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Comparison of the effects of peg-GCSF and GCSF on chemotherapy induced cytopenia in children with solid tumors

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Introduction:

- Prophylaxis of chemotherapy-induced neutropenia by granulocyte stimulating factor(GCSF) has a *significant effect on reducing the complications of chemotherapy*.
- The aim of this study is to compare the effect of Filgrastim and Pegfilgrastim in preventing chemotherapy induced neutropenia in children with solid tumors.
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Materials and methods:

- A randomized clinical trial was carried out on children who were admitted to the oncology ward of Amirkabir Hospital in Arak.
- Patients were randomly divided into 3 groups ;each comprising 30 people .

Materials and methods:

- Group A was treated with a 10 µg/kg/ single daily dose of Filgrastim were injected subcutaneously after 24 hours following chemotherapy 3 consecutive days .
- group B was treated with a 100 µg/kg/ single dose of Pegfilgrastim injected subcutaneously after 24 hours following chemotherapy.
- Group C did not receive any medication.

Materials and methods:

- CBC were recorded in the beginning and also in the 3rd, 7^{th} and 14^{th} days of treatment.
- The side effects and the duration of neutropenia
- and hospitalization due to neutropenia
- as well as the delay in starting the next cycle of chemotherapy,
- chemotherapy dose reductions due to neutropenia
- and treatment costs were all recorded.

Results:

- The mean age in group A was 6.47 years, 6.07 in group B and 6.27 in group C; the distribution of the sexes was homogeneous in theses groups.
- *Mean ANC was the same in all three groups before chemotherapy.*
- After receiving the final dose of chemotherapy, mean ANC was not significantly different in the studied groups ($p = 0.217$).

Results:

- On the first day, mean ANC in group A was 2036 higher than the other two and the highest neutropenia was seen in group C but the difference between mean ANC of these groups was not remarkable (p = 0.217).

- On the third day, mean ANC in group C was 1360.0 and it was significantly lower than the mean in groups A and B.
- Groups A and B had the same mean, and the difference between the mean of the three groups was significant (p = 0.006).

Results:

- On the 7th day, mean ANC in groups A and B was significantly increased and in group C was decreased to 253.6. There was a significant difference between the three groups ($p = 0.000$).
- On the 14th day, mean ANC for each of the three groups decreased, but neutropenia in groups A and B was much lower than that of group C.
- In group C, there was one person with severe neutropenia.

Results:

- A remarkable difference was observed in fever rates;the highest was associated with group C (70%) and the other two were a 25% rate in group A and a 20% in group B (p = 0.000).
- The neutropenic hospitalization rate was significantly different between these groups with the highest observed in group C(63.3%) compared to the rate in groups A and B which were 10 and 15 per cent , respectively (p = 0.000).

Results:

- 20% of cases in group C and 16.7% in group B received delayed treatment due to neutropenia and this difference was significant (p = 0.026)
- The highest cost was in group C and costs in groups A and B were almost the same .
- There was no significant difference between the costs of the three groups (0.064).

Mean ANC in 3 Group

	ANC D1	ANC D3	ANC D7	ANC D14
A	2036±790	5103±5007	8643±9426	1441±1774
B	1687±717	5171±4601	7333±4959	821±764
C	1603±446	1360±1505	253±262	0
P value	0.217	0.006	0.0001	0.0001

	Febrile neutropenia	Dose Reduction	Chemotherapy Delay	Hospitalization	Cost
A	10%	0%	3.3%	10%	75350000
B	25%	3.3%	16.7%	15%	77030000
C	70%	0	20%	63.3%	107410000
P value	0.0001	0.219	0.026	0.0001	0.064

DISCUSSION

2011 Alexander Chan PEG = FILgrastim

Yuan-Kai Shi 2013 PEG single dose Prefered

Georgia Kourlaba FN in PEG ↓

Nina Lathia 2012 COST PEG =FILg> none

Conclusions:

- Based on the results of this study, GCSF is effective in preventing neutropenia and reducing complications of chemotherapy.
- In this study, the efficacy and reducing effect of chemotherapy complications of Pegfilgrastim were similar to filgrastim .


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