

Autologous Immune Enhancement Therapy for cancer using NK cells and CTLs without feeder layers; our six year experience in India

Dedeepiya V¹, Terunuma H², Manjunath S¹, Senthilkumar R¹, Thamaraikannan P¹, Srinivasan T¹, HelenReena C¹, Preethy S¹, Abraham S^{1,4}

Abstract

Background:

Autologous Natural Killer (NK) cells and Cytotoxic T Lymphocytes (CTLs) based immune-cell therapy, otherwise called as Autologous Immune enhancement therapy (AIET), though has been in clinical practice in several developed nations since early 90s, in India it is in infancy due to lack of technological knowhow. Our institute has been providing the AIET cell expansion services since 2005 and we here in report our experience in 30 such patients of both solid tumours and hematological malignancies.

Materials & Methods:

The number of AIET transfusions in each patient ranged from one to six. All the patients included had Stage III to IV malignancy. AIET was either given along with the chemotherapy or after the completion of a minimum of six cycles of chemotherapy in all the patients. 70 ml of Peripheral Blood was collected each time. The protocol followed was as per Terunuma et al (Breast Cancer 2010) which uses only the patients' autologous plasma for expansion of the Natural Killer Cells and Cytotoxic T lymphocytes from the peripheral blood. The cells were cultured for a period of 10 to 16 days and then transfused to the patients intravenously. The cells were subjected to

Flow cytometry before and after the *in vitro* expansion. Feeder layers were not used in the procedure of in vitro expansion at any stage.

Results:

The percentage of NK cells and CTLs after expansion by flow cytometry ranged from 60 to 82 %. There were no adverse reactions in any of the patients following transfusion. The mean prolonged survival time was 15 months and 27% of the patients had Static non-progressive disease after the therapy. Two patients reported significant decrease in Cancer marker levels after AIET and among the terminally ill, two had more than two years survival. All the patients reported improvement in quality of life and resumption of appetite following AIET.

Conclusion:

Optimal *in vitro* expansion of NK cells and CTLs of patients with stage III-IV cancer either concurrently or after chemotherapy could be accomplished using autologous serum without use of feeder layers. The *In vitro* expanded NK cells and CTLs when given intravenously decrease the tumor size and prolong the survival without any adverse effect in our experience.