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Smudge Cells -A Diagnostic Pitfall

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Editorial

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In case of lymphoproliferative disorders an haematological artifact of a fragile lymphocyte has been observed which looks like a smudge or basket cells or shadows of Gumprecht and labelled as smudge cell after the name of its discoverer Gumprecht. Previously this morphological artifact was utilized as diagnostic marker of CLL, but in recent era smudge cell has come up as diagnostic pitfall. In present article an attempt has been made to channelize the identification, counting and clinical significance of smudge cell to minimize it's diagnostic misinterpretation [1].

What is Smudge Cell?

Smudge cells or basket cells are leukocytes that have been damaged during preparation of the peripheral blood smear. These usually occur due to the fragility of the cell. They are usually seen in chronic lymphocytic leukemia(CLL). Patients often see a reference to smudge cells in their complete blood count (CBC) reports. Smudge cells are cells that are probably damaged during the CBC process. The cell wall rupture and when seen under the microscope, they look like a smudge, hence the term smudge cells. These cells are probably lymphocytes and are so distorted that they can't be given a real name. Smudge cells are not unique to CLL [2]. However, they are seen much more frequently and in much higher number in CLL than in any other condition. For example, in normal specimens, they may be 0.01% .In patient with severe infections or burns, there may be 0.1 to 0.3% .In patients with acute leukemia, there may be as many as 1 to 3 %, but in CLL patients, smudge cells can be up to 20% of all cells or higher [3].

Conditions In Which Smudge Cell Are Likely To Be Present:

- Chronic Leukemia: - Chronic Lymphocytic Leukemia (CLL), Prolymphocytic Leukemia (PLL), Hairy Cell Leukemia(HCL), Large granular Lymphocytic leukemia (LGL)
- Acute Lymphoblastic Leukemia
- Acute Myeloid Leukemia

Smudge cells are seen more commonly in ALL but also seen in AML. It is important to note that presence of smudge cells cannot be used to support the diagnosis or classification of leukemia or any other malignancy. Normal cells may smudge depending on the pressure applied when smearing. Any diagnosis of leukemia or tumor must be on the evaluation of intact cells.

Smudge cells are a well described artifact in hematological morphology that result from the rupture of fragile lymphocytes secondary to the process of making the peripheral blood film. Although seen in both reactive and malignant lymphocytosis, they are more often associated with the lymphoproliferative disorders, as the total lymphocyte counts are usually higher and there may be acquired member defects in these disorders. The issue of either including these cells in the standard manual white blood cell differential count or enumerating them separately as a proportion of a total differential cell count has rarely been examined in the literature, as evidence by the dearth of articles on the subject in the MEDLINE database [4].

Smudge cells are counted accurately as lymphocyte by modern blood cell analyzers, which commonly enumerate 10,000 white cells or more in a 5 cell differential count. The issue is clinically significant when comparisons are made between the manual differential counts and automated differential counts performed to monitor the lymphocyte doubling time, which has been promoted as a prognostic factor in disease progression in chronic lymphocytic leukemia. The smudge cells on the film will not be included in manual differential, thereby resulting in an undercounting of the actual lymphocytes present and an overstating of the

neutrophil count relative to the automated count, the "true count" [5].

Smudge cells were initially described as white blood cells with broken down nuclei in patients with chronic lymphocytic leukemia. Subsequently, these nuclear shadows have most often been referred to as smudge cells. The mechanism is often associated primarily with traumatic disruption of cells during blood film preparation. In the process, the cell membrane rupture and when viewed under a microscope, what remain looks like a smudge, hence the term, smudge cells. Thus, the angle and the degree of incline of the slide spreader, the type of slide spreader (sharp or smooth), the cleanliness of the slides, and the overall quality of the blood films can't be overemphasized. For minimal morphologic alteration, blood film should be made within three hours and not more than twelve hours after collection. It is recommended to include smudge cells in the differential as an absolute count, especially when the smudge cell numbers are noticeably increase. This identifies a more appropriate count because smudge cells are actually lymphocyte artifacts. It also avoids the need for repeating or verifying abnormal counts [3-5].

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