Table 4: Correlation of outcome with sr. free T4 level of patients

Free T4(ng/dl)	*Expired*	*Normal*	*Total*
<0.86	3(37.5%)	5	8
0.86 – 1.76	6 (40%)	9	15
>1.76	9(52.9%)	8	17
Total	18	22	40
p value = 0.682			

Table 5: Correlation of outcome with sr. TSH level of patients

Sr. TSH(µIU/ml)	*Expired*	*Normal*	*Total*
<0.34	6 (46.2%)	7	13
0.34 – 4.25	7(36.5%)	12	19
>4.25	5(62.5%)	3	8
Total	18	22	40
p value = 0.471			

In the study RBS and Sr. Insulin level of patients also did not predict the mortality outcome in ICU Table 6 and Table 7 respectively. The p value observed was non significant (>0.05). It was seen that out of 24 patients having high level of sr. insulin 13 (54.2%) patients succumbed to death.

Table 6: Correlation of outcome RBS level of patients.

RBS (mg/dl)	*Expired*	*Normal*	*Total*
<70	2(50%)	2	4
70 – 125	4(36.4%)	7	11
>125	12(48%)	13	25
Total	18	22	40
p value = 0.793			

Table 7: Correlation of outcome with sr. insulin level of patients

Sr. Insulin(µIU/ml)	*Expired*	*Normal*	*Total*
<0.7	1(25%)	3	4
0.7 – 9	3 (27.3%)	8	11
>9	13(54.2%)	11	24
Total	18	22	40
p value = 0.241			

A total of 23 patients had an APACHE II scoring of more than 14 out of which 14(60.9%) patients succumbed to death, Table 8 with a significant p value.

Table 8: Correlation of outcome with APACHE II score of patients.

APACHE II	*Expired*	*Normal*	*Total*
≤14	4(23.5%)	13	17
>14	14(60.9%)	9	23
Total	18	22	40
p value = 0.019* (significant p=<0.05)			

Correlating the two significant parameters of Free T3 and APACHE II , out of 30 patients who had a low Free T3 level 22 patients also had an APACHE II score of >14 , reducing the p value further significantly to 0.002, Table 9.

Table 9: Correlation of Free T3 with APACHE II score of patients.

APACHE II	*T3 (<2.4pg/ml)*	*T3(2.4- 4.2pg/ml)*	*Total*
≤14	8(47.1%)	9(52.9%)	17
>14	22(95.5%)	1(4.3%)	23
Total	18	22	40
p value = 0.002* (significant p=<0.05)			

The comparison of the parameters studied where compared among the 2 group of patients, the survivors and the non-survivors. The data analyzed is given in, Table 10. It was found that free T3 and APACHE II had a significant p values.

Table 10: Comparison of the mean values of study parameters among patients

Parameters	*Expired*	*Normal*	*t*	*degree of freedom*	*P*
Free T3	0.87±0.65	1.84±1.18	3.273	38	0.002*
Free T4	4.64± 5.21	2.44± 2.62	1.625	38	0.117
Sr. TSH	2.68± 4.05	1.65±2.03	0.993	38	0.331
RBS	148.27±66.10	147.9±65.03	0.018	38	0.986
Sr. Insulin	34.51±59.88	20.18±20.56	1.051	38	0.300
APACHE II	20±6.85	14±8.96	2.280	38	0.028*
*= p value <0.05 is significant					

5. Discussion

In this study of patients admitted to ICU survival prediction was not related to demographic details of the patient as a whole like age and sex. As these factors were comparable in most of the study participants of this study the age and sex of the patients were not found to be confounding factors in this study. This is the strong point of the study as our subjects had a matched population in the comparison groups. Age and sex plays a significant role in outcomes especially

the extremes of age, but this effect was not a player in our study.

Our study demonstrated that low T3 is an important marker of the severity of the illness and predicts mortality in ICU, as 17 (56.7%) out of 30 patients having serum free T3 less than 2.4 succumbed to their illness. The same was not seen with low T4, low TSH or when any of these were combined with low T3. Our study showed low T3 (56.7%) is the commonest abnormality followed by low TSH (46.2%) and low T4 (37.5%). Previous study from pediatric ICU patients from Mumbai, showed low T3 in 80%, low T4 in 50 % and low TSH in 6.7% [26]., conducted among 30 critically ill children and control of less than 12years age admitted in pediatric ICU. Two samples were collected from all patients, first during admission and second during at the time of discharge from ICU or death. This study showed that mean T3 and T4 levels were significantly lower in critically ill children than control. The combination of low T3 and T4 together increased the mortality risk by 30 times. Our study differs in the study population (adults), no. of study sample (single sample at admission only), and lack of control group from previous study explaining the discrepancy in observed data [26].

Our study did not establish any relation between RBS, Serum Insulin in predicting the mortality of ICU patients. The outcome in serum glucose level was variable amongst survivors and non survivors. This may be attributed to the small sample size of the study. Even though not statistically significant serum insulin level, we did find that out of 24 patients having high level of serum insulin (>9µIU/ml), 13 (54.2%) patients succumbed to their illness, hence pointing towards increased mortality rate in patient with high insulin

level. In a prospective randomized control trial study conducted on 1200 ICU patients in Belgium; it was found that although length of stay in the ICU could not be predicted on admission, among 433 patients who stayed in the ICU for less than three days, mortality was greater among those receiving intensive insulin therapies. In contrast, among 767 patients who stayed in the ICU for three or more days, in-hospital mortality in the 386 who received intensive insulin therapy was reduced from 52.5 to 43.0 percent (P=0.009) and morbidity was also reduced [27]. So it can be stated that intensive insulin therapy significantly reduced morbidity but not mortality among all patients in the medical ICU [28].

Our study also did establish the relationship between APACHE II scoring and outcome of the patient, as a score of > 14 was found to be a bad prognostic marker in 14(60.9%) patients out of 23 patients. This is in agreement with a recent study done on 5815 intensive care admission from 13 different hospitals showing an increasing score (range 0-71) was closely correlated with the subsequent risk of hospital death [29].We also studied the influence of addition of free T3 to APACHE II and found that if taken together they were more accurate in prediction of the outcome [30].

The limitations in our study were firstly the small sample size. It was calculated based on the admission frequency in ICU of the hospital and considering the time frequency of the study (2months). Although the results obtained were statistically significant in parameters like free T3 and APACHE II scoring but outcomes related to other parameters could have been significant in a larger study sample because in our study those parameters were variable amongst survivors and non-survivors. This study can be a reference to future studies based on similar hypothesis, with a larger sample size where a universal dictum can be made based on the hormonal correlation of the ICU patients. Secondly we could not relate other hormones like cortisol, which also plays an important part in deciding the outcomes of ICU patients because of the cost restrain.

6. Conclusions

To conclude, our study points that in critical illness hormones plays a very important role in outcome of ICU patients. This study suggested that low serum free T3 is an important marker to correlate with the outcome of patients admitted in ICU. A scoring of >14 on APACHE II grading scale also is an indication of poorer outcome in ICU patients. Addition of APACHE II scoring to serum free T3 increases the prediction capacity of APACHE II scoring. This study also concludes that free serum T3 is a better prognostic marker than glycemic status of the patient (RBS, and serum insulin).

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