

## 腸內圓蟲症與血液像之關係

柯宗甫 鍾文政 盧盡良 張克儉

## 摘要

著者等爲了瞭解農村學童是否感染圓蟲症與臨床血液像間有何關係，特擇定本省中部農村地區之彰化縣二林鎮中正國小 1038 名學童爲對象，檢查蟯蟲，並每人收集糞便予以鏡檢。同時任意抽樣檢查 83 名學童作血紅素計數，血球容積計數，白血球計數及血片作 Eosinophil 計數，其結果如下：

## 一、寄生蟲之感染

全校平均感染率爲 54.1% 而女生爲 58.8% 略高於男生 50.4%。在各年級之感染率爲一年級 50.6% (88/174)，二年級 59.4% (97/163)，三年級 63.2% (103/163)，四年級 64.0% (105/164)，五年級 48.2% (93/193) 而六年級爲 42.0% (76/181)。同時在各種寄生蟲之感染率爲蟯蟲 48.6%，鞭蟲 41.6%，蛔蟲 11.9%，鈎蟲 2.6%，大腸阿米巴 4.2%，梨形鞭毛蟲 3.2%。

## 二、血液像：

## (一)嗜伊紅性球 (Eosinophil) 計數：

其列入不正常值者 ( $> 3\%$ ) 爲全體受檢 83 名之 37.4%，而帶蟲者 48.4% (31/64) 比非帶蟲者 0% (0/19) 高且在統計學上具有意義之差異。

## (二)白血球 (W.B.C.) 計數：

其列入不正常值者 ( $> 10,000$ ) 爲全體之 32.5% (27/83) 而帶蟲者 35.9% (23/64) 比非帶蟲者 21.1% (4/19) 高。

## (三)血紅素 (Hemoglobin) 計數：

其數值低於正常值者 (男  $14.9 \pm 1.1$  gm/dl，女： $13.1 \pm 1.0$  gm/dl) 爲全體之 30.1% (25/83) 而帶蟲者 35.9% (23/64)，比非帶蟲者 10.5% (2/19) 高。

## (四)血球容積 (Hematocrit) 計數：

其數值低於正常值者 (男： $47.1 \pm 2.9\%$ ，女： $41.0 \pm 2.8\%$ ) 爲全體之 34.9% (29/83) 而帶蟲者 39.1% (25/64) 比非帶蟲者 21.1% (4/19) 高。

## 前 言

腸內圓蟲症寄生蟲頗流行於本省各地區<sup>(1)</sup>

<sup>(2)</sup>，尤其是蛔蟲、鈎蟲、鞭蟲等，同時在本省各地先後有黃氏<sup>(43)</sup>報告屏東縣萬丹鄉 26

例鉤蟲症與貧血血像之關係分析研究，劉等<sup>(30)</sup>報告在台北縣深坑鄉深坑國小從事蛔蟲和鉤蟲對於農村學童身體發育之影響之研究，陳氏<sup>(42)</sup>報告鞭蟲感染率與血球容積之研究，以及黃等<sup>(44)</sup>在南投縣 12 所國小學童 275 名之嗜伊紅性白血球，於不同種腸內寄生蟲的感染，其治療前後計數分析研究，顯示出圓蟲症寄生蟲對於患者身體具有種種不同程度之影響。著者等為了瞭解農村學童是否感染圓蟲症寄生蟲與血液像間之關係，於 1979 年 5 月間，特擇定本省中部農村地區之彰化縣二林鎮中正國小學童為對象，其結果將可提供為公共衛生教育和健康教育之參考與利用。

**方法與對象**

於上午 8 : 30—10 : 00 間採用玻璃膠紙肛圍擦拭法<sup>(45)</sup>檢查蟯蟲，另收集每位學童糞

便約 1 克重，固定於 Formalin 液中，帶回研究室採用 Formalin—Ether Concentration<sup>(46)</sup>法並予以鏡檢，同時任意抽樣送出 83 名學童，採用 Sahli's method 檢查血紅素計數，Capillary tube method<sup>(47)</sup>做血球容積計數，Counting chamber 做 W.B.C. 計數及血液薄片帶回研究室，經 Giemsa's stain 後做 W.B.C. 分類計數，其數值分別按帶蟲者與非帶蟲者間做統計學 ( $X^2$  test) 上比較，若  $P \leq 0.05$  時，就被視為有意義之差異。

**結 果**

一、寄生蟲之罹患狀況：(表 1)

全校共 1038 名學童接受檢查，其腸道圓蟲症之一般感染率為 54.1% (562/1038) 而女生 58.8% (270/459) 高於男生的 50.4% (292/579)，但兩性間在統計學上並無有意

**Table 1. Incidence of Intestinal Parasitic Infestation among Children of Chung-Cheng Primary School, Er-Lin District, Chang-Hua County, Central Taiwan, R.O.C.**

Grade	Sex	No. of Exam.	Positive No. %		Species of Intestinal Parasites											
					Ascaris No. %		Hookworm No. %		Trichuris No. %		Enterobius* No. %		Giardia No. %		Entamoeba coli No. %	
I	M	101	40	39.6	12	11.9	3	3.0	20	19.8	34	33.7	3	3.0	5	5.0
	F	73	48	65.8	13	17.8	1	1.4	30	41.1	43	58.9	2	2.7	4	5.5
	T	174	88	50.6	25	14.4	4	2.3	50	28.7	77	44.3	5	2.9	9	5.2
II	M	100	55	55.0	19	19.0	2	2.0	37	37.0	55	55.0	2	2.0	3	3.0
	F	63	42	66.7	10	15.9	1	1.6	28	44.4	40	63.5	1	1.6	5	7.9
	T	163	97	59.5	29	17.8	3	1.8	65	39.9	95	58.3	3	1.8	8	4.9
III	M	78	50	64.1	10	12.8	3	3.8	48	61.5	41	52.6	1	1.3	4	5.1
	F	85	53	62.4	13	15.3	2	2.4	28	32.9	50	58.8	6	7.1	2	2.4
	T	163	103	63.2	23	14.1	5	3.1	76	46.6	91	55.8	7	4.3	6	3.7
IV	M	89	55	61.8	10	11.2	4	4.5	43	48.3	54	60.7	2	2.2	4	4.5
	F	75	50	66.7	7	9.3	2	2.7	45	60.0	46	61.3	3	4.0	4	5.3
	T	164	105	64.0	17	10.4	6	3.7	88	53.7	100	61.0	5	3.0	8	4.9
V	M	113	52	46.0	9	8.0	2	1.8	50	44.2	37	32.7	2	1.8	2	1.8
	F	80	41	51.3	7	8.8	3	3.8	34	42.5	36	45.0	1	1.3	2	2.5
	T	193	93	48.2	16	8.3	5	2.6	84	43.5	73	37.8	3	1.6	4	2.1
VI	M	98	40	40.8	8	8.2	3	3.1	37	37.8	34	34.7	7	7.1	6	6.1
	F	83	36	43.4	6	7.2	1	1.2	32	38.6	34	41.0	3	3.6	3	3.6
	T	181	76	42.0	14	7.7	4	2.2	69	38.1	68	37.6	10	5.5	9	5.0
Total	M	579	292	50.4	68	11.7	17	2.9	235	40.6	255	44.0	17	2.9	24	4.1
	F	459	270	58.8	56	12.2	10	2.2	197	42.9	249	54.2	16	3.5	20	4.4
	T	1038	562	54.1	124	11.9	27	2.6	432	41.6	504	48.6	33	3.2	44	4.2

\*A single examination was made by scotch adhesive tape method.

Table 2. The Comparative Relation of Carrier and Non-Carrier of Nematode Infection among Children: By Eosinophil Count

Group		Carrier			Non-carrier			Total		
Sex		M	F	T	M	F	T	M	F	T
No. Exam.		39	25	54	12	7	19	51	32	83
% of Eosinophil Count	0	—	1	1	2	1	3	2	2	4
	1	3	2	5	8	4	12	11	6	17
	2	11	5	16	2	2	4	13	7	20
	3	7	4	11	—	—	—	7	4	11
	Subtotal No. %	21 53.8	12 48.0	33 51.6	12 100.0	7 100.0	19 100.0	33 64.7	19 59.4	52 62.6
	4	5	2	7	—	—	—	5	2	7
	5	5	3	8	—	—	—	5	3	8
	6	2	—	2	—	—	—	2	—	2
	7	—	3	3	—	—	—	—	3	3
	8	2	1	3	—	—	—	2	1	3
	9	—	2	2	—	—	—	—	2	2
	11	2	1	3	—	—	—	2	1	3
	13	1	—	1	—	—	—	1	—	1
	14	1	—	1	—	—	—	1	—	1
	15	—	1	1	—	—	—	—	1	1
Subtotal No. %	18 46.2	13 52.0	31 48.4	—	—	—	18 35.3	13 40.6	31 37.4	
Total Average	168 4.3	120 4.8	288 4.5**	12 1.0	8 1.1	20 1.1	180 3.5	128 4.0	308 3.7	

X<sup>2</sup> Test      M: X<sup>2</sup> = 6.66\*  
 F: X<sup>2</sup> = 4.16\*  
 T: X<sup>2</sup> = 12.70\*      d.f. = 1, \*P > 0.05      \*\*P < 0.05

Table 3. The Comparative Relation of Carrier, or Non-Carrier Groups among Children: By W.B.C. Count

Group	Sex	No. of Exam.	W.B.C. Count				
			< 10,000		> 10,000		Average
			No.	%	No.	%	
Carrier	M	39	20	51.3	19	48.7	10134.6 (395250/39)
	F	25	21	84.0	4	16.0	8756.0 (218900/25)
	T	64	41	64.1	23	35.9	9596.1 (614150/64)
Non-Carrier	M	12	10	83.3	2	16.7	8666.7 (104000/12)
	F	7	5	71.4	2	28.6	8078.6 (56550/7)
	T	19	15	78.9	4	21.1	8450.0 (160550/19)
Total	M	51	30	58.8	21	41.2	9789.2 (499250/51)
	F	32	26	81.3	6	18.8	8607.8 (275450/32)
	T	83	56	67.5	27	32.5	9333.7 (774700/83)
X <sup>2</sup> Value	M F T	X <sup>2</sup> = 2.68 X <sup>2</sup> = 0.04 X <sup>2</sup> = 0.88					

d.f. = 1, P > 0.05



Table 4. The Comparative Relation of Carrier or Non-Carrier Groups among Children: By Hemoglobin

Group	Sex	No. of Exam.	Hemoglobin Value				Average
			Less than		Normal**		
			No.	%	No.	%	
Carrier	M	39	21	53.9	18	46.2	13.2 (513.4/39)
	F	25	2	8.0	23	92.0	13.2 (330.4/25)
	T	64	23	35.9	41	64.1	13.2 (843.8/64)
Non-Carrier	M	12	2	16.7	10	83.3	13.1 (156.8/12)
	F	7	—	—	7	100.0	13.7 (95.6/7)
	T	19	2	10.5	17	89.5	13.3 (252.4/19)
Total	M	51	23	45.1	28	54.9	13.1 (670.2/51)
	F	32	2	6.3	30	93.7	13.3 (426/32)
	T	83	25	30.1	58	69.9	13.2 (1096.2/83)
X <sup>2</sup> Value	M	X <sup>2</sup> = 3.73					
	F	X <sup>2</sup> = 0.01					
	T	X <sup>2</sup> = 3.37					

d.f. = 1, P > 0.05

\*\*Normal Chinese Adult Hemoglobin Values in Taiwan (Dr. C.H. Liu): M: 14.9 ± 1.1 gm/dl, F: 13.1 ± 1.0 gm/dl.

Table 5. The Comparative Relation of Carrier or Non-Carrier Groups among Children: By Hematocrit

Group	Sex	No. of Exam.	Hematocrit Value				Average
			Lesser		Normal**		
			No.	%	No.	%	
Carrier	M	39	22	56.4	17	43.6	38.7 (1507.5/39)
	F	25	3	12.0	22	88.0	39.3 (982/25)
	T	64	25	39.1	39	60.9	38.9 (2489.5/64)
Non-Carrier	M	12	4	33.3	8	66.7	39.4 (473/12)
	F	7	—	—	7	100.0	41.3 (289/7)
	T	19	4	21.1	15	78.9	40.1 (762/19)
Total	M	51	26	51.0	25	49.0	38.8 (1980.5/51)
	F	32	3	9.4	39	90.6	39.7 (1271/32)
	T	83	29	34.9	54	65.1	39.2 (3251.5/83)
X <sup>2</sup> Value	M	X <sup>2</sup> = 0.39					
	F	X <sup>2</sup> = 0.93					
	T	X <sup>2</sup> = 2.09					

d.f. = 1, P > 0.05

\*\*Normal Chinese Adult Hematocrit Values in Taiwan (Dr. C.H. Liu): M: 47.1 ± 2.9%; F: 41.0 ± 2.8%.



義之差異。

按年級別分：則以四年級 64.0% (105/164) 為最高，其餘依次為三年級 63.2% (103/163)，二年級 59.5% (97/163)，一年級 50.6% (88/174)，五年級 48.2% (93/193) 而以六年級 42.0% (76/181) 為最低。顯示出中、低年級之感染率高於高年級，但各年級間在統計學上並無有意義之差異。

按蟲種別分，以蟯蟲 48.6% (504/1038) 為最高，其餘依次為鞭蟲 41.6% (432/1038)，蛔蟲 11.9% (124/1038)，大腸阿米巴 4.2% (44/1038)，梨形鞭毛蟲 3.2% (33/1038) 而以鈎蟲 2.6% (27/1038) 為最低。

## 二、血液像：

在此研究中，共有 83 名學童（男 51，女 32；帶蟲者 64，非帶蟲者 19）做血液檢查，其結果如下：

(一)嗜伊紅性球 (Eosinophil) 計數：(表 2)

其 Eosinophil 數分別列為 0—15% 間，一般平均值為 3.7%，且其列在正常值者 (0—3%) 為全體之 62.6% (52/83) 而在不正常值者 (>3%) 為 37.4% (31/83)。

在帶蟲者中，其一般平均值為 4.5% 而男 4.3% 略少於女 4.8%，同時其列於不正常值者 (>3%) 為全體之 48.4% (31/64) 而男 46.2% (18/39) 即少於女 52.0% (13/25)。

在非帶蟲者中，其一般平均值為 1.1% 而男 1.0% 與女 1.1% 相類似，且全部列入正常值內。

(二)白血球 (W.B.C.) 計數：(表 3)

全體 83 名受檢學童，其 W.B.C. 數平均為 9334/cmm，其中在正常值 (<10,000) 者為 67.5% (56/83) 而比不正常值 (>10,000) 者 32.5% 為高。

在帶蟲者 64 名中，其平均值為每人 9596/cmm 而男 10135/cmm 多於女 8756/cmm，同時其在不正常值者 (>

10,000) 為 35.9% (23/64) 而男 48.7% (19/39) 即高於女的 16.0% (4/25)。

在非帶蟲者 19 名中，其平均值為每人 8450/cmm，而男 8667/cmm 略多於女 8079/cmm，但並無有意義之差異，同時其在不正常值 (>10,000) 者男女各有 2 名。

在帶蟲者與非帶蟲者間，按全體別，男女別分別做統計學上比較，發現其並無有意義之差異。

(三)血紅素 (Hemoglobin) 計數：(表 4)

全體 83 名學童中，其血紅素值總平均值為 13.2 gm/dl 而男 13.1 gm/dl 與女 13.3 gm/dl 相類似。其低於正常值為全體之 30.1% (25/83) 而男 45.1% (23/51) 多於女的 6.3% (2/32)。

在帶蟲者中，其血紅素值平均值為 13.2 gm/dl 而男 13.2 gm/dl 與女 13.2 gm/dl 相似，同時其低於正常值者為全體之 35.9% (23/64) 而男 53.9% (21/39) 顯較女的 8.0% (2/25) 為高。

在非帶蟲者中，其血紅素值平均值為 13.3 gm/dl 而男 13.1 gm/dl 較女 13.7 gm/dl 為低，同時其低於正常值者為全體之 10.5% (2/19) 且全部係男性。

(四)血球容積 (Hematocrit) 計數：(表 5)

在全體 83 名受檢學童中，其血球容積值總平均值為 39.2% 而男 38.8% 略低於女 39.7%，同時其低於正常值者的比率為全體之 34.9% (29/83) 而男 51.0% (26/51) 比女的 9.4% (3/32) 為多。

在帶蟲者中，其血球容積值平均值為 38.9% 而男 38.7% 與女 39.3% 相類似，同時其低於正常值者為全體之 39.1% (25/64) 而男 56.4% (22/39) 多於女 12.0% (3/25)。

在非帶蟲者中，其血球容積值平均值為 40.1% 而男的是 39.4%，女的是 41.3%

%，同時其低於正常值者為全體之21.1% (4/19) 且全部為男性。

## 討 論

寄生蟲從宿主奪取營養之結果，可影響到血紅素和血球容積之變化而其新陳代謝物為人體所吸收，可引起白血球數和 Eosinophil 數之增加。

Clark 和 Woodley<sup>(48)</sup> 以狗感染鈎蟲並定量測定其血液之損失量，發現每一條蟲體每日平均吸血量為 0.07—0.12 cc，而李等<sup>(49)</sup> 說明鈎蟲感染早期 (3—4 日) 時，即易有貧血之出現。

Mc Vail<sup>(50)</sup> 于 Calcutta 從 17 例鈎蟲患者中，發現其 Eosinophil 數為 6—51% 之間，平均為 19.3%。黃氏<sup>(43)</sup> 報告在本省屏東縣萬丹鄉 26 例鈎蟲患者中，發現男性 (17 例) 的為 6.5—35.5%，平均 15.6% 而女性 (9 例) 的為 7.5—29.6%，平均為 15.6%，男女間並無差異。黃等<sup>(44)</sup> 於南投縣 12 所國小中有 275 名感染腸內寄生蟲學童中，其 Eosinophil 之一般平均值為  $6.9 \pm 4.7\%$  而高於 37 名無蟲之學童之平均值  $3.8 \pm 2.3\%$ ，且具有意義之差異，其中蛔蟲獨感染者  $5.5 \pm 4.4\%$  (34 名)，蟯蟲單獨感染者  $6.3 \pm 3.1\%$  (50 名)，鈎蟲單獨感染者  $8.3 \pm 6.4\%$  (34 名)，鞭蟲單獨感染者  $6.6 \pm 4.4\%$  (45 名)，蛔蟲與蟯蟲混合感染者  $6.4 \pm 3.8\%$  (27 名)，鞭蟲與蟯蟲混合感染者  $6.5 \pm 4.1\%$  (59 名)，顯示出其數值均超過 3% 以上。在本研究中，發現其 Eosinophil 超過 3% 於帶蟲者為 48.4% (31/64) 而非帶蟲者全部在正常值內 (0—3%)，同時，其 Eosinophil 平均數為帶蟲者 4.5% 比非帶蟲者高且具有意義之差異 ( $P < 0.05$ )。

Stoll 等<sup>(51)</sup> 分析 332 例鈎蟲症之華人患者，按臨床症狀分為 4 組測定其血紅素值，結果為無症狀組之血紅素值之平均值為 66%；輕度貧血組 49.9%；中度貧血組 39.3%，而重

度貧血組為 35.3%。黃氏<sup>(43)</sup> 在屏東縣萬丹鄉發現鈎蟲蟲體數與血紅素值之關係為 10—19 條蟲體者，其血紅素除少數外均為正常；24—30 條蟲體者，其血紅素值稍微有降低現象而 260 條蟲體以上者，則有明顯降低且呈現出貧血現象。Smiling<sup>(52)</sup> 報告一個人之鈎蟲蟲體數在 25 條以內者，其血紅素值並無明顯降低，但在 25 條以上者，即始有明顯降低現象，同時其蟲體數平均在 72 條 (51—100) 者，其血紅素值平均值為 64% 而在 715 條蟲體者則為 45.5%。Darling 等<sup>(53)</sup> 測定人體血紅素值減少與鈎蟲體數之關係，其結果為兒童為 7—8 條，女人 10 條，男人 11—12 條蟲體時，其血紅素值即減少 1%。在此研究中，發現其血紅素值平均值為帶蟲者 13.2 gm/dl 與非帶蟲者 13.3 gm/dl 間相似，同時其血紅素值低於正常值 (男： $14.9 \pm 1.1$  gm/dl，女： $13.1 \pm 1.0$  gm/dl) 之人數，在帶蟲者與非帶蟲者間按全體，男、女別做統計學上比較，其結果並無有意義之差異，其原因可能是寄生蟲 (尤其是鈎蟲) 之感染蟲體數少之關係。

陳氏<sup>(42)</sup> 報告鞭蟲感染率與血球容積之關係中，發現其血球容積值平均值，女性 44.20% 高於男性 41.31%，但均為正常值內，且並無有意義之差異。在此研究中，發現其血球容積值之平均值，男、女間，帶蟲者與非帶蟲者之間並無有意義之差異。血球容積值低於正常值者之人數，在帶蟲者與非帶蟲者之間，也無有意義之差異。

## 誌 謝

此次研究工作承蒙彰化縣二林鎮中正國小校長和全體級任導師之協助與合作始得以順利完成，特此誌謝。

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## Study on the Relation of Blood Picture with Intestinal Nematode Parasitic Infestation

BRUCE C. F. KO, W. C. CHUNG, L. J. LU AND K. C. CHANG

### SUMMARY

*With the project of the relation of blood picture with intestinal nematode parasitic infection among primary school children in rural area, we have made a survey of parasitic infection of 1038 children of Chung-Cheng Primary School, Er-Lin District, Chang-Hwa County, Central Taiwan with a scotch adhesive tape method at 8:30-10:00 A.M. and formalin-ether concentration of feces specimens. We also have examined blood samples of 83 children by Sahli's method for hemoglobin, capillary tube method for hematocrit, counting chamber for w.b.c. and w.b.c. different count for eosinophil.*

*The chi-square test ( $X^2$  test) was used to examine whether the proportions were significantly different between carrier group and non-carrier group, choosing a  $p \leq 0.05$  confidence level. The results were as follows:*

*I. Infection rate of parasites:*

- 1. The general infective rate was given 54.1% out of 1038 children and female 58.8% (270/459) is higher than male 50.4% (292/579).*
- 2. By class grade: The infective rate was given 50.6% (88/174) in grade I, 59.5% (97/163) in grade II, 63.2% (103/163) in grade III, 64.0% (105/164) in grade IV, 48.2% (93/193) in grade V and 42.0% (76/181) in grade VI.*
- 3. By species of parasites: The infective rate was given 48.6% (504/1038) in Enterobius, 41.6% (432/1038) in Trichuris, 11.9% (124/1038) in Ascaris, 4.2% (44/1038) in Entamoeba coli, 3.2% (33/1038) in Giardia lamblia and 2.6% (27/1038) in hookworm.*

*II. Blood picture: Eighty-three blood samples of children (M51, F32; carrier 64, non-carrier 19) were examined and the results were as follows:*

*1. Eosinophil Count:*

*We found that the total rate of abnormal range ( $> 3\%$ ) is 37.4% (31/83). Among them, 48.4% (31/64) in carrier group is higher than 0% in non-carrier group and significantly different in each group.*

*2. W.B.C. Count:*

*We found the total rate of abnormal range ( $> 10,000$ ) is 32.5% (27/83). Among them, 35.9% (23/64) in carrier group is higher than 21.1% (4/19) in non-carrier group but not significantly different.*

3. *Hemoglobin:*

*We found the total rate of abnormal range (M:  $< 14.9 \pm 1.1$  gm/dl, F:  $< 13.1 \pm 1.0$  gm/dl) is 30.1% (25/83). Among them, 35.9% (23/64) in carrier group is higher than 10.5% (2/19) in non-carrier group but not significantly different.*

4. *Hematocrit:*

*We found the total rate of abnormal range (M:  $< 47.1 \pm 2.9\%$ , F:  $< 41.0 \pm 2.8\%$ ) is 34.9% (29/83). Among them, 39.1% (25/64) in carrier group is higher than 21.1% (4/19) in non-carrier group but not significantly different.*

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Department of Parasitology, Taipei Medical College, Taipei, Taiwan, R.O.C.

Received for Publication: September 26, 1984.