Leukemias are a group of diseases described by augmented numbers of white cells in the blood and bone marrow as a result of unregulated clonal proliferation of immature malignant cells. These abnormal white blood cells that not completely developed are called (blasts), or (leukemia cells). The diagnosis of Leukemia was confirmed by blood investigation and by bone marrow biopsy. Leukemia inhibitory factor may play an important role, along with Interleukin-6 and granulocyte colony stimulating factor, in the regulation of early hematopoietic stem cells. Leptin has been implicated in the differentiation and proliferation of hematopoietic cells. In this case control study, we evaluate, the levels of LIF, IL6, Leptin in serum of patients with myeloid leukemia and assess the relationship between leptin level & body mass index in myeloid leukemic patients, in the current study involved 96 individuals; 48 patients with myeloid leukemia and 48 controls. Leukemia inhibitory factor, Interleukin 6 and Leptin levels are measured by ELISA assay in both patient and control groups. The mean LIF, Il6 in the AML and CML groups were significantly higher than control group (p<0.05), while Leptin in the AML and CML groups was significantly lower than control group (p<0.05). And the mean (BMI) in the AML and CML groups were significantly lower than control group (p<0.05). In this study, we conclude that LIF, IL6 and Leptin play an important role in pathogenesis of Leukemia, LIF, IL6 levels in myeloid leukemic patients more than controls while Leptin level in myeloid leukemic patients less than controls and There is significant relationship between Leptin and body mass index.