

3936121 RACP/M: MAJOR: CLINICAL PATHOLOGY; M.Sc. (CLINICAL PATHOLOGY)

KEY WORDS : IMAGE ANALYSIS / RED BLOOD CELL MORPHOLOGY/ AUTOMATIC BLOOD CELL COUNTER

KETSARIN PINTARAKS: IMAGE ANALYSIS OF RED BLOOD CELL MORPHOLOGY AND NUCLEATED RED BLOOD CELL IN RELATION TO PARAMETERS OF HEMATOLOGY ANALYZER. THESIS ADVISORS; AIHOND BUNYARATVEJ, Ph.D., JIRASAK KATSUWON, Ph.D., PUNNEE BUTTHEP, Ph.D. 87 P. ISBN 974-662-630-2

The blood smear examination of red blood cells is one of the important laboratory screenings tests in the differential diagnosis of anemia. However, the interpretation of the examination is qualitative and lacks standardization because it is based on human sight and judgement. Recent application of digital image analysis has been used in medical laboratory to assist image interpretation. In this study, we have compared the correlation between two methods: image analysis of red blood cell morphology and nucleated red blood cell and automatic blood cell counter. The image analysis used in this study included cell area, diameter, density red, density blue and integrated optical density (IOD). The hematological parameters are mean corpuscular volume (MCV), mean cellular hemoglobin (MCH), mean cellular hemoglobin concentration (MCHC), red blood cell distribution width (RDW), hemoglobin distribution width (HDW), % hypochromia and % microcyte. The significant correlation was found between CV area and RDW in iron deficiency anemia (IDA), G6PD deficiency anemia (G6PD) and thalassemia disease ( $r = 0.789, 0.756$  and  $0.668$  respectively,  $P < 0.0001$ ). Correlations were also found between CV IOD and HDW in IDA, G6PD and thalassemia trait ( $r = 0.638(P < 0.0001), 0.608(P < 0.0004)$  and  $0.676(P < 0.0001)$  respectively). Significant correlation was also found between CV area, CV diameter, CV IOD and %micro in IDA ( $r = 0.731, 0.722$  and  $0.723$  respectively,  $P < 0.0001$ ). In the study of nucleated red blood cell we found significant decrease in N/C ratio and area of nucleus in orthochromatic erythroblast and late polychromatophilic erythroblast. This finding suggests that the image parameters are reliable and have correlation with parameters from hematology analyzer. The data of image parameters are more scientific and of great potential for hematology standardization in blood smear examination. The limitation in image analysis is the high cost of the hardware and software.