Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Journal of Microbiology, Immunology and Infection 54 (2021) 1006–1007

Available online at www.sciencedirect.com

ScienceDirect

journal homepage: www.e-jmii.com

Correspondence

Eosinopenia in COVID-19: What we missed so far?

KEYWORDS
Eosinophil count;
Infection;
COVID-19;
Bacterial;
Viral

Dear Editor,

We have read with great interest the article published by Outh et al. concerning the use of peripheral eosinopenia to predict the medical causes of admission in a medicine ward during the first wave of COVID-19 (n = 121).[1]

The title of the article can be misleading while it states that eosinophil count (EC) below 100/mm^3 is highly evocative of COVID-19, meanwhile conclusion supports that a threshold below 10/mm^3 is more relevant. In the present study the control group is heterogeneous, with patients suffering from respiratory tract infections with a negative SARS-CoV-2 PCR (n = 14), patients with other viruses or bacterial infections (n = 20), and patients with other non-infectious diagnoses (n = 30). Therefore, at baseline the CRP level already differs significantly between the 2 groups (Table 2), with a median CRP value of 69.8 mg/L in the COVID-19 group versus 14.7 mg/L in the non-COVID-group (p = 0.001). In the same way, Li et al. already described that eosinopenia (<20/mm^3) was associated with COVID-19 in China,[2] but authors highlighted that EC had to be interpreted in the light of the CRP level, considering their control group had a normal CRP value (<4 mg/L).

To better approach the use of eosinopenia, it must be reminded that there is no consensual threshold and that normal value for EC is ranging from 1 to 3% of total leukocytes.[3] Historically, eosinopenia has been firstly described in 1893 by Zappert et al. in response of a systemic inflammation. Moreover it has to be taken into account that eosinopenia has not been established to distinguish viral from bacterial infection in adults. Indeed, our first work focusing on bacterial infections reported eosinopenia (EC < 100/mm3) supporting the fact that eosinopenia is not specific of COVID-19. In addition our study showed that the normalization of the EC was related to the control of the bacterial infection.[4]

To our knowledge, it has been only once suggested, in a pediatric setting, that eosinopenia could help to distinguish bacterial from viral infection and was associated with bacterial meningitis.[5] Indeed, eosinopenia is not specific neither of bacterial nor viral infection, but related to the severity of the infection. For this purpose, critical care physicians monitor EC in common daily practice to predict the severity of sepsis in bacterial infections for decades.[6] For instance, undetectable EC (0/mm3) at admission has been shown to be predictive of *Clostridium difficile* infection's severity and mortality in a large study with 2065 patients.[7]

Although, EC seems to be very interesting and cost-effective, we believe that the design and the nature of the study by Outh et al.[1] cannot support the use of eosinopenia for the diagnosis of COVID-19 without considering confounding factors in a multivariate analysis. Nevertheless, EC might help to predict the severity of the SARS-CoV-2 infection and the requirement of intensive care unit transfer and should be evaluate in further studies.

Funding

No funding obtained.

I confirm that all listed authors have contributed to this work and approved the paper.

https://doi.org/10.1016/j.jmii.2021.01.013

Declaration of competing interest

The authors report no conflicts of interest.

References

1. Outh R, Boutin C, Gueudet P, Suzuki M, Saada M, Aumaître H. Eosinopenia <100/μL as a marker of active COVID-19: an observational prospective study. *J Microbiol Immunol Infect* 2021. Available at: http://www.ncbi.nlm.nih.gov/pubmed/33468435. [Accessed 21 January 2021].
2. Li Q, Ding X, Xia G, Chen H, Chen F, Geng Z, et al. Eosinopenia and elevated C-reactive protein facilitate triage of COVID-19 patients in fever clinic: a retrospective case-control study. *EClinicalMedicine* 2020;**23**:100375.
3. Rothenberg ME. Eosinophilia. *N Engl J Med* 1998;**338**:1592—600.
4. Davido B, Makhloufi S, Matt M, Calin R, Senard O, Perronne C, et al. Changes in eosinophil count during bacterial infection: revisiting an old marker to assess the efficacy of antimicrobial therapy. *Int J Infect Dis* 2017;**61**:62—6. Available at: http://linkinghub.elsevier.com/retrieve/pii/S1201971217301595. [Accessed 20 July 2017].
5. Debray A, Nathanson S, Moulin F, Salomon J, Davido B. Eosinopenia as a marker of diagnosis and prognostic to distinguish bacterial from aseptic meningitis in pediatrics. *Eur J Clin Microbiol Infect Dis* 2019;**38**.
6. Abidi K, Belayachi J, Derras Y, Khayari ME, Dendane T, Madani N, et al. Eosinopenia is a reliable marker of sepsis on admission to medical intensive care units. *Crit Care* 2008;**12**:R59.
7. Kulaylat AS, Buonomo EL, Scully KW, Hollenbeak CS, Cook H, Petri Jr WA, et al. Development and validation of a prediction model for mortality and adverse outcomes among patients with peripheral eosinopenia on admission for *Clostridium difficile* infection. *JAMA Surg* 2018;**153**(12):1127—33.

Benjamin Davido*
Maladies Infectieuses et Tropicales, Université Paris-Saclay, AP-HP Hôpital Raymond Poincaré, AP-HP, Garches, 92380, France

Bethsabee Partouche
Gériatrie, Université Paris-Saclay, AP-HP Hôpital Ambroise Paré, AP-HP, Boulogne-Billancourt, 92100, France

Karim Jaffal
Pierre de Truchis
Maladies Infectieuses et Tropicales, Université Paris-Saclay, AP-HP Hôpital Raymond Poincaré, AP-HP, Garches, 92380, France

Marie Herr
Université Paris-Saclay, UVSQ, Inserm, CESP, Echappement aux anti-infectieux et Pharmaco épidémiologie, 78180, Montigny-le-Bretonneux, France
Département Hospitalier d'Epidémiologie et de Santé Publique, AP-HP, Université Paris-Saclay, Paris, France

Marion Pepin
Gériatrie, Université Paris-Saclay, AP-HP Hôpital Ambroise Paré, AP-HP, Boulogne-Billancourt, 92100, France
Paris-Saclay University, UVSQ, Inserm, CESP, Clinical Epidemiology, Boulogne Billancourt, 92100, France

*Corresponding author. Infectious Diseases Department, Raymond Poincaré Teaching Hospital Garches, 92380, France. Fax: +33 1 47107790.
E-mail address: benjamin.davido@aphp.fr (B. Davido)

27 January 2021
Available online 18 February 2021