

Study on the Frequency and Values of Sanguine Eosinophilia in Children Admitted with Parasitary Diseases

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ABSTRACT: The authors carried out a retrospective study on the frequency, levels and relative and absolute mean values of sanguine eosinophilia in children admitted with various parasitary diseases within the sanitary units in Craiova and in the Pediatric Clinic of Fundeni Clinical Institute, Bucharest, over a period of 12 years. The study group consisted of 2,198 children, aged 0-16 years: 1,226 with diseases caused by protozoa – 1,195 intestinal giardiasis and 31 acquired Toxoplasmosis; 754 with diseases caused by nematodes - 169 Ascariasis, 470 Oxyuriasis, 23 Trichocephalosis and 92 Trichinellosis; 50 with diseases caused by cestodes - 23 Hydatidosis and 27 Himenolepidosis; 168 with different associated parasitoses. For processing the data we used statistical-mathematical methods: arithmetic mean (Am) and standard deviation (\pm Sd).

KEYWORDS: eosinophil granulocyte, sanguine eosinophily, parasitary diseases, children.

Introduction

The eosinophil granulocytes (EG) normally represent a small percentage of the leukocytes in blood, although they are much more numerous in the tissues. They can destroy parasites, but they also have immune-regulating functions and they can be involved, for instance, in reshaping/remodeling the conjunctive tissue [1].

There has been registered an important progress lately regarding the research and knowledge on these fascinating but still enigmatic cells.

The sanguine eosinophilia (SE) represents a paraclinical sign which is characteristic to parasitary diseases. It is specifically associated with parasite tissue invasion and migration and the level of eosinophilia is usually proportional to the invaded tissue area. Conversely, the parasites which do not invade tissues, the protozoans, for instance, do not generally cause increased eosinophilia [1,4].

Aim: the study of the frequency, level, and the absolute and relative values of the SE, depending on the parasitary disease type.

Materials and method

The study group comprised a number of 2198 children, aged 0-16 years, among whom 2167 were admitted with various parasitary diseases in Craiova Clinics (Pediatrics II, Pediatrics Surgery, Contagious Diseases) over a period of 12 years and a number of 31 children with acquired toxoplasmosis who were admitted in

the Pediatric Clinic of Fundeni Clinical Institute in Bucharest over a one-year-period. Among the 2198 children in the study, 1226 had diseases caused by protozoans: 1195 intestinal giardiasis and 31 acquired toxoplasmosis; 754 diseases caused by nematodes: 169 ascariasis, 470 oxyuriasis, 23 trichocephalosis and 92 trichinellosis; 50 caused by cestodes: 23 hydatidosis and 27 himenolepidosis; 168 associated parasitoses. Medical history was studied for all admitted children, from which we extracted the paraclinical data: hemogram, coproparasitary examinations, imagistic exams, immunologic investigations (T. ELISA). The relative values (%) of the E.G. were transformed into absolute values (/mm³), by reporting them to the total number of leukocytes. The term of SE was used for values higher than 400 E.G./mm³ [3]. Depending on the EG values, we determined 3 levels of SE:

Light SE – 400 – 1000 EG/mm³

Mean SE – 1000 – 3000 EG/mm³

Sanguine Hyper-eosinophilia (S.H.E.) > 3000 EG/mm³

For processing the data, we used statistic-mathematical methods: arithmetic mean (AM) and standard deviation (\pm SD).

Results

Among the 2198 children with parasitary diseases who formed our study group, 1486 (67.6%) had a normal number of E.G./mm³ while 712 (32.4%) had S.E./ S.H.E.. S.H.E. was

present in 24 children out of the total of 2198 children with parasitary diseases, representing 1.1% while S.E. (400- 3000 E.G./mm³) in 668 (31.3%) children.

We registered the following distribution on S.E. levels in the 712 children with S.E.: light S.E. in 586 children (82.3%), mean S.E. in 102 (14.3%) and Sanguine Hyper-eosinophilia S.H.E. in 24 (3.4%) children (Table 1).

Table 1. S.E. levels in the children with parasitary diseases

S.E. level	N°.	%
Light S.E.	586	82,3
Mean S.E. (S.H.E.)	102	14,3
Total	712	100

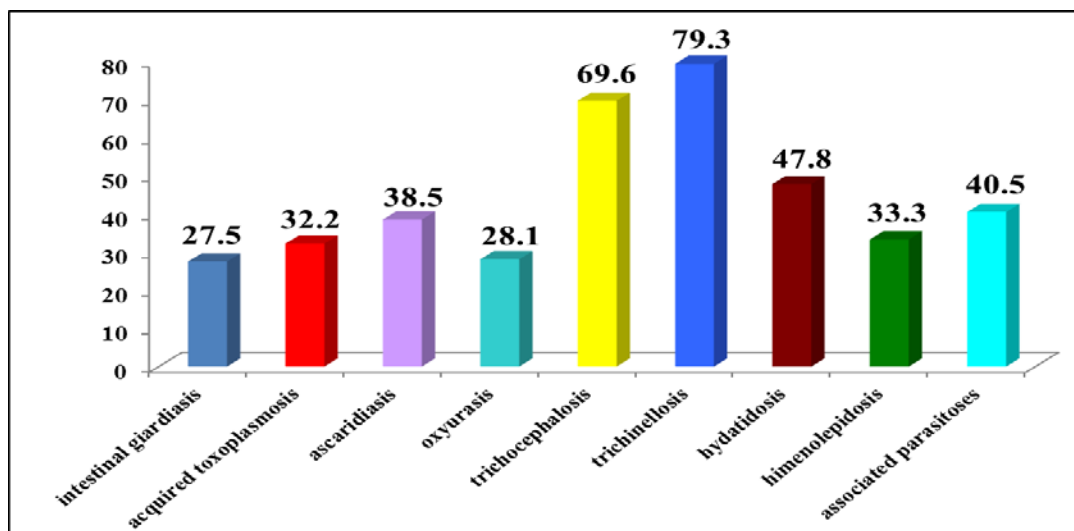


Fig. 1. S.E. frequency in the children with parasitary diseases

The frequency of S.E. in the parasitary diseases was as follows: among the 1195 children with intestinal giardiasis, 328 (27.5%) presented S.E. In the children with acquired toxoplasmosis, S.E. was present in 10 children (32.2%) out of 31 children. Among the 169 children with ascariidiasis, 65 (38.5%) presented S.E.; among the 470 children with oxyuriasis, 132 (28.1%) presented S.E.; among the 23

children with trichocephalosis, 16 of them (69.6%) presented S.E.; in the children with trichinellosis, 73 (79.3%) out of 92 presented S.E.; 11 out of the 23 children with hydatidosis (47.8%) presented S.E.; among the 27 children with himenolepidosis, 9 of them (33.3%) presented S.E.. In the children with associated parasitoses, S.E. was present in 68 (40.5%) out of 168 children (figure 1).

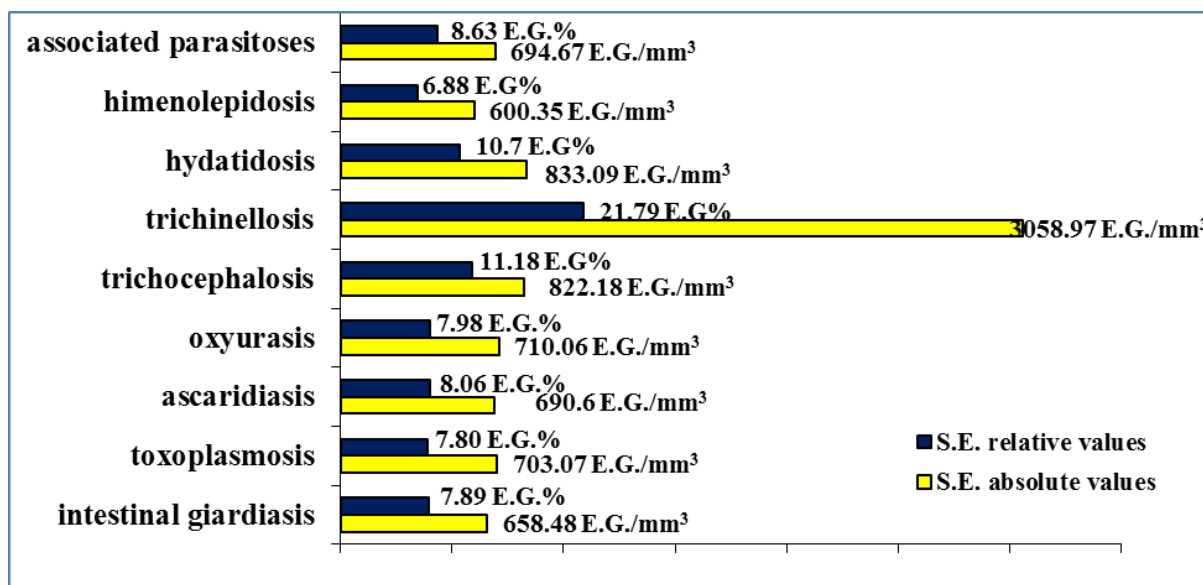


Fig. 2. Absolute and relative mean values of S.E. in parasitary diseases

The absolute and relative mean values of the S.E. in the children with parasitary diseases were: in intestinal giardiasis 658.48±444.12 E.G./mm³, 7.89±4.42 E.G.% respectively; in toxoplasmosis 703.07±475.77 E.G./mm³, 7.8±5.48 E.G.% respectively; in ascariasis 690.6±450.4 E.G./mm³, 8.06±4.53 E.G.% respectively; in oxyuriasis 710.06±506.17 E.G./mm³, 7.98±5.25 E.G.% respectively; in

trichocephalosis 822.18±484.87 E.G./mm³, 11.18±7.23 E.G.% respectively; in trichinellosis 3058.97±3532.67 E.G./mm³, 21.79±14.5 E.G.% respectively; in hydatidosis 833.09±582.8 E.G./mm³, 10.7±5.48 E.G.% respectively; in himenolepidosis 600.35±116.28 E.G./mm³, 6.88±2.08 E.G.% respectively; in associated parasitoses 694.67±370.59 E.G./mm³, 8.63±4.28 E.G.% respectively (fig.2)

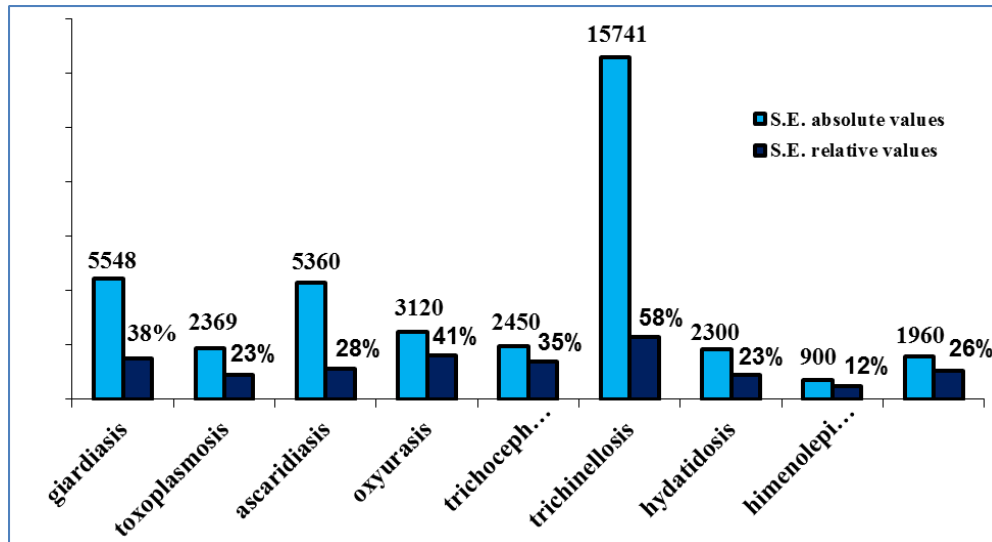


Fig.3. Absolute and relative maximum values of S.E. in parasitary diseases

The absolute and relative maximum values of the S.E. were as follows: in giardiasis 5548 E.G./mm³, 38 E.G.% respectively; in toxoplasmosis 2369 E.G./mm³, 23 E.G.% respectively; in ascariasis 5360 E.G./mm³, 28 E.G.% respectively; in oxyuriasis 3120 E.G./mm³, 41 E.G.% respectively; in trichocephalosis 2450 E.G./mm³, 35 E.G.% respectively; in trichinellosis 15741 E.G./mm³, 58 E.G.% respectively; in hydatidosis 2300 E.G./mm³, 23 E.G.% respectively; in himenolepidosis 900 E.G./mm³, 12 E.G.% respectively; in associated parasitoses 1960 E.G./mm³, 26 E.G.% respectively (fig.3)

Discussions

One can notice that most of the children with parasitary diseases (82.3%) presented light S.E.. S.H.E. was found in a small number of children (3.4%). S.E. registered the highest frequency (79.3%) in the children with trichinellosis, a parasitosis which is known to be accompanied by S.E., according to “the laws of parasitary eosinophilia” of Bonin, Moretti and Bertrand. The S.E. frequency was also increased in the children with trichocephalosis (69.6%), a parasitosis which, according to the specialty

literature [5,8], is accompanied by S.E., constantly met in children.

S.E. registered the lowest frequency in intestinal giardiasis (27.5%) and oxyuriasis (28.1%), parasitoses which, according to “the laws of parasitary eosinophilia”, are not accompanied by S.E. [1]. The newest data describes the presence of S.E. in these parasitoses, too, within variable percentages [5,6].

The highest mean value of the absolute and relative S.E. was encountered in trichinellosis (3058.97 E.G./mm³, 21.79 E.G.%), one of the parasitary diseases accompanied by S.E., with high values [1,4,7].

The mean values of S.E. were the lowest in the children with himenolepidosis (600.35 E.G./mm³, 6.88 E.G.%) but also in the children with intestinal giardiasis (658.48 E.G./mm³, 7.89 E.G.%). In himenolepidosis, S.E. has moderate values 5% - 10% [5] up to 15% [11] and it is encountered in approximately one third of the patients. The presence of S.E. in giardiasis triggered numerous discussions in the last few years. There are authors [2,10,11] who question the presence of eosinophilic properties for the protozoa, particularly for the giardiasis. Other

authors [1,6,9] present numerous cases of giardiasis accompanied by eosinophilia.

The highest absolute and relative value was registered in a child with trichinellosis (15741 E.G./mm³, 58 E.G.%). High absolute and relative values were also registered in giardiasis (5548 E.G./mm³, 38 E.G.%, respectively) and in oxyuriasis (3120 E.G./mm³, 41 E.G.%, respectively). The presence of S.E. within these two last parasitoses is mentioned in the specialty literature and it is partly explained through/by the intensity of the parasitary infestation, on account of the parasite's ability to penetrate the tissues, through the specific way of the human body to respond to the parasitary aggression [1,5,6]. Another explanation could be the fact that the study group consisted in a great number of children with giardiasis and oxyuriasis and by the fact that these children were not further investigated in order to decide upon another possible cause for S.E. and S.H.E.; we should also take into consideration a laboratory error, given the fact that the children never came again for a subsequent control to repeat the hemogram.

Conclusions

The frequency of SE in the parasitary diseases in children was of 32.4%. Most of the cases (82.3%) presented light SE. S.H.E. was present in a small number of children (3.4%).

The highest frequency of SE was registered in trichinellosis (79.3%). The lowest frequency was registered in oxyuriasis (28.1%) and in giardiasis (27.5%).

The highest mean value was registered in trichinellosis (3058.97 E.G./mm³, 21.79 E.G.%). The lowest mean values were registered in intestinal giardiasis (658.48 E.G./mm³, 7.89 E.G.%) and in himenolepidosis (600.35 E.G./mm³, 6.88 E.G.%).

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