SOLIA SER MEDICO

Solía ser médico
Ahora soy un prestador de salud

Solía practicar la medicina
Ahora trabajo en un sistema gerenciado de salud

Solía tener pacientes
Ahora tengo una lista de clientes

Solía diagnosticar
Ahora me aprueban una consulta por vez

Solía efectuar tratamientos
Ahora espero autorización para proveer servicios

Solía tener una practica exitosa colmada de pacientes.
Ahora estoy repleto de papeles.

Solía emplear mi tiempo para escuchar a mis pacientes
Ahora debo utilizarlo para justificarme ante los auditores

Solía tener sentimientos
Ahora solo tengo funciones

Solía ser médico
Ahora no sé lo que soy

Salmón Schachter

EVALUACIÓN MORFOLÓGICA DE SANGRE PERIFÉRICA Y MÉDULA ÓSEA

DR. JORGE CASTILLO
HEMATÓLOGO

- Antes de evaluar una lámina periférica, es imprescindible tener en cuenta:

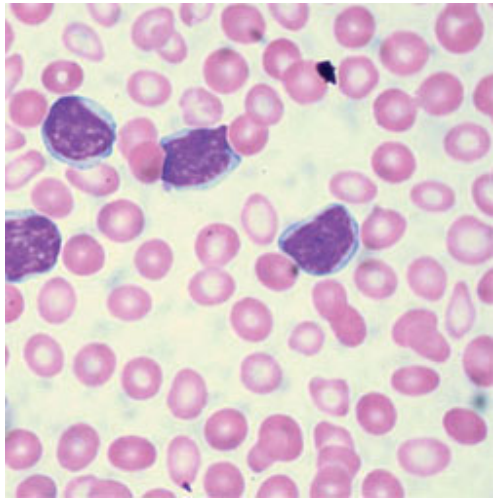
CALIDAD DEL EXTENDIDO

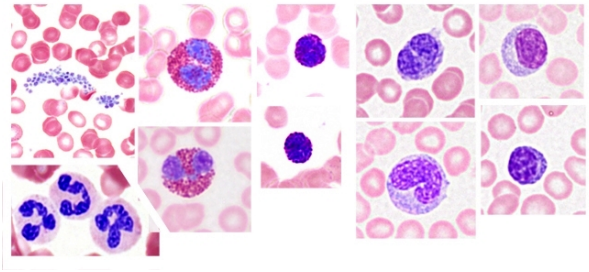
- Coloración de la muestra. Ideal Wright/ Glemsa
- ¿Quién la debería hacer ?
- No debe ser considerada de rutina

¿Alguno de Uds. rechaza una lámina entregada por técnico "experto en colorear en masa"?

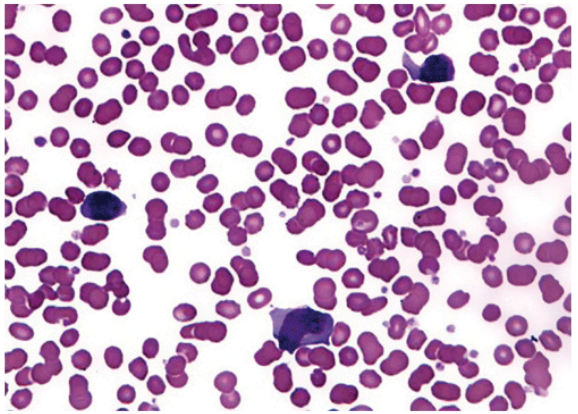
CALIDAD DEL EXTENDIDO

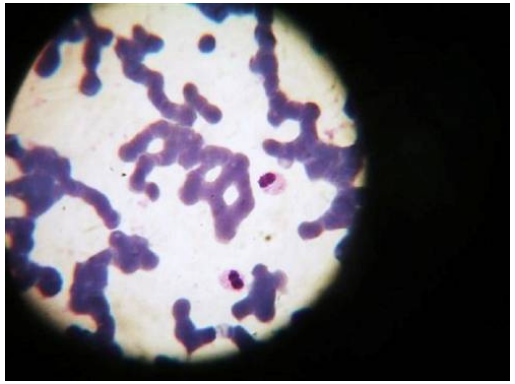
"DEL ATLAS"





"DE LA VIDA REAL"





Frotis SP: No debe ser considerada de rutina

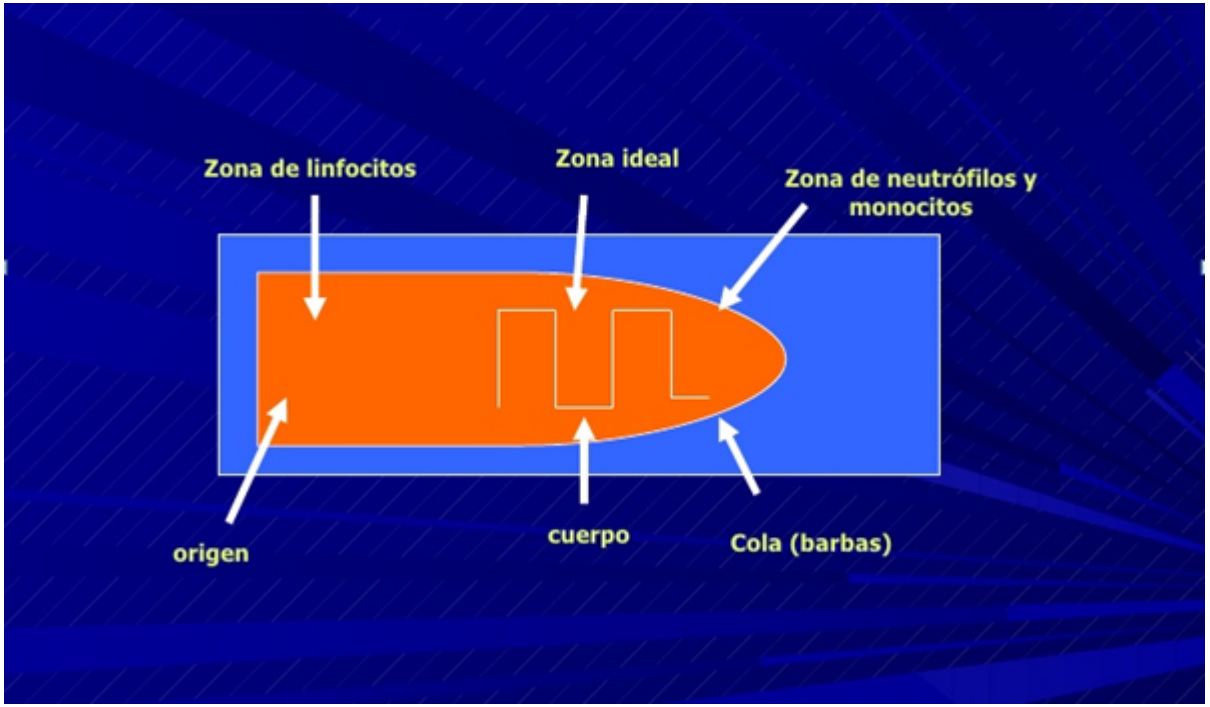
Table 1. Clinical Indications for Examination of a Blood Smear.

Features suggestive of anemia, unexplained jaundice, or both
Features suggestive of sickle cell disease — dactylitis or sudden splenic enlargement and pallor in a young child or, in an older child or adult, limb, abdominal, or chest pain
Features suggestive of thrombocytopenia (e.g., petechiae or abnormal bruising) or neutropenia (e.g., unexpected or severe infection)
Features suggestive of a lymphoma or other lymphoproliferative disorder — lymphadenopathy, splenomegaly, enlargement of the thymus (a mediastinal mass on radiology) or other lymphoid organs, skin lesions suggestive of infiltration, bone pain, and systemic symptoms such as fever, sweating, itching, and weight loss
Features suggestive of a myeloproliferative disease — splenomegaly, plethora, itching, or weight loss
Suspicion of disseminated intravascular coagulation*
Acute or recent-onset renal failure or unexplained renal enlargement, particularly in a child
On retinal examination, hemorrhages, exudates, signs of hyperviscosity, or optic atrophy
Suspicion of a bacterial or parasitic disease that can be diagnosed from a blood smear
Features suggestive of disseminated nonhematopoietic cancer — weight loss, malaise, bone pain
General ill health, often with malaise and fever, suggesting infectious mononucleosis or other viral infection or inflammatory or malignant disease

* In acute disseminated intravascular coagulation, red-cell fragments may be absent.

Barbara J. Bain. Diagnosis from the Blood Smear N Engl J Med 2005;353:498-507.

¿ Dónde ubicarse en la lámina?



- **SERIE ROJA**

- Realidades vs artefactos (colorante sobrehidratado), se obvian acantocitos, microangiopatía, defectos de membrana.
- En casos especiales hemoparásitos: tiempo adecuado
- ¿Compatibilizan los índices corpusculares del analizador con lo que vemos en lámina?
- Mala coloración ocasiona precipitaciones: hemoparásitos, punteado basófilo.

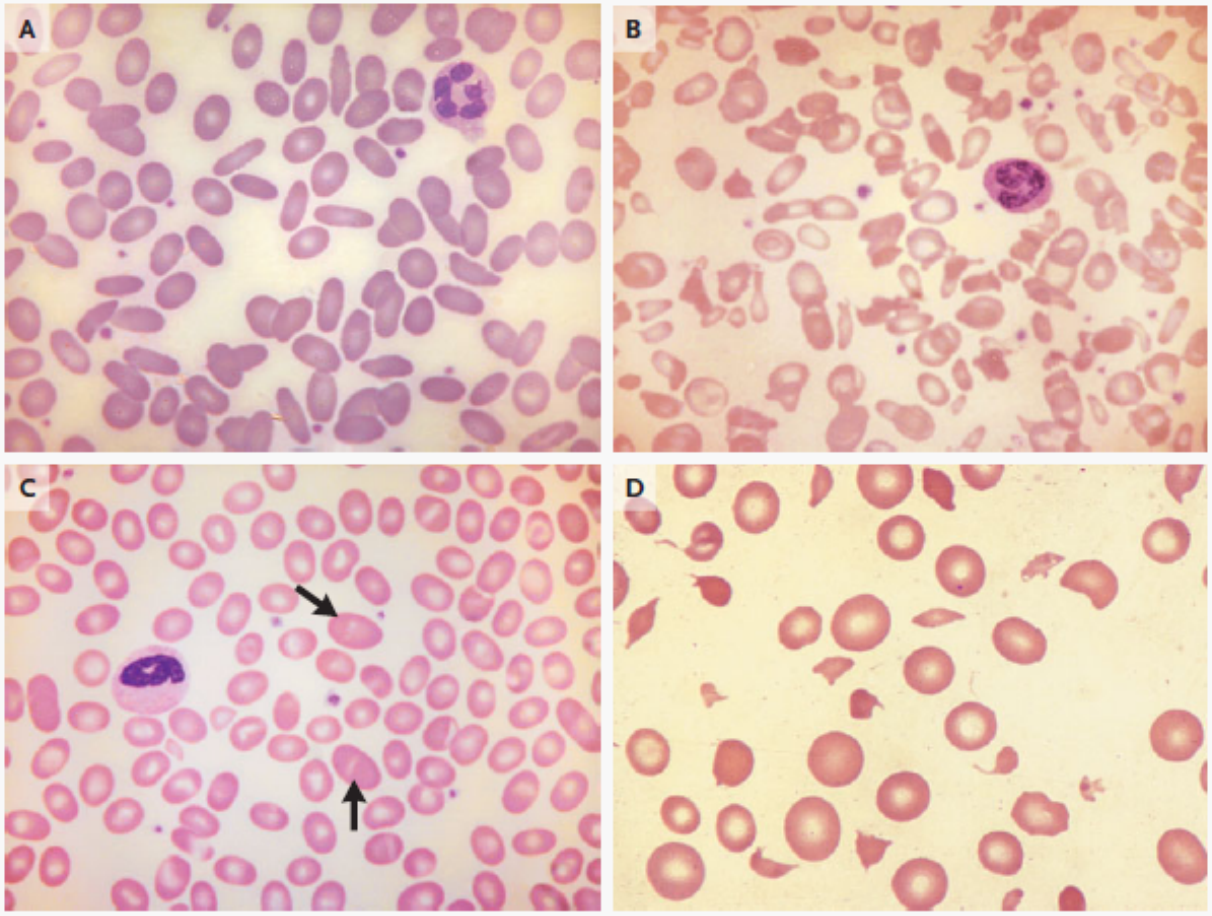


Figure 1. Hemolytic Anemias, Characterized by Different Types of Poikilocytes.

In Panel A, the blood smear shows hereditary elliptocytosis, with numerous elliptocytes and smaller numbers of ovalocytes. Panel B shows hereditary pyropoikilocytosis; there is striking poikilocytosis, with elliptocytes, ovalocytes, and fragments. In Panel C, Southeast Asian ovalocytosis shows moderate poikilocytosis, with the poikilocytes including several macro-ovalocytes (arrows). Panel D shows microangiopathic hemolytic anemia resulting from cyclosporine therapy, with numerous red-cell fragments. All specimens were stained with May–Grünwald–Giemsa stain.

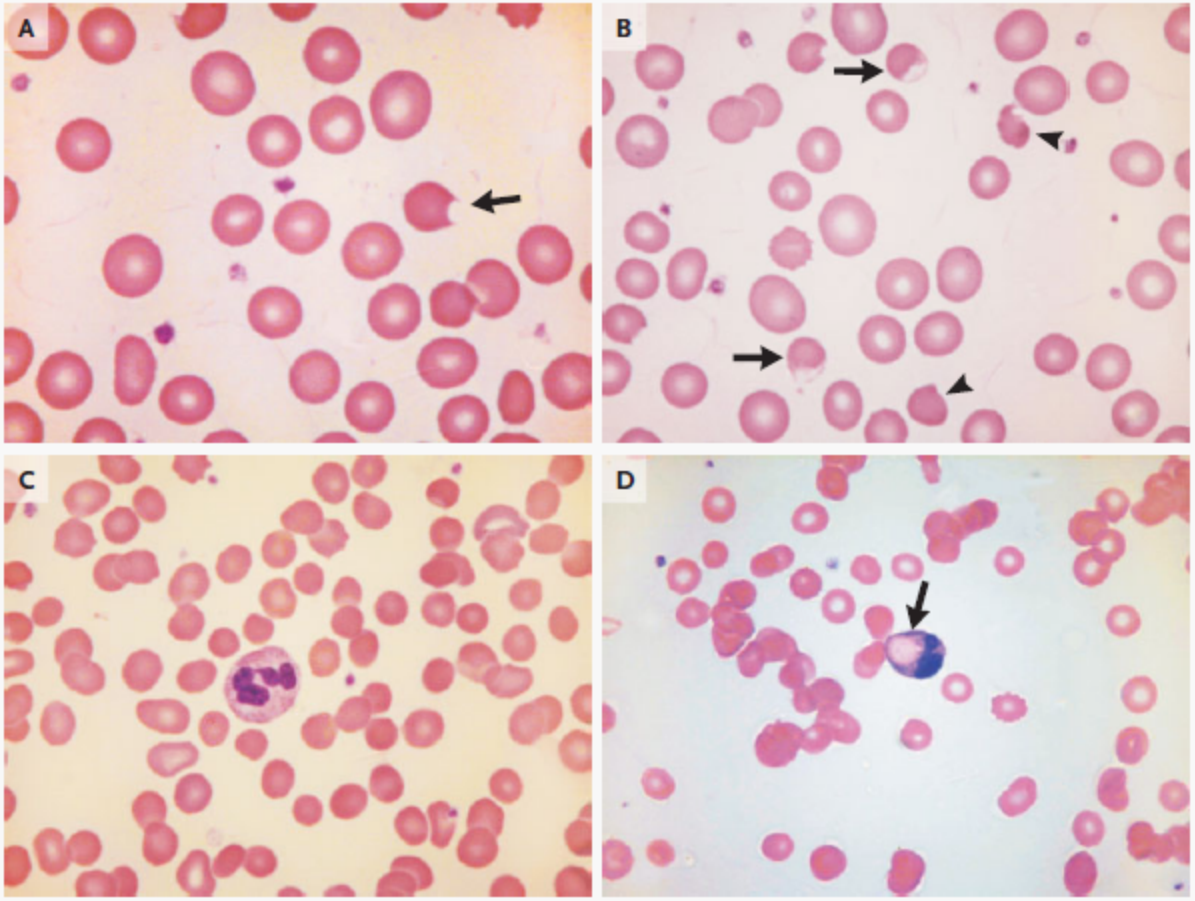


Figure 2. Red-Cell Changes in Various Types of Hemolytic Anemia.

The blood smear in Panel A depicts acute hemolysis in glucose-6-phosphate dehydrogenase (G6PD) deficiency, with the presence of a "bite" cell, or keratocyte (arrow). Panel B shows acute hemolysis in G6PD deficiency, with two "blister cells" (arrows), as well as polychromatic macrocytes and irregularly contracted cells (arrowheads). In Panel C, hereditary spherocytosis is characterized by numerous spherocytes (hyperchromatic cells with a regular outline). Panel D shows paroxysmal cold hemoglobinuria, with erythrophagocytosis; the arrow points to a red cell that has been phagocytosed by a neutrophil. All specimens were stained with May–Grünwald–Giemsa stain.

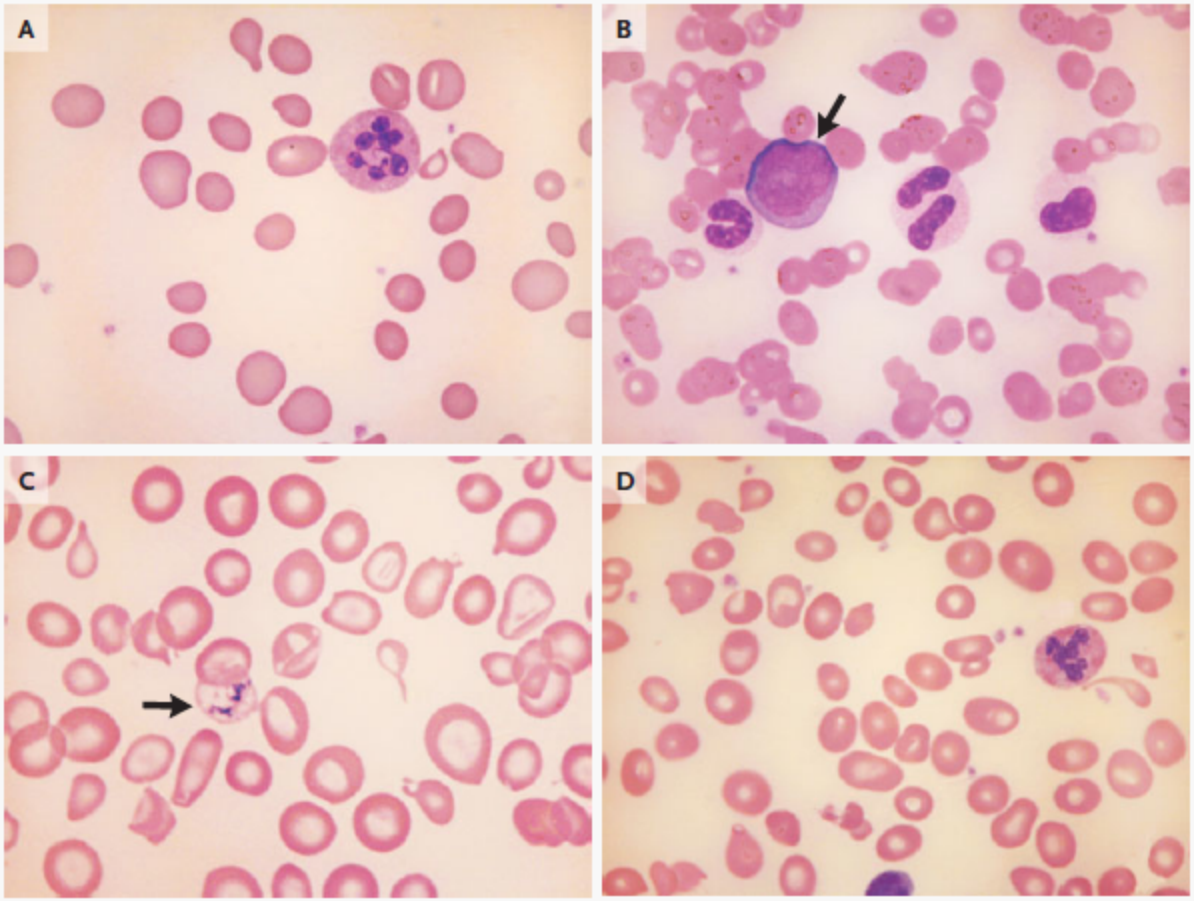


Figure 3. Red-Cell Changes in Various Types of Macrocytic Anemia.

Pernicious anemia is shown in the blood smear in Panel A, with anisocytosis, macrocytosis, and a hypersegmented neutrophil. Panel B shows myelodysplastic syndrome, with a blast cell (arrow) and two neutrophils that have hypolobulated nuclei, one of which is binucleated and the other hypogranular. Panel C shows myelodysplastic syndrome with anisocytosis, poikilocytosis, macrocytes, stomatocytes, and an erythrocyte with prominent Pappenheimer bodies (arrow); the smear is also dimorphic, showing both well-hemoglobinized macrocytes and hypochromic microcytes. Panel D depicts type 1 congenital dyserythropoietic anemia, with anisocytosis, poikilocytosis, and some macrocytes. All specimens were stained with May–Grünwald–Giemsa stain.

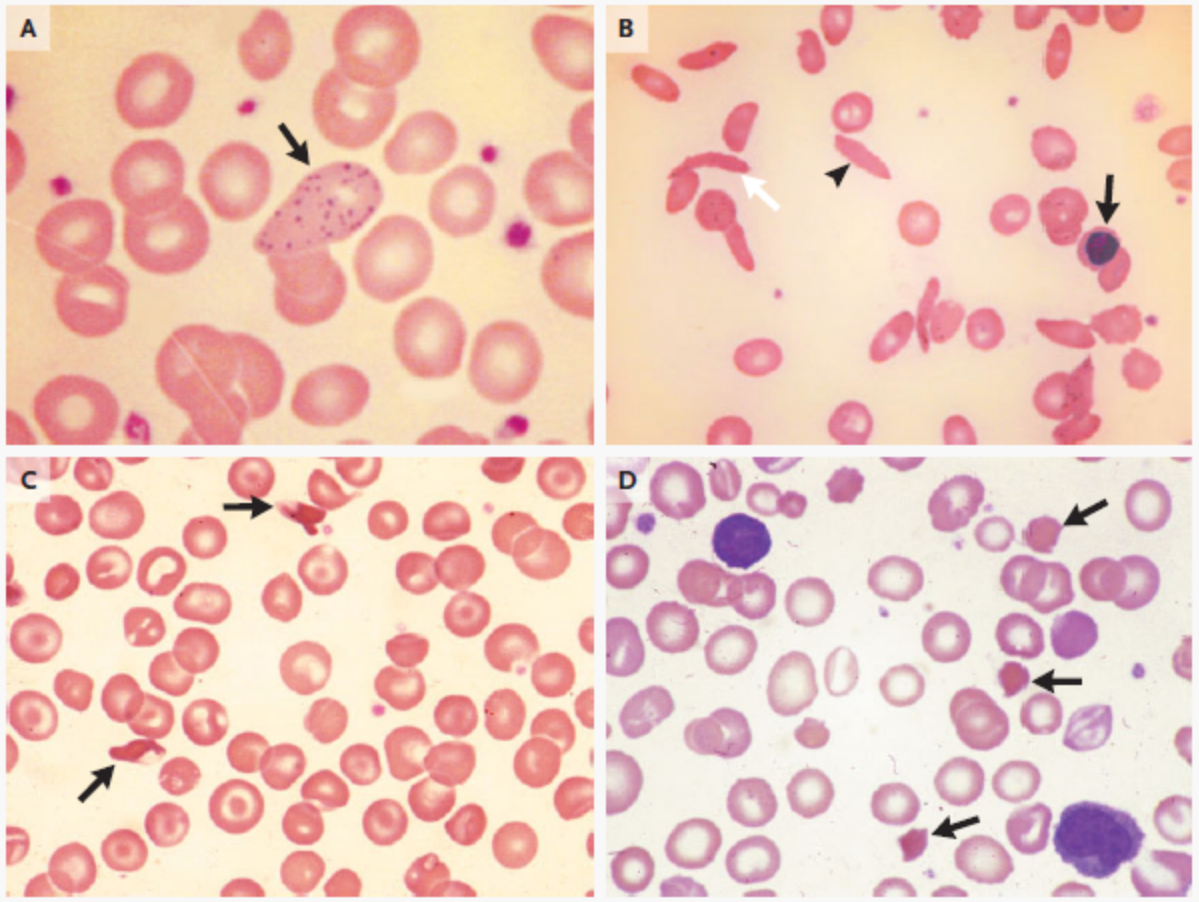


Figure 4. Red-Cell Changes with Lead Poisoning and in Hemoglobinopathies.

Panel A shows an erythrocyte with prominent basophilic stippling (arrow), a result of lead poisoning. Panel B shows sickle cell anemia, with a nucleated red cell (black arrow), sickle cells (white arrow), and boat-shaped cells (arrowhead). Panel C shows sickle cell–hemoglobin C disease, with target cells, irregular contracted cells, and two hemoglobin SC poikilocytes (arrows). Panel D demonstrates heterozygosity for hemoglobin Hammersmith (an unstable hemoglobin), with irregularly contracted cells (arrows). All specimens were stained with May–Grünwald–Giemsa stain.

blood

JOURNA
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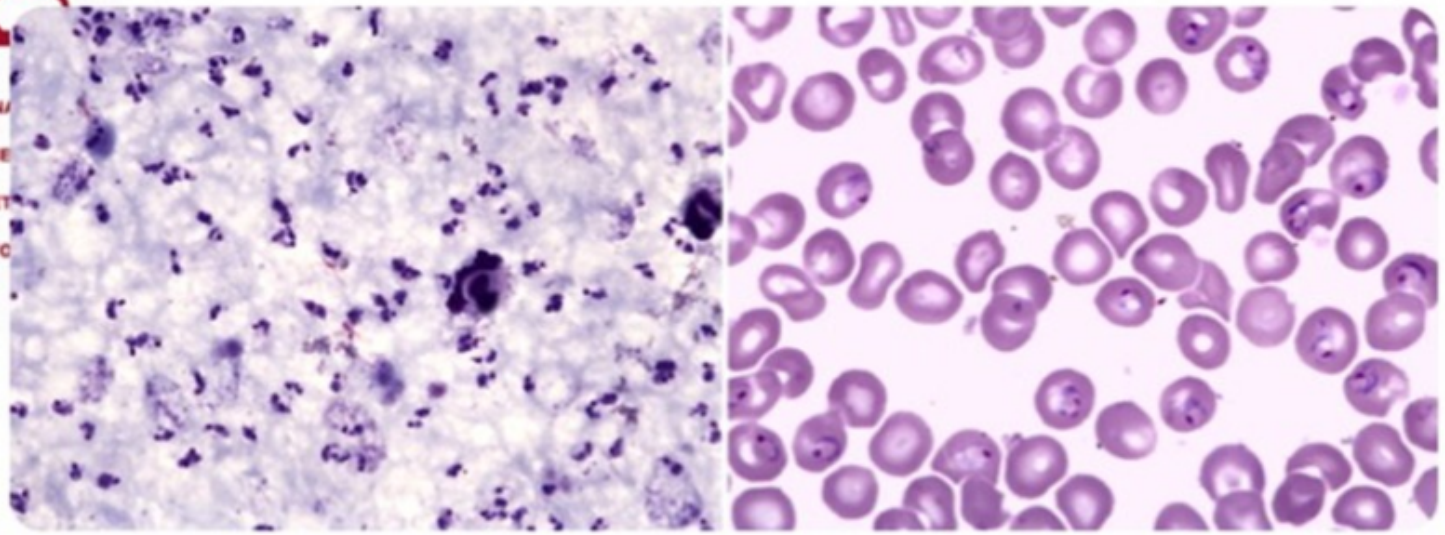
HEMATO

A 2-year-old boy presented to a clinic in rural Mali with fever and malaise.

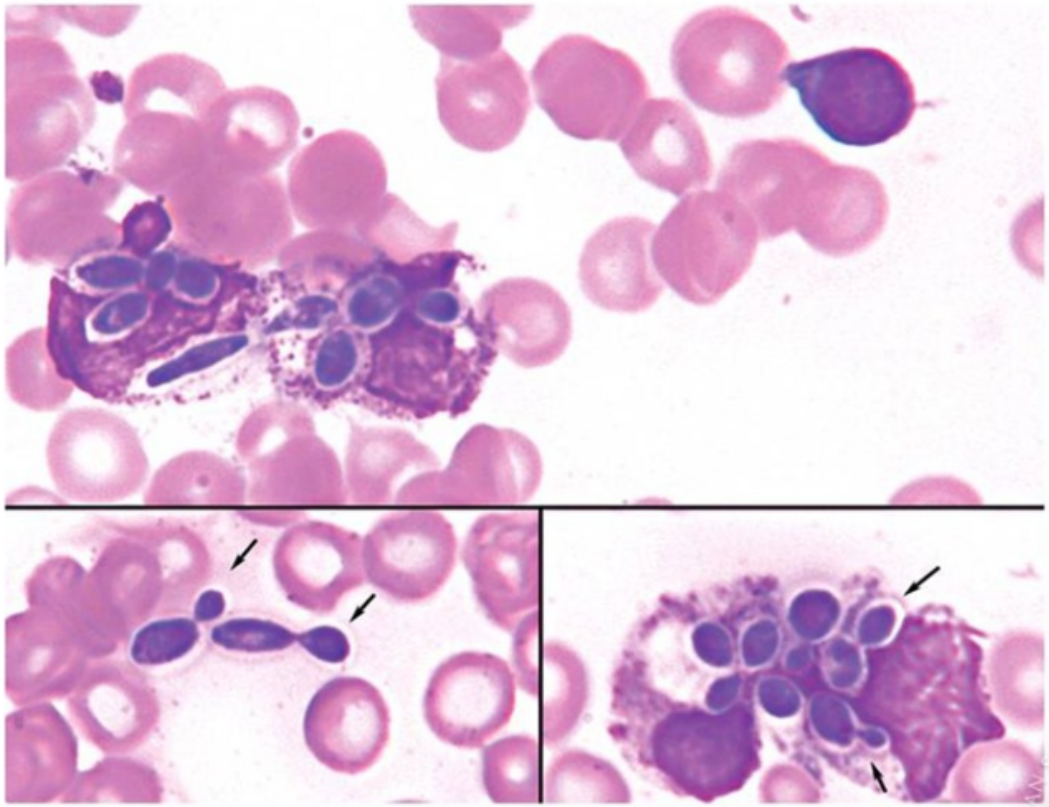


American Society of Hematology et al. Blood 2011;117:6410-6410

blood

JOURNAL OF THE AMERICAN SOCIETY OF HEMATOLOGY

nth-old boy with a history of chronic intestinal dysmotility requiring total parenteral nutrition was admitted with a suspected line-related sepsis.



Lam S , Hsia C C Blood 2012;119:4822-4822

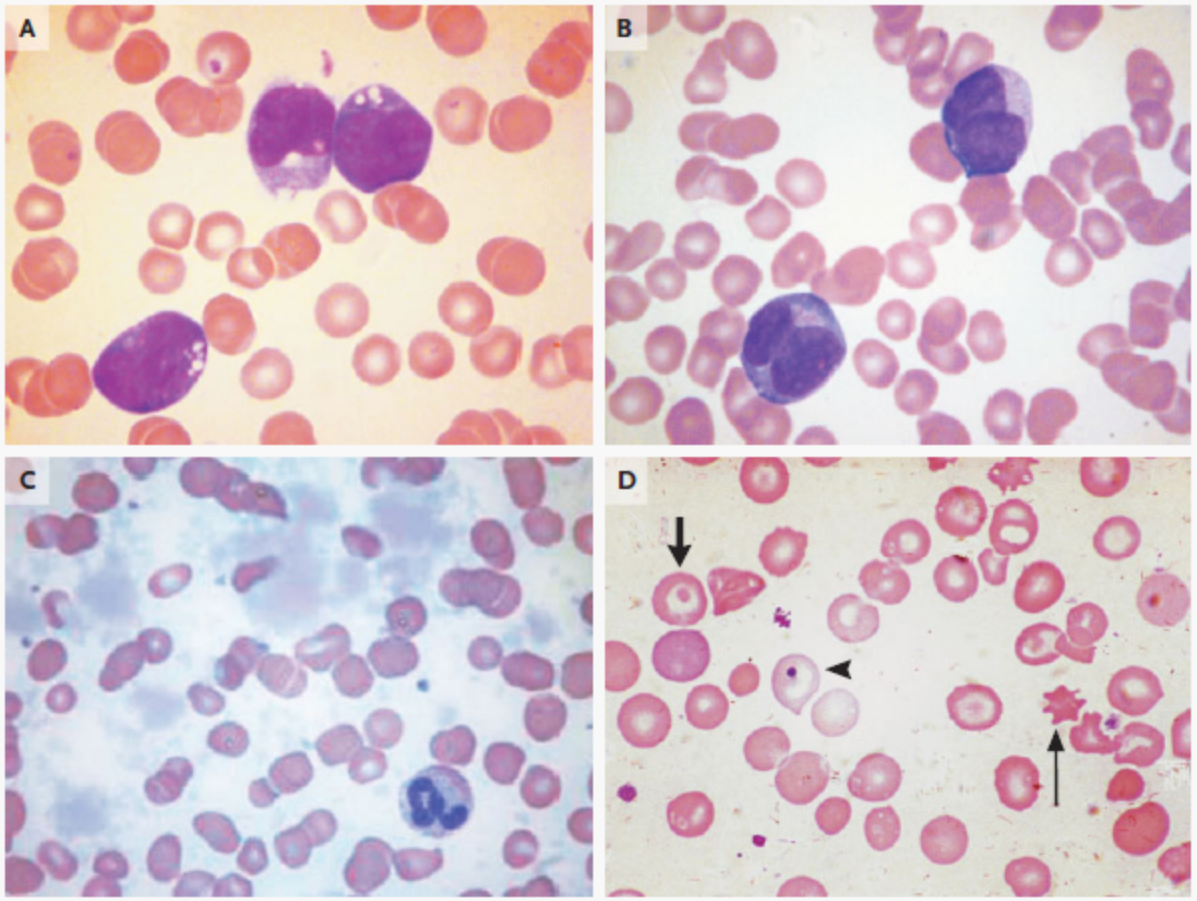


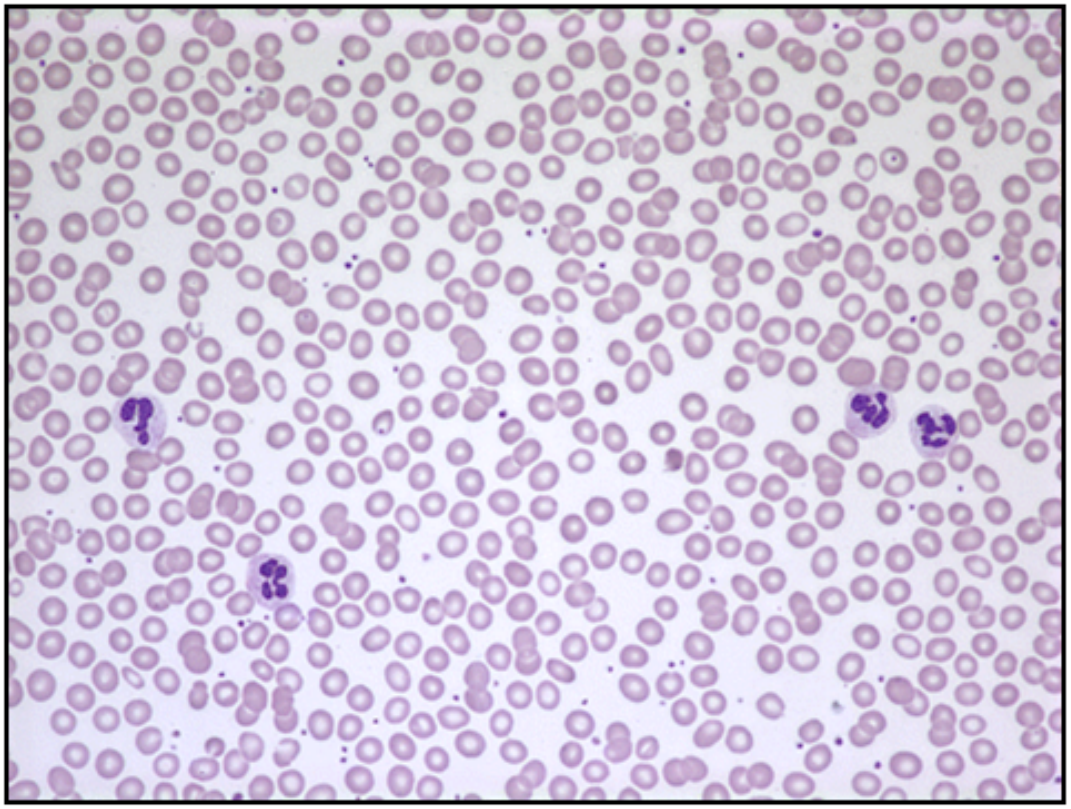
Figure 6. Miscellaneous Conditions in Which the Blood Smear Can Be Diagnostically Important.

Panel A shows Burkitt's lymphoma, with three basophilic vacuolated lymphoma cells. Hypogranular promyelocytic leukemia is shown in Panel B, with two characteristic bilobed leukemic promyelocytes. Panel C depicts cryoglobulin deposition in a blood sample from a patient with hepatitis C virus infection. Panel D shows target cells (short arrow), acanthocytes (long arrow), and a Howell–Jolly body (arrowhead) — all features of hyposplenism — in a blood smear from a patient with iron-deficiency anemia and splenic atrophy as features of celiac disease. All specimens were stained with May–Grünwald–Giemsa stain.

- **SERIE BLANCA**

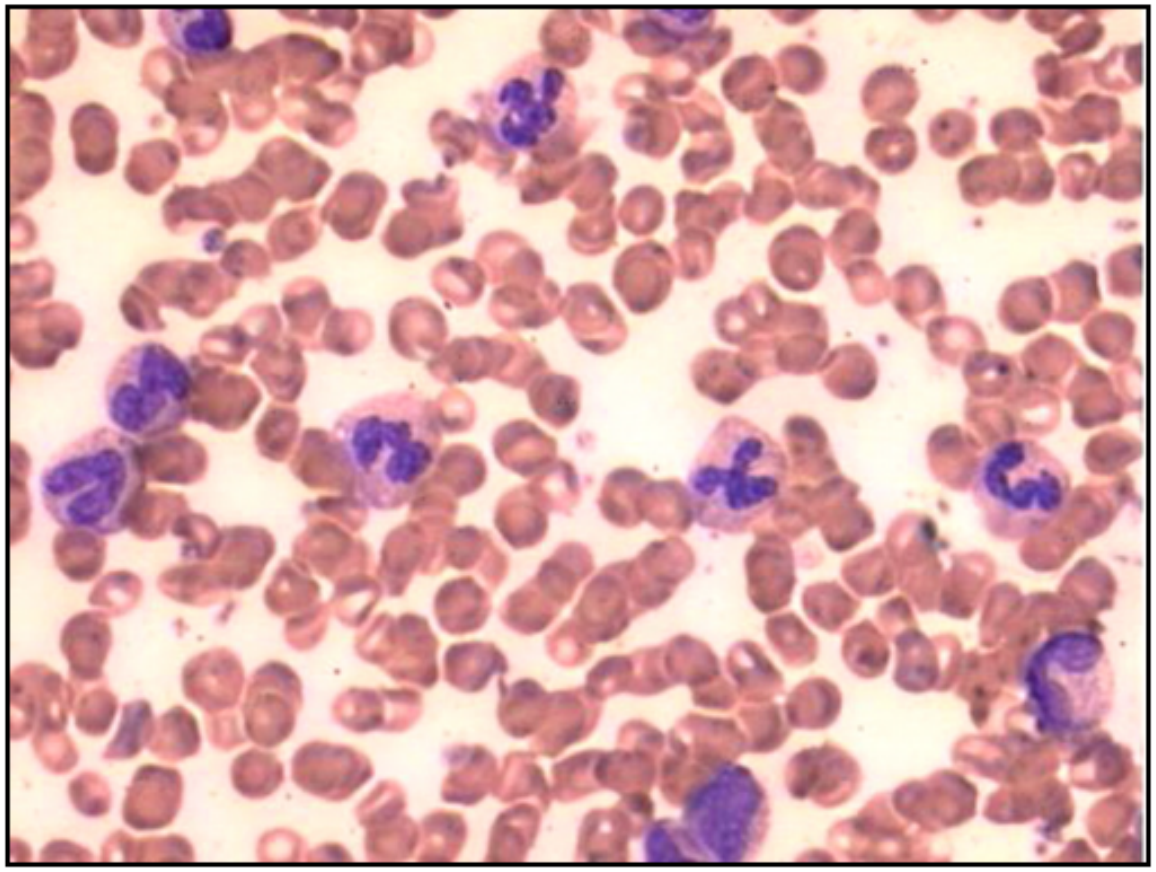
- Confusión entre elementos atípicos, alteraciones en la maduración
- ¿Objeta la lámina cuando no se tiñen los gránulos azurófilos?

ASH Teaching Slides: Blood Cells



Normal blood smear. The four larger cells shown are called granulocytes, a type of white blood cell.

ASH Teaching Slides: Blood Cells



Chronic myelogenous leukemia. The blood smear shows an increased number of neutrophils, a type of white blood cell.

- **PLAQUETAS**

- Obviar alteraciones congénitas de plaquetas

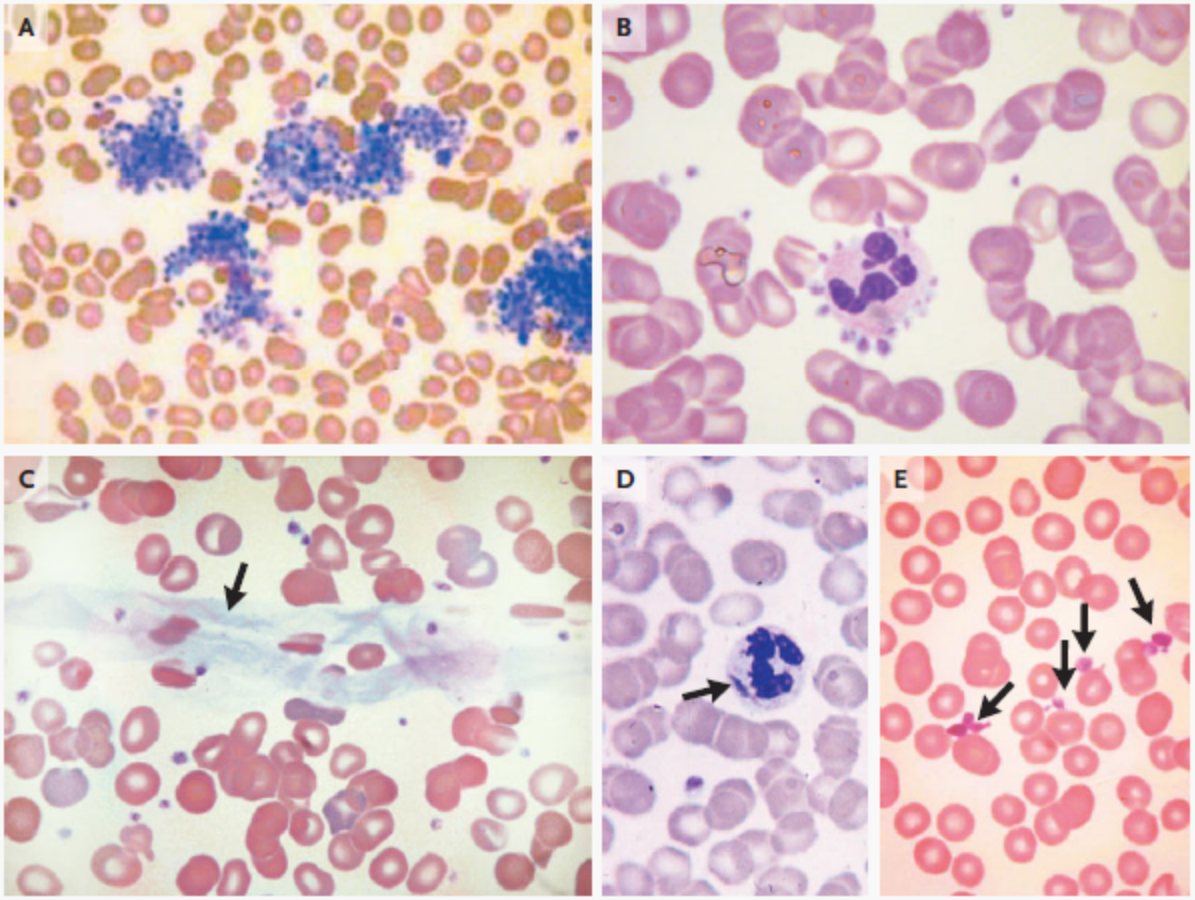


Figure 5. Blood-Smear Features Associated with Thrombocytopenia and Errors in the Platelet Count.

Panel A shows large clumps of platelets that led to a factitiously low platelet count. Panel B demonstrates platelet satellitism. Panel C shows fibrin strands (arrow). Panel D shows the May–Hegglin anomaly, with large platelets and a characteristic neutrophil inclusion (arrow). Panel E shows *Candida glabrata* (arrows) that led to a sudden, unexpected improvement in the "platelet" count. All specimens were stained with May–Grünwald–Giemsa stain.

EVALUACIÓN DE MÉDULA ÓSEA

- Calidad del aspirado y extensión adecuada
- **Tinción Romanowski por experto**. ES LO MAS IMPORTANTE
- Zona espicular y paraespicular.
- Componente estromal (vascular,grasa)

- **Serie roja**

- Relación M:E
- Maduración: normoblástica,megaloblástica intermedia y megaloblástica.

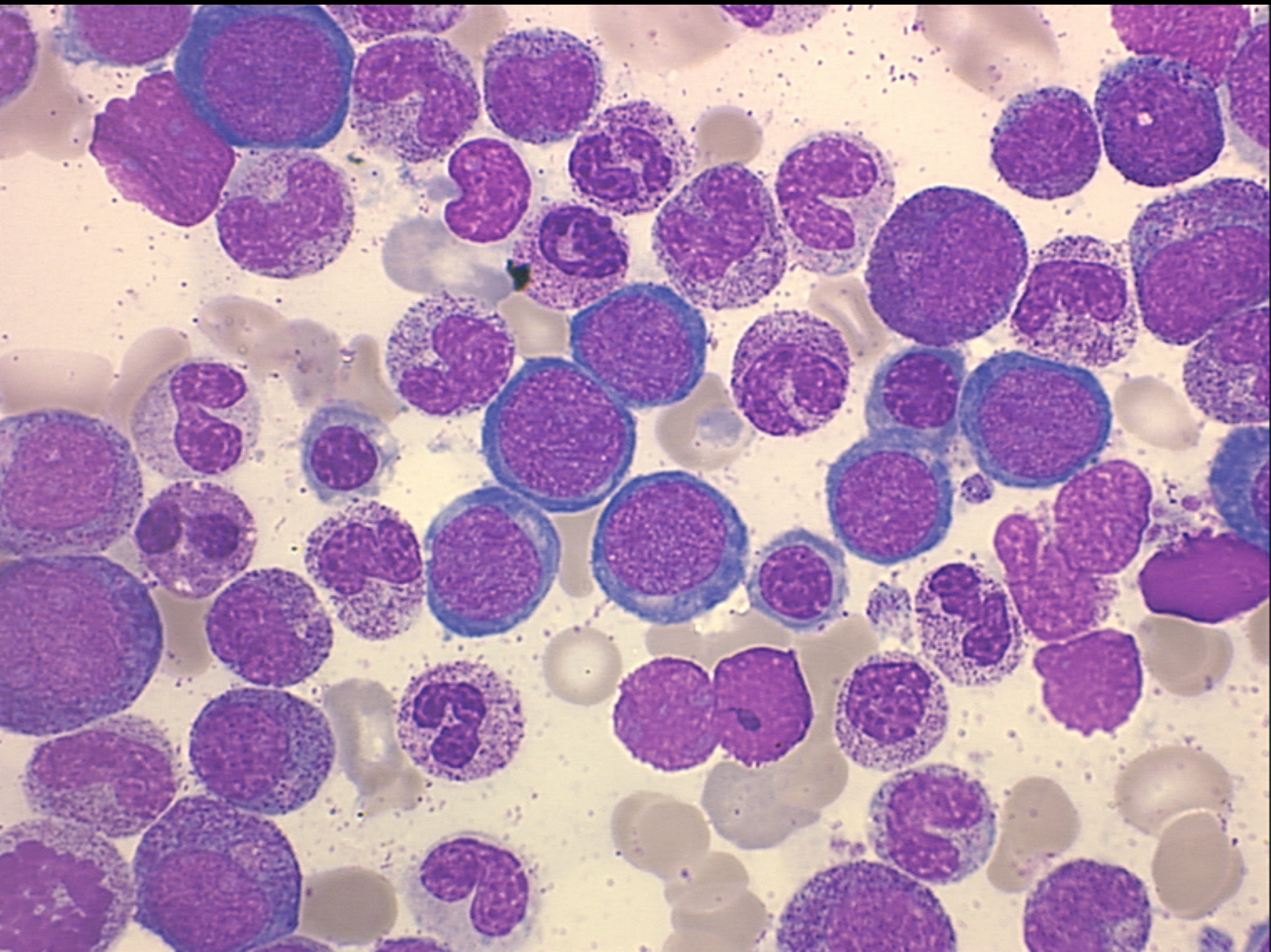
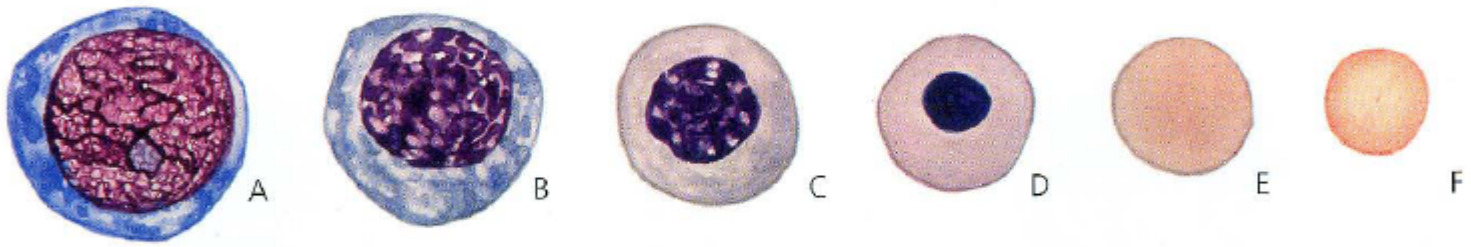
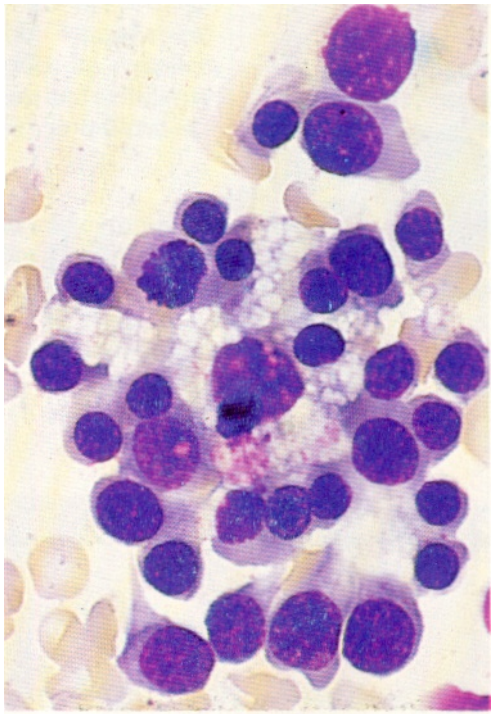


Plate 11. Erythroblastic System



11A. Proerythroblast
11B. Basophilic erythroblast
11C. Polychromatophilic erythroblast
11D. Orthochromatic erythroblast
11E. Polychromatophilic erythrocyte
11F. Erythrocyte



- **Serie blanca**

- Diferenciación
- Número de blastos
- Incremento de algunos elementos

Serie granulocítica

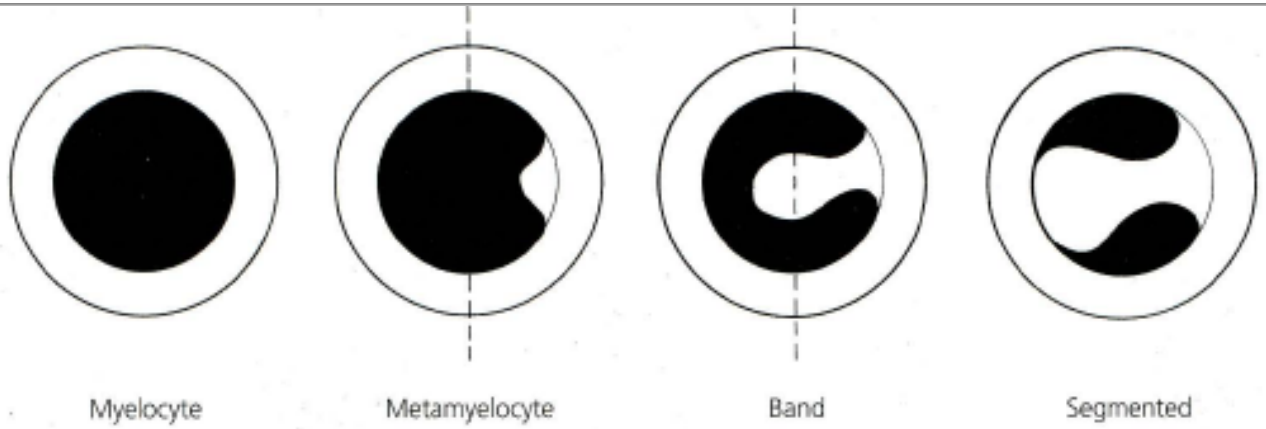
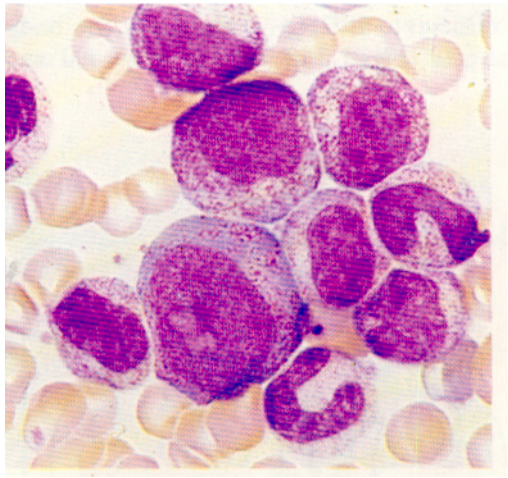
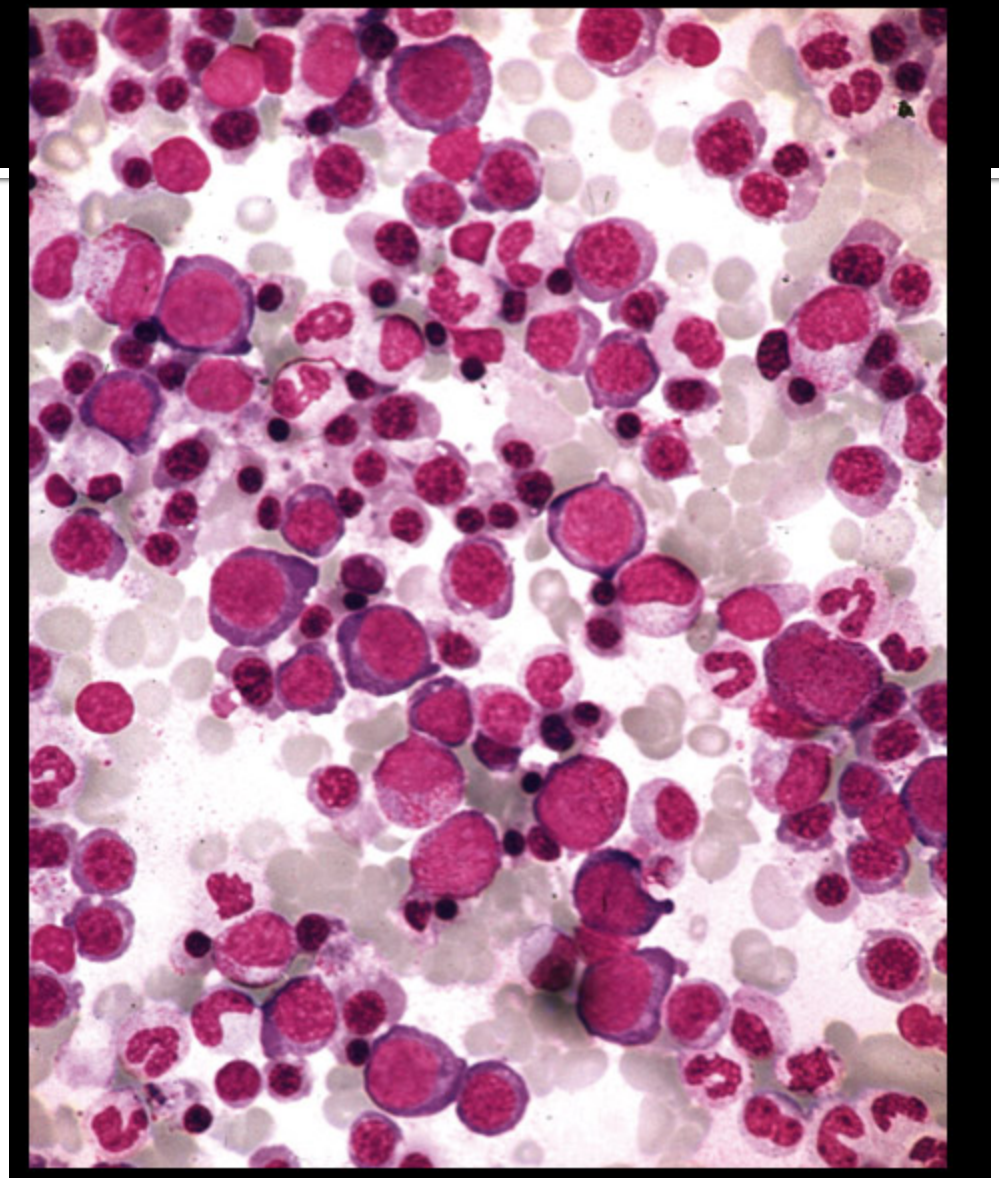


Figure 2. Terminology Based on Indentation of Nuclei

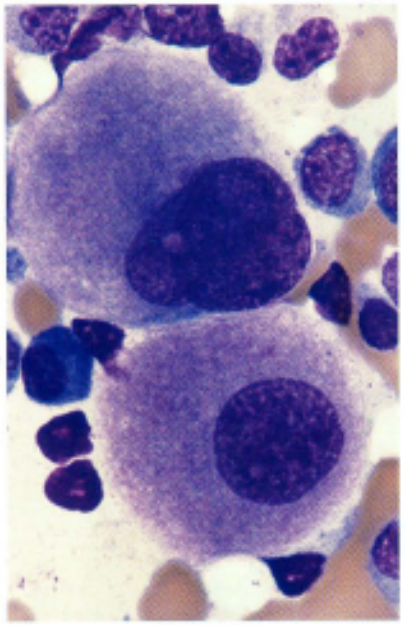




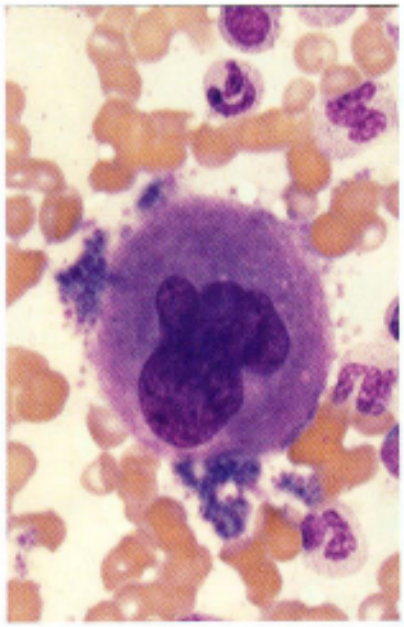
- **Serie megacariocítica**

- Presencia
- Micromegas mononucleares (enanos)

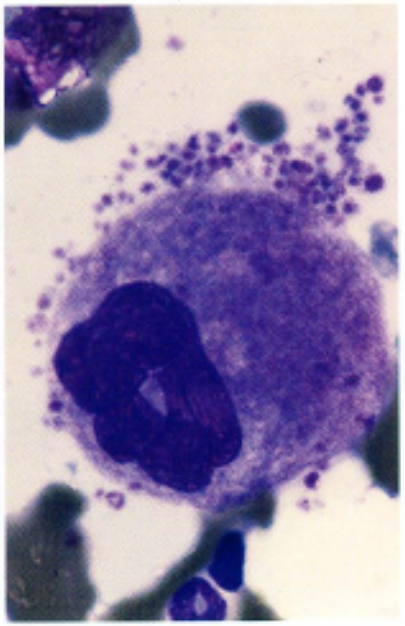
Megacariopoyesis



15G. Granular megakaryocytes without platelets



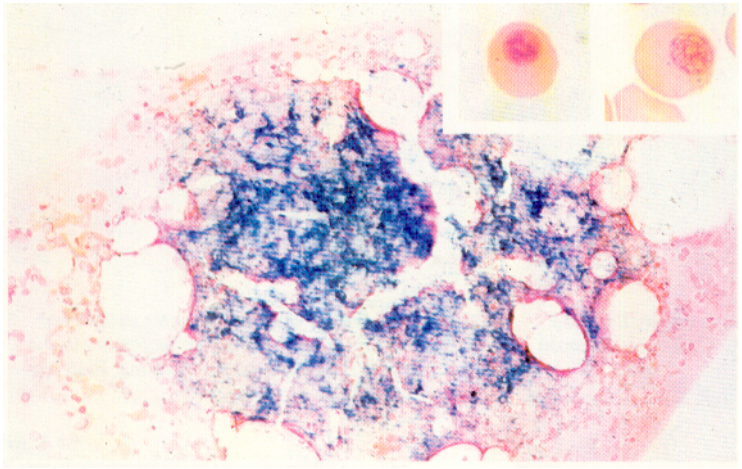
15H. Megakaryocyte with lobulated nucleus and platelets

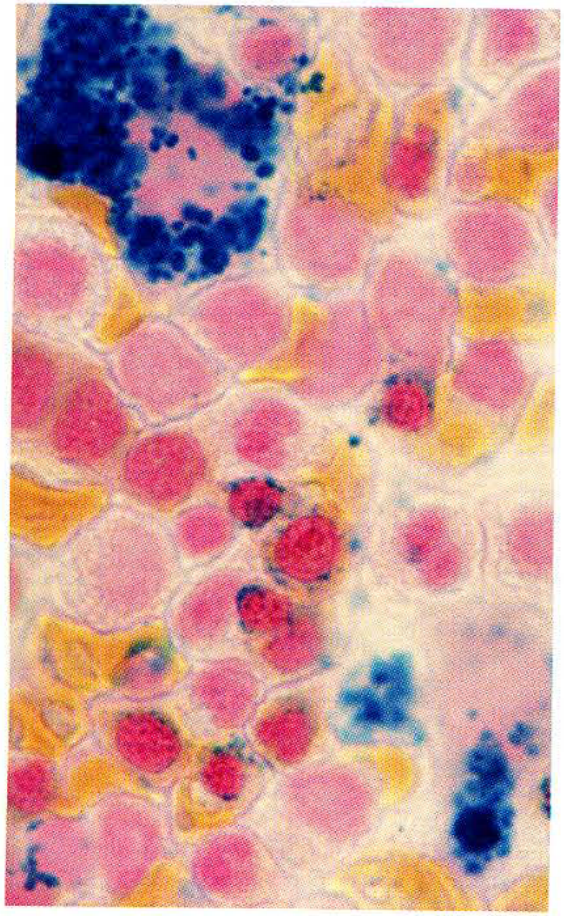


15I. Megakaryocyte with lobulated nucleus and platelets

HIERRRO MEDULAR

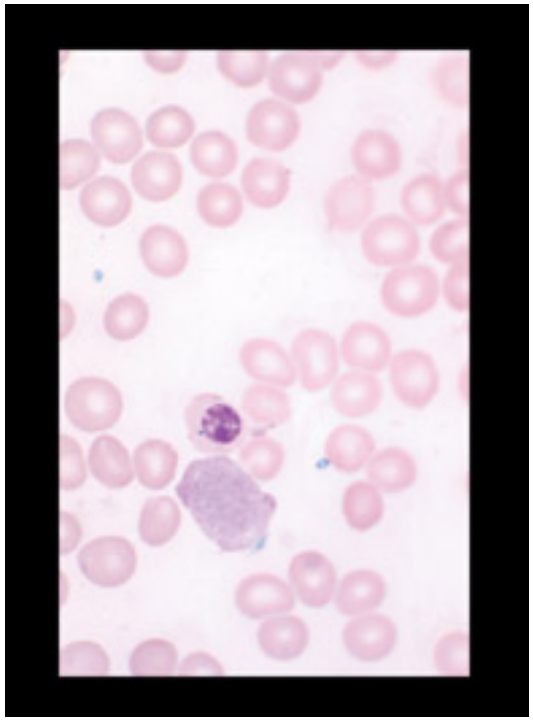
- La presencia de Fe debe ser con soluciones del día.





56D. Prussian blue iron stain: ringed sideroblasts, macrophage with hemosiderin, RARS, BM

HIERRO

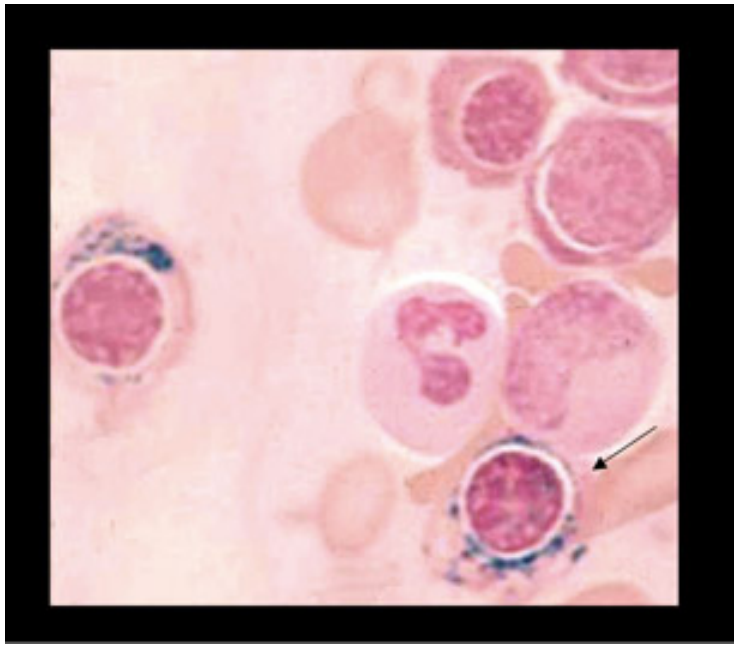


Título : Imagen 30

Descripción :

Sideroblasto de tipo I con dos gránulos de hemosiderina (técnica de Perls).

HIERRO

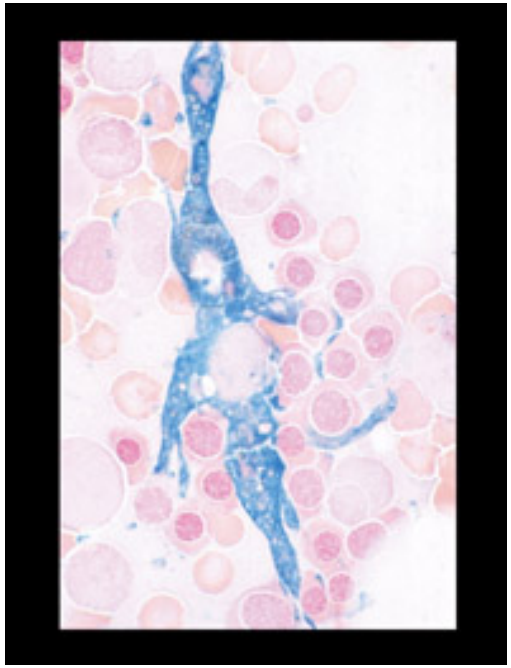


Título : Imagen 31

Descripción :

Se observa un sideroblasto en anillo (flecha) cuyo núcleo se ve circundado por un collarete de gránulos de hemosiderina (técnica de Perls).

HIERRO

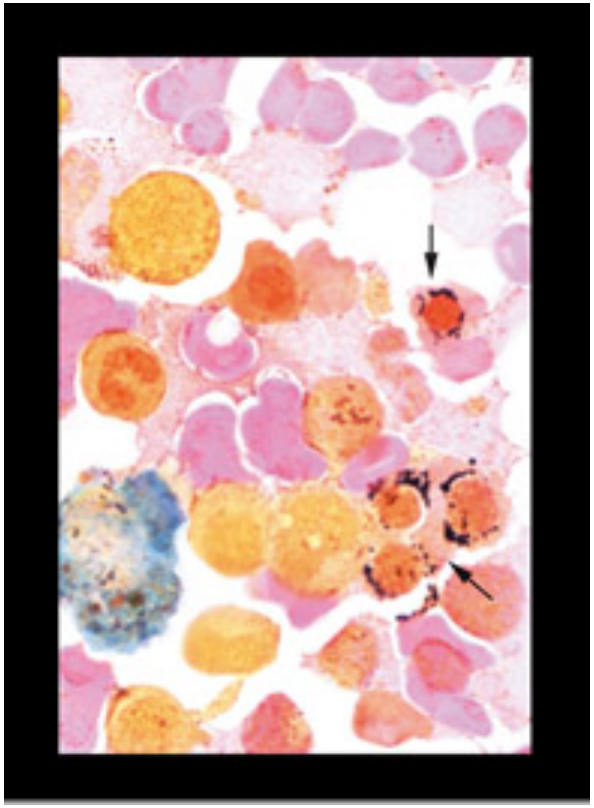


Título : Imagen 32

Descripción :

Macrófago medular con extensas prolongaciones citoplasmáticas que atesoran gran cantidad de hemosiderina (técnica de Perls).

HIERRO



Título : Imagen 33

Descripción :

Tinción de Perls-argéntica en una anemia refractaria sideroblástica donde se observan varios sideroblastos en anillo (flechas) con gránulos negruzcos de precipitado de plata alrededor del núcleo y un macrófago con hemosiderina coloreado de verde.

- LAS MÉDULAS NO SE VEN, SE SIENTEN

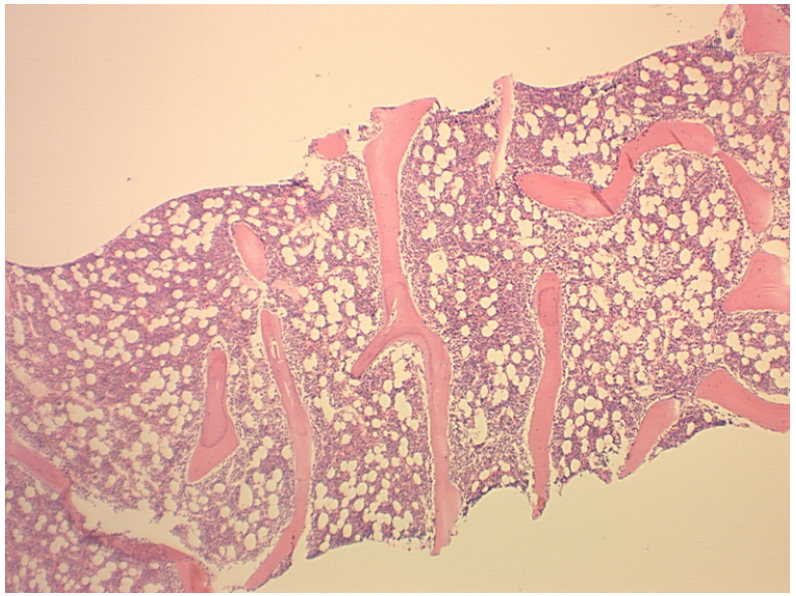
=

- Ojo educado , interpretación de la realidad clínica contra lo que se ve en la lámina

ACTUALIDAD MEDULAR

- Las láminas ya no la ven hematólogos, si no patólogos clínicos en países desarrollados.
- Aspectos económicos priman

- Biopsia acompaña a la mayoría de médulas, sobre todo en hospitales



AMO: Indicaciones: 10

Table 1. Indications for bone marrow examination
Investigation of unexplained anaemia, abnormal red cell indices, cytopenias or cytoses
Investigation of abnormal peripheral blood smear morphology suggestive of bone marrow pathology
Diagnosis, staging and follow-up of malignant haematological disorders (e.g. acute and chronic leukaemias, myelodysplastic syndromes, chronic myeloproliferative disorders, lymphomas, plasma cell myeloma, amyloidosis, mastocytosis)
Investigation of suspected bone marrow metastases
Unexplained focal bony lesions on radiological imaging
Unexplained organomegaly or presence of mass lesions inaccessible for biopsy
Microbiological culture for investigations of pyrexia of unknown origin or specific infections, e.g. military tuberculosis, leishmaniasis, malaria
Evaluation of iron stores
Investigation of lipid/glycogen storage disorders
Exclusion of haematological disease in potential allogeneic stem cell transplant donors

ICSH guidelines for the standarization of bone marrow specimens and reports,Int. Jnl.Lab Hem.2008

¿AMO sólo o AMO+Bx?

Table 2 Indications for a bone marrow aspiration with or without a trephine biopsy and relevance of other techniques applicable to the aspirate

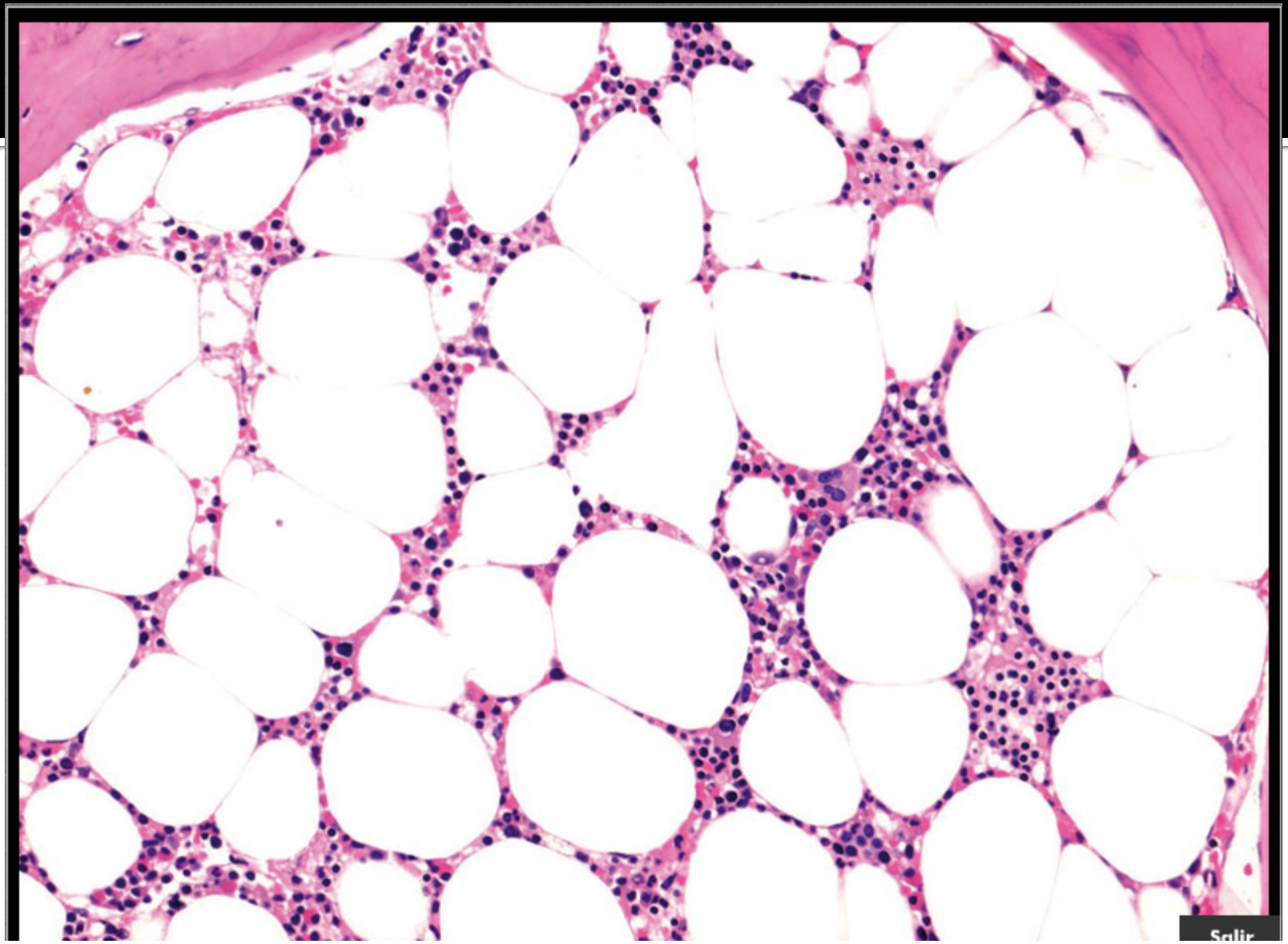
Indication	*Need for a trephine biopsy*	*Notes on other useful investigations*
Investigation of unexplained microcytosis	Only if MDS is suspected	
Investigation of unexplained macrocytosis	Only if MDS is suspected	Deoxyuridine suppression test may be useful but is mainly a research technique
Investigation of unexplained anaemia	Usually	Cytogenetic analysis if MDS is suspected; ultrastructural examination if congenital dyserythropoietic anaemia is suspected
Investigation of unexplained thrombocytopenia	Only if MDS is suspected	
Investigation of pancytopenia (including suspected aplastic anaemia)	Yes	Cytogenetic analysis if MDS is suspected; appropriate culture if mycobacterial infection or leishmaniasis is suspected; bone marrow is a useful source of DNA if investigation for Pearson's syndrome is required; cytogenetic analysis if a haemophagocytic syndrome is suspected†
Investigation of a leucoerythroblastic blood film and suspected bone marrow infiltration	Yes	Cytogenetic analysis if a haematological neoplasm is suspected; if an abnormal infiltrate is found, immunophenotyping and cytogenetic analysis may be useful; cytogenetic analysis is indicated if a small cell tumour of childhood is suspected because the demonstration of certain specific cytogenetic abnormalities can confirm the diagnosis
Investigation of suspected acute leukaemia	No*	Cytogenetic and possibly molecular genetic analysis; immunophenotypic analysis unless cells are clearly myeloid
Assessment of remission status after treatment of acute leukaemia	No*	Follow up cytogenetic analysis is only occasionally useful; molecular genetic analysis may be indicated for assessment of minimal residual disease

Bone Marrow.B J Bain. J Clin Pathol,2001

¿AMO sólo o AMO+Bx?

Investigation of suspected MDS or myelodysplastic/ myeloproliferative disorder	Yes	Cytogenetic analysis; investigation of colony forming units if juvenile myelomonocytic leukaemia is suspected
Investigation of suspected chronic myeloid leukaemia	No*	Cytogenetic analysis; molecular genetic analysis is not indicated because it can be performed, when necessary, on peripheral blood cells
Follow up of chronic myeloid leukaemia	No	Cytogenetic analysis
Investigation of suspected myeloproliferative disorder (polycythaemia rubra vera, essential thrombocythaemia, idiopathic myelofibrosis, or systemic mastocytosis)	Yes	Cytogenetic analysis; investigation of colony forming units (erythropoietin independent burst forming units) may be useful but in most centres is not a routine diagnostic test
Investigation of chronic lymphocytic leukaemia	Yes	Immunophenotyping is not indicated because it can be performed easily on the peripheral blood
Investigation of suspected non-Hodgkin's lymphoma	Yes	If an abnormal infiltrate is present, immunophenotyping, molecular analysis and cytogenetic analysis may be needed
Diagnosis and follow up of hairy cell leukaemia	Yes	Immunophenotyping, unless there are sufficient circulating cells for it to be performed on peripheral blood cells; tartrate resistant acid phosphatase stain if detailed immunophenotyping is not available
Staging of low grade non-Hodgkin's lymphoma (if the results of investigation will alter management)	Yes	Immunophenotyping, unless there are sufficient circulating cells for this to be done on blood cells; cytogenetic and molecular genetic analyses are sometimes useful if the specific type of non-Hodgkin's lymphoma has not already been determined

Bone Marrow.B J Bain. J Clin Pathol,2001



- La tecnología atenta contra la percepción del observador, pues los ojos de este descansan en la citometría de flujo y otros para identificar poblaciones anormales

- El que no pone “displasia” en cualquier médula es un mal hematólogo

- ¿Cuándo fue la última vez que diagnosticó médula ósea reactiva? (Más del 95% de casos en general)

MENSAJE

- No se puede ser autodidacta en médula, no se aprende viendo fotos bonitas de libros caros.
- Se aprende con tiempo y errores, guiado por alguien que ya pasó y sufrió esos problemas

- Requisito dentro de la formación del Residente hematólogo:
- Rotación por tinción de médulas, sangre y lectura obligada de ambas CON TUTOR ACREDITADO.
- La Sociedad de Hematología podría ser el puente entre la Universidad y el Centro Hospitalario. Comité de expertos

- En médula no se puede ser cerrado o necio: la razón puede estar en varios ojos, la verdad en un par….bien entrenado

- *"…and if this was all review for you, then think of it like going to a religious service; it never hurts to be reminded to be good"*

- GRACIAS