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THE INFLUENCE OF MASTITIS,  
LOCAL PERITONITIS AND DISTOMATOSIS  
ON THE LYMPHOCYTIC PICTURE  
OF BOVINE BLOOD

By

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In the eradication of bovine adult leukosis, various hematological methods are widely in use. The aim is to detect the early preclinical cases. The results are interpreted with the help of various leukosis keys. *Stöber* (1965) and *Wiesner* (1967) have reviewed the subject very thoroughly. The hematological methods have, however, a serious shortcoming. They are not specific enough, which creates problems in diagnostic work. To avoid false conclusions, several chronic diseases are worth noting in connection with blood sampling, because even long-prevailing lymphocytosis has been observed in herds known to be free from leukosis. Studies on non-specific lymphocytosis have mainly been undertaken in herds with leukosis, with resultant difficulties in interpretation. Considerably less work has been done in herds free from leukosis.

*Nieland* (1930), as well as many others, have observed that tuberculous mastitis can lead to a long-lasting lymphocytosis. *Schöttler & Schöttler* (1934) refer to earlier works (*Schwanitz* 1920 and *Knoblauch* 1924) pointing out the importance of tuberculosis in this sense. In the opinion of *Niepage* (1953), hematological findings are not specific unless lymphocytes with certain morphological changes are found. This because he has found non-specific lymphocytosis in connection with the amputation of claws, local peritonitis, bovine malignant catarrh and retentio secundinarum. *Götze et al.* (1953) studied the material of a clinic to see whether diseases might create problems in the

early diagnosis of leukosis. In their material, four cattle with piroplasmiasis had a long-prevailing lymphocytosis. *Nordström & Otterlin* (1957) have observed lymphocytosis in cases of mastitis, foreign body peritonitis, pneumonia, abscess and metritis. *Niepage* (1961) has seen lymphocytosis in clinically healthy as well as in chronically diseased cattle. According to him, cattle with distomatosis generally had low lymphocyte counts.

The purpose of this paper is to present the results of hematological, patho-anatomical and parasitological studies with the aim of seeing if cattle suffering from mastitis, local peritonitis or distomatosis show changes in the lymphocytic blood picture.

### MATERIAL AND METHODS

In order to secure suitable material, a certain limited area was selected. Blood samples were collected from every animal from this area coming to the slaughterhouse. During the subsequent meat inspection a careful examination was performed with special attention to disease conditions which might possibly change the blood picture. All findings were recorded and samples were taken for histological examination when needed. In this way, 232 suitable samples were collected. EDTA\* was used as the anticoagulant and the hematological tests were performed within 24 hrs. Samples were hemolyzed with saponine and in each the white cells were counted twice using a Celloscope 202 electronic computer. Blood films were stained with MacNeal's tetrachrome stain\*\*, and differential counting of 100 white cells was done. Histological slides were prepared of udders and livers, using routine methods. The results were finally processed on an electronic computer (Student's t-test).

### RESULTS AND DISCUSSION

The results are presented in Tables 1 to 3. The animals are divided into four age groups. There were a few animals with more than one of the above-mentioned diseases. One had all three conditions, 7 had mastitis and distomatosis, 8 peritonitis and distomatosis, and 3 mastitis and peritonitis simultaneously.

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\* Manufactured by E. Merck AG, Darmstadt, W. Germany.

\*\* Manufactured by Hopkin & Williams Ltd, Chadwell Heath, England.

Five cases of mastitis were histologically considered acute and 10 chronic.

Key to the tables

	A	
B		D
C		E

- A — number of animals  
 B — average of the total number of leukocytes/mm<sup>3</sup>  
 C — standard deviation of B  
 D — average of the % of lymphocytes  
 E — standard deviation of D

Table 1. The total number of leukocytes and percentage of lymphocytes in bovines with distomatosis as compared with the rest of the experimental group.

Age in years	No distomatosis		Mild distomatosis		Severe distomatosis	
1 yr.	64		13		3	
	6108	56.61	6592	56.62	4600	61.33
	1979	12.88	1950	15.76	1296	6.18
2 yrs.	14		3		3	
	5521	52.64	5700	58.00	4767	54.33
	1875	13.53	942	11.43	946	12.66
3 yrs.	9		2		1	
	5089	55.00	5350	37.50	4500	49.00
	1901	13.16	1850	12.50	—	—
4 or more yrs.	56		31		33	
	4402	53.13	4781	54.00	4312	49.88
	1627	11.26	1658	12.53	952	8.95

There is no significant difference within the age groups between distomatotic and non-distomatotic populations. Neither is there any significant difference in the percentage of lymphocytes, and thus no significant difference in the total number.

Although animals under 4 years of age suffering from distomatosis are under-represented, with perhaps the one exception of yearlings with mild distomatosis, it can be observed that there are no indications that significant differences could be expected between distomatotic and non-distomatotic groups.

The only age group where a comparison of results between the populations is possible is the last one, 4 years and older; in

**Table 2.** The total number of leukocytes and percentage of lymphocytes in bovines with mastitis as compared with the rest of the experimental group.

Age in years	No mastitis		Mastitis	
1 yr.		80		—
	6130	56.79		
	1840	13.24		
2 yrs.		19		1
	5521	53.89	3800	50.00
	1676	13.56	—	—
3 yrs.		12		—
	5083	51.58		
	1822	14.08		
4 or more yrs.		106		14
	4377	51.94	4329	56.36
	1474	10.66	1542	13.74

this age group there is no significant difference, neither in the total number nor in the percentage of lymphocytes. In the younger age groups, comparison was impossible because mastitis cases were too scarce.

**Table 3.** The total number of leucocytes and percentage of lymphocytes in bovines with local peritonitis as compared with the rest of the experimental group.

Age in years	No peritonitis		Peritonitis	
1 yr.		79		1
	6142	56.80	5200	56.00
	1849	13.32	—	—
2 yrs.		20		—
	5435	53.70		
	1676	13.24		
3 yrs.		9		3
	5167	49.22	4833	58.67
	1509	14.57	2522	9.46
4 or more yrs.		101		19
	4317	52.41	4663	52.74
	1395	10.99	1850	11.99

In those groups where statistical analysis is possible there are no significant differences between the groups.

In this material, distomatosis, mastitis and local peritonitis have thus resulted in no significant changes neither in the total number nor in the percentage of lymphocytes. It is interesting to note that animals suffering from distomatosis generally had low values, though significant differences could not be detected. *Niepage* (1961) has made a somewhat similar observation.

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#### SUMMARY

The authors have studied hematologically and patho-anatomically 232 slaughter cattle, of which 89 had distomatosis, 15 mastitis and 23 local peritonitis. None was observed to have lymphocytosis. The statistical comparison between the age groups and between diseased and healthy animals did not reveal any significant differences in the total count of leukocytes or in the relative number of lymphocytes.

## ZUSAMMENFASSUNG

*Der Effekt von Euterentzündungen, lokaler Bauchfellentzündungen und Distomatose auf dem Lymphozytenbild des Rinderblutes.*

Die Verfasser haben 232 Schlachtrinder hämatologisch und pathoanatomisch untersucht. 89 von den Tieren litten an Distomatose, 15 an Euterentzündung und 23 an lokaler Bauchfellentzündung. Kein Tier hatte Lymphozytose. Ein statistischer Vergleich ergab keine signifikante Differenzen zwischen den verschiedenen Gruppen weder in der totalen Anzahl der Leukozyten noch in der relativen Zahl der Lymphozyten.

## SAMMANFATTNING

*Effekten av mastiter, lokala peritoniter och distomatos på nötkreaturens blodlymfocytbild.*

Författarna har hematologiskt och pathoanatomiskt undersökt 232 slaktnöt, av vilka 89 led av distomatos, 15 av mastit och 23 av lokal peritonit. Inget djur visade lymfocytos. Statistisk jämförelse av de olika åldersgrupperna och av de olika sjukdomsgrupperna gav inga signifikanta skillnader varken i det totala leukocytantalet eller det procentuella lymfocytvärdet.

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