

Comparative Haematological Studies on *Tatera indica* with Three Anti Coagulant Compounds

Pages with reference to book, From 203 To 207

A.B. Rehman, S.I Ahmad (Department of Pharmacology, Faculty of Pharmacy, University of Karachi, Karachi-32.)

Abstract

Haematological effects of 0.025% warfarin, 0.0375% coumatetralyl and 0.005% difenacoum on the blood picture of *Tatera indica* was studied. The blood changes in survivors treated with anticoagulants, induced noticeable changes in the blood picture as expressed by reduction of haemoglobin value, red cell count, and increase in leucocytes. The platelets exhibited a similar trend to that of erythrocytic count showing an early phase of thrombocytopenia associated with prolongation of bleeding, coagulation and prothrombin time (JPMA 33:203, 1983).

Introduction

Susceptibility of *Tatera indica* differ in response to different anticoagulants, and it was found that *Tatera indica* is more susceptible to difenacoum than warfarin and coumatetralyl. Male *Tatera indica* is supposed to be the most tolerant to warfarin (Greaves and Rehman, 1977).

This work deals with the consequences of anticoagulant effects on the blood picture of *Tatera indica* with three different anticoagulants as a basis from biological discrimination between various anticoagulants. In the present investigation the effect of warfarin coumatetralyl and difenacoum have been studied.

Material and Methods

Mature medium weight group of male rats, *Tatera indica* being the most tolerant, was selected for the present study. The animals were experimentally exposed to different feeding periods i.e., 2, 4, 6, 8, 10 and 15 days respectively. The animals were caged individually and were supplied with water and laboratory diet. The animals first given plain flour so as to establish feeding. After 2 or 3 days the flour mixed with the toxic compound was supplied and exact amount of anticoagulant used from toxic diet was calculated. Blood was drawn from the survived animals and haemoglobin was determined, erythrocytes, leucocytes and differential count were made by counting chamber, prothrombin time was measured by Simplastin, using Quick one stage time, coagulation was measured by using capillary glass tube method and bleeding time was determined by Duke's method.

The blood picture of the survivors treated with 0.025% warfarin, 0.0375% coumatetralyl and 0.005% difenacoum was studied for 48 hours after treatment then on 4, 6, 10 and 15 days respectively. In the same way the blood picture of controlled were examined. The haematological techniques suggested by Britton (1963) and Seiverd (1964) was observed in the present studies.

Results and Discussion

Survivors of rats exposed to warfarin (Table-I)

Table 1

Blood Picture of *Tatera indica* Given Oral Treatment With 0.025% Warfarin (Mean values).

Days Treat- ment	H.b. % (Sahli's)	R.B.C. in mill./mm ³	Differential Leucocytic Count (%)							Platelets thous./ mm ³	Time in seconds of		
			W.B.C. in thous./ mm ³	Lympho	Neutro	Mono	Eosino	Baso	Bleed- ing		Coagu- lation	Proth- rombin	
Normal	84.5	4,30000	10.636	65.0	28.0	5.0	1.7	0.7	359.000	80.0	46.7	16.50	
2	80.6	4,10000	9.584	60.1	23.0	7.0	2.5	0.6	358.000	81.0	65.2	34.00	
4	73.2	4,00000	11.231	56.2	39.0	10.0	1.7	0.6	202.000	84.0	104.8	120.00	
6	49.6	2,30000	15.131	53.4	38.2	7.4	2.5	0.5	82.000	89.0	220.0	400.00	
10	38.2	1,20000	14.216	32.7	34.6	9.3	3.8	0.6	75.000	440.0	240.0	500.00	
15	38.7	75000	18.131	30.4	39.4	13.2	3.4	0.3	72.000	542.0	682.0	560.00	

showed marked reduction in the red cell count and haemoglobin content. The reduction was higher when treated for 10 and 15 days, decrease in haemoglobin content and erythrocytic count was observed and increase in leucocytic count was still higher. The changes in the differential leucocytic count were more noticeable showing high polymorphnuclear leucocytosis. The reduction in thrombocytic count was highly significant, bleeding time also increased, coagulation time showed prolongation and prothrombin time follows the same trend of coagulation time.

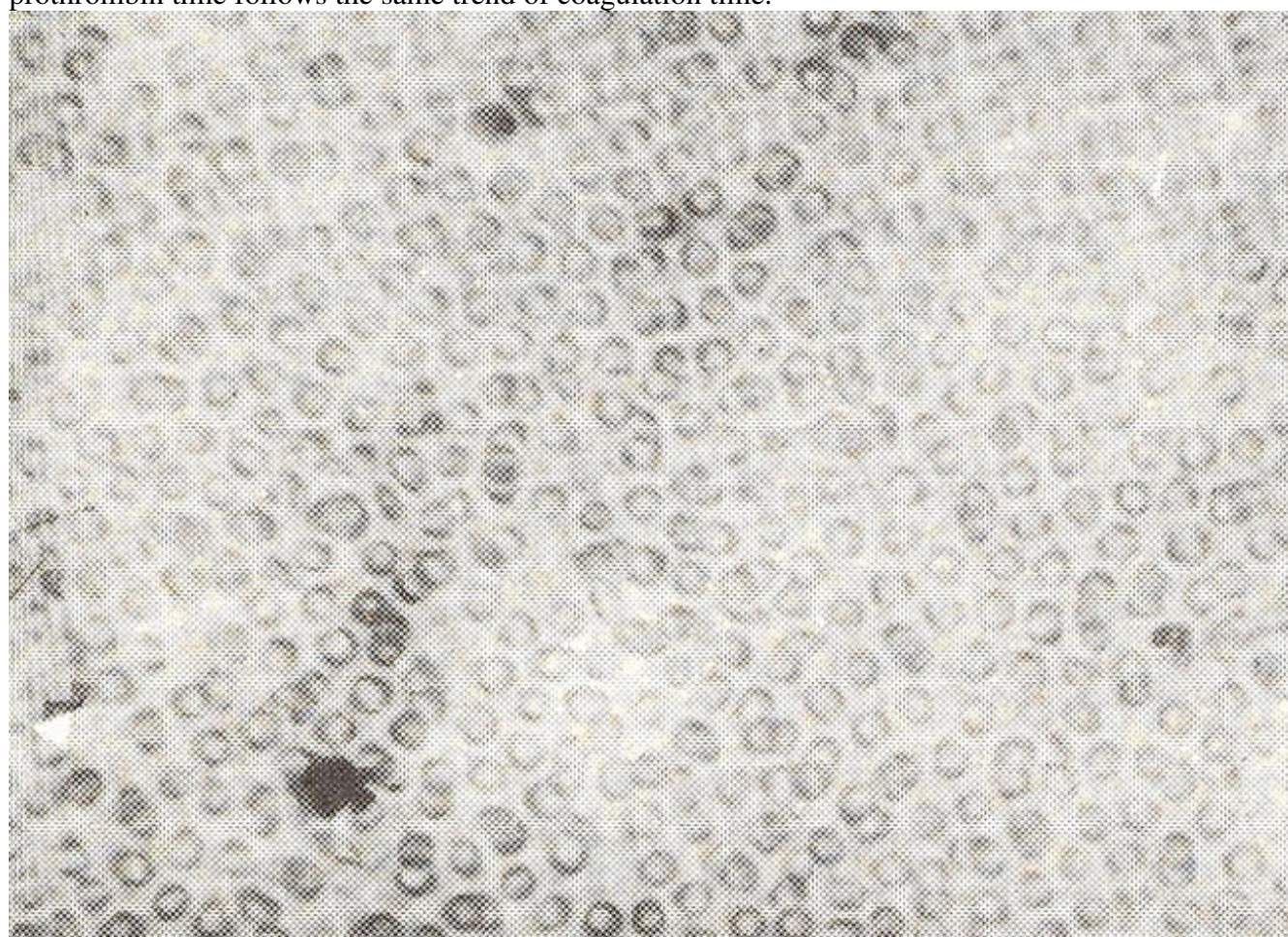


Fig.1 Normal blood film of Tetra Indica x 40.

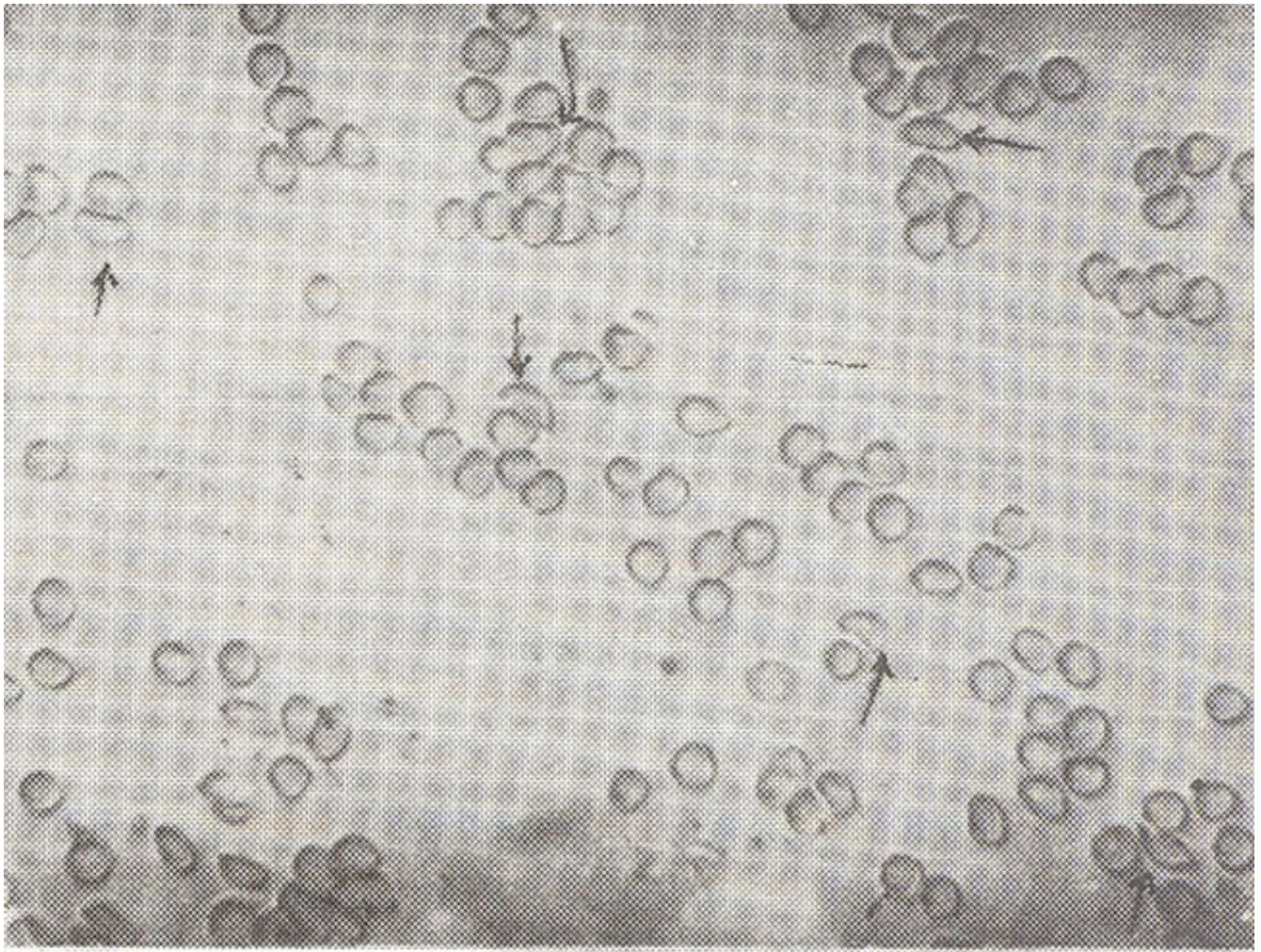


Fig.2 Blood picture of Tatera ,indica treated with 0.025% warfarin for 10 days showing poikilocytosis and anisocytosis x 40.

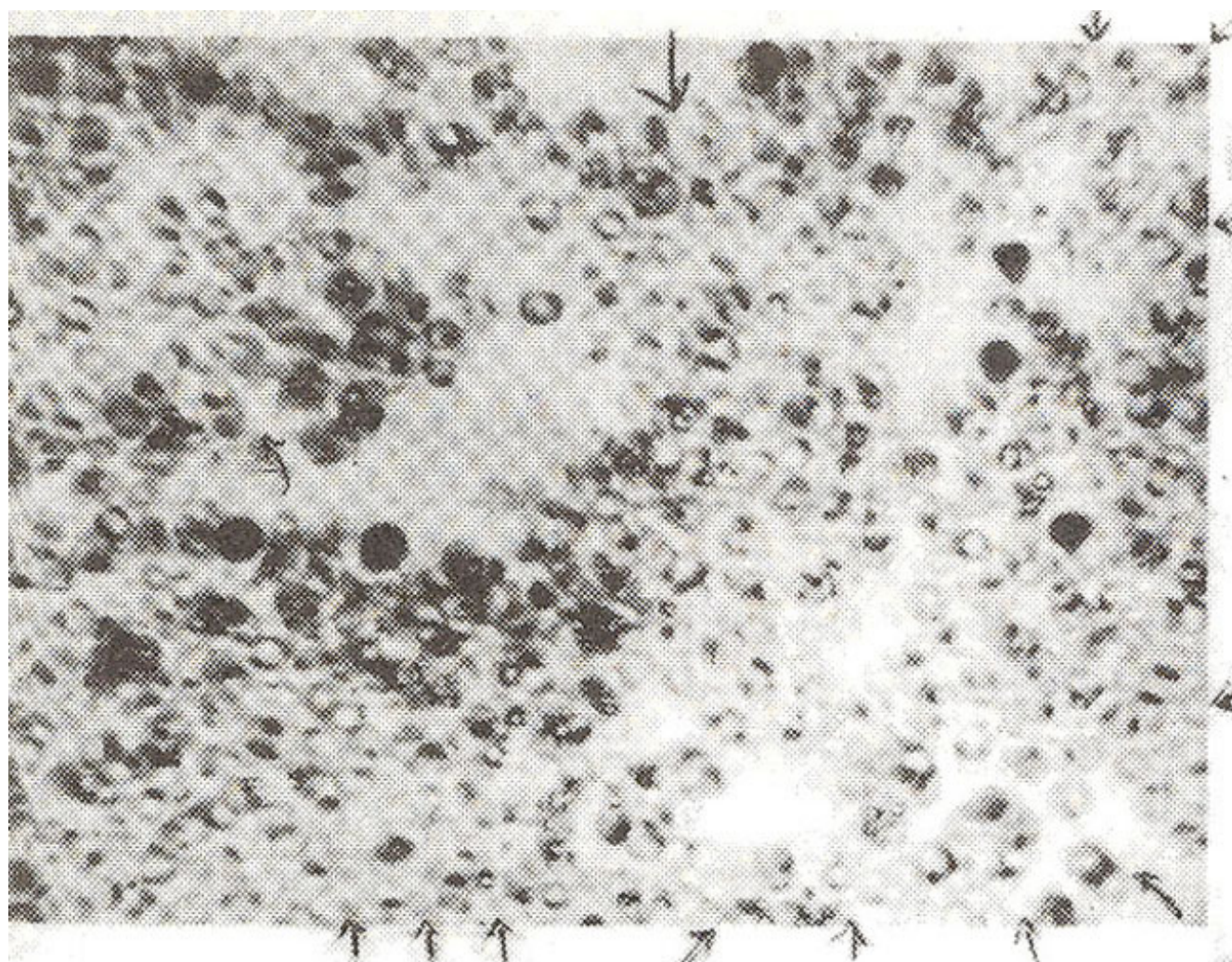


Fig.3 Blood film of *Tatera indica* treated with 0.025% warfarin for 15 days showing marked hypochromia x 40.

The red cells showed some abnormal pear shaped structures i.e., poikilocytosis and anisocytosis (Figure-2) and severe hypochromia (Figure-3) when compared to normal blood film (Figure-I). The results obtained from coumatetralyl and difenacoum studies are summarised in Table-II and III.

Table II Blood Picture of *Tatera indica* Given Oral Treatment With 0.0375% Coumatetralyl (Mean values).

Days Treat- ment	H.b. % (Sahli's)	R.B.C. in mill./mm ³	W.B.C. in thous./ mm ³	Differential Leucocytic Count (%)						Platelets thous./ mm ³	Time in seconds of		
				Lympho	Neutro	Mono	Eosino	Baso	Bleed- ing		Coagu- lation	Proth- rombin	
Normal	85.5	4,55750	7.270	68.0	22.0	7.0	1.70	0.90	312.557	73.5	46.7	16.3	
2	83.2	4,56000	7.600	63.0	23.0	5.0	2.00	0.70	312.557	70.2	46.7	16.8	
4	70.4	3,77210	10.200	59.0	25.0	9.0	1.70	0.75	210.518	120.0	48.0	48.3	
6	62.4	1,50000	14.300	43.0	27.0	12.0	2.60	1.00	170.000	300.0	170.0	180.3	
10	46.2	92131	16.340	48.0	31.0	9.0	2.30	1.50	72.000	348.0	480.0	375.0	
15	36.4	62000	17.00	39.0	39.0	13.0	2.10	1.50	65.000	480.0	610.0	500.0	

Table III

Blood Picture of *Tatera indica* Given Oral Treatment With 0.005% Difenacoum (Mean values).

Days Treat- ment	H.b. % (Sahli's)	R.B.C. in mill./mm ³	Differential Leucocytic Count (%)							Time in seconds of		
			W.B.C. in thous./ mm ³	Lympho	Neutro	Mono	Eosino	Baso	Platelets thous./ mm ³	Bleed- ing	Coagu- lation	Proth- rombin
Normal	85.5	4,70000	7.00	65.2	26.2	4.0	1.6	0.6	330.000	80.0	46.7	16.3
2	80.2	4,20013	7.213	62.3	27.1	3.0	1.6	0.5	312.621	91.3	48.2	17.2
4	71.8	3,15000	9.522	52.3	32.8	6.6	1.8	0.3	201.811	112.2	118.4	51.8
6	65.1	2,11321	13.213	43.6	38.2	6.9	1.9	0.4	92.000	327.6	316.2	197.6
10	42.1	92000	15.003	40.5	41.7	8.1	2.8	0.8	73.160	400.3	528.1	412.2
15	32.8	72000	18.600	38.6	42.1	9.4	2.7	0.6	60.310	532.0	690.3	528.0

Tatera indica at different anticoagulants showed reduction in the erythrocytic count and haemoglobin contents which reached at its climax on day. The early studies observations show (10 days) that the blood was followed by hypochromic and anisocytosis,

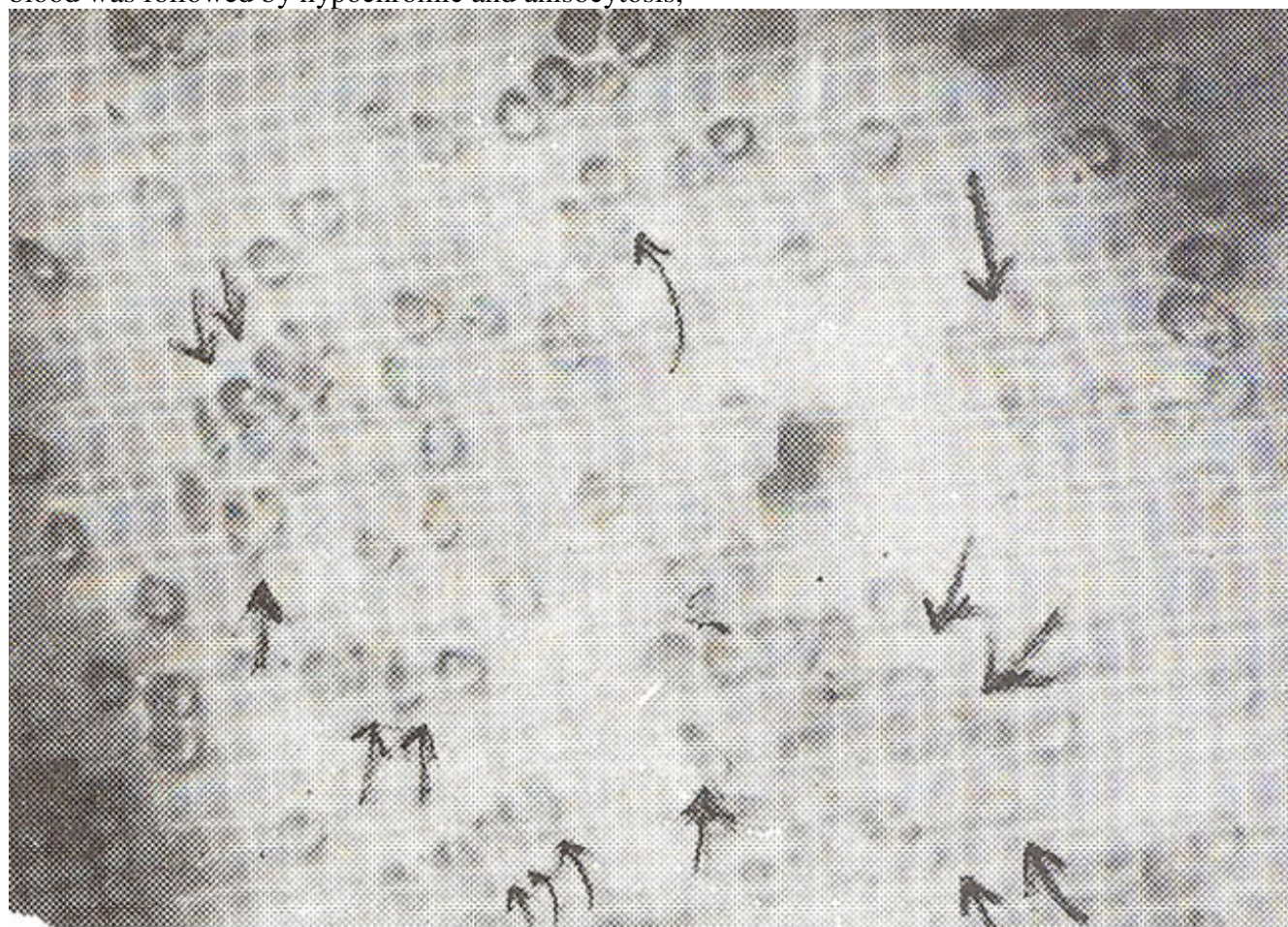


Fig.4 Blood film of *Tatera Indica* treated with 0.375% coumatetralyl for 10 days showing hypochromia cells and anisocytosis x 40.

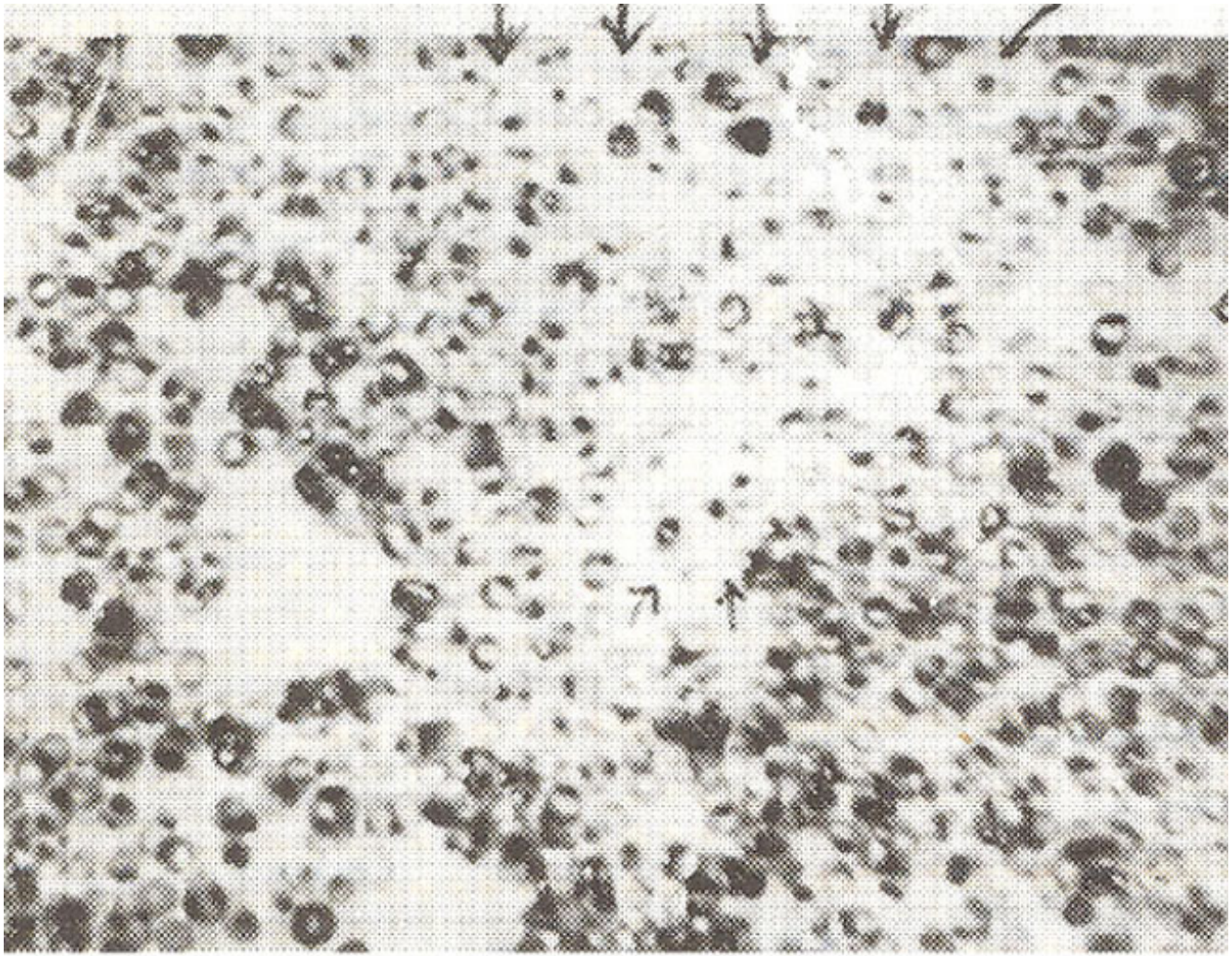


Fig.5 Blood picture of *Tatera indica* treated with 0.0375% coumatetralyl for 15 days after cessation of treatment showing microcytic hypochromic cells $\times 40$.

(Figure-4) microcytic hypochromic (Figure-5) treated for 15 days. As for leucocytic changes, the rats exhibited increase in their count immediately after the treatment (4 days) followed by gradual rise to reach a phase of leucocytosis essentially due to increase in neutrophils. Monocytes showed limited trend of increase in their count. The blood films treated with difenacoum for 10 and 15 days showed hypochromic cells and poikilocytosis (Figure-6) and hypochromic (Figure-7) respectively. These findings agree with Helal et al. (1974).

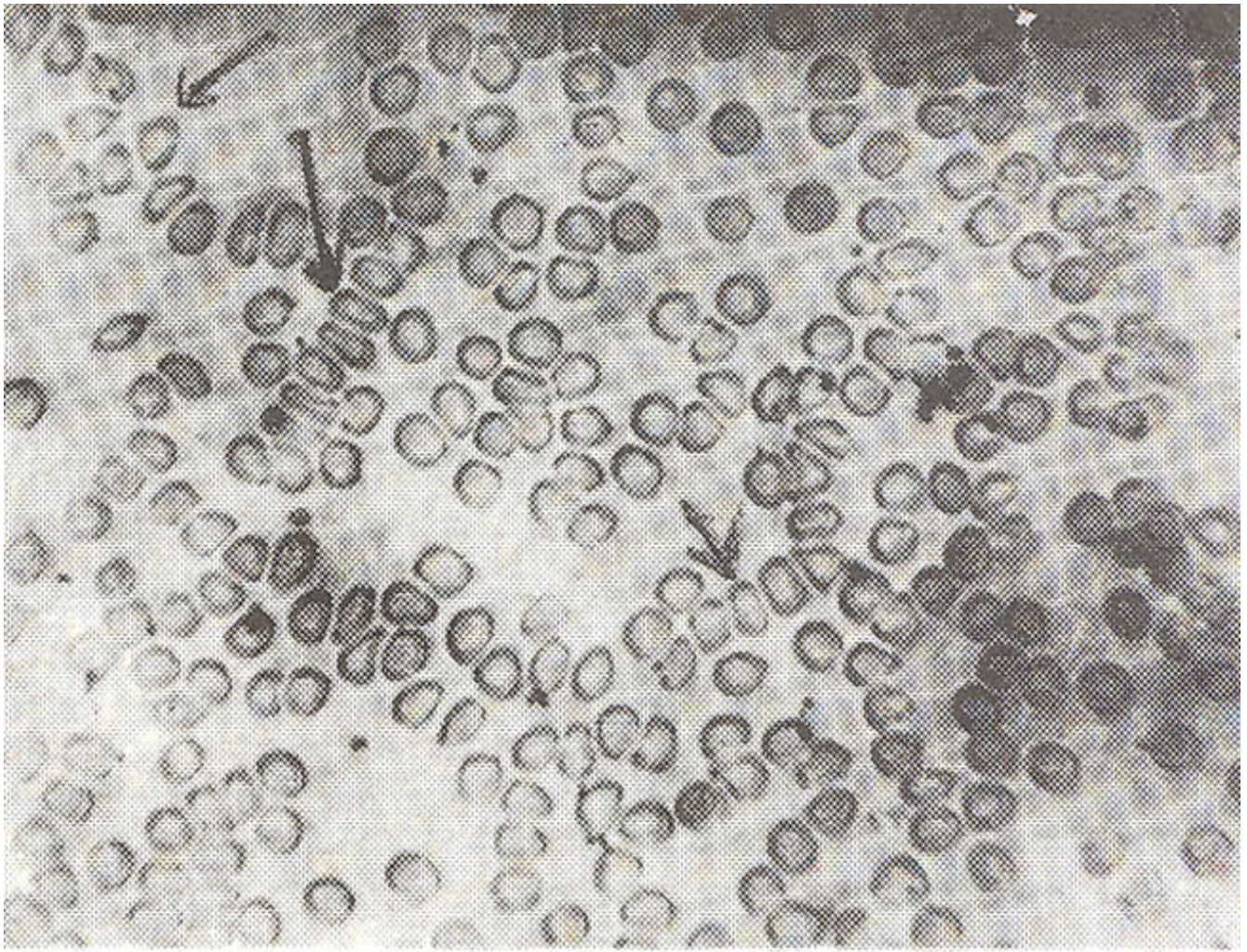


Fig. 6 Blood film of *Tatera indica* treated with 0.005% difenacoum for 10 days showing hypochromic and poikilocytosis x 40.

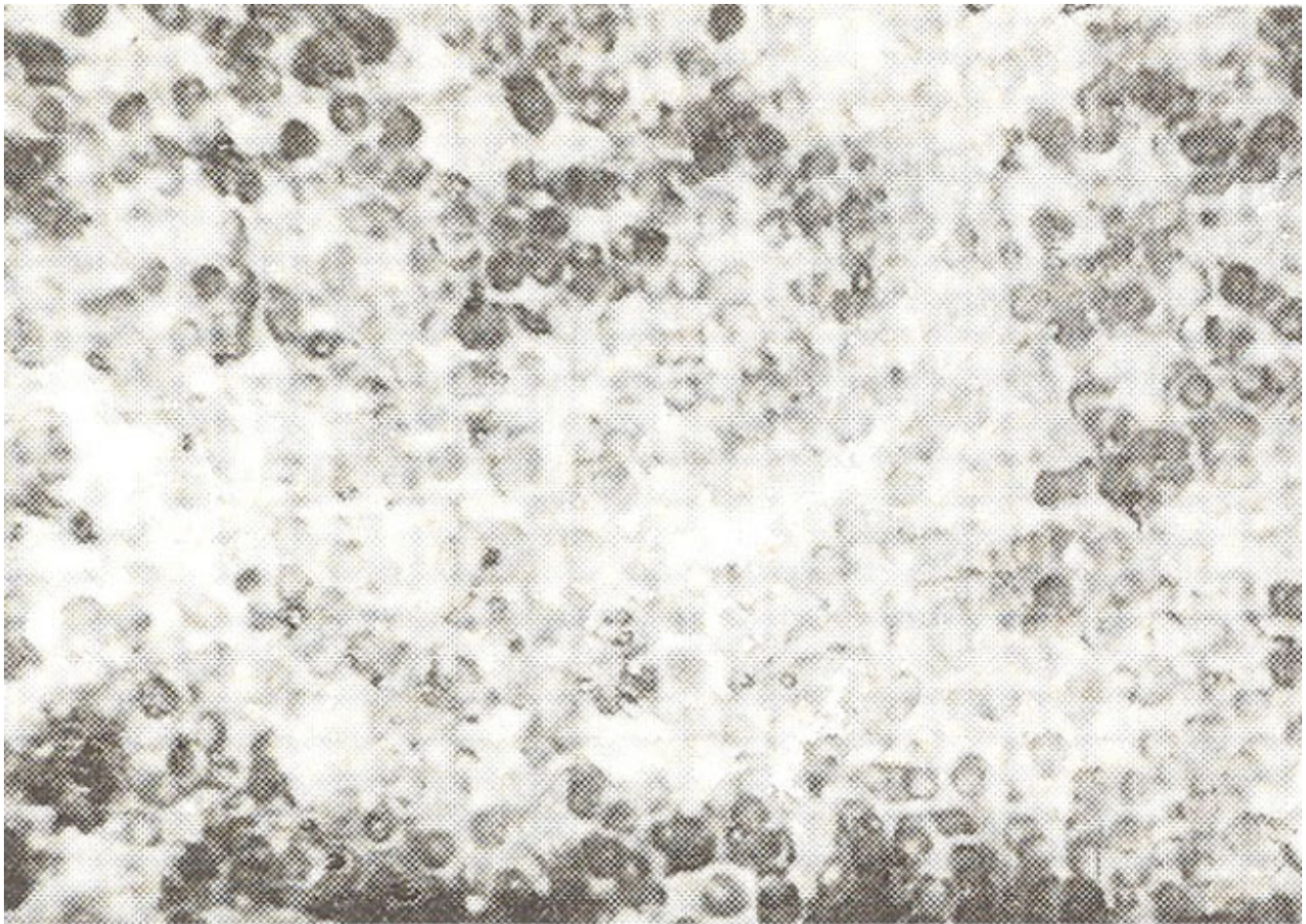


Fig. 7 Blood film of *Tatera indica* treated with 0.005% difenacoum for 15 days after cessation of treatment showing hypochromic cells x 40.

This may be explained in the light of phagocytic action of polymorphnuclear cells and monocytes in eliminating the resultant elements of internal haemorrhage as quoted by Britton (1963) and confirming the hypothesis that rats which exhibited better haematological response were more efficient in their potential recovery.

References

1. Britton, C.J.C. Whitby and Britton's disorder of the blood 9th ed., London Churchill, 1963.
2. Greaves, J.H. and Rehman, A.B. (1977) The Susceptibility of *Tatera indica*, *Nesokia indica* and *Bandicota bengalensis* to three anticoagulant rodenticides. Hyg. (Camb.), 78:75.
4. Helal, T.Y., Salit, A.M., Arafa, M.S., Meher-Ali, A., Abd-el-Wahab and Omar, A.H. (1974) Haematological studies on egyptian rodents intoxicated with the anticoagulant rodenticides Racumin 57 (Coumatetralyl) Part-I. Effect of different exposure dosage, Proceedings. All India Rodents Seminar, September 23-26, 1975, Ahmedabad (India), 222-226.
5. Seiverd, E.C. (1964) Haematology for medical technologists, 3rd ed., Philadelphia, Lea and Febiger, 1964.