**Table 1**. Clinical characteristics of CTCs and CTECs in research participants

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No(%)** | | **CTCs (Units/6ml)** | | | | | | | | | | |  | **CTECs (Units/6ml)** | | | | | | | | | | |
| **Characteristics** | **Total CTCs** | | |  | **LCTCs** | | |  | **sCTCs** | | |  | **Total CTECs** | | |  | **LCTECs** | | |  | **sCTECs** | | |
|  | **M** | **P25-P75** | ***P*** |  | **M** | **P25-P75** | ***P*** |  | M | **P25-P75** | ***P*** |  | **M** | **P25-P75** | ***P*** |  | **M** | **P25-P75** | ***P*** |  | **M** | **P25-P75** | ***P*** |
| Healthy | 24 | | 5.5 | 3-8.75 | <0.001 |  | 3 | 1-6 | 0.027 |  | 2 | 0-4.5 | <0.0001 |  | 6 | 2-10 | <0.001 |  | 3 | 2-6.75 | 0.0001 |  | 0 | 0-0 | <0.0001 |
| BLDP | 31 | | 5 | 1-11 |  |  | 2 | 0-5 |  |  | 2 | 0-5 |  |  | 5 | 2-7 |  |  | 5 | 0-8 |  |  | 1 | 0-2 |  |
| NSCLC | 49 | | 16 | 7-22.5 |  |  | 5 | 1.5-11.5 |  |  | 10 | 3.5-17 |  |  | 18 | 11.5-28.5 |  |  | 13 | 5-24 |  |  | 4 | 2-8 |  |
| Pathological type | |  |  |  | 0.629 |  |  |  | 0.153 |  |  |  | 0.891 |  |  |  | 0.183 |  |  |  | 0.557 |  |  |  | 0.156 |
| AC | 36(73.5) | | 16 | 8.25-21.75 |  |  | 4 | 2-10.75 |  |  | 10.5 | 3.25-17 |  |  | 17 | 9.5-27 |  |  | 14 | 5-23.75 |  |  | 4 | 1-1.75 |  |
| SC | 8(16.3) | | 14 | 5.5-37.75 |  |  | 7.5 | 2.25-26 |  |  | 8 | 4.75-12 |  |  | 20 | 13.25-36.5 |  |  | 12 | 4.5-30 |  |  | 5 | 3-8.75 |  |
| ASC | 3(6.1) | | 34 | 3-90 |  |  | 16 | 2-50 |  |  | 18 | 1-40 |  |  | 32 | 22-131 |  |  | 18 | 13-115 |  |  | 16 | 4-19 |  |
| Other | 2(4.1) | | 9 | 2-16 |  |  | 0.5 | 0-1 |  |  | 8.5 | 2-15 |  |  | 10.5 | 6-15 |  |  | 8 | 2-14 |  |  | 2.5 | 1-4 |  |
| TNM stage |  | |  |  | 0.715 |  |  |  | 0.747 |  |  |  | 0.564 |  |  |  | 0.388 |  |  |  | 0.525 |  |  |  | 0.826 |
| Ⅰ | 27(55.1) | | 16 | 6-23 |  |  | 4 | 1-12 |  |  | 13 | 2-17 |  |  | 17 | 8-30 |  |  | 11 | 4-26 |  |  | 4 | 2-8 |  |
| Ⅱ | 2(4.1) | | 36 | 5-67 |  |  | 27.5 | 1-54 |  |  | 8.5 | 4-13 |  |  | 18 | 17-19 |  |  | 14 | 12-16 |  |  | 4 | 1-7 |  |
| Ⅲ | 9(18.4) | | 14 | 7.5-17 |  |  | 5 | 1.5-8.5 |  |  | 7 | 3-9.5 |  |  | 17 | 7-23.5 |  |  | 12 | 1.5-19 |  |  | 4 | 0.5-8.5 |  |
| Ⅳ | 11(22.5) | | 16 | 14-34 |  |  | 5 | 4-16 |  |  | 12 | 8-18 |  |  | 25 | 16-73 |  |  | 18 | 9-67 |  |  | 6 | 2-8 |  |

Measurement data were compared between two groups by Mann-Whitney U test, multiple groups by Kruskal-Wallis test. Abbreviations: NSCLC non-small cell lung cancer, BLDP benign lung disease patients, AC Adenocarcinoma, SC Squamous carcinoma, ASC adenosquamous carcinoma, CTCs circulating tumor cells, CTECs circulating tumor-derived endothelial cells, M median, P25-P75 inter-quartile range

**Table 2.** Clinical characteristics of CTCs and CTECs aneuploids in research participants

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No(%)** | | | **CTCs (Units/6ml)** | | | | | | | | | | | | | | | | | | | | | | |  | | | **CTECs (Units/6ml)** | | | | | | | | | | | | | | | | | | | | | | | | | | |
| **Characteristics** | **Triploid** | | | | |  | | **Tetraploid** | | | | | |  | | | **Multiploid** | | | | | | |  | | | **Triploid** | | | | | | |  | | | **Tetraploid** | | | | | | |  | **Multiploid** | | | | | | | | |
|  | **M** | | **P25-P75** | | ***P*** | |  | | **M** | | **P25-P75** | | ***P*** | | |  | | | M | | **P25-P75** | | ***P*** | | |  | | | **M** | | **P25-P75** | | ***P*** | | |  | | | **M** | | **P25-P75** | | ***P*** | | | |  | | **M** | | **P25-P75** | | ***P*** | | |
| Healthy | 24 | | | 1 | | 0-2 | | <0.001 | |  | | 0 | | 0-1.75 | | <0.0001 | | |  | | | 3 | | 1-6 | | 0.058 | | |  | | | 0 | | 0-0 | | <0.0001 | | |  | | | 0 | | 0-0 | | <0.0001 | | | |  | | 3 | | 0.25-6 | | <0.001 | | |
| BLDP | 31 | | | 2 | | 0-5 | |  | |  | | 1 | | 0-3 | |  | | |  | | | 1 | | 0-4 | |  | | |  | | | 1 | | 0-3 | |  | | |  | | | 0 | | 0-3 | |  | | | |  | | 4 | | 1-8 | |  | | |
| NSCLC | 49 | | | 8 | | 3.5-12 | |  | |  | | 4 | | 1.5-6 | |  | | |  | | | 3 | | 1-7.5 | |  | | |  | | | 3 | | 1-6 | |  | | |  | | | 2 | | 1-4 | |  | | | |  | | 8 | | 4-23 | |  | | |
| Pathological type | |  |  | |  | | 0.887 | |  | |  | |  | | 0.657 | | |  | | |  | |  | | 0.428 | | |  | | |  | |  | | 0.069 | | |  | | |  | |  | | 0.083 | | | |  | |  | |  | | 0.127 | | |
| AC | 36(73.5) | | | 7.5 | | 4-13.5 | |  | |  | | 4 | | 2-5.75 | |  | | |  | | | 8 | | 4-22 | |  | | |  | | | 2.5 | | 1-6 | |  | | |  | | | 2 | | 0-4 | |  | | | |  | | 8.5 | | 4.25-22 | |  | | |
| SC | 8(16.3) | | | 8 | | 4-8.75 | |  | |  | | 2 | | 0.25-12 | |  | | |  | | | 10.5 | | 5.75-30 | |  | | |  | | | 4 | | 3-5.75 | |  | | |  | | | 2.5 | | 1.25-4 | |  | | | |  | | 10.5 | | 5.75-30 | |  | | |
| ASC | 3(6.1) | | | 11 | | 1-40 | |  | |  | | 6 | | 1-9 | |  | | |  | | | 12 | | 8-106 | |  | | |  | | | 8 | | 8-8 | |  | | |  | | | 8 | | 6-11 | |  | | | |  | | 12 | | 8-106 | |  | | |
| Other | 2(4.1) | | | 6.0 | | 1-11.0 | |  | |  | | 2.5 | | 1-4 | |  | | |  | | | 1 | | 1-1 | |  | | |  | | | 1.5 | | 0-3 | |  | | |  | | | 1.5 | | 1-2 | |  | | | |  | | 3.5 | | 1-6 | |  | | |
| TNM stage |  | | |  | |  | | 0.240 | |  | |  | |  | | 0.897 | | |  | | |  | |  | | 0.365 | | |  | | |  | |  | | 0.134 | | |  | | |  | |  | | 0.653 | | | |  | |  | |  | | 0.389 | | |
| Ⅰ | 27(55.1) | | | 9 | | 4-14 | |  | |  | | 4 | | 2-6 | |  | | |  | | | 2 | | 0-7 | |  | | |  | | | 2 | | 0-6 | |  | | |  | | | 2 | | 1-4 | |  | | | |  | | 7 | | 4-24 | |  | | |
| Ⅱ | 2(4.1) | | | 4.5 | | 3-6 | |  | |  | | 12 | | 1-23 | |  | | |  | | | 19.5 | | 1-38 | |  | | |  | | | 2 | | 1-3 | |  | | |  | | | 2 | | 0-4 | |  | | | |  | | 7.5 | | 3-12 | |  | | |
| Ⅲ | 9(18.4) | | | 4 | | 2-8 | |  | |  | | 4 | | 0-5.5 | |  | | |  | | | 3 | | 2-7.5 | |  | | |  | | | 5 | | 1-6 | |  | | |  | | | 1 | | 0-4 | |  | | | |  | | 8 | | 3-16 | |  | | |
| Ⅳ | 11(22.5) | | | 11 | | 8-14 | |  | |  | | 3 | | 2-6 | |  | | |  | | | 4 | | 2-17 | |  | | |  | | | 5 | | 3-8 | |  | | |  | | | 3 | | 0-7 | |  | | | |  | | 14 | | 8-58 | |  | | |

The number of CTEC triploid in adenosquamous carcinoma was significantly higher than that in adenocarcinoma and squamous carcinoma (*p*=0.0161\*, Mann-Whitney U test; *p*=0.0424\*, Mann-Whitney U test). The number of CTEC tetraploid in adenosquamous carcinoma was significantly higher than that in adenocarcinoma and squamous carcinoma (*p*=0.0061\*\*, Mann-Whitney U test; *p*=0.0061\*\*, Mann-Whitney U test). The number of CTEC triploid in stage IV was significantly higher than that in stage I (p=0.0276\*, Mann-Whitney U test).Measurement data were compared between multiple groups by Kruskal-Wallis test.

Abbreviations: NSCLC non-small cell lung cancer, BLDP benign lung disease patients, AC Adenocarcinoma, SC Squamous carcinoma, ASC adenosquamous carcinoma, CTCs circulating tumor cells, CTECs circulating tumor-derived endothelial cells, M median, P25-P75 inter-quartile range.

**Table3.** The diagnostic sensitivity of CTCs and CTECs in different pathological types and stages of NSCLC

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No** | | **CTCs** | | | | | | | | | | |  | **CTECs** | | | | | | | | | | |
| **Characteristics** | **Total CTCs** | | |  | **LCTCs** | | |  | **sCTCs** | | |  | **Total CTECs** | | |  | **LCTECs** | | |  | **sCTECs** | | |
| **No** | **≥11.5** | **＜11.5** | **SEN%** |  | **≥6.5** | **＜6.5** | **SEN%** |  | **≥6.5** | **＜6.5** | **SEN%** |  | **≥10.5** | **＜10.5** | **SEN%** |  | **≥8.5** | **＜8.5** | **SEN%** |  | **≥2.5** | **＜2.5** | **SEN%** |
| Pathological type | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC | 36 | | 27 | 9 | 75.0 |  | 12 | 24 | 33.3 |  | 23 | 13 | 63.9 |  | 27 | 9 | 75.0 |  | 23 | 13 | 63.9 |  | 22 | 14 | 61.1 |
| SC | 8 | | 6 | 2 | 75.0 |  | 5 | 3 | 62.5 |  | 6 | 2 | 75.0 |  | 7 | 1 | 87.5 |  | 6 | 2 | 75.0 |  | 7 | 1 | 87.5 |
| ASC | 3 | | 2 | 1 | 66.7 |  | 2 | 1 | 66.7 |  | 2 | 1 | 66.7 |  | 3 | 0 | 100.0 |  | 3 | 0 | 100.0 |  | 3 | 0 | 100.0 |
| Other | 2 | | 1 | 1 | 50.0 |  | 0 | 2 | 0.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |
| TNM stage |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ⅰ | 27 | | 19 | 8 | 70.4 |  | 10 | 17 | 37.0 |  | 16 | 11 | 59.3 |  | 19 | 8 | 70.4 |  | 17 | 10 | 63.0 |  | 18 | 9 | 66.7 |
| Ⅱ | 2 | | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 2 | 0 | 100.0 |  | 2 | 0 | 100.0 |  | 2 | 0 | 100.0 |
| Ⅲ | 9 | | 7 | 2 | 77.8 |  | 4 | 5 | 44.4 |  | 6 | 3 | 66.7 |  | 7 | 2 | 77.8 |  | 5 | 4 | 55.6 |  | 5 | 4 | 55.6 |
| Ⅳ | 11 | | 9 | 2 | 81.8 |  | 4 | 7 | 36.4 |  | 9 | 2 | 81.8 |  | 10 | 1 | 90.9 |  | 9 | 2 | 81.8 |  | 8 | 3 | 72.7 |

Abbreviations: NSCLC non-small cell lung cancer, BLDP benign lung disease patients, AC Adenocarcinoma, SC Squamous carcinoma, ASC adenosquamous carcinoma, CTCs circulating tumor cells, CTECs circulating tumor-derived endothelial cells.

**Table4.** The diagnostic sensitivity of aneuploid CTCs and CTECs in different pathological types and stages of NSCLC

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | **No** | | **CTCs** | | | | | | | | | | |  | **CTECs** | | | | | | | | | | |
| **Characteristics** | **Triploid** | | |  | **Tetraploid** | | |  | **Multiploid** | | |  | **Triploid** | | |  | **Tetraploid** | | |  | **Multiploid** | | |
| **No** | **≥6.5** | **＜6.5** | **SEN%** |  | **≥4.5** | **＜4.5** | **SEN%** |  | **≥6.5** | **＜6.5** | **SEN%** |  | **≥3.5** | **＜3.5** | **SEN%** |  | **≥2.5** | **＜2.5** | **SEN%** |  | **≥7.5** | **＜7.5** | **SEN%** |
| Pathological type | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| AC | 36 | | 19 | 17 | 52.8 |  | 12 | 14 | 33.3 |  | 9 | 27 | 33.3 |  | 16 | 20 | 44.4 |  | 15 | 11 | 41.7 |  | 19 | 14 | 52.8 |
| SC | 8 | | 6 | 2 | 75.0 |  | 2 | 6 | 25.0 |  | 3 | 5 | 37.5 |  | 4 | 4 | 50.0 |  | 4 | 4 | 50.0 |  | 6 | 2 | 75.0 |
| ASC | 3 | | 2 | 1 | 66.7 |  | 2 | 1 | 66.7 |  | 2 | 1 | 66.7 |  | 3 | 0 | 100.0 |  | 3 | 0 | 100.0 |  | 3 | 0 | 100.0 |
| Other | 2 | | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 0 | 2 | 0.0 |  | 0 | 2 | 0.0 |  | 0 | 2 | 0.0 |  | 0 | 1 | 0.0 |
| TNM stage |  | |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| Ⅰ | 27 | | 16 | 9 | 59.3 |  | 10 | 17 | 37.0 |  | 8 | 19 | 29.6 |  | 11 | 16 | 40.7 |  | 11 | 16 | 40.7 |  | 13 | 14 | 48.1 |
| Ⅱ | 2 | | 0 | 2 | 0.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |  | 0 | 2 | 0.0 |  | 1 | 1 | 50.0 |  | 1 | 1 | 50.0 |
| Ⅲ | 9 | | 3 | 6 | 33.3 |  | 2 | 7 | 22.2 |  | 2 | 7 | 22.2 |  | 6 | 3 | 66.7 |  | 3 | 6 | 33.3 |  | 5 | 4 | 55.6 |
| Ⅳ | 11 | | 9 | 2 | 81.8 |  | 3 | 8 | 27.3 |  | 3 | 8 | 27.3 |  | 7 | 4 | 63.6 |  | 7 | 4 | 63.6 |  | 9 | 2 | 81.8 |

Abbreviations: NSCLC non-small cell lung cancer, BLDP benign lung disease patients, AC Adenocarcinoma, SC Squamous carcinoma, ASC adenosquamous carcinoma, CTCs circulating tumor cells, CTECs circulating tumor-derived endothelial cells.