A novel flowcytometry-based approach for detecting malignant cells in body fluids has been developed

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Abstract (600 word limit):

Malignancy is detected by morphological microscopic analyses of nucleated cells in bodily fluid (BF) samples. The morphological differentiation, on the other hand, is time-consuming and labor-intensive. The goal of this work was to create a new flowcytometry-based gating analysis mode called "XN-BF gating algorithm" to detect malignant cells using a Sysmex XN-1000 automated haematology analyzer. WDF white blood cell (WBC) differential channel was installed in the XN-BF mode. The WDF channel now has two new algorithms: Rule 1 targets clustered malignant cells by detecting larger and clumped cell signals compared to leukocytes; Rule 2 targets haematological malignant cells and solid tumour cells by detecting middle-sized mononuclear cells with fewer granules than neutrophils and a fluorescence signal similar to monocytes. BF samples that met at least one rule were found to be cancerous. The May-Grunwald Giemsa dye was used for manual microscopic distinction, as well as a WBC count with a hemocytometer. These three approaches were compared to cytological diagnosis to see how well they performed. In detecting malignant-cell positive samples, the XN-BF gating algorithm had a sensitivity of 63.0 percent and specificity of 87.8%, with 68.0 percent positive predictive value and 85.1 percent negative predictive value. Manual microscopic WBC differentiation and WBC count revealed sensitivities of 70.4 percent and 66.7 percent, respectively, and specificities of 96.9% and 92.3 percent. The XN-BF gating technique could be a useful tool in haematology labs for quickly detecting malignant cells in a variety of BF samples.

Importance of Research:

By modifying the usual HF-BF method, we propose a new XN-BF gating approach to detect malignant cells in this work. Two gating parameters based on the WDF channel, Rule 1 and Rule 2, were combined with HF-BF: Rule 1 detects signals from large cells and clumped cells, the majority of which are clustered malignant cells; and Rule 2 detects middle sized mononuclear cells with fewer granules than neutrophils and a similar fluorescence signal to monocytes, the majority of which are haematological malignant cells and solid tumour cells. This innovative approach was evaluated by comparing it to cytological diagnosis in a pathology lab utilising diverse BF samples with and without cancerous cells.

Biography:

Toshihiro Horii is the Department of Clinical Laboratory, Juntendo University, Tokyo, Japan. He has lectured nationally and internationally and has published on many aspects of cancer care. He attended medical school and completed his surgical residency in Juntendo University, and completed a surgical oncology fellowship. He has been named to the Top Docs list and has won awards for the development of multidisciplinary oncology care programs.

Information of Institute:

Juntendo University is a private university in Japan. Its headquarters are on its campus in Bunkyo, Tokyo, for the School of Medicine and in Inzai, Chiba, for the School of Health and Sports Science. The university was established in 1838 for medical and in 1946 for other departments. It is nicknamed Jundai. The Faculty of Medicine orchestrates study abroad opportunities at Juntendo, though placements are also available through the faculties of Sports Science, Health Care and Nursing. For international students who wish to study at Juntendo, the university offers Japanese language lessons at beginner, intermediate and advanced levels.

Institution:

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