cases died), table (3).

Regarding the mode of therapy (oxygen or mechanical ventilation) smoking status, 12 out of 16 smoker case (75%) and 20 out of 34 non-smoker case (58.8%) need mechanical ventilation, there was no significant association between smoking status and use of mechanical ventilation, table (4).

The relation between mode of therapy and final outcome revealed patients on mechanical ventilation showed low survival rate37.5 %(12 case out of 32 were survived) compared to those on oxygen mask72.2%, table (5).

Regarding the duration spent in I.C.U. & outcome, there was no significant association, table (6).

Table 1: Distribution of sampled patients according to outcome, age and gender.

	All		Survived		Died		
Sample	N=50	100.0%	N=25	50.0%	N=25	50.0%	P value
Age							0.059
• ≤ 60 year	36	100.0	21	58.3	15	41.7	
• > 60 year	14	100.0	4	28.6	10	71.4	
Males							0.518
• ≤ 60 year	19	100.0	10	52.6	9	47.4	
• > 60 year	10	100.0	4	40.0	6	60.0	
Females							0.020
• ≤ 60 year	17	100.0	11	64.7	6	35.3	
• > 60 year	4	100.0	0	0.0	4	100.0	

Survival was significantly associated with ages up to 60 years only among Females (P < 0.05).

Table 2: Distribution of sampled patients according to outcome, smoking status and gender.

	All		Survived		Died		
Smoking status	N=50	100.0%	N=25	50.0%	N=25	50.0%	P value
All Patients							0.015
• Smoker	16	100.0	4	25.0	12	75.0	
• Non-smoker	34	100.0	21	61.8	13	38.2	
Male							0.035
• Smoker	12	100.0	3	25.0	9	75.0	
• Non-smoker	17	100.0	11	64.7	6	35.3	
Female							0.223
• Smoker	4	100.0	1	25.0	3	75.0	
• Non-smoker	17	100.0	10	58.8	7	41.2	

Survival significantly lower among smokers (specifically male smokers) (P < 0.05).

Table 3: Distribution of sampled patients according to outcome and degree of respiratory insufficiency.

Respiratory Failure/hypoxia	All		Survived		Died		
	N=50	100.0%	N=25	50.0%	N=25	50.0%	P value
All Patients							< 0.001
• Type I	25	100.0	12	48.0	13	52.0	
• Type II	12	100.0	2	16.7	10	83.3	
• Hypoxemia*	13	100.0	13	100.0	0	0.0	
Male							0.043**
• Type I	17	100.0	10	58.8	7	41.2	
• Type II	8	100.0	2	25.0	6	75.0	
• Hypoxemia*	4	100.0	4	100.0	0	0.0	
Female							< 0.001**
• Type I	8	100.0	2	25.0	6	75.0	
• Type II	4	100.0	0	0.0	4	100.0	
• Hypoxemia*	9	100.0	9	100.0	0	0.0	

*Hypoxemia without respiratory failure
**P value could be invalid due to small sample size.

Survival was significantly higher in hypoxia without failure (100%), and more in type I failure (48%) than in type II failure (16.7%) (P< 0.005).

Table 4: Distribution of sampled patients according to mode of therapy and smoking status.

	All		Mechanical Ventilation		Oxygen Mask Therapy		P value
Smoking Status	N=50	100.0%	N=32	64.0%	N=18	36.0%	
All							0.266
• Smoker	16	100.0	12	75.0	4	25.0	
• Non-smoker	34	100.0	20	58.8	14	41.2	
Male							0.653
• Smoker	12	100.0	10	83.3	2	16.7	
• Non-smoker	17	100.0	13	76.5	4	23.5	
Female							0.748
• Smoker	4	100.0	2	50.0	2	50.0	
• Non-smoker	17	100.0	7	41.2	10	58.8	

There is no significant association between smoking status and use of mechanical ventilation (P > 0.05).

Table 5: Distribution of patients according to their mode of therapy & outcome.

	All		Survived		Died		P value
Sample	N=50	100.0%	N=25	50.0%	N=25	50.0%	
All							0.006
• Mechanical ventilation	32	100.0	12	37.5	20	62.5	
• Oxygen Mask therapy	18	100.0	13	72.2	5	27.8	
Male							0.742
• Mechanical ventilation	22	100.0	10	45.5	12	54.5	
• Oxygen Mask therapy	7	100.0	4	57.1	3	42.9	
Total Male	29	100.0	14	48.3	15	51.7	
Female							<0.001
• Mechanical ventilation	11	100.0	2	18.2	9	81.8	
• Oxygen Mask therapy	10	100.0	9	90.0	1	10.0	
Total Female	21	100.0	11	52.4	10	47.6	

Patients (especially Female subgroup) on mechanical ventilation significantly showed very low survival rate compared to those on oxygen mask (P < 0.05, table 5).

Table 6:Distribution of sampled patient according to duration of stay in I.C.U. & outcome.

	All		Survived		Died		
Sample	N=50	100.0%	N=26	%	N=24	%	P value
All							0.706
• ≤ 2 weeks	45	100.0	23	51.1	22	48.9	
• > 2 weeks	5	100.0	3	60.0	2	40.0	
Male							0.077
• ≤ 2 weeks	26	100.0	12	46.2	14	53.8	
• > 2 weeks	3	100.0	3	100.0	0	0.0	
Female							0.119
• ≤ 2 weeks	19	100.0	11	57.9	8	42.1	
• > 2 weeks	2	100.0	0	0.0	2	100.0	

There was no significant association between survival and the length of stay in I.C.U. (P > 0.05).

DISCUSSION:

This study showed 50% survival rate and 50% mortality rate, as compared with Matthieu et al [7]. His study showed mortality 15%, this may be related to small number in our study & probably high medical care in that region of that study.

In this study, highest survival was in females ≤ 60 year of age, which was 64.7%, as compared with other studies, Romo et al study [13] which showed older women >50 years have a higher mortality rate than men and this difference is not apparent for patients staying longer in the ICU. Mahmood et al study [14] found that women have higher mortality rate than men do despite biological evidence of the protection effect of estrogen on both immune function and cardiovascular response. The highest survival in females in our study may attributed for age difference as majority of female patients were ≤ 60 year of age, and protective effect of estrogen.

The survival was lower among smokers in general and specifically male smokers. This may have related for negative adverse effect of tobacco smoking on lungs and cardiovascular health and function.

Regarding the survival in respect to respiratory insufficiency and failure, the survival was statistically significant higher in hypoxemia without failure (i.e. Pao2 between (60-80 mmHg) 100%, and higher in type I failure (48%) than in type II failure (16.7%). Patients (especially female cases) on mechanical ventilation showed statistically significant low survival rate 37.5% compared to those on oxygen mask therapy 72.2%. In a study done by Tomicic V. et al [15], he mentioned I.C.U. mortality was 33.9% for those on mechanical ventilation and he mentioned the factors which increased the mortality like the severity of the illness & ventilator parameter like plateau pressure > or = 30 cm. H2O at second day. While in a study done by Esteban A. et al [16], mentioned the outcomes of mechanically ventilated patients have improved due to improvement in ventilator practice.

This study showed there is no statistically significant association between smoking status and the use of mechanical ventilation, a study done by Ho k et al [17], he mentioned smokers had a higher risk of requiring mechanical ventilation and dying in hospital than non-smoker (10.7% VS 6.7%), this may be related to a small number of patients in study sample.

In this study most of cases spent ≤ two weeks (length of stay) in I.C.U. and there was no statistically significant association between survival and the length of stay in I.C.U., in comparable finding with a study done by Jeremy et al [18] mentioned there was no significant relation between survival and the length of stay in I.C.U.

CONCLUSION:

1. Smoker patients showed lower survival than non- smokers.
2. The survival rate is higher in hypoxemia without respiratory failure (i.e. Pao2 between (60-80 mmHg). Patients who received mechanical ventilation showed low survival rate in comparison with those on oxygen mask therapy alone.
3. There is no significant association between survival and the length of stay in I.C.U.

REFERENCES:

1. Costa JI, Gomes L, Juliano Y. Severity and prognosis in intensive care. SaoPaulo Medical Journal Sept. 1999;117.
2. Young MP, Bickmeyer JD. Potential reduction in mortality rates using an intensivist model to manage intensive care units. Eff Clin .Pract Nov-Dec 2000;3:284-89.
3. Promovost P, Wu A, Dorman. Building safety into I.C.U. care. J Crit care Jun 2002;17:78-85.
4. Wareen Lee, Arthur Slutsky. Hypoxemic respiratory failure. Murray and Nadel's textbook of respiratory medicine vol. two fourth edition 2005:2352.
5. Andrew fishorr, William Jackson. Assessing the value and impact of critical care in an era of limited resoureces.In Irwin and Rippe's intensive care Medicine. Sixth edition 2008:2350.
6. Stephen Chapman, Grace Robinson. Intensive therapy unit: when to involve? Oxford handbook of respiratory medicine second edition 2009:690.
7. Matthieu RR, Azoulay E. Evaluating mortality in I.C.U, Critical care 2006;10 issue 1.
8. Moller AM, Pederson T, Villerbro N, et al. A study of the impact of long-term tobacco smoking on postoperative intensive care admission. Anaesthesia Jan 2003;58:55-56.
9. Hawan MT, Houston TK, Campanga EJ, et al. The attributable risk of smoking on surgical complications. Ann Surg 2011;254:914-20.
10. Khullar D, Maa J. The impact of smoking on surgical outcomes. Am Coll Surg 2012;215:418-26.

11. Lu Q. Cigarette smoking causes lung vascular barrier dysfunction via oxidative stress mediated inhibition of RhoA and focal adhesion kinase. AJP Lung Cellular and Molecular Physiology Des 2011;301:847-57.

12. Marini J. Mechanical ventilation: past lessons and the near future. Critical Care 2013; 17:S1.

13. Romo H, Amaral AC, Vincent JL. Effect of patients' sex on intensive care unit survival. Arh Intern Med 2011;164:61-65.

14. Mahmood K, Eldeirawi K, Wahidi MM. Association of gender with outcomes in critically ill patients. Critical Care 2012;16: R92.

15. Tomicic V., Espinozo M. Characterstics and factors associated with mortality in patients receiving mechanical ventilation. Rev Med Chil Aug 2008;136: 959-67.

16. Esteban A., Frutos-vivar F. Evolution of mortality over time in patients receiving mechanical ventilation. Am. J. Respir. Crit Care Med Jul 2013;188:220-30.

17. Ho K, Hart G., Austin D. Dose-Related effect of smoking on mortality in critically ill patients. Intensive care medicine Jun 2011;37:981-89.

18. Jeremy M, Christopher H. Hospital volume and the outcome of mechanical ventilation. N Engl J. Med July 2006;355:41-50.