Serum B-cell maturation antigen: a novel biomarker to predict outcomes for multiple myeloma patients

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Supplemental Figure 1: Comparison of BCMA levels in samples with different clinical status using Dunnett's test. The group complete response (CR) is used as the Dunnett's control group. BCMA levels of cohorts grouped under progressive disease (PD) and untreated patients show a significant difference from the control group.

Supplemental Figure 2: Correlation of a matrix of different covariates among each other following multivariate analysis. This shows that BCMA is independent of the other co-variates and is not influenced by any of the other factors. The Color map represents the degree of correlation for each covariate with the other co-variates. Strong Red indicates a positive correlation whereas Blue represents an inverse correlation.

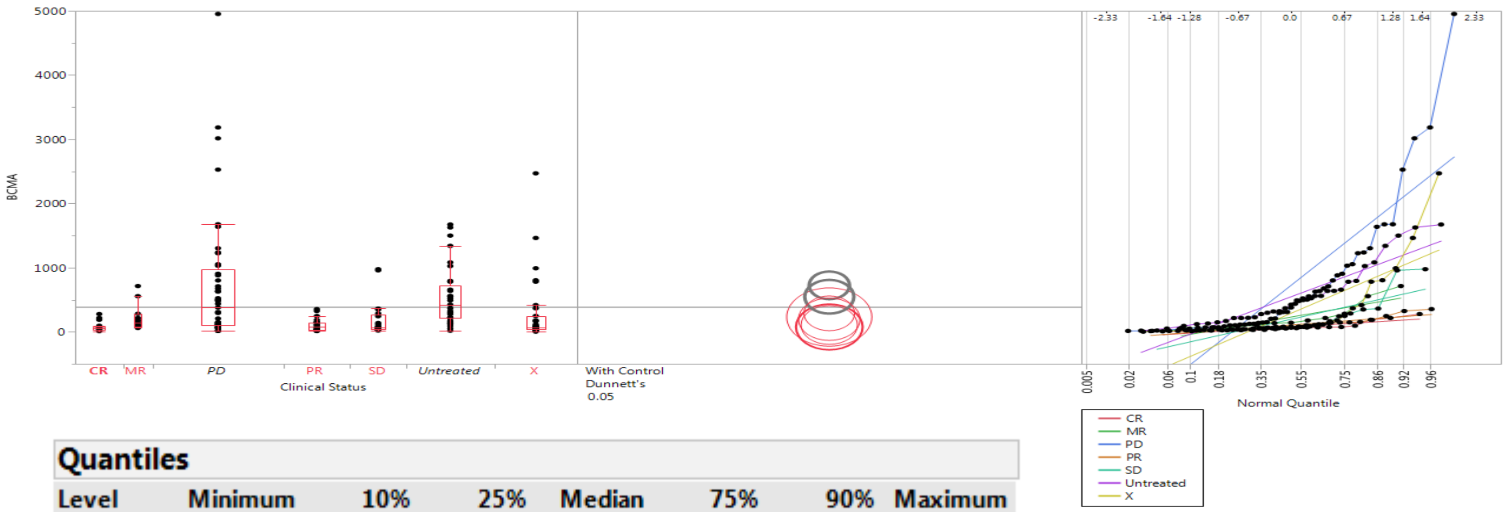
Supplemental Figure 3: Comparison of BCMA levels in samples of patients with (group 1) or without (group 0) the bone disease using Dunnett's test. The group without the bone disease is used as the Dunnett's control group. No significant differences (P=0.46) are observed amongst these two groups.

Supplemental Figure 4: A total of 44 patients were evaluated to determine if there was a relationship between sBCMA and conventional MM markers. Of these 44 patients, 33 had at least 4 time points at which their sBCMA level was measured within 2-weeks of their conventional MM labs. A Pearson R-correlation coefficient was computed between sBCMA levels and either serum M-protein or SFLC. Patients with a diagnosis of heavy and light chain myeloma had their sBCMA levels correlated to serum M-protein or SFLC depending on their clinical status (patients diagnosed with both a heavy and light chain isotype of MM and a clinical response measured to be CR with negative immunofixation results were correlated using SFLC instead of serum M-protein). Patients with light chain only had their sBCMA levels correlated to SFLC.

Supplemental Table 1

Co- Variate	Regression Co-Efficient	Error	Wald	P-Value	Hazard Ratio	95% CI -Hazard Ratio
Age	-0.00465	0.013	0.1134	0.78	0.9989	0.980432 - 1.0178
BCMA	0.0004182	9.96E-05	14.5948	0.00024	1.0001	0.9998 - 1.00045
Creatinine	0.2172	0.2218	0.6148	0.5161	1.3104	0.7418 - 2.2614
Hemoglobin	-0.02865	0.0914	0.06674	0.7524	1.01929	0.7642 - 1.24933
ISS	0.05123	0.3624	0.02542	0.92	1.3214	0.5562 - 2.0128

Supplemental Figure 1



Quantiles

Level	Minimum	10%	25%	Median	75%	90%	Maximum
CR	8.722136	9.612001	25.65272	55.59765	80.1623	222.1499	277.5595
MR	60.67967	62.57167	82.58251	142.0277	281.4129	682.2737	713.9088
PD	14.03963	51.29533	108.2294	379.8685	968.1474	1675.939	4952.374
PR	11.67151	18.70493	31.85611	80.82061	146.5171	278.2764	354.2312
SD	20.39998	29.92842	42.21731	70.85189	264.6807	838.9531	976.704
Untreated	17.78244	103.756	214.9688	423.3179	719.2372	1435.904	1672.542
X	2.79	21.90511	37.03714	65.94417	248.233	953.1565	2470.107

Means Comparisons

Comparisons with a control using Dunnett's Method

Control Group = CR

Confidence Quantile

|d|	Alpha
2.56011	0.05

LSD Threshold Matrix

Level	Abs(Dif)-LSD	p-Value
PD	233	0.0005*
Untreated	28.81	0.0323*
X	-234	0.6309
MR	-423	0.9477
SD	-365	0.9636
PR	-436	1.0000
CR	-503	1.0000

Positive values show pairs of means that are significantly different.

Supplemental Figure 2

A

Correlations

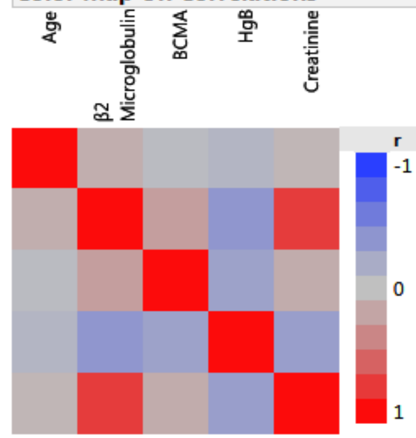
	Age	β2 Microglobulin	BCMA	HgB	Creatinine
Age	1.0000	0.1352	-0.0566	-0.1122	0.0796
β2 Microglobulin	0.1352	1.0000	0.2511	-0.3916	0.7840
BCMA	-0.0566	0.2511	1.0000	-0.2922	0.1503
HgB	-0.1122	-0.3916	-0.2922	1.0000	-0.3211
Creatinine	0.0796	0.7840	0.1503	-0.3211	1.0000

There are 63 missing values. The correlations are estimated by REML method.

Inverse Corr

	Age	β2 Microglobulin	BCMA	HgB	Creatinine
Age	1.0389	-0.2024	0.1263	0.1032	0.0901
β2 Microglobulin	-0.2024	2.8681	-0.3204	0.3403	-2.0751
BCMA	0.1263	-0.3204	1.1439	0.2734	0.1570
HgB	0.1032	0.3403	0.2734	1.2524	0.0861
Creatinine	0.0901	-2.0751	0.1570	0.0861	2.6238

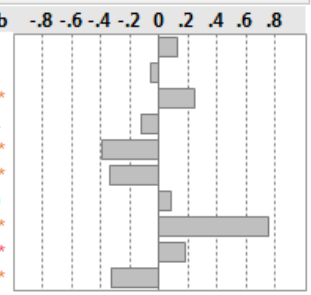
Color Map On Correlations



B

Pairwise Correlations

Variable	by Variable	Correlation	Count	Lower 95%	Upper 95%	Signif Prob
β2 Microglobulin	Age	0.1275	143	-0.0374	0.2857	0.1291
BCMA	Age	-0.0573	180	-0.2019	0.0897	0.4445
BCMA	β2 Microglobulin	0.2470	144	0.0869	0.3946	0.0028*
HgB	Age	-0.1230	127	-0.2910	0.0524	0.1684
HgB	β2 Microglobulin	-0.3946	126	-0.5327	-0.2359	<.0001*
HgB	BCMA	-0.3354	128	-0.4810	-0.1719	0.0001*
Creatinine	Age	0.0861	127	-0.0895	0.2564	0.3360
Creatinine	β2 Microglobulin	0.7548	126	0.6681	0.8213	<.0001*
Creatinine	BCMA	0.1865	128	0.0134	0.3487	0.0351*
Creatinine	HgB	-0.3246	128	-0.4716	-0.1601	0.0002*



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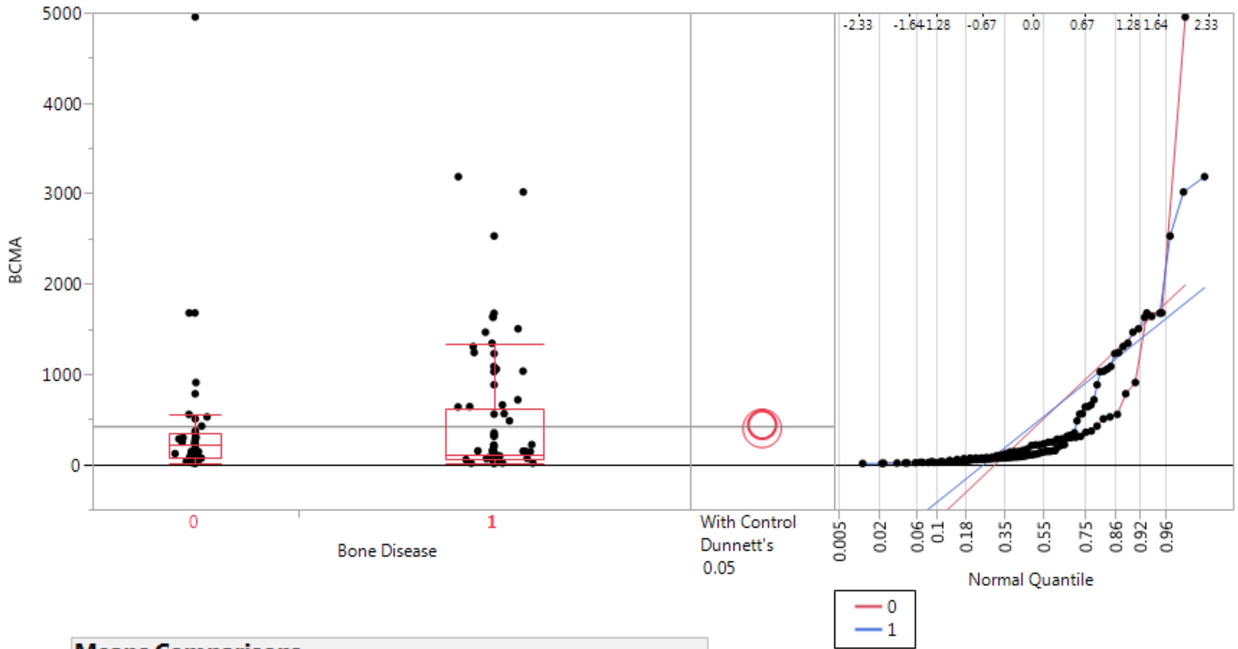
Supplemental Figure 3



Means Comparisons

Comparisons with a control using Dunnett's Method

Control Group = 1

Confidence Quantile

|d|	Alpha
1.97897	0.05

LSD Threshold Matrix

Level	Abs(Dif)-LSD	p-Value
1	-218	1.0000
0	-223	0.7640

Positive values show pairs of means that are significantly different.

Van der Waerden Test (Normal Quantiles)

Level	Count	Score Sum	Expected Score	Score Mean	(Mean-Mean0)/Std0
0	44	3.970	0.000	0.09023	0.761
1	84	-3.970	0.000	-0.04726	-0.761

2-Sample Test, Normal Approximation

S	Z	Prob>|Z|
3.9699659	0.76058	0.4469

1-way Test, ChiSquare Approximation

ChiSquare	DF	Prob>ChiSq
0.5785	1	0.4469

Supplemental Figure 4

MRN	Heavy Chain	Light Chain	Correlation Coefficient
1119	IgG	Lambda	0.46
1148	IgG	Kappa	0.85*
1411	IgG	Kappa	0.99*
1416	IgA	Kappa	0.10
1429	IgA	Kappa	0.93*
1431	IgG	Kappa	0.21
1538	N/A	Lambda	0.02
1547	IgA	Lambda	0.97*
1634	IgG	Lambda	0.81*
1697	N/A	Kappa	-0.09
1701	IgA	Kappa	0.82*
1899	IgA	Lambda	0.99*
1904	N/A	Kappa	0.87*
1916	IgG	Kappa	0.98*
1944	IgG	Kappa	0.62*
1945	IgG	Kappa	0.85*
1964	N/A	Lambda	0.75*
1973	IgG	Kappa	0.02
1978	IgG	Kappa	0.96*
1979	IgG	Lambda	0.69*
2023	IgG	Kappa	0.50*
2036	IgG	Lambda	-0.05
2064	IgG	Kappa	0.91*
2079	IgA	Lambda	0.68*
2080	IgG	Kappa	0.65*
2106	N/A	Lambda	0.92*
2116	IgG	Kappa	-0.30
2130	IgG	Kappa	0.27
2143	IgA	Lambda	0.79*
2145	N/A	Kappa	0.84*
2166	IgG	Kappa	0.33
2167	N/A	Kappa	0.82*
2188	IgG	Kappa	0.56*

*significant correlation