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Liquid Biopsy Usage as Biomarker in Identification of Osteosarcoma

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Osteosarcoma (OS) is the most common primary bone cancer and is histologically characterized by the production of osteoid by malignant cells. Its incidence has a bimodal age distribution, with the first peaking at 12-14 years and the second peaking after 60 years [1]. OS is a relatively rare malignant tumor, accounting for about 1% of all newly diagnosed cancers in adults and 3-5% in children [2]. For non-metastatic OS, 5-year patient survival ranges from 40% to 75%, a comprehensive regimen of 2-3 rounds of chemotherapy followed by radical resection and additional adjuvant chemotherapy. Unfortunately, about 20% of patients who have metastasized to the lungs at the time of diagnosis have a poor prognosis. In particular, a major problem in the treatment of patients with OS is chemotherapy resistance, which may also promote the rapid growth of metastases [3]. Due to the extremely unstable chromosomes of the OS, it is characterized by a very complex karyotype, including varying copy count increases and decreases [4]. Some studies highlight potential changes in the genome of OS cells and suggest potential candidate genes that promote the etiology of OS, but the exact relationship between genetic instability and the development of OS is still debated. It has been [5]. Increases and decreases in whole chromosomes or chromosomal segments have been observed in various regions containing oncogenes such as MYC and COSP3 and tumor suppressor genes [6] such as LSAMP, CDKN2A, RB1 and TP53. Genetic mutations, certain bone diseases, hereditary cancer syndromes, and ionizing radiation are known risk factors for developing OS. Genetic and environmental factors activate a number of cancer-related molecular signaling pathways whose role in the pathogenesis of OS is currently the subject of further investigation [7]. OS diagnosis includes a series of clinical analyses, radiological examinations, and biopsy-based evaluation of histopathology. Radiography is routinely used as a front-line diagnostic imaging method for assessing primary bone tumors. If OS is suspected, magnetic resonance imaging (MRI) is used to understand the distribution of tumors in the bone, assess the presence of soft tissue masses, and detect skipped metastases. Computed tomography (CT) is less sensitive than MRI when assessing tumors locally, but it is recommended to detect lung metastases. Similarly, bone scintigraphy allows the detection of bone metastases in OS, but the role of positron emission tomography (PET) and integrated PET / CT imaging is particularly to monitor the effects of chemotherapy and to improve progression-free survival. It is increasingly being considered by clinicians to predict time to live.

Liquid biopsy produces circulating tumor microRNAs (miRNAs) and long non-coding RNAs (lncRNAs), circulating tumor cells (CTCs), circulating tumor DNAs (ctDNAs), and micro vesicles / exo somes released into the blood by malignant cells can be done to detect. Such a new approach does not require a surgical biopsy, but provides clinicians with a wide range of information, including tumor origin, staging, patient response to treatment, and the emergence of drug resistance. By repeating sampling, liquid biopsy can help in the early evaluation of tumors and improve the identification of minimal metastases and minimal residual lesions that can only be partially detected by conventional diagnostic methods. In particular, it can reflect the overall heterogeneity of the disease and helps to more accurately monitor molecular changes within the tumor in real time.

Liquid biopsy has significant advantages over traditional tissue biopsies, researchers need to develop accurate and reproducible blood tests for routine clinical practice. In particular, variables at each stage of pre-analysis (bio sample collection, storage, storage), analysis (bio sample quantification and analysis), and post-analysis (data collection and interpretation) should be carefully examined and validated. In addition, liquid biopsy tests need to be more sensitive, able to accurately detect small amounts of circulating tumor components and specific, correctly distinguishing and distinguishing between circulating and non-tumor components.

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