duce comparable results with fresh samples, but do not so with thawed/ washed ones. Furthermore, we would caution against extrapolation of unit counts from segment specimens.

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GM-IVA, a short induction course for *de novo* acute myeloid leukemia, suitable for the elderly

Sir,

The number of older patients with AML is progressively increasing due to longer life expectancy and increased exposure to mutagenic agents.[1] The therapeutic approach in these patients is uncertain[2-4] and prognosis is generally poor both due to the patients' conditions and to unfavorable biologic features.[5]

We report on our experience with a short regimen that includes GM-CSF, Ara-C, VP-16 and idarubicin, followed by the FLANG protocol, a fludarabine containing salvage regimen, for patients with residual disease. Between May 1994 and January 1996, 21 consecutive patients with non M3 *de novo* acute myeloid leukemia entered the study. Poor performance status was not considered an exclusion criterion.

Clinical and hematologic features are summarized in Table 1. Mean age was 64 years (range 29-85) and fourteen patients were over 60 years of age.

Diagnosis and classification of AML were performed according to the FAB criteria. Cytogenetic analysis was performed for all subjects at diagnosis on 24 h cultured BM cells according to standard procedures. At least 10 Q-banded metaphases were examined for each sample. Five (26%) abnormal karyotypes were found. Patients in complete remission also had cytogenetic follow up.

The GM-IVA scheme included idarubicin (12 mg/m^2/day, by rapid infusion), etoposide (100 mg/m^2/day by 30 minute infusion) and cytosine arabinoside (250 mg/m^2/die in a continuous infusion preceded by a 100 mg i.v. bolus on day 1). All drugs were administered for three days. GM-CSF (300 mg) was given 12 hours before the start of therapy.[6] Patients with a blast count exceeding 100×10^9/L were not primed with GM-CSF. Three patients died during the induction therapy. Patients with blastic regrowth after one course of GM-IVA were considered resistant and salvaged with FLANG.[7]

Patients under 60 years old achieving complete remission received 2 courses of FLANG and autologous or allogeneic BMT whenever possible.

Patients over 60 in CR received a second course of GM-IVA whenever possible. The results are reported in Table 2.

The therapeutic strategy itself was effective since 65% of patients achieved CR. The complete remission rate obtained in the younger (< 60 years) subset of patients (85%) is comparable to what has been reported in recent trials.[10] In elderly patients the final CR rate (62%) is noteworthy, considering that 6 patients were above 70 years of age and 3 were above

Table 1. AML treated with GM-IVA: clinical features.

Treated patients	21
M/F	12/9
Median age (range)	64 (29-85)
WHO performance status:	
0	5
1	10
2	4
3	2
FAB subtype	
M0	1
M1	3
M2	7
M4	6
M5	4
Karyotype	
interm/unfav. prognosis :	5
normal/favor. prognosis:	16

Abbreviations: favorable prognosis: t(8;21), inv16; interm/unfavorable prognosis: +8, complex, –5, del 5, –7, del 7.

Table 2. AML treated with GM-IVA / IVA: treatment and toxicity.

	All patients	*> 60 years*	*< 60 years*
Hematologic recovery (mean no. days from the end of therapy)			
to PMN > 0.5×10^9/L	15 (11-22)	17 (12-22)	15 (11-18)
to Plt > 20×10^9/L	15 (12-22)	17 (12-22)	15 (9-21)
Median transfus. support:			
RBC Units (range)	7 (3-14)	8 (4-12)	7 (4-14)
PLT Units (range)	6 (2-12)	6 (2-9)	7 (3-12)
No. days with T > 38°C, median (range)	7 (1-21)	5 (1-16)	10 (2-21)
Complications			
Bronchopneumonia	3	3	-
Sepsis	1	1	-
Aspergillosis	1	-	1
Other	3	2	1
Responses			
CR	12/21 (57%)	7/14 (50%)	5/7 (71%)
CR after FLANG	2	1	1
Final CR	14/21 (67%)	8/14 (62%)	6/7 (86%)
CR and karyotype:			
normal favorable	13/16 (80%)		
intermed unfavorable	1/5 (20%)		
Failures	7/21 (33%)	6/14	1/7 (14%)
Resistant disease	4/21	3/14	1/7
Early deaths	3/21 (14%)	3/14 (21%)	-
Relapse	7/14	5/7	2/7
Mean DFS (months)	14 (3-38)	9,4 (3-38)	25 (6-35)
Mean survival (months)	14 (1-39)	10 (1-39)	30 (10-37)
Alive/dead	7/14	3/11	4/3
BMT			
allogeneic	2	2	
autologous	1	1	

80. All three patients over 80 achieved CR (lasting 5 to 7 months) after one course of GM-IVA and survived 6 to 14 months. The karyotype was the most important prognostic factor, as 13 out of 16 patients (81%) with normal or favorable karyotypic alterations achieved CR, whereas only 1 out of 5 (20%) with an intermediate-unfavorable karyotype did so. It is impossible to evaluate the relative effect of the single dose of GM-CSF given as priming 12 hours before chemotherapy. We can only say that no patients showed a significant increase in peripheral blood blasts. Our scheme was well tolerated. Hematologic recovery was fast (PMN > 0.5×10^9/L in less than 20 days). We did not observe early deaths and only one major infectious complication (pulmonary aspergillosis) occurred among patients under 60. In the elderly group 3 out of 14 patients died during induction (21%) and 4 life threatening infections were observed (28%). The low toxicity of GM-IVA is largely due to the short duration of chemotherapy and to the rapid hematologic recovery.[8,9]

Although these results were obtained in a small group of patients and need to be confirmed in a larger series, they suggest that relatively low doses of chemotherapy may be successful in a considerable proportion of patients, especially in those with a normal or favorable karyotype.[10]

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