

Highly elevated c-reactive protein (CRP) with normal leukocyte count among febrile pediatric patients: Clinical implications

White blood cells count (WBC) is routinely used to assess children with fever, though the test has low sensitivity. The C-reactive protein (CRP) has a higher sensitivity for the diagnosing of bacterial infection. However, there is a lack of information about conditions where WBC is normal while CRP is increased. We aimed to identify the prevalence of this phenomenon and to describe its clinical features.

The study included children aged 3mo – 18y who presented at our emergency department with fever during 2018-2020. Included were children with CRP>15 mg/dL, a value considered highly specific for bacterial disease. Patients were divided into two groups: normal versus abnormal blood count (age-adjusted). Out of 15,961 children, 1173 were diagnosed with CRP> 15 mg/dL (7.3%). A bacterial diagnosis was determined for 74.5% of the 471 (40.1%) children with normal WBC, who had longer duration of fever ($p = 0.008$); were more likely to be of Arab/African descent ($P = 0.011$); had more GI symptoms ($P = 0.017$); and fewer fever $\geq 39.50c$ ($P = 0.035$). In terms of final diagnoses, they were less likely to have pneumonia or urinary tract infections and more likely to have bacterial enteritis ($p<0.001$).

In conclusion, approximately 40% of patients with CRP > 15 mg/dl had a normal WBC, and the majority a bacterial infection. Children with diarrhea at presentation, fever > 2 days, fever < 39.5, and who were of Arab/African descent were at increased likelihood for normal leukocytes; for these cases CRP should be routinely considered alongside WBC.

Table 1 – Final diagnoses among pediatric patients with fever and CRP \geq 15 mg/dL. Patients are divided into 2 groups: normal leukocyte count ("discrepancy group") and abnormal leukocyte count ("both abnormal").

Variable n/N(%)	Group 1 – CRP \geq 15, abnormal leukocyte count (both abnormal) n=702 (59.8%)	Group 2 – CRP \geq 15, normal leukocyte count (discrepancy) n=471 (40.2%)	p-value
Final diagnosis	604 (86.0%)	351 (74.5%)	<0.001
Bacterial	45 (6.4%)	68 (14.4%)	
Viral	26 (3.7%)	26 (5.5%)	
Inflammatory	27 (3.8%)	26 (5.5%)	
Unclear			
Pathogen type	64 (33.9%)	37 (33.0%)	0.234
Gram positive	108 (57.1%)	55 (49.1%)	
Gram negative	12 (6.3%)	12 (6.3%)	
Polymicrobial			
Pathogen - specific	21 (11.1%)	16 (14.3%)	0.234
Streptococcus group A	6 (3.2%)	8 (7.1%)	0.114
Staph. Aureus	93 (49.2%)	33 (29.5%)	0.001
E. coli	20 (10.6%)	4 (3.6%)	0.030
Pneumococci			
Final diagnosis (bacterial)	264 (37.6%)	132 (28.0%)	0.001
Pneumonia vs. other diagnoses	154 (21.9%)	73 (15.5%)	0.006
UTI vs. other diagnoses	13 (1.9%)	39 (8.3%)	<0.001
Dysentery vs. other diagnoses			
Bacterial infection site	103 (53.9%)	47 (41.2%)	0.032
Urine	1 (0.5%)	13 (11.4%)	<0.001
GI	12 (6.3%)	12 (6.3%)	1.0
Throat / ENT	17 (8.9%)	3 (2.6%)	0.0331
Multibacterial process/abscess			

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