

Liquid biopsy is defined as the process of obtaining material for pathologic examination and analysis from body fluids. Liquid biopsy has been intensively researched for its clinical application in patients with solid malignancies, including melanoma and colon, breast, and lung cancers. This will become a standard and routine tool for the diagnostic and prognostic evaluation of all cancer types. This article provides an overview of liquid biopsy, its uses in cancer management, and its implications for nursing practice.

AT A GLANCE

- Liquid biopsy's utility in diagnostics and for prognostication of various cancers is growing rapidly, which calls for more educational efforts to meet patients' information needs and clinicians' knowledge gap on this topic.
- Preliminary evidence has shown that liquid biopsies offer valid and reliable noninvasive alternatives to surgical tissue excision biopsies in some cancers.
- Liquid biopsies provide genomic data that are needed for achieving the full potential of precision medicine; clinicians, patients, and research funders must collaborate in supporting large-scale validation studies to establish the reliability and validity of liquid biopsies for diagnostic and prognostic purposes.

KEYWORDS

liquid biopsy; genetic biomarkers; genomic data; precision medicine

DIGITAL OBJECT

IDENTIFIER

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Liquid Biopsy

A tool for the diagnostic and prognostic evaluation of cancers

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The concept of liquid biopsy is a novel one. In 2018, the concept was first introduced as a medical subject heading (MeSH) term by the National Center for Biotechnology Information, which houses biotechnology and biomedicine databases. Liquid biopsy is defined as a procedure that obtains material for pathologic examination and analysis. Liquid biopsies can be obtained from body fluids by retrieving specimen materials, such as cell-free nucleic acids, cell-derived microparticles, exosomes, circulating neoplasm cells, and other circulating cells and cellular structures (U.S. National Library of Medicine, 2018). In nontechnical language, liquid biopsy can enable clinicians to discover cancer cells from a tumor through a blood, urine, or saliva sample (Hofman, 2017). Liquid biopsy provides genomic data that can help clinicians accurately determine a patient's cancer diagnosis and prognosis. It is considered one of the most advanced noninvasive diagnostic systems with which to obtain key molecular information relevant to clinical decisions and the practice of precision medicine (Finotti et al., 2018).

Identification of Genetic Biomarkers

Genetic biomarkers are crucial in helping clinicians predict which treatment for a particular cancer will work best in specific subsets of patients with cancer, as well as efficiently monitoring their response to therapy (U.S. National Library of Medicine, 2016). Research and clinical

interest in biomarkers identified by liquid biopsy continue to grow exponentially (Coco et al., 2017). For example, liquid biopsy can provide understanding into the real-time dynamics of lung cancer by more frequent analysis of circulating biomarkers, such as circulating tumor cells and circulating tumor DNA, in the peripheral blood of patients with lung cancer (Lim, Kim, Sunkara, Kim, & Cho, 2018). The genomic data from the liquid biopsy aid the clinician in deciding which treatment option is a more appropriate therapy (including immunotherapy), based on the unique patient's molecular and immune profile at diagnosis or relapse stage, without an invasive biopsy of the lung tumor.

A systematic review by Armeth (2018) concerning liquid biopsy in clinical practice reported that liquid biopsy can accurately identify *KRAS*, *BRAF*, and epidermal growth factor receptor mutations, key genomic data in the treatment of melanoma and breast, lung, and colon cancers. The review suggests that liquid biopsy, which is an accurate method of detecting and monitoring tumor mutations, will become the preferred diagnostic method, rather than standard tumor tissue biopsy (Armeth, 2018).

Although liquid biopsy is attractive because of its minimally invasive approach (sample is easily repeatable and easier to obtain than a tumor tissue biopsy) and cost-effectiveness (compared to the cost of computerized tomography or magnetic resonance imaging), the key issue is the sensitivity and specificity of the identified biomarkers for application to early diagnosis (Knight et al., 2017). Liquid biopsies