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The Predictors of Early Mortality in Hiv Infected Patients Initiating Antiretroviral Therapy In A Tertiary Hospital

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ABSTRACT: Introduction: There is high prevalence of HIV/AIDS all over the globe and so is the high mortality rate from this disease even in this era of HAART. In India most of the patients visiting a tertiary care hospital are poor, it is of utmost importance to identify the probable predictors of early ART mortality from the clinical observations and commonly available laboratory workups.

Objectives: The aim of the present study is to assess the mortality rate within the first three months of starting ART and to identify predictors of mortality in these HIV-infected patients.

Materials and Method: The study was a prospective hospital-based cohort study.

Result: There were 8 (6.45%) deaths in the first month and 9 in the next 2 months, resulting in a total of 17 (13.71%) moralities in the first 3 months of starting ART in HIV/AIDS patients of which 12 were males and 5 were females.

In this study, poor nutritional status was associated with early ART mortality. The effects of metabolic parameters like low serum phosphate and high serum potassium levels were also significant. The presence of opportunistic infections like tuberculosis and low baseline CD4 count were associated with increased mortality during the early period after initiation of ART.

Conclusion: Poor nutritional status as evidenced by low skin fold thickness and low albumin was significantly associated with early ART mortality. The effects of low serum phosphate and high serum potassium levels were also significant. High pulse rate and high total leukocyte count were predictive of mortality. Co-infection with tuberculosis and low baseline CD4 count have significant impact on early mortality in HIV/AIDS patients after starting HAART.

I. INTRODUCTION

Human immunodeficiency virus (HIV) infection has become a global pandemic posing one of the greatest challenges to global public health[1].In India around 2.31 million people currently living with HIV[2]. In a country where poverty, illiteracy and poor health are rife, managing HIV presents a daunting task.

The profile of people affected by acquired immune deficiency syndrome (AIDS) has been modified recently in India. After an initial predominance among high-risk group people, epidemic is now spreading among general population. The introduction of highly active antiretroviral therapy (HAART) in 1996 has dramatically improved the prognosis of HIV infected patients[2].

Nevertheless, mortality has been high, particularly in the first few months after initiating ART[3,4]. Factors contributing to this high mortality are poorly understood, though multiple factors have been implicated[5,6,7]. A better knowledge of prognostic factors would allow a closer follow-up and more targeted intervention in high-risk patients, thus reducing mortality.

II. METHODOLOGY

This study was prospective hospital-based cohort study.

This study was conducted at ART Centre, North Bengal Medical College & Hospital, West Bengal, India after ethical review approval was granted by the West Bengal University of Health Sciences and West Bengal State AIDS Control Society (WBSACS). It is the Regional ART Centre encompassing nearby five districts with approximately 300 new enrollments every year.

All the patients newly registered for HAART at NBMCH ART Centre during the study period who gave consent for the study were included in the study.

All data recorded as per NACO HIV care/ARTform comprising complete medical history, physical examination and laboratory investigations (CD4+ count, Hb%, TLC, DC, ESR, Liver Function Tests, Fasting Blood Glucose, Urea, Creatinine, Sodium, Potassium, Phosphate), and other investigation as necessary.

For this research, the data were analyzed using SPSS 16.0 .For all data analyzed with Confidence Interval at 95%.

III. RESULTS AND DISCUSSIONS

In our study total 131 patient was enrolled of which 7 patient was lost to follow up .

The mean age for male (M) and female (F) population were 35.35±8.17 and 29.58±7.6 years respectively which was statistically significant (p<0.001). The mean body weight of the male and female patients were 51.53 ± 8.06 kg and 46.63±6.81 kg (p=0.001) and. The mean skin fold thickness in male and female population were 13.38±1.44 mm and 12.03±1.26 mm respectively (p<0.001) . The mean BMI of the male population was 18.69±2.23 kg/m2 whereas 19.38±2.59 kg/m2 in females (p=0.127) . The mean pulse rate was 75.75 ± 5.83 beats/ min (M= 76.09±5.61, F= 75.07±6.26, p=0.360). The mean blood pressure was 116/77 mm of Hg (M= 117/78, F= 111/74, p=<0.001)

The mean hemoglobin concentration of the study population was 10.62±1.8 gm/dL, total leucocyte count was 6174 IU/L of blood of which 64.62 % neutrophils, 29.64 % lymphocytes. The mean CD4-T cell count was 164±88 and ESR was 40.08 ± 3.36 mm. There was no significant difference of the mean values between the male and the female groups for the hematological parameters.

The mean total bilirubin of the study population was 0.79 ± 0.27 mg/dL and mean albumin and globulin were 3.81 and 3.54 respectively whereas mean serum urea level was found to be 26.89±7.26 and serum creatinine level was 0.91±0.14 mg/dL. There was no significant difference in the values of these parameters in the two gender groups.

The mean values of SGOT is39.85±1.64 U/L and for SGPT 36.42±1.22 U/L and that for alkaline phosphatase level was 135.85±42.22 U/L. The mean fasting plasma glucose was 85.64±7.21 mg/dL and those for serum sodium and potassium were 136.96±4.48 mEq/L and 3.91±0.3 mEq/L respectively. The mean serum inorganic phosphate level was 3.55±0.76 mg/dL.

The biostatus (live or dead) of the study population at subsequent follow-up visits showed that there was no mortality within 2 weeks after starting ART. Eight (6.45%) deaths in the first month and 9 (7.25%) in the next 2 months, resulting in a total of 17 (13.71%) mortalities in the first 3 months of starting ART in HIV/AIDS patients. In a few studies carried out in several countries in the Sub-Saharan Africa found mortality rates which is little higher than what we found in this study.

There were 7 males and only 1 female among 8 mortalities in the first month of follow-up. There were 12 males and 5 females among total 17 mortalities at the end of the study. So, we find that the total mortality was higher among male than female in this study amounting to 14.46% and 12.2% respectively.

Although most of the early ART mortalities (9) were in the age group 30-39 years (16.36%), the highest percentage of mortality in the study subjects were above 50 years of age (25%). The mortality rate was 13.71% in the total study population.

It was found that 21.82% of the urban population expired within the first three months of initiating ART, but only 7.25% of the rural population expired in the early period.

The mortality started increasing (N=8 out of 124 enrolled) when the baseline CD4 count was between 50 and 99 cells/cmm. The highest mortality rate (63.63%) was found with CD4 count less than 50 cells/mm. No mortality recorded when CD4 count was more than 200 cells/mm.

There was significant direct correlation of early ART mortality with pulse (p<0.001), total leukocyte count (TLC, p=0.002) and neutrophil count (p<0.001) and erythrocyte sedimentation rate (ESR, p=0.002) suggesting increased mortality with high pulse rate, TLC, neutrophil count and ESR. There was inverse correlation of mortality with body weight (p=0.013), skin fold thickness (p<0.001), body mass index (BMI. p=0.008), CD, T cell level (p<0.001), hemoglobin (p<0.001) and lymphocyte count (p<0.001), which means mortality increases with decrease of these parameters.

Similarly, haemoglobin concentration ≤ 8 g/dl was also one of the significant predictors of mortality. Also, low absolute lymphocyte count which is an indirect marker of CD4 count, was associated with increased mortality.

There was also direct correlation with serum urea level (p=0.037) means that increased urea level can be a indicator of increase mortality. There was significant inverse corellation of serum albumin (p=0.01) and phosphate (p<0.001) levels on mortality, suggesting that,there is increse in mortality with decrease in serum level of these parameters. Comparing studies with similar motives, phosphate was found to be an independent predictor of early ART mortality. Coexistent

tuberculosis was also associated with increased mortality (p=0.001).

There was significant difference of study parameters like body weight (p=0.013), skin fold thickness (p<0.001), BMI (p=0.008), pulse (p<0.001), CD4 count (p<0.001), Hb% (p<0.001), TLC (p=0.002), neutrophil (p<0.001), lymphocyte (p<0.001). ESR (p=0.036), albumin (p=0.010), urea (p=0.037) and phosphate (p<0.001).between live and dead category

Analysis at the end of the study revealed that the outcome was significantly associated with skin fold thickness (p=0.001) and pulse (p=0.003).

Regression analysis of the other studied parameters showed that mortality was significantly associated with CD4 (p=0.026) count, total leukocyte count (p=0.043), albumin (p=0.024), serum potassium (p=0.011) and phosphate (p=0.004) levels.

There was significant association of early ART mortality with co existent tuberculosis (p=0.001) but not with HBV or HCV co-infection status. In multivariate analyses from some studies had not found history of TB and a history of oral Candidiasis as independent predictors of mortality whereas few other studies found opportunistic infections like tuberculosis, cryptococcosis, pneumocystis and candidiasis as predictors of early mortality in HIV-infected patients.

IV. SUMMARY

Among the total study population of 124 there were 83 (66.9%) males and 41 (33.1%) females.

Sixty-nine patients (55.65%) were from rural and 55 (44.35%) were from urban areas.

Mean age of the study population was 33.44±8.4 years.

The mean body weight of the male and female patients were 51.53±8.06 kg and 46.63±6.81 kg .

Bulk (41.13%) of the study population had CD4 count in between 100 and 199 cells/mm.

There was no mortality within 2 weeks of starting ART, 8 (6.45%) mortalities in the first month and 9 (7.25%) mortalities in the next 2 months, resulting in a total of 17 (13.71%) mortalities in the first 3 months of starting ART in HIV/AIDS patients which 12 were males and 5 were females.

Highest mortality rate (63.63%) has been found with CD4 count less than 50 cells/cmm. and no mortality has been observed with CD4 count > 200 cells/cmm.

There was significant positive association of early ART mortality with pulse rate (p<0.001), total leukocyte count (TLC, p=0.002), neutrophil count (p<0.001), ESR (p=0.002) and serum urea level (p=0.037).

There was inverse correlation of mortality with body weight (p=0.013), skin fold thickness (p<0.001), BMI (p=0.008), CD4-T cell count (p<0.001), hemoglobin (p<0.001) and lymphocyte count (p<0.001) and phosphate (p<0.001) and albumin (p=0.01).However the strongest correlation have been observed with skin fold thickness, CD4 count, phosphate and hemoglobin.

However most significant mortality rate was associated with low skin fold thickness (0.001) and high pulse rate (p=0.003) among the clinical parameters.

It was significantly associated with low CD4 count (p=0.026). high total leukocyte count (p=0,043), low serum albumin level (p=0.024) high serum potassium (p=0.011) and low serum phosphate (p=0.004) levels for hematological, biochemical and metabolic parameters

Co-existent tuberculosis (p=0.001) had significant impact on mortality.

V. CONCLUSION

In this study, poor nutritional status as evidenced by low skin fold thickness and low albumin was associated most significantly with early ART mortality. The effects of metabolic parameters like low serum phosphate and high serum potassium levels were also significant. The markers of subtle chronic inflammation like high pulse rate and high total leukocyte count were predictive of mortality. Lastly, co-infection with tuberculosis and low baseline CD4 count were significant predictors of early mortality in HIV/AIDS patients starting HAART.

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