

**Table S1. Univariate Logistic Regression for the Ovary Cancer Patients with Brain Metastases among the Entire Cohort.**

| Variables             | among the Entire Cohort. |         | among the Metastatic Subset. |         |
|-----------------------|--------------------------|---------|------------------------------|---------|
|                       | OR (95%CI)               | P value | OR (95%CI)                   | P value |
| <b>Age (years)</b>    |                          |         |                              |         |
| 18-58                 | Reference                |         | Reference                    |         |
| ≥59                   | 1.572 (1.004-2.460)      | 0.048   | 0.887(0.563-1.395)           | 0.603   |
| <b>Marital status</b> |                          |         |                              |         |
| Married               | Reference                |         | Reference                    |         |
| Single                | 1.360(0.797-2.319)       | 0.260   | 1.233(0.718-2.116)           | 0.448   |
| Divorced              | 1.085(0.503-2.341)       | 0.836   | 0.964(0.443-2.096)           | 0.926   |
| Widowed               | 1.560(0.873-2.787)       | 0.133   | 1.116(0.621-2.006)           | 0.714   |
| Unknown               | 2.116(0.938-4.772)       | 0.071   | 1.979(0.864-4.531)           | 0.106   |
| <b>Race</b>           |                          |         |                              |         |
| White                 | Reference                |         | Reference                    |         |
| Black                 | 1.517(0.821-2.803)       | 0.183   | 1.058(0.569-1.967)           | 0.859   |
| Others                | 0.595(0.240-1.476)       | 0.263   | 0.693(0.277-1.732)           | 0.433   |
| Unknown               | 3.895(0.948-16.010)      | 0.059   | 11.131(2.271-54.542)         | 0.003   |
| <b>Origin recode</b>  |                          |         |                              |         |
| Hispanic              | Reference                |         | Reference                    |         |
| None-hispanic         | 1.156(0.614-2.176)       | 0.653   | 1.037(0.547-1.965)           | 0.912   |
| <b>Laterality</b>     |                          |         |                              |         |
| Unilateral            | Reference                |         | Reference                    |         |
| Bilateral             | 1.186 (0.694-2.028)      | 0.533   | 0.753(0.438-1.295)           | 0.305   |
| Unknown               | 3.502(2.159-5.681)       | <0.0001 | 1.036(0.635-1.690)           | 0.888   |
| <b>Tumor staging</b>  |                          |         |                              |         |
| I                     | Reference                | NA      | -                            | -       |
| II                    | 2.907(2.600-3.249)       | <0.0001 | -                            | -       |
| III                   | 6.207(5.718-6.737)       | <0.0001 | Reference                    | NA      |
| IV                    | 12.758(11.756-13.846)    | <0.0001 | 0.051(0.005-0.564)           | 0.015   |
| Unknown               | 11.390(10.181-12.742)    | <0.0001 | 0.100(0.004-2.287)           | 0.149   |
| <b>T staging</b>      |                          |         |                              |         |
| T1                    | Reference                |         | Reference                    |         |
| T2                    | 1.718(0.711-4.149)       | 0.229   | 0.443(0.180-1.092)           | 0.077   |
| T3                    | 1.224(0.605-2.479)       | 0.574   | 0.176(0.085-0.362)           | <0.0001 |
| Unknown               | 10.699(5.510-20.775)     | <0.0001 | 0.683(0.345-1.354)           | 0.275   |
| <b>N staging</b>      |                          |         |                              |         |
| N0                    | Reference                |         | Reference                    |         |
| N1                    | 1.525(0.908-2.562)       | 0.111   | 0.694(0.411-1.171)           | 0.171   |
| Unknown               | 3.395(2.051-5.619)       | <0.0001 | 1.063(0.638-1.769)           | 0.815   |
| <b>Histology</b>      |                          |         |                              |         |
| Epithelial neoplasms  | Reference                |         | Reference                    |         |
| Gonadal neoplasms     | 0.605(0.148-2.471)       | 0.484   | 2.428(0.574-10.273)          | 0.228   |
| Others                | 1.100(0.345-3.503)       | 0.872   | 0.975(0.303-3.137)           | 0.966   |
| Unknown               | 8.079(4.723-13.818)      | <0.0001 | 4.217(2.427-7.326)           | <0.0001 |

|  |                         |         |                       |         |
|--|-------------------------|---------|-----------------------|---------|
| <b>Treatment</b>   |                         |         |                       |         |
| Others   | Reference               |         | Reference             |         |
| RS   | 12.873(3.679-45.036)    | <0.0001 | 36.203(5.871-223.250) | <0.0001 |
| SC   | 0.026(0.010-0.067)      | <0.0001 | 0.084(0.033-0.215)    | <0.0001 |
| RC   | 21.800(11.376-41.777)   | <0.0001 | 10.971(5.485-21.944)  | <0.0001 |
| R  | 16.895(6.665-42.830)    | <0.0001 | 10.344(3.762-28.437)  | <0.0001 |
| S  | 0.032(0.008-0.133)      | <0.0001 | 0.287(0.069-1.204)    | 0.088   |
| C  | 0.240(0.111-0.516)      | <0.0001 | 0.219(0.102-0.474)    | <0.0001 |
| CSR  | 5.857(3.064-11.195)     | <0.0001 | 10.121(4.895-20.925)  | <0.0001 |
| <b>Surgery</b>   |                         |         |                       |         |
| U/BSO  | Reference               |         | Reference             |         |
| Cytoreductive  | 0.753(0.326-1.741)      | 0.508   | 0.296(0.127-0.688)    | 0.005   |
| Others   | 0.000(0.000-NA)         | 0.994   | 0.000(0.000-NA)       | 0.997   |
| NO   | 8.888(4.989-15.835)     | <0.0001 | 1.274(0.710-2.288)    | 0.417   |
| <b>Radiotherapy</b>  |                         |         |                       |         |
| No   | Reference               |         | Reference             |         |
| Yes  | 65.751 (42.519-101.676) | <0.0001 | 30.036(18.655-48.360) | <0.0001 |
| <b>Chemotherapy</b>  |                         |         |                       |         |
| No   | Reference               |         | Reference             |         |
| Yes  | 0.378 (0.249-0.574)     | <0.0001 | 0.387(0.253-0.590)    | <0.0001 |
| <b>Radiation Sequence with surgery</b>                             |                         |         |                       |         |
| RBS  | Reference               |         | Reference             |         |
| RAS  | 1.092(0.135-8.808)      | 0.934   | 3.290(0.365-29.638)   | 0.288   |
| RBAS   | 0.000(0.000-NA)         | 1.000   | 0.000(0.000-NA)       | 1.000   |
| Others   | 0.034(0.004-0.262)      | 0.001   | 0.125(0.015-1.048)    | 0.055   |
| <b>Bone Met</b>  |                         |         |                       |         |
| No   | Reference               |         | Reference             |         |
| Yes  | 40.031(24.612-65.109)   | <0.0001 | 4.337 (2.664-7.063)   | <0.0001 |
| Unknown  | 50.214(17.389-145.002)  | <0.0001 | 11.486(3.775-34.946)  | <0.0001 |
| <b>Liver Met</b>   |                         |         |                       |         |
| No   | Reference               |         | Reference             |         |
| Yes  | 4.387(2.669-7.210)      | <0.0001 | 0.214(0.120-0.352)    | <0.0001 |
| Unknown  | 19.204(8.170-45.140)    | <0.0001 | 3.769(1.525-9.311)    | 0.004   |
| <b>Lung Met</b>  |                         |         |                       |         |
| No   | Refence                 |         | Reference             |         |
| Yes  | 11.957(7.781-18.374)    | <0.0001 | 0.726(0.471-1.118)    | 0.146   |
| Unknown  | 8.500(2.627-27.498)     | <0.0001 | 1.927(0.582-6.380)    | 0.283   |
| <b>Extracranial Metastatic sites to bone, lung, and liver, No.</b> |                         |         |                       |         |
| 0  | Reference               |         | Reference             |         |
| 1  | 5.694(3.345-9.691)      | <0.0001 | 3.174(1.852-5.438)    | <0.0001 |
| 2  | 21.506(11.861-38.996)   | <0.0001 | 19.806(10.439-37.579) | <0.0001 |
| 3  | 92.269(41.227-206.502)  | <0.0001 | 1.240E+11(0.000-NA)   | 0.999   |
| Unknown  | 15.497(6.846-35.082)    | <0.0001 | 5.372(2.334-12.368)   | <0.0001 |

**CA125**

|          |                     |       |                    |       |
|----------|---------------------|-------|--------------------|-------|
| Normal   | Reference           |       | Reference          |       |
| Elevated | 1.608(0.580-4.458)  | 0.362 | 0.339(0.119-0.963) | 0.042 |
| Unknown  | 3.624(1.289-10.192) | 0.015 | 0.943(0.327-2.724) | 0.914 |

**Insurance situation**

|         |                    |       |                    |       |
|---------|--------------------|-------|--------------------|-------|
| No      | Reference          |       | Reference          |       |
| Yes     | 0.430(0.198-0.935) | 0.033 | 0.497(0.225-1.096) | 0.083 |
| Unknown | 1.607(0.508-5.089) | 0.420 | 1.909(0.582-6.267) | 0.286 |

**Residence type**

|              |                     |       |                     |       |
|--------------|---------------------|-------|---------------------|-------|
| Rural        | Reference           |       | Reference           |       |
| Urban        | 1.716(0.223-13.225) | 0.604 | 1.888(0.241-14.789) | 0.545 |
| Metropolitan | 1.431(0.199-10.308) | 0.722 | 1.486(0.203-10.868) | 0.696 |
| Unknown      | NA                  | 0.999 | NA                  | NA    |

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**Table S2. Univariate Cox Regression for the Ovary Cancer Patients among the Entire Cohort.**

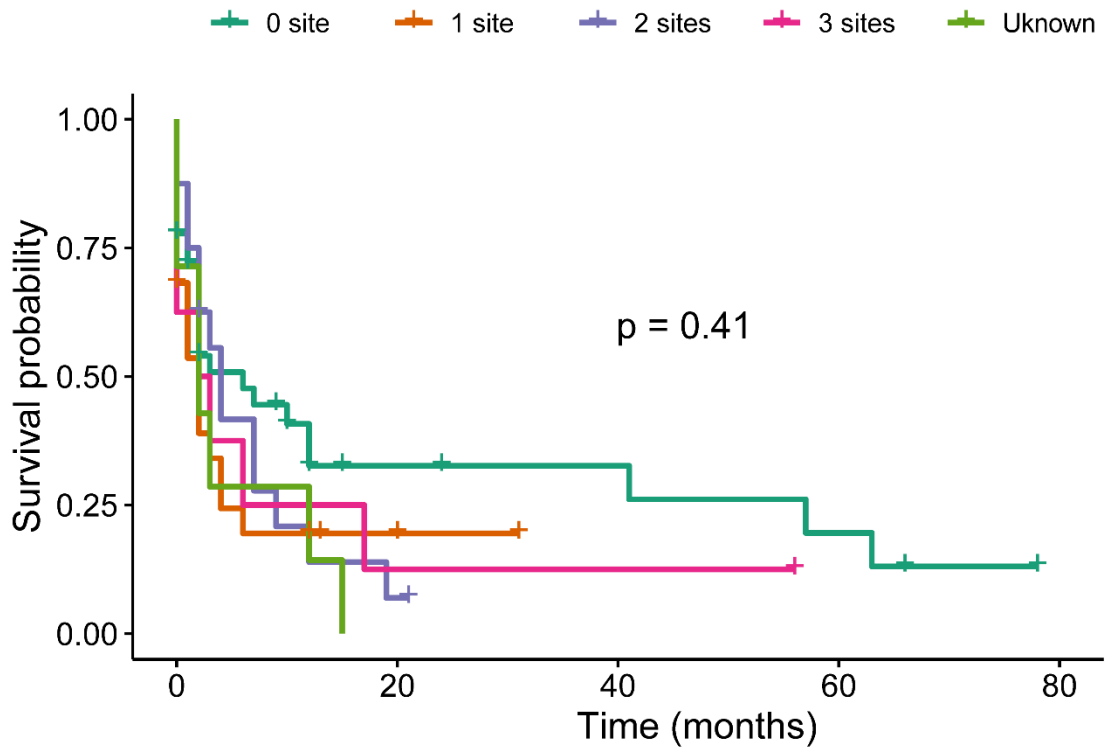
| Variables             | Patients, No.      |                              | All-Cause Mortality among Entire Cohort |         | All-Cause Mortality among Brain Metastases |         |
|-----------------------|--------------------|------------------------------|---|---------|--|---------|
|                       | Patients (N=29512) | With Brain Metastases (N=89) | HR (95%CI)                              | P value | HR (95%CI)                                 | P value |
| <b>Age (years)</b>    |                    |                              |   |         |  |         |
| 18-58                 | 12359              | 28                           | Reference                               |         | Reference                                  |         |
| ≥59                   | 17153              | 61                           | 2.564(2.462-2.670)                      | <0.0001 | 1.227(0.739-2.036)                         | 0.430   |
| <b>Marital status</b> |                    |                              |   |         |  |         |
| Married               | 14188              | 35                           | Reference                               |         | Reference                                  |         |
| Single                | 6565               | 22                           | 1.114(1.061-1.170)                      | <0.0001 | 1.019(0.538-1.929)                         | 0.954   |
| Divorced              | 2990               | 8                            | 1.392(1.310-1.478)                      | <0.0001 | 2.860(1.258-6.504)                         | 0.012   |
| Widowed               | 4424               | 17                           | 2.537(2.423-2.658)                      | <0.0001 | 1.404(0.749-2.632)                         | 0.290   |
| Unknown               | 1345               | 7                            | 1.259(1.152-1.376)                      | <0.0001 | 0.846(0.322-2.223)                         | 0.734   |
| <b>Race</b>           |                    |                              |   |         |  |         |
| White                 | 23792              | 70                           | Reference                               |         | Reference                                  |         |
| Black                 | 2692               | 12                           | 1.348(1.273-1.428)                      | <0.0001 | 0.774(0.386-1.549)                         | 0.468   |
| Others                | 2852               | 5                            | 0.735(0.686-0.787)                      | <0.0001 | 1.061(0.384-2.931)                         | 0.910   |
| Unknown               | 176                | 2                            | 0.299(0.195-0.459)                      | <0.0001 | 0.397(0.055-2.881)                         | 0.361   |
| <b>Origin recode</b>  |                    |                              |   |         |  |         |
| Hispanic              | 4136               | 11                           | Reference                               |         | Reference                                  |         |
| Non-hispanic          | 25376              | 78                           | 1.215(1.149-1.284)                      | <0.0001 | 1.518(0.693-3.325)                         | 0.297   |
| <b>Laterality</b>     |                    |                              |   |         |  |         |
| Unilateral            | 15441              | 32                           | Reference                               |         | Reference                                  |         |
| Bilateral             | 9362               | 23                           | 1.519(1.456-1.585)                      | <0.0001 | 0.799(0.426-1.500)                         | 0.485   |
| Unknown               | 4709               | 34                           | 4.846(4.634-5.069)                      | <0.0001 | 1.360(0.787-2.349)                         | 0.270   |
| <b>Tumor staging</b>  |                    |                              |   |         |  |         |
| I                     | 6966               | 0                            | Reference                               |         | Reference                                  |         |
| II                    | 2435               | 0                            | 2.907(2.600-3.249)                      | <0.0001 | NA   | NA      |
| III                   | 10799              | 1                            | 6.207(5.718-6.737)                      | <0.0001 | NA   | NA      |
| IV                    | 8239               | 87                           | 12.758(11.756-13.846)                   | <0.0001 | NA   | NA      |
| Unknown               | 1073               | 1                            | 11.390(10.181-12.742)                   | <0.0001 | NA   | NA      |
| <b>T staging</b>      |                    |                              |   |         |  |         |
| T1                    | 7811               | 11                           | Reference                               |         | Reference                                  |         |
| T2                    | 3724               | 9                            | 3.175(2.922-3.450)                      | <0.0001 | 1.024(0.363-2.891)                         | 0.964   |
| T3                    | 15084              | 26                           | 5.403(5.057-5.774)                      | <0.0001 | 0.953(0.410-2.215)                         | 0.911   |
| Unknown               | 2893               | 43                           | 12.754(11.814-13.768)                   | <0.0001 | 1.353(0.615-2.977)                         | 0.452   |
| <b>N staging</b>      |                    |                              |   |         |  |         |
| N0                    | 20246              | 45                           | Reference                               |         | Reference                                  |         |
| N1                    | 6202               | 21                           | 1.554(1.489-1.622)                      | <0.0001 | 1.219(0.667-2.227)                         | 0.519   |
| Unknown               | 3064               | 23                           | 3.258(3.099-3.424)                      | <0.0001 | 1.369(0.778-2.407)                         | 0.276   |
| <b>Histology</b>      |                    |                              |   |         |  |         |
| Epithelial neoplasms  | 26303              | 67                           | Reference                               |         | Reference                                  |         |
| Gonadal neoplasms     | 1297               | 2                            | 0.180(0.150-0.216)                      | <0.0001 | 0.373(0.051-2.716)                         | 0.330   |
| Others                | 1071               | 3                            | 1.836(1.695-1.990)                      | <0.0001 | 0.340(0.047-2.467)                         | 0.286   |

|  |       |    |                       |         |                     |         |
|--|-------|----|-----------------------|---------|---------------------|---------|
| Unknow                                 | 841   | 17 | 3.785(3.494-4.099)    | <0.0001 | 2.422(1.374-4.272)  | 0.002   |
| <b>Treatment</b>                       |       |    |                       |         |                     |         |
| CSR                                    | 213   | 13 | Reference             |         | Reference           |         |
| RS                                     | 24    | 3  | 1.345(0.742-2.440)    | 0.329   | 3.782(0.703-20.352) | 0.121   |
| SC                                     | 17127 | 5  | 0.532(0.441-0.642)    | <0.0001 | 1.163(0.275-4.913)  | 0.837   |
| RC                                     | 77    | 15 | 2.335(1.665-3.276)    | <0.0001 | 2.963(0.962-9.121)  | 0.058   |
| R                                      | 38    | 6  | 3.297(2.179-4.989)    | <0.0001 | 9.509(2.563-35.281) | 0.001   |
| S                                      | 5647  | 2  | 0.402(0.331-0.487)    | <0.0001 | 5.195(0.961-28.089) | 0.056   |
| C                                      | 3015  | 8  | 2.523(2.087-3.051)    | <0.0001 | 4.350(1.262-14.986) | 0.020   |
| Others                                 | 3371  | 37 | 5.715(4.730-6.906)    | <0.0001 | 8.415(3.097-22.865) | <0.0001 |
| <b>Surgery</b>                         |       |    |                       |         |                     |         |
| U/BSO                                  | 12146 | 14 | Reference             |         | Reference           |         |
| Cytoreductive                          | 10360 | 9  | 2.332(2.218-2.451)    | <0.0001 | 1.297(0.410-4.100)  | 0.658   |
| Others                                 | 505   | 0  | 2.399(2.088-2.756)    | <0.0001 | NA                  | NA      |
| No                                     | 6501  | 66 | 11.462(10.908-12.046) | <0.0001 | 4.302(1.881-9.841)  | 0.001   |
| <b>Radiotherapy</b>                    |       |    |                       |         |                     |         |
| No                                     | 352   | 37 | Reference             |         | Reference           |         |
| Yes                                    | 29160 | 52 | 1.605(1.396-1.846)    | <0.0001 | 0.455(0.273-0.759)  | 0.003   |
| <b>Chemotherapy</b>                    |       |    |                       |         |                     |         |
| No                                     | 20432 | 41 | Reference             |         | Reference           |         |
| Yes                                    | 9080  | 48 | 0.625(0.602-0.649)    | <0.0001 | 0.266(0.157-0.450)  | <0.0001 |
| <b>Radiation Sequence with surgery</b> |       |    |                       |         |                     |         |
| RBS                                    | 15    | 1  | Reference             |         | Reference           |         |
| RAS                                    | 235   | 17 | 0.694(0.364-1.322)    | 0.267   | 0.379(0.046-3.107)  | 0.366   |
| RBAS                                   | 1     | 0  | 4.291(0.549-33.522)   | 0.165   | NA                  | NA      |
| Others                                 | 29261 | 71 | 0.535(0.288-0.995)    | 0.048   | 1.353(0.186-9.824)  | 0.765   |
| <b>Brain Met</b>                       |       |    |                       |         |                     |         |
| No.                                    | 89    | 89 | Reference             |         | NA                  | NA      |
| Yes                                    | 29413 | 0  | 4.059(3.208-5.135)    | <0.0001 | NA                  | NA      |
| <b>Bone Met</b>                        |       |    |                       |         |                     |         |
| No                                     | 310   | 24 | Reference             |         | Reference           |         |
| Yes                                    | 29160 | 61 | 3.859(3.395-4.388)    | <0.0001 | 1.025(0.599-1.755)  | 0.928   |
| Unknown                                | 42    | 4  | 3.807(2.732-5.306)    | <0.0001 | 1.429(0.513-3.984)  | 0.495   |
| <b>Liver Met</b>                       |       |    |                       |         |                     |         |
| No                                     | 2120  | 21 | Reference             |         | Reference           |         |
| Yes                                    | 27249 | 62 | 2.762(2.615-2.918)    | <0.0001 | 1.481(0.861-2.546)  | 0.156   |
| Unknown                                | 143   | 6  | 3.157(2.614-3.813)    | <0.0001 | 1.567(0.665-3.694)  | 0.304   |
| <b>Lung Met</b>                        |       |    |                       |         |                     |         |
| No                                     | 1773  | 37 | Reference             |         | Reference           |         |
| Yes                                    | 27538 | 49 | 2.967(2.799-3.145)    | <0.0001 | 1.368(0.840-2.230)  | 0.208   |
| Unknown                                | 201   | 3  | 4.142(3.554-4.827)    | <0.0001 | 1.971(0.601-6.461)  | 0.263   |
| <b>CA125</b>                           |       |    |                       |         |                     |         |
| Normal                                 | 2654  | 4  | Reference             |         | Reference           |         |
| Elevated                               | 20241 | 49 | 3.552(3.220-3.918)    | <0.0001 | 3.448(0.820-14.493) | 0.091   |

|                            |       |    |                    |         |                     |       |
|----------------------------|-------|----|--------------------|---------|---------------------|-------|
| Unknown                    | 6617  | 36 | 3.083(2.781-3.418) | <0.0001 | 3.085(0.732-13.003) | 0.125 |
| <b>Insurance situation</b> |       |    |                    |         |                     |       |
| No                         | 1096  | 7  | Reference          |         | Reference           |       |
| Yes                        | 27927 | 77 | 0.986(0.898-1.082) | 0.759   | 0.422(0.188-0.948)  | 0.037 |
| Unknown                    | 489   | 5  | 1.221(1.036-1.440) | 0.017   | 0.464(0.135-1.599)  | 0.224 |
| <b>Residence type</b>      |       |    |                    |         |                     |       |
| Rural                      | 482   | 1  | Reference          |         | Reference           |       |
| Urban                      | 3376  | 12 | 0.999(0.867-1.150) | 0.986   | 1.140(0.146-8.876)  | 0.900 |
| Metropolitan               | 25630 | 76 | 0.858(0.751-0.980) | 0.024   | 0.526(0.072-3.844)  | 0.527 |
| Unknown                    | 24    | 0  | 0.988(0.553-1.767) | 0.968   | NA                  | NA    |

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**Figure S1. Overall survival among patients with OCBM at diagnosis stratified by the number of metastatic diseases to any distant site.**



**No. at risk**

|         | 0  | 5 | 10 | 15 | 20 |
|---------|----|---|----|----|----|
| 0 site  | 36 | 6 | 5  | 3  | 0  |
| 1 site  | 22 | 2 | 0  | 0  | 0  |
| 2 sites | 16 | 1 | 0  | 0  | 0  |
| 3 sites | 8  | 1 | 1  | 0  | 0  |
| Unknown | 7  | 0 | 0  | 0  | 0  |