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Detection of circulating tumor cells in sarcoma patients

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Abstract:

Background: The presence of circulating tumor cells (or CTCs) in peripheral blood has been confirmed to be associated with prognosis and tumor metastasis in several cancers. However, CTCs in sarcomas has not been fully elucidated. The biological process of Epithelial-Mesenchymal Transition (EMT) may play an important role in the generation of more aggressive sub-population of CTCs. According to EMT process of CTCs, CTCs can be identified as epithelial CTCs, mesenchymal CTCs and hybrid (epithelial/mesenchymal) CTCs. And the mesenchymal CTCs may be associated with high metastatic potential.

Purposes: To investigate the application value of circulating tumor cells (or CTCs) detection in clinical diagnosis, treatment, prognosis of sarcomas.

Patients and Methods: Peripheral blood samples from 28 cases of sarcomas confirmed by pathology were detected using CanPatrol CTC enrichment technique (SurExam China). After isolating CTCs via a filter-based method, a multiplexed mRNA fluorescence in situ hybridization method was applied to characterize CTCs according to the expression status of epithelial and mesenchymal biomarkers. The result of CTCs detection was analyzed in combination with clinical data.

Results: The diagnosis of the 28 cases was osteosarcoma (23 cases), Ewing's sarcoma (1 case), leiomyosarcoma (1 case), myosarcoma (1 case), liposarcoma (2 cases). Among the 28 patients, 27 patients(96.4%) had detectable CTCs. The number of CTCs ranged from 1 to 45. The mean of CTCs in all the patients was 13.46. All the CTC-positive patients had detectable mesenchymal CTCs and/or hybrid CTCs. Mesenchymal CTCs were detected in 85.2% CTC-positive patients (22/27). The number of CTCs was positively correlated with that of platelet level($P < 0.01$).

Conclusions: This technology of CTCs detection is a new technology, which can detect CTCs in peripheral blood samples from patients. With a high capture rate, this technology is simple, rapid and accurate. Combining with the number of platelet and using this technology to detect CTCs number and cell-type, can help to evaluate the efficacy of treatment and predict the prognosis of sarcomas. And this technology of CTCs detection should be validated in further studies.