

# Abnormal WDF and WNR scattergrams from Sysmex XN-V in a dog

## Contributors

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## Specimen

EDTA whole blood and abdominal effusion

## Signalment

4-month-old intact male, Australian shepherd dog

## History

The dog was referred to the emergency unit at the veterinary teaching hospital of Toulouse, France, for the medical care of a parvovirus infection diagnosed by a positive SNAP test (SNAP Parvo, Idexx Laboratories, Westbrook, USA) in the context of vomiting and diarrhoea evolving for 2 days.

## Clinical findings

Clinical examination revealed pale mucous membranes and palpable fluid accumulation in the abdomen.

A CBC performed at the emergency unit with the ProCyte Dx (Idexx, Westbrook, USA) (Table 1) revealed a marked normocytic normochromic regenerative anemia, and leukocytosis with neutrophilia, monocytosis, and thrombocytopenia with a flag and an increased MPV. The thrombocytopenia was suspected to be true despite the observation of few platelet-fibrin clots on the blood smear.

An abdominal point-of-care ultrasound (POCUS) confirmed the presence of an abdominal effusion. The dog was transfused with compatible blood.

The next day, a complete abdominal ultrasound was performed by a specialist and revealed a large amount of abdominal effusion and a hyperechoic mass with ill-defined contours located between the liver and the stomach and consistent with a hematoma.

Blood and effusion were sampled and analyzed with the Sysmex XN-V (Sysmex, Kobe, Japan) (Figure 1; Tables 1 and 2) and smears were reviewed. Very few platelets with no clumps were observed in blood and effusion. Hemostasis panel was performed on STA Compact Max3 (Stago, Asnières-sur-Seine, France) and was unremarkable (Table 3).

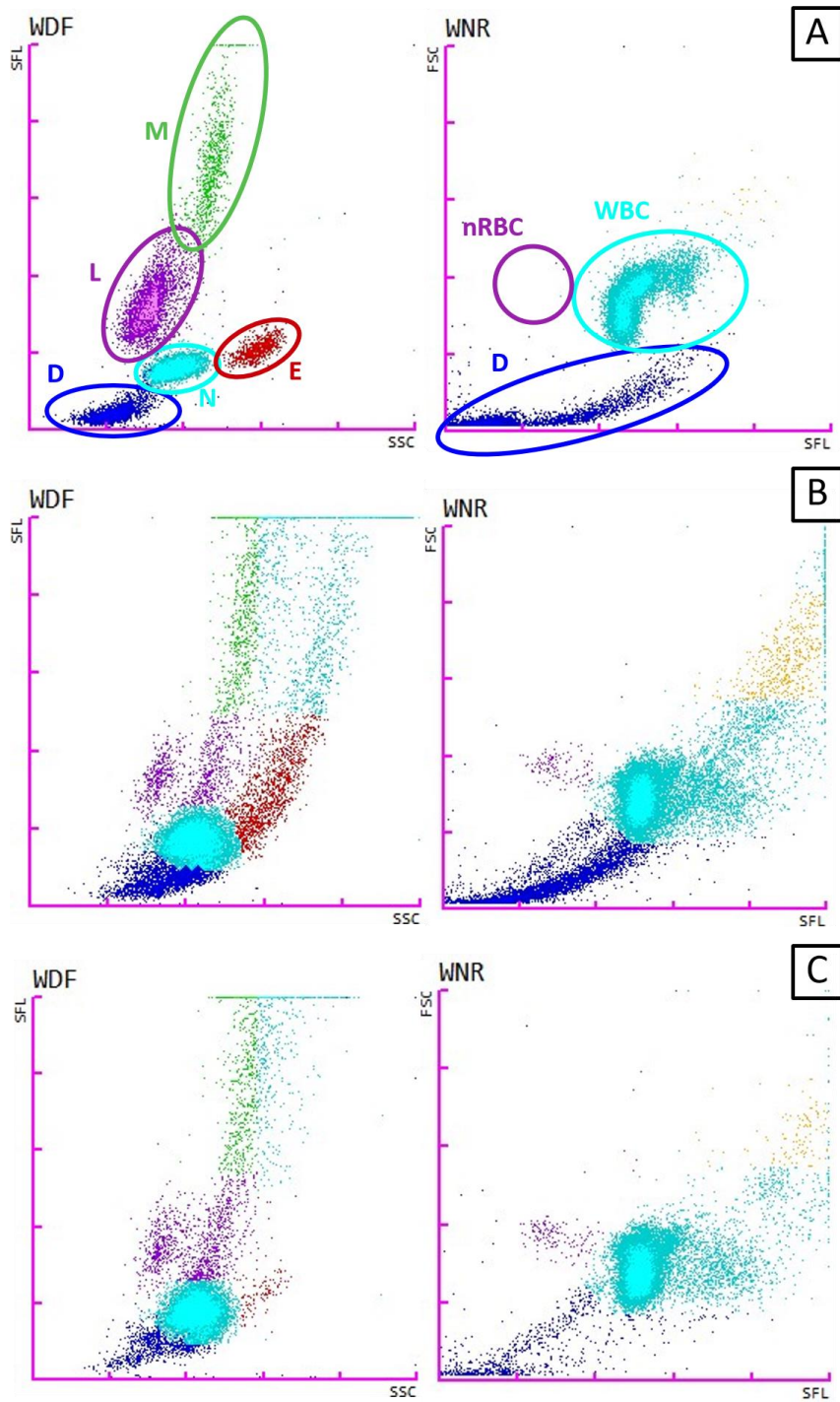


Figure 1 : Sysmex XN-V WBC differential (WDF) and white cell nucleated (WNR) scattergrams of EDTA-blood specimen from a healthy 3-year-old dog (A) and EDTA-blood (B) and EDTA-effusion (C) specimens from a 4-month-old Australian shepherd dog with Parvovirus infection.

Abbreviations: D, debris; E, eosinophils; FSC, forward scatter; L, lymphocytes; M, monocytes; N, neutrophils; nRBC, nucleated red blood cells; SFL, side fluorescence light; SSC, side scatter; WBC, white blood cells

Table 1: Hematological numerical results for EDTA-blood specimens with ProCyte Dx (before transfusion) and Sysmex XN-V (after transfusion) and EDTA-effusion specimen with Sysmex XN-V.

Variable	ProCyte Dx Blood specimen		Sysmex XN-V Blood specimen		Sysmex XN-V Effusion
	Result	RI	Result	RI	Result
RBC (x10 <sup>12</sup> /L)	<b>2.41</b>	5.65-8.87	<b>3.46</b>	5.20-7.90	3.44
HCT (%)	<b>16.5</b>	37.3-61.7	<b>25.6</b>	35.0-52.0	25.1
HGB (g/dL)	<b>5.8</b>	13.1-20.5	<b>8.5</b>	12.4-19.2	8.4
MCV (fL)	68.5	61.6-73.5	<b>74.0</b>	60.0-71.0	73.0
MCH (pg)	24.1	21.2-25.9	24.6	21.9-26.3	24.4
MCHC (g/dL)	35.2	32.0-37.9	<b>33.2</b>	34.4-38.1	33.5
RDW (%)	14.9	13.6-21.7	<b>12.1</b>	13.2-19.1	12.0
RET (%)	3.7	-	1.45	-	1.44
Corrected RET (%)	<b>1.4</b>	0-1	0.83	0-1	-
RET (x10 <sup>9</sup> /L)	89.4	10.0-110.0	50.2	19.1-150.1	49.5
WBC (x10 <sup>9</sup> /L)	<b>18.23</b>	5.05-16.76	18.88 <sup>a</sup>	5.60-20.40	17.03 <sup>a</sup>
Neutrophils (x10 <sup>9</sup> /L)	<b>14.72</b>	2.95-11.64	<b>15.45</b>	2.90-13.60	15.12
Lymphocytes (x10 <sup>9</sup> /L)	2.06	1.05-5.10	<b>0.78</b>	1.10-5.30	1.01
Monocytes (x10 <sup>9</sup> /L)	<b>1.35</b>	0.16-1.12	0.71	0.40-1.60	0.65
Eosinophils (x10 <sup>9</sup> /L)	0.09	0.06-1.23	1.44	0.10-1.50	0.13
Basophils (x10 <sup>9</sup> /L)	0.01	0.00-0.10	0.50	Rare	0.12
PLT <sup>b</sup> (x10 <sup>9</sup> /L)	<b>2*</b>	148-484	<b>12*</b>	108-562	5
MPV (fL)	<b>23.0</b>	8.7-13.2	7.7*	-	10.5

Bolded values are outside the reference interval (RI).

Abbreviations: HGB, hemoglobin; HCT, hematocrit; MCH, mean corpuscular hemoglobin; MCHC, mean corpuscular hemoglobin concentration; MCV, mean cell volume; MPV, mean platelet volume; nRBCs, nucleated red blood cells; PLT, platelets; RBC, red blood cells; RET, reticulocytes; RDW, red cell distribution width; WBC, white blood cells; \*, error flag.

<sup>a</sup> Leukocyte count obtained with the XN-V analyzer WNR channel

<sup>b</sup> Platelet counts were obtained with the impedance channel with the ProCyte Dx and with the optical channel with the Sysmex XN-V

Table 2: Additional results for abdominal effusion and EDTA-whole blood

Variable	Abdominal effusion	EDTA- whole blood
<b>Macroscopic appearance</b>	Red, opaque	Normal
<b>TNCC<sup>a</sup> (x10<sup>9</sup>/L)</b>	16.69	-
<b>Total proteins<sup>b</sup> (g/L)</b>	33	-
<b>Packed cell volume<sup>c</sup> (L/L)</b>	25	25
<b>Manual cell differential<sup>c</sup> (%)</b>		
<b>Neutrophils</b>	69	90
<b>Lymphocytes</b>	4	3
<b>Monocytes/Macrophages</b>	27	5
<b>Eosinophils</b>	0	2

Abbreviations: TNCC, Total nucleated cells

<sup>a</sup> Leukocyte count obtained with the XN-V analyzer WDF channel

<sup>b</sup> Obtained on supernatant with a refractometer

<sup>c</sup> Obtained by manual methods

Table 3: Hemostasis panel

<b>Variable</b>	<b>Result</b>	<b>Reference interval</b>
<b>Antithrombin III (%)</b>	111	102 – 191
<b>FDP (mg/L)</b>	< 5	0 – 5
<b>Fibrinogen (g/L)</b>	3.7	1.3 – 4.7
<b>PT (s)</b>	8.0	7.3 – 9.9
<b>aPTT (s)</b>	15.8	12.9 – 16.9

Abbreviations: aPTT, activated partial thromboplastin time; FDP, Fibrin degradation product ; PT, prothrombin time

### Questions

1/ Give your interpretation and the most probable cause for the abdominal effusion.

2/ Concerning the CBC performed on Sysmex XN-V (Figure 1), what is the main anomaly in the scattergrams from the case compared to the ones of a healthy dog? What does it imply regarding numerical results?

3/ What could be the cause of the abnormal scattergrams and how would you investigate it?