Table S1. Main characteristics of the included studies with clinical and molecular features

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| First author | Country | Age | Method | Stage | Staining | Cut-off values | N (E+%) | ER+ | ER- | PR+ | PR- | Her-2+ | Her-2- | TN- | TN+ | EGFR+ | EGFR- |
| E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N |
| Rodriguez-Pinilla 2007 | Spain | NA | IHC | NA | nuclear |  Any  | 198 (16.7%) | 15/138 | 18/59 | 15/126 | 18/70 | 2/16 | 31/182 | 13/30 | 16/147 | 8/19 | 24/173 |
| Lengerke 2011 | Germany | 50-69 | IHC | NA | nuclear | >0% | 86 (27.9%) | 19/69 | 5/17 | 18/64 | 6/22 | 4/11 | 20/75 | 2/7 | 22/79 |  |  |
| Leis 2012 | Spain | 55 | IHC | 1-3 | nuclear | >0% | 160 (15%) | 18/121 | 6/39 | 15/103 | 9/57 | 9/32 | 15/128 | 2/22 | 23/136 | 4/22 | 5/43 |
| Li 2013  | China | NA | IHC | 1-4 | NA | ≥30% | 269 (46.5%) |  |  |  |  |  |  |  |  |  |  |
| Nagata 2014 | Japan | 55.2 | IHC | 0-3 | nuclear |  3–5 scores | 100 (34%) | 29/81 | 5/19 |  |  |  |  | 3/14 | 31/86 |  |  |
| Piva 2014 | Spain | NA | IHC | NA | nuclear | NA | 81 (59.3%) |  |  |  |  | 8/13 | 34/62 |  |  |  |  |
| Abd El-Maqsoud 2014  | Egypt | 53.37 | IHC | NA | nuclear | Any  | 126 (33.3%) | 28/56 | 14/70 | 31/68 | 11/58 | 29/75 | 13/51 | 23/36 | 19/90 |  |  |
| Huang 2014  | China | NA | IHC | NA | nuclear | ≥1% | 552 (19%) | 70/417 | 35/133 | 68/397 | 37/150 | 22/101 | 83/449 | 9/26 | 88/491 | 16/60 | 89/482 |
| Shima 2016  | Japan | 60.5 | IHC | NA | nuclear | Any  | 102 (8.8%) | 6/80 | 3/22 | 4/61 | 5/40 | 3/13 | 6/88 | 2/14 | 7/87 |  |  |
| Gwak 2017  | Korea | 50.9 | IHC | NA | nuclear | ≥1% | 319 (10.3%) | 20/221 | 13/98 | 17/174 | 16/145 | 11/81 | 22/238 | 8/56 | 25/263 |  |  |
| Wang 2017 | China | NA | IHC | 1-4 | nuclear | NA | 74 (25.7%) | 11/45 | 8/29 |  |  | 15/46 | 4/28 | 1/10 | 18/64 |  |  |
| Ni 2017 |  China | NA | IHC | 1-4 | NA | 2 or 3 scores | 127 (33.1%) | 29/63 | 13/64 | 28/67 | 14/60 | 30/84 | 12/43 |  |  |  |  |
| Gupta 2018 | Canada | NA | IHC | NA | nuclear | an average score of 20 in the 5 fields | 35 (37.1%) | 10/18 | 3/17 | 8/22 | 5/13 |  |  |  |  |  |  |
| Zhang 2018 | China | 54.35 | IHC/IF | 1-3 | cell membrane | ≥HSCORE 0.7 | 127 (16.5%) |  |  |  |  |  |  |  |  |  |  |
| Li 2018 | China | NA | IHC | NA | NA |  ≥1 score | 70 (72.9%) |  |  |  |  |  |  |  |  |  |  |
| Kündig 2018 | Switzerland | NA | IHC | NA | cytoplasm/nuclear | >0% | 283 (9.5%) |  |  |  |  |  |  |  |  |  |  |
| Liu 2018 |  China | 50.93 | IHC | 1-4 | NA | ≥2 scores | 237 (51.5%) |  |  |  |  |  |  |  |  |  |  |
| Yang 2018 | China | 53.8 | IF | 1-3 | NA | ≥HSCORE 0.7 | 134 (20.9%) | 12/71 | 16/63 | 12/60 | 16/74 | 　 | 　 | 　 | 　 | 　 | 　 |

Table S1. Continued

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| First author | Country | Cut-off values | N (E+%) | ≥ 50years | ≤ 50 years | Postmenopausal | Premenopausal | Clinical stage 3-4 | Clinical stage 0-2 | Grade 3 | Grade 1-2 | pT-stage 2-4 | pT-stage 1 | Lymph node metastasis (yes) | Lymph node metastasis (no) | Lymphovascular invasion (yes) | Lymphovascular invasion (no) |
| E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N | E+/N |
| Rodriguez-Pinilla 2007 | Spain |  Any  | 198 (16.7%) |  |  | 18/106 | 14/84 |  |  | 16/81 | 11/94 | 18/67 | 12/98 |  |  |  |  |
| Lengerke 2011 | Germany | >0% | 86 (27.9%) |  |  |  |  |  |  | 9/26 | 15/60 | 11/27 | 13/59 | 6/23 | 18/62 | 9/23 | 15/63 |
| Leis 2012 | Spain | >0% | 160 (15%) | 15/107 | 9/53 |  |  | 2/22 | 18/132 | 9/48 | 15/107 | 5/49 | 10/56 | 1/41 | 11/59 |  |  |
| Li 2013  | China | ≥30% | 269 (46.5%) |  |  |  |  | 39/54 | 86/215 | 40/54 | 69/140 |  |  | 22/49 | 0/66 |  |  |
| Nagata 2014 | Japan |  3–5 scores | 100 (34%) |  |  | 19/62 | 15/38 | 2/9 | 32/91 |  |  |  |  |  |  |  |  |
| Piva 2014 | Spain | NA | 81 (59.3%) | 32/55 | 8/18 |  |  |  |  | 18/20 | 30/59 | 18/35 | 12/26 |  |  |  |  |
| Abd El-Maqsoud 2014  | Egypt | Any  | 126 (33.3%) | 26/88 | 16/38 | 24/80 | 18/46 |  |  | 30/71 | 12/55 | 41/119 | 1/7 | 34/86 | 8/40 |  |  |
| Huang 2014  | China | ≥1% | 552 (19%) | 56/334 | 49/218 |  |  |  |  | 50/193 | 55/353 | 73/313 | 32/233 | 46/254 | 55/276 | 19/93 | 28/208 |
| Shima 2016  | Japan | Any  | 102 (8.8%) |  |  | 5/71 | 4/35 |  |  | 7/31 | 2/64 | 5/41 | 4/60 | 4/26 | 5/76 | 4/33 | 5/62 |
| Gwak 2017  | Korea | ≥1% | 319 (10.3%) |  |  |  |  |  |  | 25/180 | 8/139 | 20/156 | 13/163 | 15/136 | 18/183 | 15/146 | 18/173 |
| Wang 2017 | China | NA | 74 (25.7%) | 10/36 | 9/38 |  |  | 16/40 | 3/34 | 16/45 | 3/29 | 13/53 | 6/21 | 17/48 | 2/19 |  |  |
| Ni 2017 |  China | 2 or 3 scores | 127 (33.1%) | 14/39 | 28/88 |  |  |  |  | 9/44 | 33/83 | 16/62 | 26/65 | 18/62 | 24/65 |  |  |
| Gupta 2018 | Canada | an average score of 20 in the 5 fields | 35 (37.1%) | 9/26 | 4/9 |  |  |  |  | 10/17 | 3/18 |  |  |  |  | 10/13 | 3/22 |
| Zhang 2018 | China | ≥HSCORE 0.7 | 127 (16.5%) | 9/71 | 12/56 |  |  | 10/45 | 11/82 | 4/5 | 17/122 | 17/88 | 4/39 | 18/94 | 3/33 |  |  |
| Li 2018 | China |  ≥1 score | 70 (72.9%) |  |  |  |  |  |  | 10/10 | 41/60 | 45/61 | 6/9 |  |  |  |  |
| Kündig 2018 | Switzerland | >0% | 283 (9.5%) |  |  |  |  |  |  | 21/110 | 6/173 |  |  |  |  |  |  |
| Liu 2018 |  China | ≥2 scores | 237 (51.5%) | 51/95 | 71/142 | 51/98 | 71/139 | 54/70 | 68/167 | 66/119 | 56/118 |  |  | 90/114 | 32/123 |  |  |
| Yang 2018 | China | ≥HSCORE 0.7 | 134 (20.9%) | 14/69 | 14/65 | 　 | 　 | 9/30 | 19/104 | 7/11 | 21/123 | 26/100 | 2/34 | 17/75 | 11/59 | 　 | 　 |

NA: not applicable; IHC: immunohistochemistry; IF: immunofluorescence; N: the number of the study population; E+: positive expression; HSCORE: histological score; ER: estrogen receptor; PR: progesterone receptor; HER2: human epidermal growth factor receptor 2; TN: triple-negative; EGFR: epidermal growth factor receptor; -: negative.