**Supplementary Table 1: The characteristics of 305 LPL/WM patients.**

|  |  |
| --- | --- |
| **Characteristics** | **Patients (*N* = 305)** |
| Age (years) |  |
|  Median (range) | 62 (32–87) |
| ≥65, *n* (%) | 111 (36.4) |
| Sex, *n* (%) |  |
|  Male | 216 (70.8) |
|  Female | 89 (29.2) |
| Median time to diagnosis (range) (months) | 7 (0–156) |
| ISSWM, *n\**(%) |  |
|  Low | 45/255 (17.6) |
|  Intermediate | 93/255 (36.5) |
|  High | 117/255 (45.9) |
| IgM level |  |
|  Median (range) (mg/dL) | 3485 (120–14,400) |
| ≥4000 mg/dL, *n* (%) | 126 (41.3) |
| Cytopenia at baseline, *n* (%) |  |
| Hemoglobin of ≤11.5 g/dL | 244 (80.0) |
| Platelet count of ≤100 × 109/L  | 102 (33.4) |
| Absolute neutrophil count of ≤1.5 × 10**9**/L | 58 (19.0) |
| Median hemoglobin (range) (g/dL) | 8.5 (2.4–18.7) |
| Bone marrow infiltration |  |
|  Median cellularity (range) (%) | 45.0 (2.0–97.0) |
|  Median cellularity detected by flow cytometry (range) (%) | 16.4 (0.2–92.9) |
| Median β2 microglobulin (range) (mg/L) | 3.8 (0.2–25.6) |
| Elevated β2 microglobulin, *n\** (%) | 196/235 (83.4) |
| Median LDH (range) (U/L) | 145 (52–648) |
| Elevated LDH, *n\** (%) | 42/260 (16.2) |
| Extramedullary disease, *n\** (%) |  |
|  Splenomegaly | 113/298 (37.9) |
| Hepatomegaly | 49/300 (16.3) |
|  Lymphadenopathy | 112/293 (38.2) |
| B symptoms | 87/293 (29.7) |

ISSWM: International Prognostic Scoring System for WM; LDH: Lactate dehydrogenase; LPL/WM: Lymphoplasmacytic lymphoma/Waldenström’s macroglobulinemia.\*Clinical data were missing in some patients.

**Supplementary Table 2: Summary of cytogenetic aberrations in 194 patients of WM.**

|  |  |  |
| --- | --- | --- |
| **Individual abnormalities** | **FISH\*\* (%)** | **FISH combined with conventional cytogenetics (CC)\* (%)** |
| 6q deletion | 21.4 (6/28) | 33.3 (11/33) |
|  Trisomy 12 | 7.6 (5/66) | 9.0 (6/67) |
|  17p13 deletion | 6.0 (11/184) | 6.5 (12/185) |
|  13q14 deletion | 5.3 (9/171) | 5.3 (9/171) |
|  1q21 application | 2.8 (1/36) | 2.8 (1/36) |
|  11q22 deletion | 2.0 (2/100) | 4.9 (5/103) |
| Combined abnormalities |  |  |
|  0 abnormality | 85.6 (166/194) | 81.4 (158/194) |
| 1 abnormality | 11.9 (23/194) | 14.4 (28/194) |
| 6q deletion | 14.3 (4/28) | 21.2 (7/33) |
|  Trisomy 12 | 7.6 (5/66) | 9.0 (6/67) |
|  17p13 deletion | 3.8 (7/184) | 3.8 (7/185) |
|  13q14 deletion | 2.9 (5/171) | 2.9 (5/171) |
|  1q21 application | 2.8 (1/36) | 2.8 (1/36) |
|  11q22 deletion | 1.0 (1/100) | 1.0 (1/103) |
|  2 abnormalities | 4 patients | 7 patients |
|  6q deletion and 13q14 deletion | 1 patient | 1 patient |
|  17p13 and 13q14 deletion | 2 patients | 2 patients |
|  17p13 and 6q deletion | 1 patient | 1 patient |
| 17p13 and 11q22 deletion |  | 1 patient |
| 6q and 11q22 deletion |  | 2 patients |
| 3 abnormalities | 1 patient | 1 patient |
|  17p13, 13q14 and 11q22 deletion | 1 patient | 1 patient |

\*CC was defined as the cytogenetic detected by conventional karyotype analysis. FISH combined with conventional cytogenetics (CC) showed that patients who had detected the cytogenetics by FISH or by CC can both include in the analysis.

\*\* Not all the patients had the entire FISH probes.

CC: Conventional cytogenetics; FISH: Fluorescence *in situ* hybridization; OS: Overall survival; PFS: Progression-free survival; WM: Waldenström’s macroglobulinemia.

**Supplementary Table 3: The median PFS and OS according to FISH combined**

**with conventional cytogenetic abnormalities.\***

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Cytogenetic abnormalities\*\*** | **Number** | **Median PFS, months (95% CI)** | ***P*-value** | **Median OS, months (95% CI)** | ***P*-value** |
| 13q14 deletion |  |  | 0.867 |  | 0.298 |
|  Positive | 9 | 34.0 (6.8–61.2) |  | 34.0 (10.0–57.9) |  |
|  Negative | 162 | 50.0 (40.5–59.4)  |  | 114.0 (89.4–138.6) |  |
| 11q22 deletion |  |  | 0.320 |  | 0.024 |
|  Positive | 5 | 34.0 (1.1–66.9) |  | 34.0 (19.0–49.0) |  |
|  Negative | 98 | 50.0 (36.2–63.8)  |  | 114.0 (89.2–138.8) |  |
| Trisomy 12 |  |  | 0.618 |  | 0.255 |
|  Positive | 6 | 22.0 (17.2–26.8) |  | 41.0 (7.7–74.3) |  |
|  Negative | 61 | 50.0 (34.4–65.6) |  | 135.0 (66.1–204.0) |  |
| 6q deletion |  |  | 0.465 |  | 0.143 |
|  Positive | 11 | 62.0 (33.2–90.8) |  | NR |  |
|  Negative | 22 | 46.0 (22.9–69.1) |  | 109.0 (0–269.8) |  |
| 17p13 deletion |  |  | 0.023 |  | 0 |
|  Positive | 12 | 28.0 (20.5–35.5) |  | 28.0 (22.0–34.0) |  |
|  Negative | 173 | 54.0 (44.9–63.1)  |  | 114.0 (89.4–138.6) |  |

\*CC was defined as the cytogenetic detected by conventional karyotype analysis.

\*\* Not all the patients had the entire FISH probes.

CC: Conventional cytogenetics; FISH: Fluorescence *in situ* hybridization; OS: Overall survival; PFS: Progression-free survival.

**Supplementary Table 4: The correlations between FISH abnormalities and clinical characteristics\*.**

|  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **characteristics** | **Without 13q14 deletion**  | **13q14 deletion** | ***P*-value** | **Without 17p13deletion** | **17p 13 deletion** | ***P*-value** | **Without trisomy12** | **Trisomy12** | ***P*-value** | **Without 6q deletion** | **6q deletion** | ***P*-value** |
| Age (years) |  |  | 0.426 |  |  | 0.815 |  |  | 0.511 |  |  | 0.466 |
| <65 | 64.8 (105/162) | 77.8 (7/9) |  | 67.1 (116/173) | 63.6 (7/11) |  | 65.6 (40/61) | 80.0 (4/5) |  | 68.2 (15/22) | 83.3 (5/6) |  |
| ≥65 | 35.2 (57/162) | 22.2 (2/9) |  | 32.9 (57/173) | 36.4 (4/11) |  | 34.4 (21/61) | 20.0 (1/5) |  | 31.8 (7/22) | 16.7 (1/6) |  |
| Hb (g/dL) |  |  | 0.523 |  |  | 0.090 |  |  | 0.355 |  |  | 0.338 |
| ≤11.5  | 80.2 (130/162) | 88.9 (8/9) |  | 79.1 (136/172) | 100.0 (11/11) |  | 85.2 (52/61) | 100.0 (5/5) |  | 86.4 (19/22) | 100.0 (6/6) |  |
| >11.5 | 19.8 (32/162) | 11.1 (1/9) |  | 20.9 (36/172) | 0 |  | 14.8 (9/61) | 0 (0/5) |  | 13.6 (3/22) | 0 (0/6) |  |
| Platelet count (×109/L) |  |  | 0.759 |  |  | 0.488 |  |  | 0.745 |  |  | 0.057 |
| ≤100 | 28.6 (46/161) | 66.7 (3/9) |  | 29.7 (51/172) | 40.0 (4/10) |  | 26.7 (16/60) | 20.0 (1/5) |  | 40.9 (9/22) | 0 (0/6) |  |
| >100 | 71.4 (115/161) | 33.3 (6/9) |  | 70.3 (121/172) | 60.0 (6/10) |  | 73.3 (44/60) | 80.0 (4/5) |  | 59.1 (13/22) | 100.0 (6/6) |  |
| Neutrophil count (×109/L) |  |  | 0.192 |  |  | 0.579 |  |  | 0.018 |  |  | 0.338 |
| ≤1.5 | 17.7 (28/158) | 0 (0/8) |  | 16.7 (28/168) | 10.0 (1/10) |  | 16.4 (10/61) | 60.0 (3/5) |  | 13.6 (3/22) | 0 (0/6) |  |
| >1.5 | 82.3 (130/158) | 100.0 (8/8) |  | 83.3 (140/168) | 90.0 (9/10) |  | 83.6 (51/61) | 40.0 (2/5) |  | 86.4 (19/22) | 100.0 (6/6) |  |
| Albumin (g/dL) |  |  | 0.909 |  |  | 0.612 |  |  | 0.057 |  |  | 0.099 |
| <35 | 57.5 (92/160) | 55.6 (5/9) |  | 55.8 (96/172) | 63.6 (7/11) |  | 56.7 (34/60) | 100.0 (5/5) |  | 45.5 (10/22) | 83.3 (5/6) |  |
| ≥35 | 42.5 (68/160) | 44.4 (4/9) |  | 44.2 (76/172) | 36.4 (4/11) |  | 43.3 (26/60) | 0 |  | 54.5 (12/22) | 16.7 (1/6) |  |
| β2-MG (mg/L) |  |  | 0.706 |  |  | 0.743 |  |  | 0.828 |  |  | 0.327 |
| ≤3 | 27.7 (39/141) | 20.0 (1/5) |  | 27.2 (40/147) | 22.2 (2/9) |  | 20.4 (10/49) | 25.0 (1/4) |  | 20.0 (4/20) | 0 (0/4) |  |
| >3 | 72.3 (102/141) | 80.0 (4/5) |  | 72.8 (107/147) | 77.8 (7/9) |  | 79.6 (39/49) | 75.0 (3/4) |  | 80.0 (16/20) | 100.0 (4/4) |  |
| IgM (g/dL) |  |  | 0.686 |  |  | 0.325 |  |  | 0.093 |  |  | 0.338 |
| ≤7 | 83.0 (132/159) | 77.8 (7/9) |  | 84.1 (143/170) | 72.7 (8/11) |  | 83.6 (51/61) | 50.0 (2/4) |  | 86.4 (19/22) | 100.0 (6/6) |  |
| >7 | 17.0 (27/159) | 22.2 (2/9) |  | 15.9 (27/170) | 27.3 (3/11) |  | 16.4 (10/61) | 50.0 (2/4) |  | 13.6 (3/22) | 0 (0/6) |  |
| LDH (U/L) |  |  | 0.012 |  |  | 0.857 |  |  | 0.468 |  |  | 0.059 |
| ≤250 | 91.9 (136/148) | 66.7 (6/9) |  | 89.5 (145/162) | 87.5 (7/8) |  | 90.4 (47/52) | 100.0 (5/5) |  | 100.0 (17/17) | 80.0 (4/5) |  |
| >250 | 8.1 (12/148) | 33.3 (3/9) |  | 10.5 (17/162) | 12.5 (1/8) |  | 9.6 (5/52) | 0 (0/5) |  | 0 (0/17) | 20.0 (1/5) |  |

β2-MG: β2-microglobulin; FISH: Fluorescence *in situ* hybridization; Hb: Hemoglobin; LDH: Lactate dehydrogenase.

\*Clinical data were missing in some patients.