

**Title**

Pancytopenia in a 13-year-old dog

**Contributors**

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**Specimen**

Bone marrow aspiration

Liver fine-needle aspiration

Spleen fine-needle aspiration

**Signalment**

13-year-old neutered female, Cairn Terrier dog

**History**

The dog was referred to the ICU of the veterinary teaching hospital of Lyon, France, for the medical management of pancytopenia in a context of weight loss and fatigue that had been evolving for 4 months. A biochemistry panel and urine dipstick also revealed slightly increase of alkaline phosphatase (354 U/L; reference interval 23-212 U/L) and moderate bilirubinuria respectively. Total bilirubin was within reference intervals and SNAP 4Dx Plus (detection of *Dirofilaria immitis* antigen, antibodies to *Anaplasma phagocytophilum*, *Anaplasma platys*, *Borrelia burgdorferi*, *Ehrlichia canis*, *Ehrlichia ewingii*, IDEXX Laboratories, Westbrook, USA) was negative. No other prior results were available.

**Clinical findings**

Clinical examination revealed pale mucous membranes, prolonged capillary refill time, tachycardia and heart murmur at the apex (4/6). Blood group was determined as DEA1- and a blood transfusion was performed.

*Hematology*

A CBC performed on Sysmex XT-2000iV analyzer (Sysmex, Kobe, Japan) revealed moderate macrocytic normochromic non regenerative anemia, panleukopenia and thrombocytopenia (confirmed on the smear)(Table 1). Blood smear revealed frequent ovalocytes, a left shift with presence of toxic neutrophils (not depicted), granular lymphocytes, and activated monocytes, and confirmed thrombocytopenia (Figure 1).

Figure 1: Blood smear, Romanowsky stain, 50x objective.

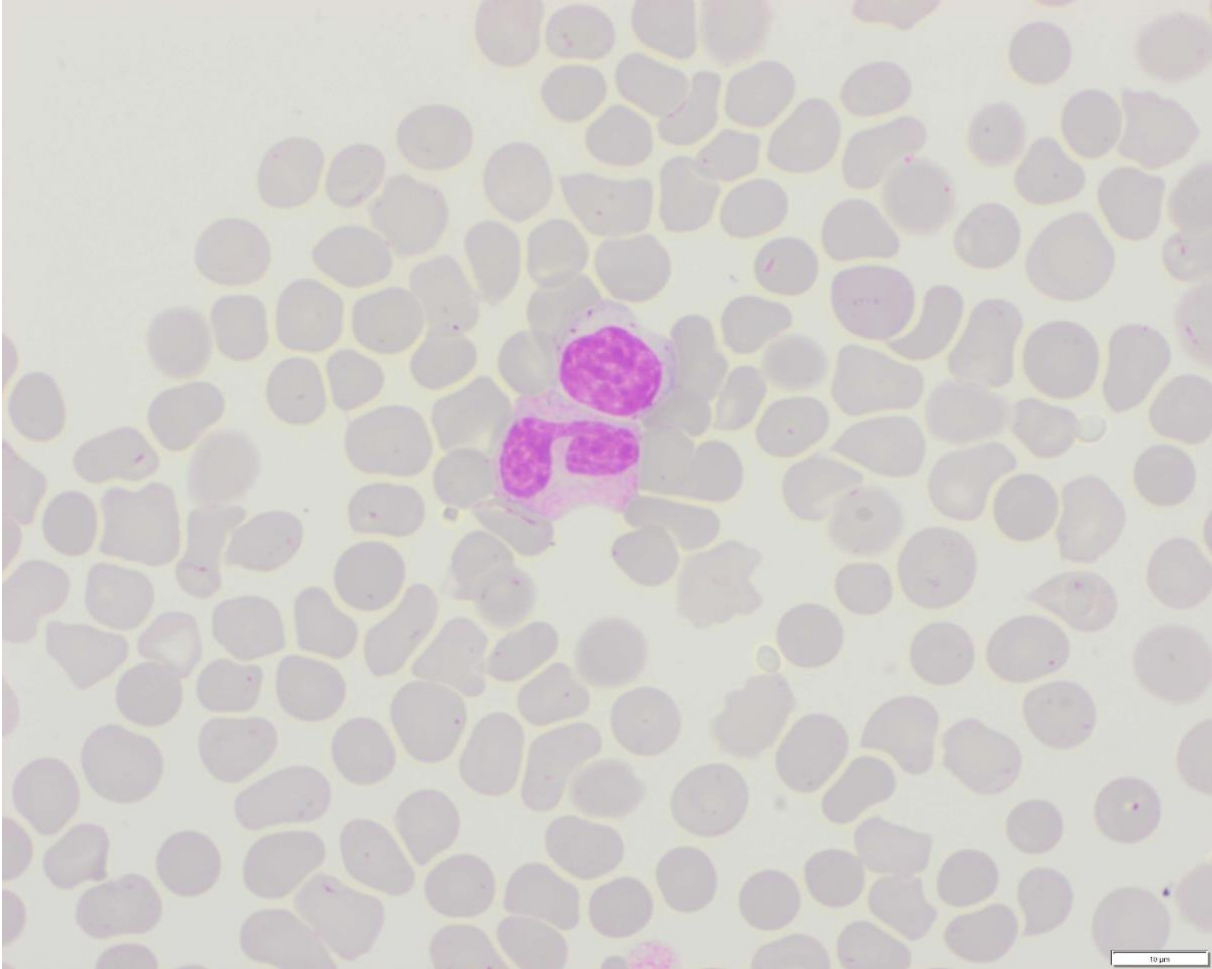


Table 1: CBC results Sysmex XT-2000iV

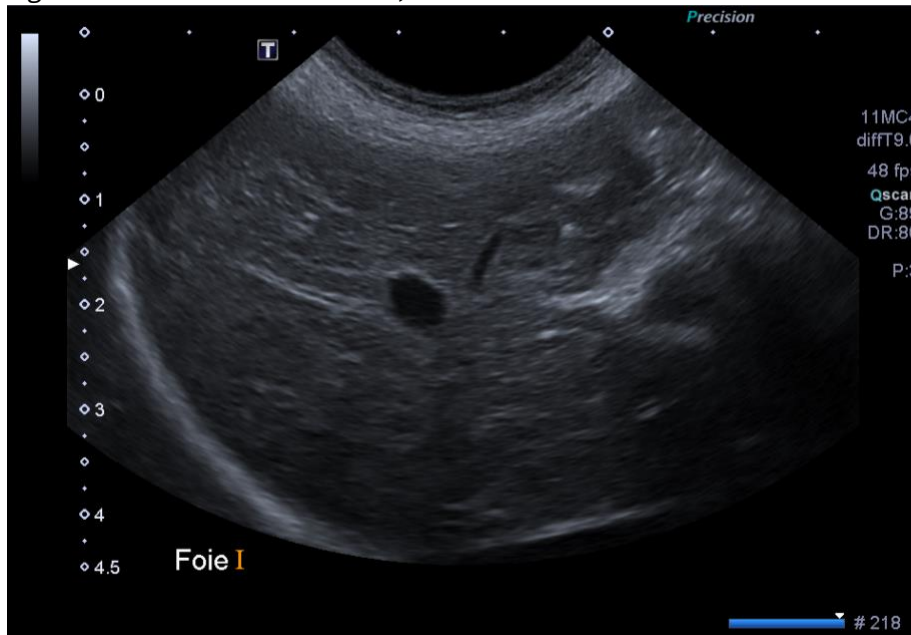
Measurand	Units	Result	LRL of RI	URL of RI
<b>RBC</b>	10 <sup>12</sup> /L	<b>1.7</b>	5.5	8.5
<b>HGB</b>	g/dL	<b>5.3</b>	12	18
<b>HCT</b>	%	<b>15.3</b>	37	54
<b>MCV</b>	fL	<b>90</b>	60	71
<b>MCH</b>	pg	<b>31.2</b>	17	23
<b>MCHC</b>	g/dL	34.6	31	36
<b>RET</b>	%	3.54		
<b>Corrected RET</b>	%	<b>1.2</b>	0	1
<b>RET</b>	10 <sup>9</sup> /L	60.2	0	80
<b>WBC</b>	10 <sup>9</sup> /L	<b>1.6</b>	6	17
<b>Neutrophils</b>	10 <sup>9</sup> /L	<b>0.7</b>	2.9	13.6
<b>Lymphocytes</b>	10 <sup>9</sup> /L	<b>0.7</b>	1.1	5.3
<b>Monocytes</b>	10 <sup>9</sup> /L	<b>0.2</b>	0.3	1.6
<b>Eosinophils</b>	10 <sup>9</sup> /L	<b>0</b>	0	1.4
<b>Basophils</b>	10 <sup>9</sup> /L	<b>0</b>	0	0.1
<b>PLT-O</b>	10 <sup>9</sup> /L	<b>92</b>	140	600

*RBC: red blood cell; HGB: hemoglobin; HCT: hematocrit; MCV: mean corpuscular volume; MCH: mean corpuscular hemoglobin; MCHC: mean corpuscular hemoglobin concentration; RET: reticulocyte; WBC: white blood cell; PLT-O: platelet count by optic method; RI: reference interval; LRL: lower reference limit; URL: upper reference limit.*

*Abdominal Ultrasound examination (Figures 2, 3 and 4)*

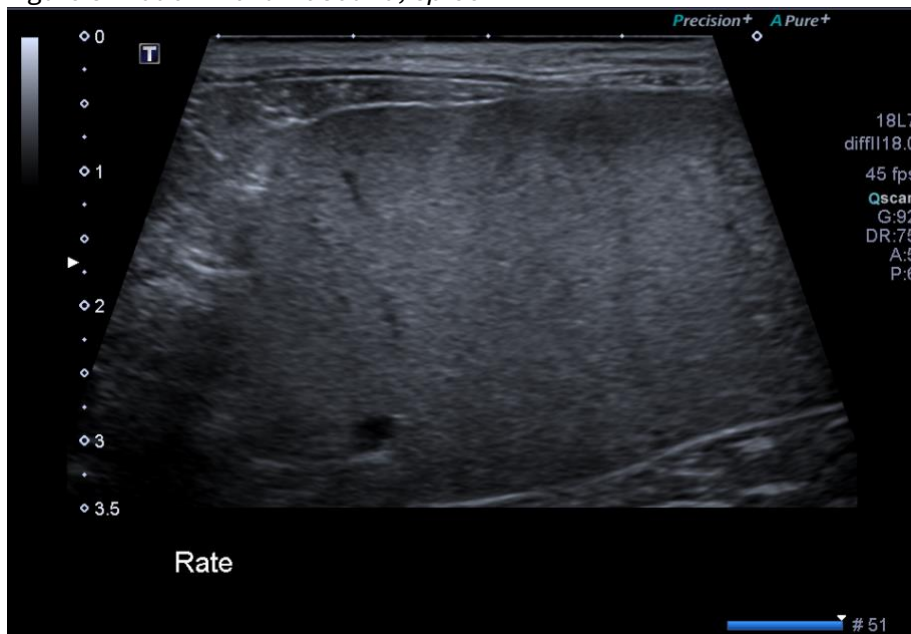
Abdominal Ultrasound examination revealed marked splenomegaly and hepatomegaly with diffuse hyperechoic structure. Splenic and ileocolic lymph nodes were also slightly increased.

Figure 2: Abdominal ultrasound, liver



Credit: VetAgroSup, Diagnostic Imaging Department

Figure 3: Abdominal ultrasound, spleen



Credit: VetAgroSup, Diagnostic Imaging Department

Figure 4: Abdominal ultrasound, splenic lymph nodes



Credit: VetAgroSup, Diagnostic Imaging Department

Considering these initial results, bone marrow, liver, spleen, and lymph nodes fine-needle aspirations were performed.



Figure 5: Fine needle aspirate biopsy of the liver, Romanowsky stain, 50x (A) 100x (B) objectives.

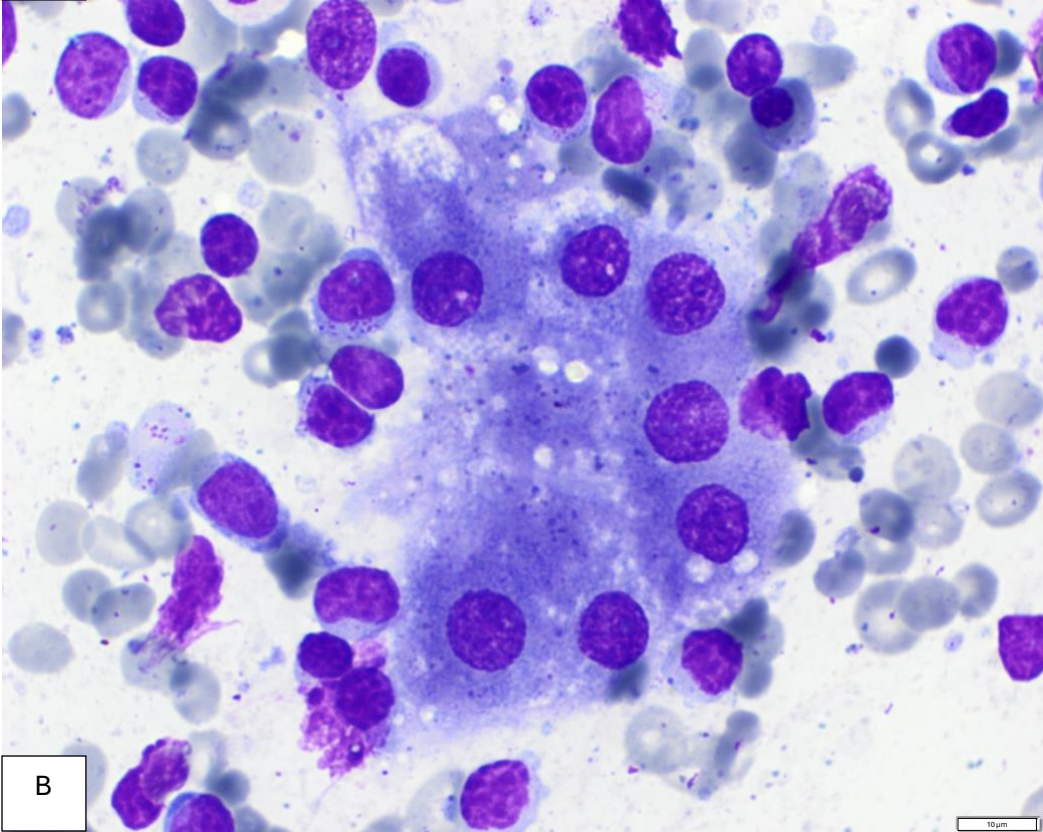
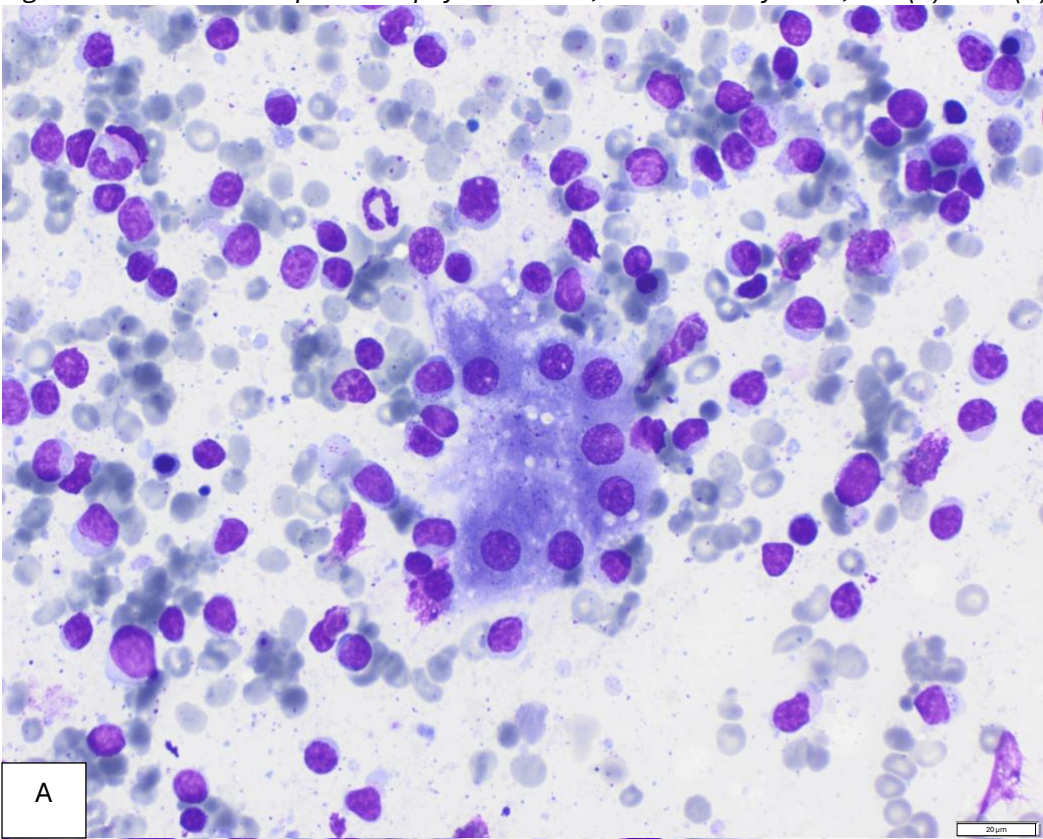




Figure 6: Fine needle aspirate biopsy of the spleen, Romanowsky stain, 50x (A) 100x (B) objectives.

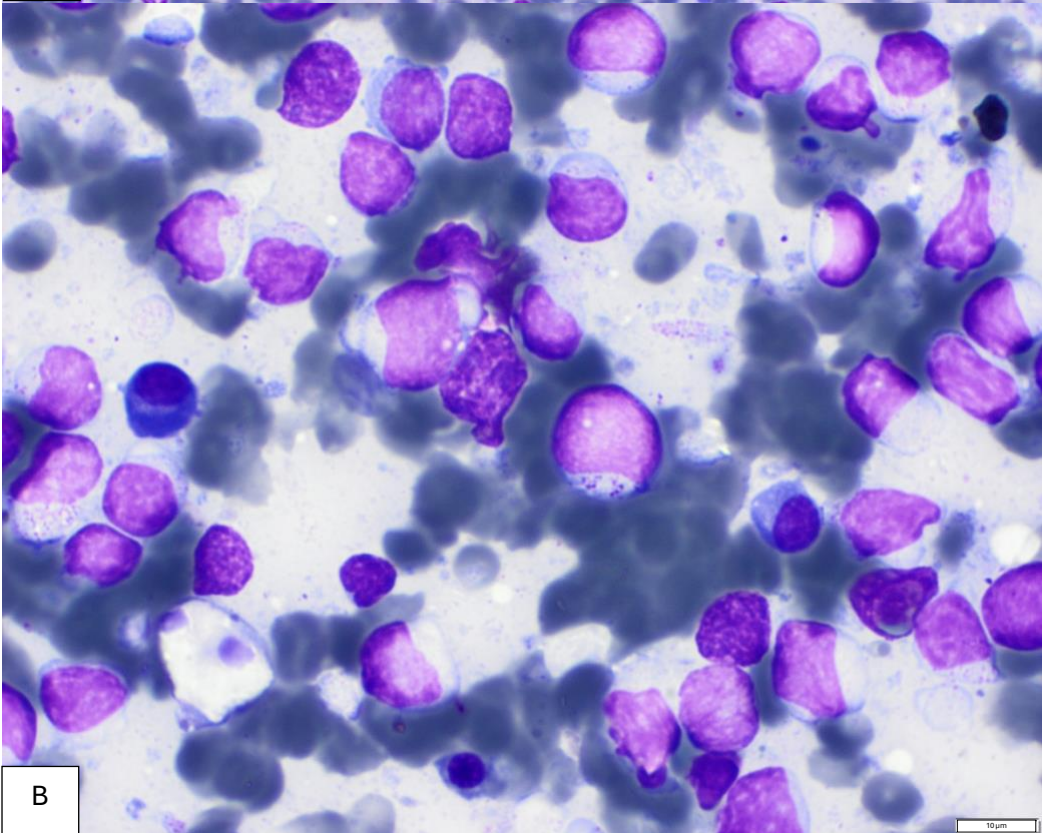
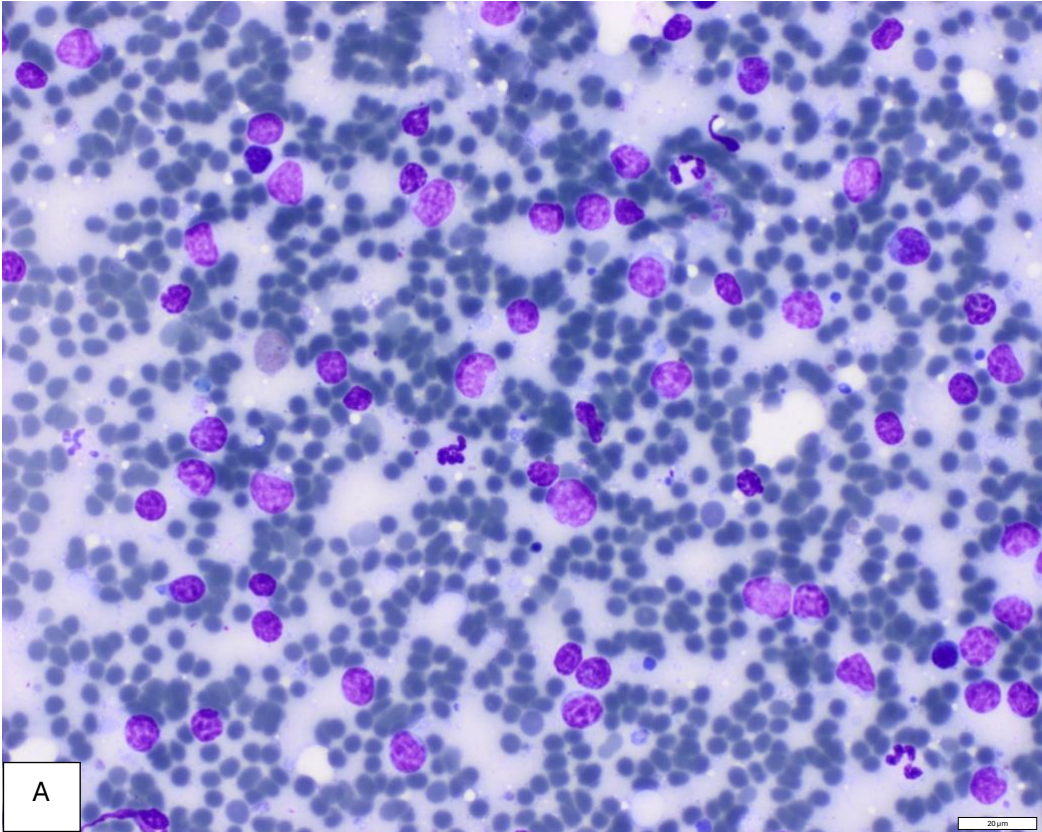
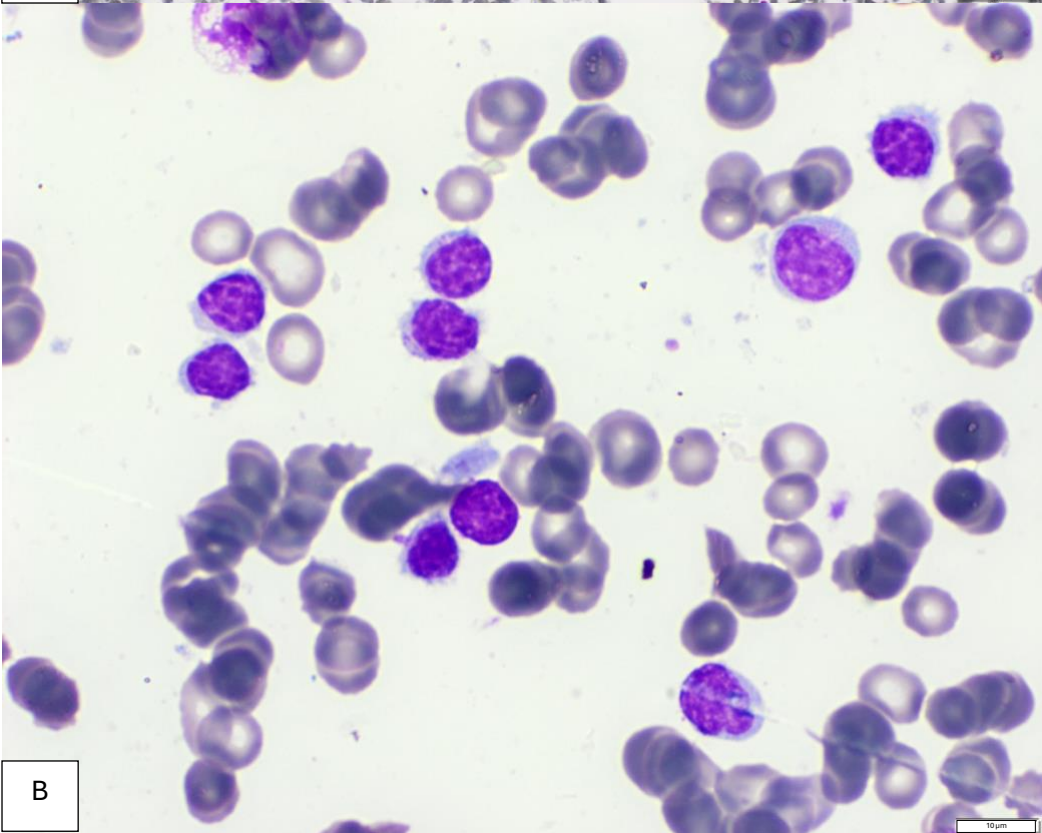
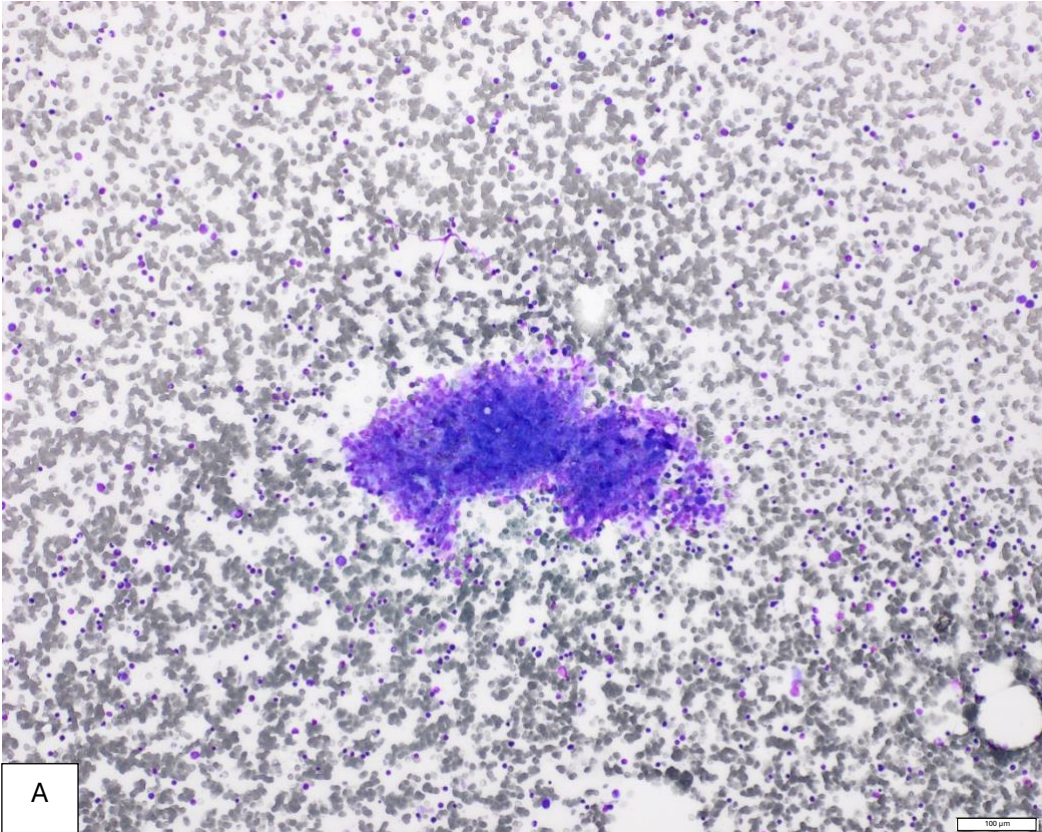




Figure 7: Fine needle aspirate biopsy of the bone marrow, Romanowsky stain, 10x (A) 100x (B) objectives.





Unfortunately, fine-needle aspirate biopsy of lymph nodes were not representative (aspiration of adipose tissue only).

**Questions**

What do the 3 aspirations have in common?

What could be your first hypothesis for the origin of pancytopenia?

Which additional data could confirm your hypothesis?