Interleukin 6 strongly correlates with malnutrition inflammation score and it is strong predictor for mortality in hemodialysis patients

**Abstract**

**Background:** Among chronic kidney dialysis patients the morbidity and mortality rate is high, with recent evidence suggested that this may be linked to inflammation. The activity of IL-6 plays a pivotal role in inflammation, being the most powerful inducer of the acute-phase response, and markedly up-regulated in end stage renal diseases (ESRD) patients and serum IL-6 levels predict outcome of hemodialysis (HD) patients. Studies are performed to investigate the relationship between serum IL-6 and the nutritional status among chronic hemodialysis patients.

**Methodology:** The study was conducted at Sri Ramachandra University Hospital, descriptive cross-sectional design with fifty three patients were recruited using convenient sampling technique which is of non-probability type and Pre dialysis blood samples were taken for IL 6. The Malnutrition Inflammation Score (MIS) has 10 components, which is a likert scale ranging from normal to severe. Statistical Analysis was done using SPSS 16.0.

**Results:** The IL–6 mean score was 16.2 with the SD of 3.4, where as for MIS the mean was 19.77 with SD of 4.49. The Pearson’s correlation coefficient values $r'=0.305$ which is statically significant at $p<0.05$ Level. Patients with high score of MIS demonstrated severe degree of malnutrition and inflammation. This reveals that increase in MIS leads to elevation of IL–6, which indicates that the patients are gradually developing inflammation when unidentified can even cause mortality.

**Conclusion:** Study finding suggests that patients must be monitored for MIS score periodically rather than testing IL–6 levels, which can be and a cost effective methods for the patients.

**Keywords:** inflammation, malnutrition, hemodialysis, interleukin 6

**Abbreviations:** ESRD, end stage renal diseases; HD, hemodialysis; MIS, malnutrition inflammation score
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Result

The IL 6 mean score 16.12 with the SD of 34.10, whereas for serum albumin, the mean was 3.41 with SD of 0.44. The Pearson’s correlation co-efficient value r=-0.429, which statistically evidenced highly negative correlation at p<0.01 level. This shows that if IL 6 increases, then the serum albumin decreases (Table 1) (Table 2). The IL 6 mean score 16.12 with the SD of 34.10, whereas for MIS, the mean was 19.77 with SD of 4.49. The Pearson’s correlation co-efficient value r=0.304, which statistically evidenced positive correlation at p<0.05 level. This shows that if IL 6 increases, then the MIS increases (Table 3).

Table 1 Mean and Standard Deviation of Study Variables among Hemodialysis Patients

| Sl. No. | Variables                  | Mean±SD     |
|---------|----------------------------|-------------|
| 1       | Age (in years)             | 50.04±15.26 |
| 2       | Duration of illness (months) | 52.58±66.28 |
| 3       | Duration of diabetes(months) | 36±84    |
| 4       | Duration of hypertension(months) | 86.28±85.921 |
| 5       | Interleukin 6 (pg/ml)      | 16±34      |
| 6       | Serum Albumin(gm/dL)       | 3±0.4      |

Table 2 Relationship between Interleukin 6 and Albumin among hemodialysis patients (Correlation co-efficient value)

| Scales               | Statistical values |
|----------------------|--------------------|
|                      | Mean   | SD     | r-value     |
| Interleukin 6       | 16.12  | 34.1   | r=-0.429 p<0.01 (Highly Significant) |
| Serum Albumin       | 3.41   | 0.44   |

Table 3 Relationship between IL 6 and Malnutrition Inflammation Score (MIS) among hemodialysis patients. (Correlation co-efficient value)

| Scales               | Statistical values |
|----------------------|--------------------|
|                      | Mean   | SD     | r-value     |
| Interleukin 6       | 16.12  | 34.1   | r=-0.429 p<0.01 (Highly Significant) |
| Serum Albumin       | 3.41   | 0.44   |

Discussion

In this study, that the response of the fifty three maintenance hemodialysis patients to a simple question about malnutrition inflammation score (MIS) of the hemodialysis patients was significantly associated with several measures of inflammatory and nutritional status. During the Study the objective data of IL 6 was measured pre dialysis. In our study, IL 6 was well correlated with biochemical variables and MIS. In our study serum albumin has been shown to be a strong predictor of morbidity and mortality, and other numerous studies have focused on the determinants of level of serum albumin in patients treated with HD. In our study malnutrition and increased inflammation have been the most important factors associated with this biochemical markers. 1-11

In the present study also able to show a relationship of negative correlation between lower serum albumin and the pro-inflammatory cytokines of IL 6. 3,12,13 In the present study reveals that IL-6 levels independently predict survival for the elevated levels of circulating pro-inflammatory cytokines. The MIS correlating significantly with prospective hospitalizations of MHD patients and was found to be a predictor of mortality in MHD patients. Absolutely, improved correlations between the MIS and morbidity, MIS and mortality occur at least partly because of inclusion criteria of such known markers of outcome as serum albumin level and BMI, which is the reason included in the MIS. This study demonstrate that correlation between the MIS and serum IL 6 level was comparatively positive relationship, perhaps because of serum albumin level, a component of the MIS, is known to negatively correlates with serum IL 6 level.

Conclusion

The MIS performs to be a convenient, short-term tool to risk-stratify MHD patients, which may circumvent the need for measuring inflammatory markers like IL-6. Study finding suggests that patients must be monitored for MIS score periodically rather than testing IL-6 levels, which can be a cost effective methods for the patients.

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Conflict of interest

The author declares no conflict of interest.

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