中文題目：絕對單核球數值和血清白蛋白當多發性骨髓癌病患存活期的預測因子

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英文題目：**Absolute Monocyte Count and Serum Albumin as Predictors of Overall Survival time in Multiple Myeloma**

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Running Title: Absolute Monocyte Count and Serum Albumin in Multiple Myeloma

Background

Multiple myeloma (MM) is a debilitating plasma cell leukemia which is often discovered through clinical symptoms and blood screening. Although various new parameters have been increasingly reported, the white *blood cell (WBC) differential counts* are rarely used as risk estimates of survival outcomes in MM.

Methods

We conducted a retrospective analysis of medical records of 102 patients with MM between October 2000 and December 2012. The *WBC differential* counts were assessed before undergoing chemotherapy. The survival outcome and significance of absolute monocytes count (AMC) were analyzed.

Results

We performed receiver operating characteristic curve (ROC) analysis in which AMC was better than β2-microglobulin (ß2m) and determine the optimal cutoff value of AMC (< 436 and ≧ 436/mm^3). We performed the univariate and multivariate analysis, in which serum albumin was an independent risk factor of all-cause mortality (hazard ratio [HR], 0.645, 95% confidence interval [CI] 0.452-0.921, p = 0.016). In addition, there was

potential significant survival difference regarding AMC. Based on AMC and serum albumin for staging, there was significant survival difference among myeloma patients with stage I and II ($p = 0.002$).

Conclusion

AMC was a potential prognostic factor of survival outcome in patients with MM.

Table 1.

Characteristics	Patients (N = 102)
Median age (yrs)	71 (40-92)
Current status (n, %)	
Alive	27 (26.5%)
Sex (n, %)	
Male	63 (61.8%)
Female	39 (38.2%)
ECOG	
1-2	67 (65.7%)
3-4	35 (34.3%)
Myeloma Type (n, %)	
IgG	56 (54.9%)
IgA	19 (18.6%)
Light chain	20 (19.6%)
Non-secretory	7 (6.9%)
Disease stage at diagnosis (ISS; n, %)	
Stage I	18 (17.6%)
Stage II	34 (33.3%)
Stage III	50 (49.0%)
Renal insufficiency at diagnosis (n, %)[1]	27 (26.5%)
Hypercalcemia at diagnosis[2]	29 (28.4%)
Bortezomib therapy	40 (39.2%)
Mean overall survival (month)	25.2
Median overall survival (month)	18.0

1. serum creatinine ≥ 2 mg/dl

2. Total calcium > 10 (mg/dL)

Table 2.

Variable	AMC in MM patients		p-value
	≧436	<436	
	n = 48	n = 54	
Patient characteristics			
Gender (M:F ratio)	1 : 0.41	1 : 0.86	NS
Age, years	71.33±9.85	67.93±11.69	NS
Stage ISS	2.58±0.68	2.15±0.79	0.003
Laboratory data			
AMC (/ mm^3)	796.16±496.08	275.24±113.17	<0.001
Hb (g/dl)	9.23±2.38	9.31±1.93	NS
Cr (mg/dL)	2.74±2.87	1.46±1.77	0.009
T Ca (mg/dL)	9.88±1.92	9.65±1.40	NS
Albumin (g/dL)	3.14±0.71	3.27±0.71	NS
ß2m	13.96±17.66	6.72±5.85	0.009

Table 3.

Variable	Univariable		p value
	HR	95% CI	
Patient characteristics			
Gender			
Men, n (%)	1.000		NS
Women, n (%)	1.003	0.632-1.590	
Age, years	1.017	0.997-1.039	NS
Stage ISS	1.240	0.917-1.676	NS
Laboratory data			
AMC (/ mm^3)	1.000	1.000-1.001	NS
Hb (g/dl)	0.955	0.860-1.059	NS
Cr (mg/dL)	1.059	0.982-1.142	NS
T Ca (mg/dL)	1.149	0.994-1.328	NS
Albumin (g/dL)	0.636	0.453-0.892	0.009
ß2m	1.009	0.995-1.023	NS

Note: HR, hazard risk of death; NS, not significant

Table 4.

Variable	Multivariable		p value
	HR	95% CI	
Patient characteristics			
Stage ISS	1.091	0.767-1.552	NS
Laboratory data			
AMC (/ mm^3)	1.000	1.000-1.001	NS
Hb (g/dl)	0.877	0.890-1.105	NS
Cr (mg/dL)	1.046	0.904-1.210	NS
Albumin (g/dL)	0.645	0.452-0.921	0.016
ß2m	1.000	0.973-1.029	NS

Note: HR, hazard risk of death; NS, not significant

Figure Legend

Figure 1. Patients' classification in this study

Figure 2. The ROC analysis on all WBC differential counts and ratio

Figure 3. Overall Survival of MM based on AMC

Figure 4. Overall Survival of MM based on clinical stage at diagnosis by AMC-Alb staging

Fig 1

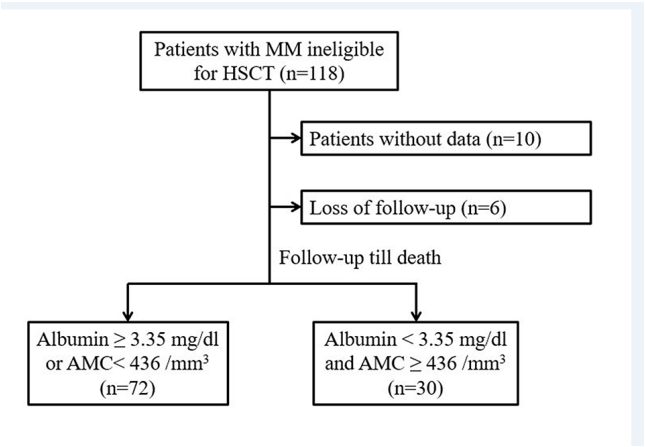


Fig 2

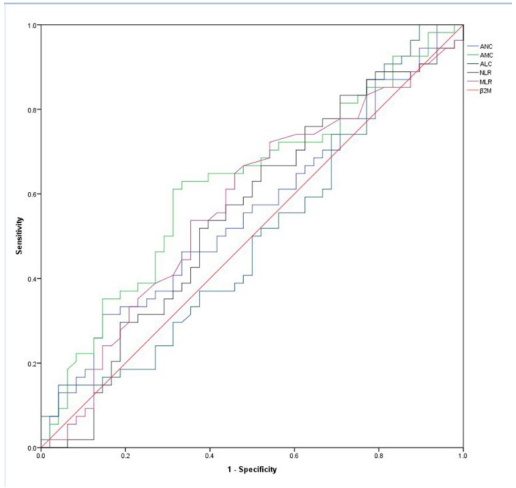

Sensitivity
1 - Specificity
0.0
0.2
0.4
0.6
0.8
1.0
ANC
AMC
ALC
NLR
MLR
β2M

Fig 3

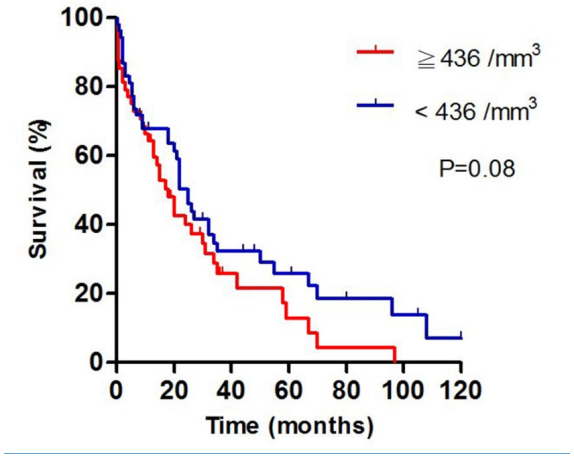
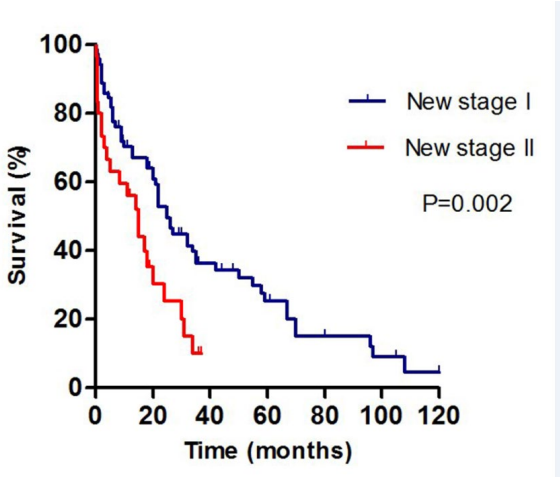

100
80
60
40
20
0
Survival (%)
0 20 40 60 80 100 120
Time (months)
≧436 /mm3
< 436 /mm3
P=0.08

Fig4.


100
80
60
40
20
0
Survival (%)
0 20 40 60 80 100 120
Time (months)
New stage I
New stage II
P=0.002