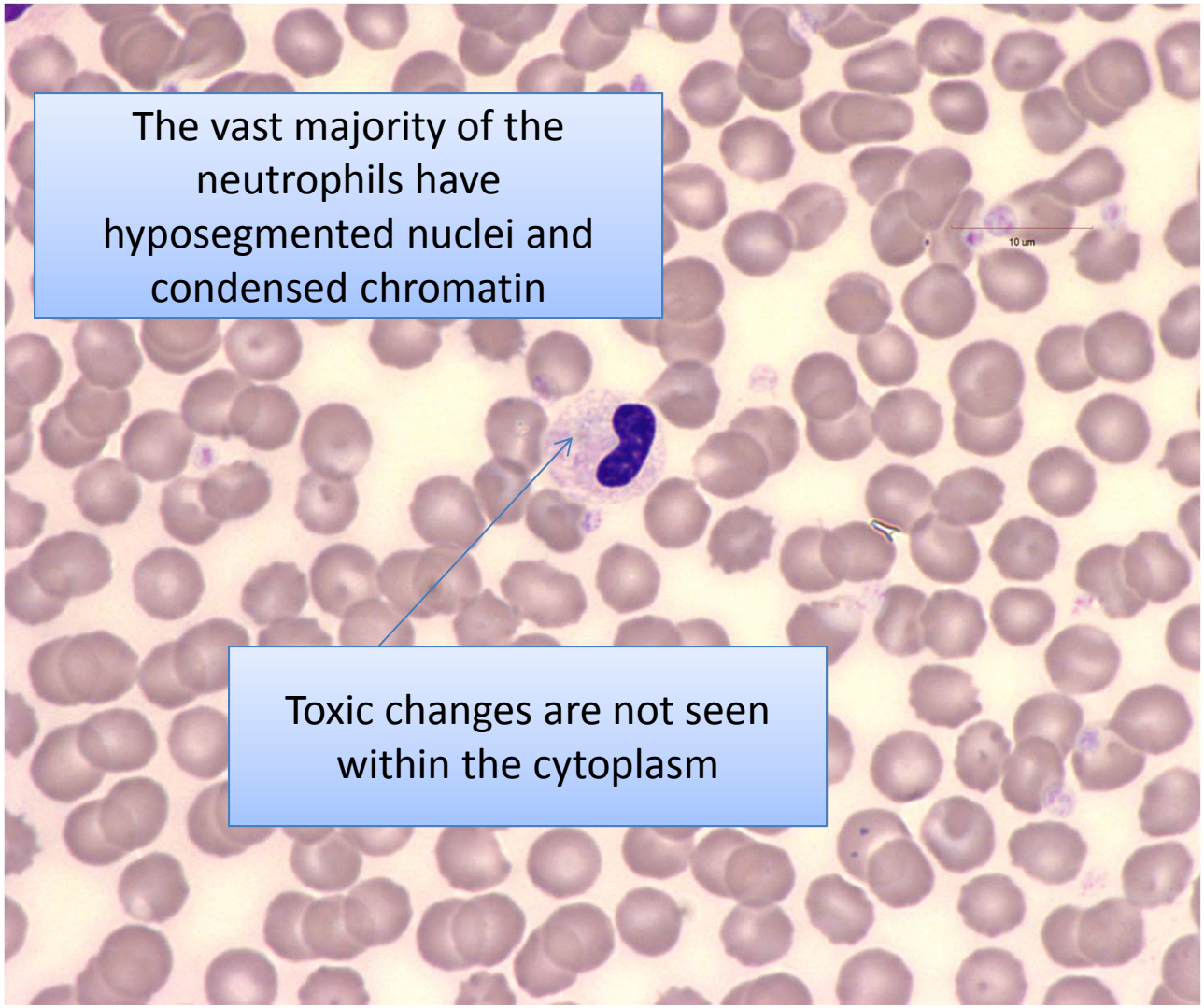
7 year old, spayed female Australian Shepherd. Presented for orthopedic surgery (repair of ruptured cruciate ligament). Other than lameness no abnormalities are found on physical exam.

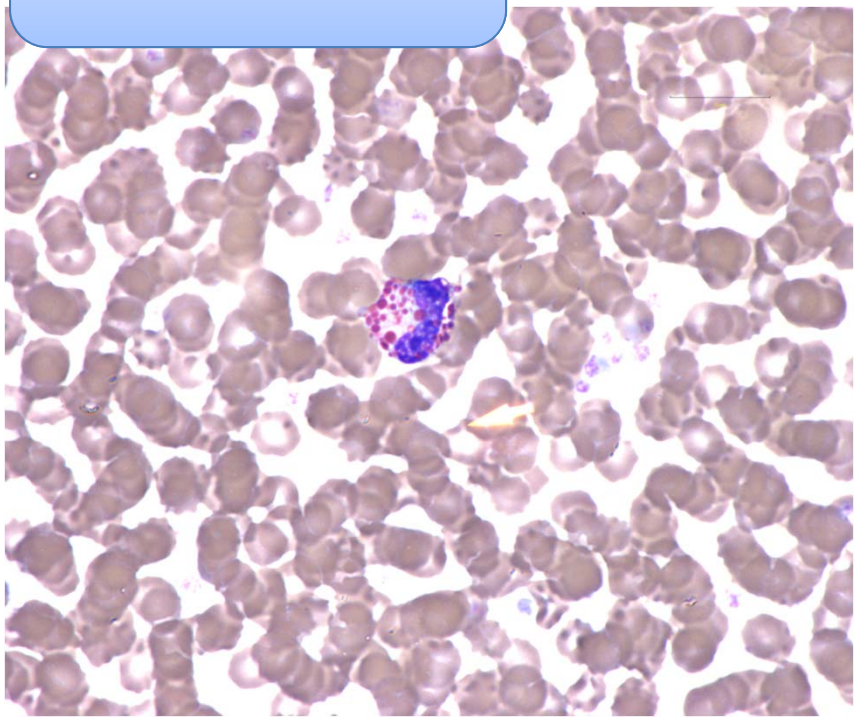
	Result	Units	Reference Interval
Leukocyte count	**4.7 L**	k/uL	6-17
Erythrocyte concentration	6.47	M/uL	5.5-8.5
Hemoglobin	16.6	g/dL	12-18
Mean Cell Volume	76	fl	60-77
Mean Cell Hemoglobin	26 H	pg	19-24
MCHC	34	g/dL	32-36
Platelet Concentration	255	K/uL	164-510
Segmented Neutrophil	**0.9 L**	K/uL	3-11.5
Band Neutrophil	**2.3 H**	K/uL	0-0.3
Lymphocyte	**0.5 L**	K/uL	1.5-5
Monocyte	0.3	K/uL	0.1-0.8
Eosinophil	0.7	K/uL	0-0.75

Blood smear 100x

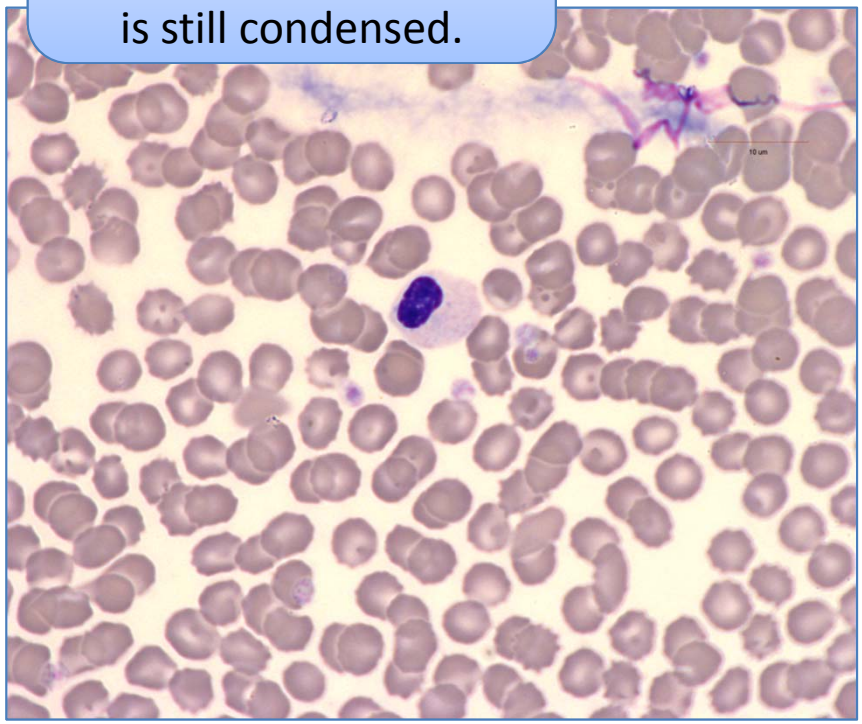


Blood smear 100x

Eosinophil nuclei are also hyposegmented

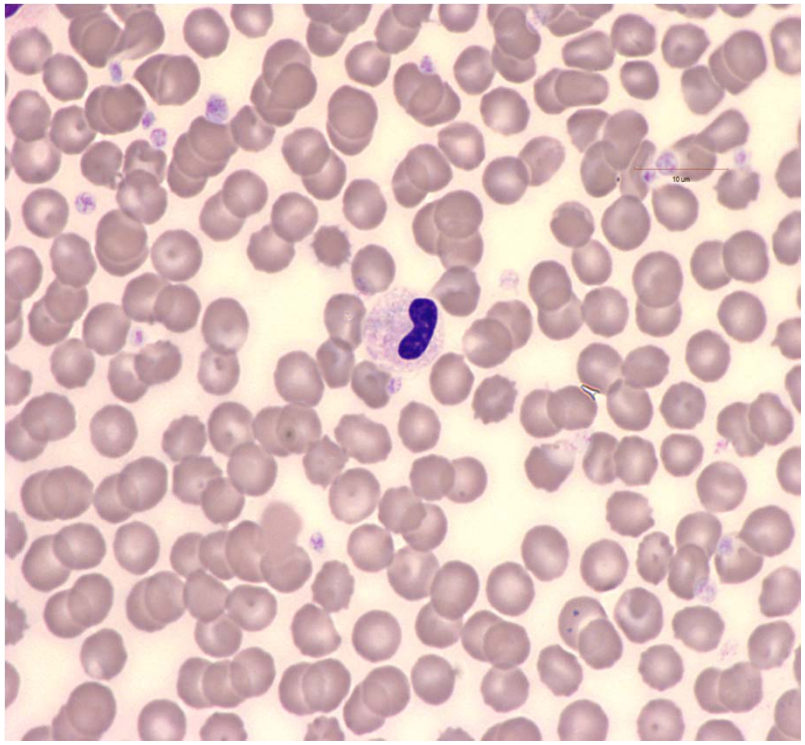


Occasional neutrophils have round or kidney bean nuclei. Chromatin is still condensed.



What is your diagnosis?

- Considering the signalment, physical exam findings and the CBC data, what are the differentials for the apparent pronounced left shift in this patient?



Discussion

- On initial evaluation the CBC data of this patient may appear to be consistent with a severe, acute inflammatory leukogram characterized by a degenerative left shift (more band neutrophils than segmented neutrophils).
- Does this fit with the physical exam findings and history?
- What is another explanation for the hyposegmentation seen in the granulocytes?

Pelger-Huet Anomaly

- Inherited condition in dogs, cats, horses, rabbits and humans[1]
- Characterized by failure of mature granulocyte and monocyte nuclei to lobulate. Megakaryocytes may also be affected[1]
- Leukocyte function is normal in affected dogs[2]
- Reported in many purebred breeds, including Australian shepherds, Australian cattle dogs, basenjis, border collies, cocker spaniels, coonhounds, foxhounds, German shepherds and foxhounds[3]

Pelger-Huet Anomaly

- In Australian shepherds it is inherited as an autosomal dominant trait with incomplete penetrance. Heterozygotes express the leukocyte morphologic abnormality, homozygotes die in utero[3]
- **~10% of Australian shepherds** are affected. There is no sex predilection. [3]
- In humans and mice the mutation is in the gene coding the **lamin B receptor.**[1] The genetic abnormality has not been identified in dogs but is suspected to be the same.
- Genetic testing is not yet available in dogs
- Confirmation of the condition can be done by serial CBCs and documentation of persistence of the condition in a healthy animal and/or evaluating relatives for presence of the anomaly

Why is it important to recognize this condition?

- Can be mistaken for a marked inflammatory leukogram or a preleukemic condition
- Must be differentiated from another condition called **pseudo Pelger-Huet anomaly**
  - Acquired hyposegmentation of granulocytes secondary to infections, myelodysplastic syndromes or drug treatments[1]
  - The chromatin is more clumped in true Pelger-Huett anomaly [1]

References

1. Weiss, D. J. Neutrophil Function Disorders. In Weiss, D.J. ed. Schalm's Veterinary Hematology. 6th ed. Ames, IA: Wiley-Blackwell 2010; 275-28
2. Latimer, K.S. Leukocyte Function in Pelger-Huet Anomaly of Dogs. Journal of Leukocyte Biology 1989: 45: 301-310
3. Latimer, K. S. Pelger-Huett Anomaly in Australian Shepherds: 87 Cases (1991-1997). Comparative Haematology International 2000: 10: 9-13