

## INTISARI

**Latar belakang:** Defisiensi besi merupakan salah satu kondisi kekurangan mikronutrien paling umum yang mengakibatkan anemia, mempengaruhi semua kelompok populasi terutama anak dan wanita usia reproduksi. Feritin serum merupakan pemeriksaan yang paling efektif untuk mendeteksi defisiensi besi, tetapi masih relatif mahal dan ketersediaannya masih sangat kurang terutama di daerah terpencil. Evaluasi apusan darah tepi merupakan alternatif pemeriksaan untuk mendeteksi anemia defisiensi besi. Mikrositik, hipokromik, ovalosit, eliptosit, dan sel pensil berhubungan dengan kondisi klinis anemia defisiensi besi. Metode pelaporan atau *grading* morfologi eritrosit yang abnormal masih bervariasi di beberapa negara. *The International Council for Standardization in Haematology* (ICSH) merekomendasikan pedoman dalam pelaporan eritrosit, leukosit, dan trombosit yang abnormal. Tujuan komite ICSH adalah standarisasi dalam pelaporan sediaan apus darah tepi, nomenklatur, dan *grading* eritrosit, leukosit dan trombosit.

**Tujuan:** Untuk mengetahui penampilan diagnostik eritrosit mikrosit, hipokrom, oval, dan elips berdasarkan *grading system* ICSH untuk diagnosis anemia defisiensi besi.

**Metode:** Penelitian ini adalah penelitian observasional analitik dengan desain uji diagnostik. Subjek penelitian adalah individu usia produktif yang menjalani pemeriksaan kesehatan di Departemen Patologi Klinik dan Kedokteran Laboratorium FK-KMK UGM/ Instalasi Laboratorium Terpadu RSUP Dr. Sardjito Yogyakarta. Evaluasi morfologi eritrosit dilakukan dalam 1000 eritrosit berdasarkan *morphology grading system* ICSH untuk diagnosis anemia defisiensi besi. Standar rujukan yang digunakan sebagai pembanding yaitu kadar feritin serum  $\leq 12 \mu\text{g/L}$ . Analisis statistik deskriptif menggunakan rerata  $\pm$  simpang baku, median (minimal-maksimal), uji beda menggunakan *independent t test*, Mann Whitney. Penampilan diagnostik morfologi eritrosit meliputi mikrositik, hipokromik, ovalosit, dan eliptosit dianalisis menggunakan tabel 2x2.

**Hasil:** Subjek penelitian pada penelitian ini berjumlah 174 subjek usia produktif yang memenuhi kriteria inklusi dan eksklusi. Berdasarkan standar baku feritin serum, subjek dibagi menjadi 2 kelompok, yaitu anemia defisiensi besi sebanyak 121 orang dan kelompok anemia bukan defisiensi besi sebanyak 53 orang. Dalam mendiagnosis anemia defisiensi besi, mikrositik  $>11\%$  memiliki sensitivitas 53,8%, spesifisitas 69,1%, nilai ramal positif (NRP) 79%, dan nilai ramal negatif (NRN) 40,9%; hipokromik  $>11\%$  memiliki sensitivitas 61,3%, spesifisitas 63,6%, NRP 78,5%, dan NRN 43,2%; ovalosit  $>5\%$  memiliki sensitivitas 70,6%, spesifisitas 43,6%, NRP 73%, dan NRN 40,7%; eliptosit  $>5\%$  memiliki sensitivitas 5%, spesifisitas 100%, NRP 73%, dan NRN 32,7%.

**Simpulan:** Mikrositik  $>11\%$  memiliki sensitivitas 53,8% dan spesifisitas 69,1%, hipokromik  $>11\%$  memiliki sensitivitas 61,3% dan spesifisitas 63,3%, ovalosit  $>5\%$  memiliki sensitivitas 70,6% dan spesifisitas 43,6%, eliptosit  $>5\%$  memiliki sensitivitas 5% dan spesifisitas 100% untuk mendeteksi anemia defisiensi besi pada usia produktif.

**Kata kunci:** Anemia defisiensi besi (ADB), morfologi eritrosit, *morphology grading system* ICSH

## ABSTRACT

**Background:** Iron deficiency is one of the most common micronutrient deficiency conditions resulting in anemia, affecting all population groups, especially children and women of reproductive age. Serum ferritin is the most effective test to detect iron deficiency, but it is still relatively expensive and its availability is still lacking, especially in peripheral areas. Evaluation of the peripheral blood smear is an alternative test to detect iron deficiency anemia. Microcytic, hypochromic, elliptocytes or ovalocytes is associated with clinical conditions of iron deficiency anemia. The method of reporting or grading abnormal red blood cells morphology still varies in some countries. The International Council for Standardization in Hematology (ICSH) recommends guidelines for reporting of abnormal red blood cells, leucocytes, and platelets. The aim of the ICSH committee is to standardize the reporting of peripheral blood smears, nomenclature, and grading of red blood cells, leucocytes, and platelets.

**Objective:** To determine diagnostic performance of microcyte, hypochrome, oval, and ellips red blood cells based on grading system ICSH for the diagnosis of iron deficiency anemia.

**Method:** This study was observational analytic with diagnostic test. The subject were productive age who underwent a medical check up program at the Department of Clinical Pathology and Laboratory Medicine, Faculty of Medicine, Public Health and Nursing UGM Yogyakarta. Red blood cells morphology evaluation was conducted in 1000 red blood cells based on the morphology grading system ICSH for diagnosis iron deficiency anemia. The reference standard used as a comparison was serum ferritin  $\leq 12$   $\mu\text{g/L}$ . Statistical analysis used mean $\pm$ SD or median (minimum-maximum) for descriptive statistic, Independent t test or Mann Whitney for differences. Diagnostic performance of red blood cells morphology including microcytic, hypochromic, ovalocytes, and elliptocytes was analyzed using 2x2 tables.

**Result:** The number of subject in this study was 174 productive age person who fulfilled the inclusion and exclusion criteria. According to serum ferritin level, the gold standard, subjects were divided into 2 groups, iron deficiency anemia (121 subjects) and non iron deficiency anemia (53 subjects). To diagnose iron deficiency anemia, microcytic  $>11\%$  (sensitivity 53.8%, specificity 63.6%, positive predictive value (PPV) 79%, negative predictive value (NPV) 40.9%), hypochromic  $>11\%$  (sensitivity 61.3%, specificity 63.6%, PPV 78.5%, NPV 43.2%), ovalocyte  $>5\%$  (sensitivity 70.6%, specificity 43.6%, PPV 73%, NPV 40.7%), elliptocyte  $>5\%$  (sensitivity 5%, specificity 100%, PPV 73%, NPV 32.7%).

**Conclusion:** Microcytic  $>11\%$  has sensitivity 53.8% and specificity 63.6%, hypochromic  $>11\%$  has sensitivity 61.3% and specificity 63.6%, ovalocyte  $>5\%$  has sensitivity 70.6% and specificity 43.6%, elliptocyte  $>5\%$  has sensitivity 5% and specificity 100% to diagnose iron deficiency anemia in productive age.

**Keywords:** Iron Deficiency Anemia (IDA), red blood cells morphology, morphology grading system ICSH