

Wood units · m² or Wood units/m²: does it matter?

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As we know that, the Fick principle involves many limitations. Most important concern is measuring oxygen consumption (VO₂) for Fick calculation. However, direct measurement of VO₂ is difficult and expensive. Therefore, it has been generally accepted that, predicted VO₂ values can be use in practice (1).

A table has been published in European Society of Cardiology (ESC) Guideline which is pointed out operability, inoperability and controversial values for both pulmonary vascular resistance (PVR) and PVR index (PVRI) in patients with pulmonary arterial hypertension (PAH) (2). Additionally, a new pediatric guideline has been released by American Heart Association (AHA) at the end of the 2015 (1). PVRI and PVR to systemic vascular resistance (SVR) ratio had been pointed out to operability in that guideline. Both ESC and AHA guidelines use Wood Units.m² (WU.m²) as an unit for PVRI.

However, in some published articles Wood Units/m² has been given instead of WU.m² (3, 4). A corrective text related to the units was published after the publication of the article which is written by Simonneau et al. (3). However, in our opinion, the new unit given in the correction text as Wood Units index = mm Hg/L/min/m², instead of WU.m² will lead to confusion.

An important detail is the unit of VO₂. If the unit of VO₂ is (mL/min)/m² the obtained value will be cardiac index, not cardiac output. In this case, the calculated value will be the PVRI, not the PVR.

Because of this kind of concern, we need some more special definitions for surgical treatment of pediatric PAH patients. The defined operability limits are controversial for pediatric patients in ESC Guideline (2). For a child with PVRI value of 3 WU.m², with a body surface area of 0.5 the PVR value will be 6 Wood units (WU). In this case, when checked as PVRI, it is within operability limits (<4 WU.m²), but when checked as PVR it is inoperable (>4.6 WU). As a result, PVR-PVRI correlation in the table in ESC Guideline is not valid for pediatric patients. Repair of congenital heart disease in patients with PAH recommended if PVRI <6 WU.m² or PVR/SVR <0.3 according to the AHA guideline (1). This definition seems to be more acceptable as we discuss in the example above. However, there is some confusion in AHA guideline about PVR and PVRI abbreviations. In that text the 6 WU.m² definition used both PVR and PVRI in various section (1).

We should keep in mind that the unit of VO₂ tables is (mL/min)/m² (5). Hereby, we should not forget that, the calculations with using that VO₂ tables resulted as PVRI not PVR. This condition is important in considering the result as WU.m² or WU.

Because of these possible risks for calculation of PVRI we do agree with AHA guideline. The AHA guideline point out the importance of PVR / SVR ratio rather than PVRI value (1). So, we strongly recommend that pediatric cardiologists should use the PVR / SVR ratio instead of PVRI for decision of operability.

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