doi:10.11659/jjssx.01E022002

·述 评·

氧合指数的医学概念亟待界定——PaO_2/FiO_2不是 oxygenation index

王 平,毛庆祥 (陆军军医大学大坪医院麻醉科,重庆 400042)

Medical concept of Chinese oxygenation index needs to be defined urgently: PaO_2/FiO_2 doesn't mean oxygenation index

WANG Ping, MAO Qing-xiang (Department of Anesthesiology, Daping Hospital Affiliated to Army Medical University, Chongqing 400042, China)

[关键词] PaO_2/FiO_2;氧合指数;急性呼吸窘迫综合征;平均气道压
[中图分类号] R563.8 [文献标识码] A [收稿日期] 2022-01-03

PaO_2/FiO_2是判断急性呼吸窘迫综合征(acute respiratory distress syndrome,ARDS)严重程度的重要指标,该值越小,提示病情越严重。PaO_2/FiO_2受呼气末正压水平等的影响,并不能完全反映 ARDS 患者肺部病变的严重程度,因此 ARDS 柏林诊断标准联合使用呼气末正压和PaO_2/FiO_2作为病情分级标准。国内麻醉学、重症医学教科书及医学专著或译本多将PaO_2/FiO_2称为氧合指数[1-3],还有部分国内医学研究者将PaO_2/FiO_2英译为 oxygenation index[4-6]。

但在国外大部分医学文献中,oxygenation index 不是指PaO_2/FiO_2,而是平均气道压/(PaO_2/FiO_2)×100。平均气道压/(PaO_2/FiO_2)×100 是儿科重症研究领域的学者在 20 世纪 80 年代提出的指标[7],多用于评估儿童低氧血症[8-9],该值越大,提示病情越严重。平均气道压/(PaO_2/FiO_2)×100 将平均气道压引入评估体系,提高了诊断的特异性。研究显示,平均气道压/(PaO_2/FiO_2)×100 较PaO_2/FiO_2更适用于 ARDS 患者病死率的评估,也常被国内儿科医学文献译为氧合指数[10-11]。PaO_2/FiO_2和平均气道压/(PaO_2/FiO_2)×100 虽然都能反映 ARDS 病情严重程度,但是两者数值变化对应的病情演变趋势相反,计算方法和代表含义也各不相同。由于目前国内医学研究者对这两个指标的中文译名不加以区别,均译为氧合指数,容易引起混淆。

笔者查阅文献发现,1994 年欧美 ARDS 共识委员会在制定 ARDS 诊断标准时引入PaO_2/FiO_2,但是该指南及 2012 年制定的 ARDS 柏林诊断标准均未将PaO_2/FiO_2称为 oxygenation index[12-13]。在 1980 年至 2000 年发表的英文文献中,PaO_2/FiO_2有多个英文表达,如 oxygenation index[14-16]、respiratory index[17]及 oxygenation ratio[18]等。2000 年之后,国外主流刊物才逐渐将PaO_2/FiO_2统一称为 P/F ratio,将平均气道压/(PaO_2/FiO_2)×100 称为oxygenation index[19-21],从英文字面意思分析,oxygenation index 更适合被译为氧合指数。由此推测,国内学者可能受 2000 年以前发表的英文文献影响,将PaO_2/FiO_2译为氧合指数。根据国内教科书和医学专著的现状,将PaO_2/FiO_2称为氧合指数已经先入为主,国人近 5 年来发表的医学论文大多将PaO_2/FiO_2称为氧合指数,并将其英译为 oxygenation index[5-6,22-24],即使是高水平国际期刊刊载的论文亦是如此,尤其文中无明确定义时,读者容易混淆。

由于PaO_2/FiO_2和平均气道压/(PaO_2/FiO_2)×100 两个指标均有重要的临床价值,笔者呼吁学术界尽快规范其中文翻译,以期为未来的学术交流和医学教育提供一定参考。

[通信作者] 毛庆祥,E-mail: maomaosmmu@126.com

[参考文献]

[1] 葛均波,徐永健,王 辰. 内科学[M]. 第 9 版. 北京:人民卫生出版社,2018:131-132.
[2] Cropper MA. 米勒麻醉学[M]. 邓小明,黄宇光,李文志,译. 第 9 版. 北京:北京大学医学出版社,2022:1275-1276.
[3] 邓小明,姚尚龙,于布为,等. 现代麻醉学[M]. 第 4 版. 北京:人民卫生出版社,2014:1930-1931.
[4] Huang SQ, Zhang J, Zhang XX, et al. Can dexmedetomidine improve arterial oxygenation and intrapulmonary shunt during one-lung ventilation in adults undergoing thoracic surgery? A meta-analysis of randomized, placebo-controlled trials[J]. Chin Med J (Engl), 2017, 130(14): 1707-1714. doi:10.4103/0366-6999.209891.
[5] 罗红敏. 氧合指数对肺功能的评估价值[J]. 中华危重病急救医学, 2016,28(10):926. doi:10.3760/cma.j.issn.2095-4352.2016.10.106.
[6] 黄 浩,陈 瑜,马丽娅,等. 儿童重症腺病毒肺炎的临床特征及高危因素分析[J]. 中华儿科杂志,2021,59(1):14-19. doi:10.3760/cma.j.cn112140-20200704-00687.
[7] Gerstmann DR, de Lemos RA, Coalson JJ, et al. Influence of ventilatory technique on pulmonary baroinjury in baboons with hyaline membrane

disease[J]. Pediatr Pulmonol,1988,5(2):82 - 91. doi:10.1002/ppul.1950050204.

[8] Durand M,Snyder JR,Gangitano E,et al. Oxygenation index in patients with meconium aspiration:conventional and extracorporeal membrane oxygenation therapy[J]. Crit Care Med,1990,18(4):373 - 377. doi:10.1097/00003246 - 199004000 - 00005.

[9] 林 蔷,黎巧茹,陈 简. 不同剂量肺表面活性物质对晚期早产/足月新生儿呼吸窘迫综合征患儿的临床研究[J]. 中国临床药理学杂志,2020,36(6):610 - 612. doi:10.13699/j.caki.1001 - 6821.2020.06.005.

[10] Balzer F,Menk M,Ziegler J,et al. Predictors of survival in critically ill patients with acute respiratory distress syndrome (ARDS):an observational study[J]. BMC Anesthesiol,2016,16(1):108. doi:10.1186/s12871 - 016 - 0272 - 4.

[11] 中英文对照名词词汇(三)[J]. 中国现代神经疾病杂志,2020,20(10):53.

[12] Bernard GR,Artigas A,Brigham KL,et al. The American-European consensus conference on ARDS. Definitions,mechanisms,relevant outcomes,and clinical trial coordination[J]. Am J Respir Crit Care Med,1994,149(3 Pt 1):818 - 824. doi:10.1164/ajrccm.149.3.7509706.

[13] ARDS Definition Task Force,Ranieri VM,Rubenfeld GD,et al. Acute respiratory distress syndrome:the Berlin definition[J]. JAMA,2012,307(23):2526 - 2533. doi:10.1001/jama.2012.5669.

[14] Luterman A,Horovitz JH,Carrico CJ,et al. Withdrawal from positive end-expiratory pressure[J]. Surgery,1978,83(3):328 - 332.

[15] Pfenninger J,Gerber AC. High-frequency ventilation (HFV) in hyaline membrane disease:a preliminary report[J]. Intensive Care Med,1987,13(1):71 - 75. doi:10.1007/BF00263563.

[16] Mure M,Martling CR,Lindahl SG. Dramatic effect on oxygenation in patients with severe acute lung insufficiency treated in the prone position[J]. Crit Care Med,1997,25(9):1539 - 1544. doi:10.1097/00003246 - 199709000 - 00022.

[17] Okada H,Tsukamoto I,Sugahara S,et al. Does intensive perioperative dialysis improve the results of coronary artery bypass grafting in haemodialysed patients? [J]. Nephrol Dial Transplant,1999,14(3):771 - 775. doi:10.1093/ndt/14.3.771.

[18] Dimmeler S,Lechleuthner A,Auweiler M,et al. Effect of H1-antagonism on cardiovascular,pulmonary,and immunological dysfunction in porcine endotoxic shock[J]. Shock,1995,3(6):416 - 421.

[19] Adhikari NK,Burns KE,Friedrich JO,et al. Effect of nitric oxide on oxygenation and mortality in acute lung injury:systematic review and meta-analysis[J]. BMJ,2007,334(7597):779. doi:10.1136/bmj.39139.716794.55.

[20] Khemani RG,Rubin S,Belani S,et al. Pulseoximetryvs. PaO_2 metrics in mechanically ventilated children:Berlin definition of ARDS and mortality risk[J]. Intensive Care Med,2015,41(1):94 - 102. doi:10.1007/s00134 - 014 - 3486 - 2.

[21] Yehya N,Thomas NJ,Khemani RG. Risk stratification using oxygenation in the first 24 hours of pediatric acute respiratory distress syndrome[J]. Crit Care Med,2018,46(4):619 - 624. doi:10.1097/CCM.000000 0000002958.

[22] 李晓东,李 甜,邸兴伟. 基于肺动脉压力导向的最佳呼气末正压对 ARDS 患者氧合指数及血流动力学的影响研究[J]. 中国急救医学,2020,40(7):619 - 623. doi:10.3969/j.issn.1002 - 1949.2020.04.008.

[23] Zhang L,Feng X,Zhang D,et al. Deep vein thrombosis in hospitalized patients with COVID-19 in Wuhan,China:prevalence,risk factors,and outcome[J]. Circulation,2020,142(2):114 - 128. doi:10.1161/CIRCULATIONAHA.120.046702.

[24] Wang C,Xie K,Li K,et al. Potential therapeutic effects of interleukin-35 on the differentiation of naïve T cells into Helios$^+$ Foxp3$^+$ Tregs in clinical and experimental acute respiratory distress syndrome[J]. Mol Immunol,2021,132:236 - 249. doi:10.1016/j.molimm.2021.01.009.

(编辑:龙小芬)