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2173-5727/

Validation of medical researchs☆

Validación de las investigaciones médicas

Dear Editor,

We have read the letter «Inclusive use of effect size conversion and Bayes factor in Intensive Care Medicine research»,[1] referred to our article recently published in MEDICINA INTENSIVA, entitled: «HLA genetic polymorphisms and prognosis of patients with COVID-19», with great interest.[2]

Our study involved 72 patients with COVID-19 (10 deceased and 62 surviving after 30 days), and reported a statistically significant association between different genetic polymorphisms of the human leukocyte antigen (HLA) system and mortality due to COVID-19 in the regression analysis. One of the mentioned alleles was HLA-A*11.

The comparison of deceased patients and survivors identified a statistical tendency ($p = 0.051$) towards a greater presence of the HLA-A*11 allele among the patients that died (3/30 [30%]) versus the survivors (4/62 [6.5%]). However, the deceased individuals presented higher APACHE-II ($p < 0.001$) and SOFA scores ($p = 0.001$) than the survivors. The regression analysis found the presence of the HLA-A*11 allele to be associated to increased mortality controlling for SOFA (OR: 7.693; 95%CI: 1.063–55.650; $p = 0.04$) or APACHE-II (OR: 11.858; 95%CI: 1.524–92.273; $p = 0.02$).

We admitted that our study had limitations, including the fact that we only entered two variables in each regression model, due to the small number of deceased patients in our study, which precluded the inclusion of several variables.[3] Nevertheless, we feel that the strengths of the study were the fact that the presence of the HLA-A*11 allele was associated to mortality after controlling for two patient severity scores (SOFA or APACHE-II), and that the presence of this allele has previously been associated to a poor outcome in the context of other infectious diseases.[4,5]

We agree with the methodological reflection of Ramos-Vera, recommending the confirmation of clinical research in order to validate the results obtained and strengthen their practical credibility. As commented by Ramos-Vera, the option of using Bayesian inference offers a very good approach to the control of error in estimations. Moreover, we are happy to know that the Bayesian analysis made by Ramos-Vera to define the level of evidence of our study using the Bayes factor (BF) method found the results referred to FB10 (in favor of the alternative hypothesis) and FB01 (in favor of the null hypothesis) to indicate extreme evidence of our findings. Nevertheless, we recommend the validation of observational or experimental results to be made using replication with samples external to the study. We therefore consider that it would be interesting to obtain findings similar to our own in future samples involving different COVID-19 patients, in order to determine whether the findings are stable, reducing the uncertainty of possible type 1 errors.

In conclusion, we agree with Ramos-Vera that the confirmation of clinical research is necessary (based on external samples or Bayesian inference) in order to validate the results obtained and strengthen their practical credibility.

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Decibans: It is time to weigh the evidence about diagnostic accuracy

Decibanes: es hora de sopesar la evidencia sobre la exactitud diagnóstica

Dear Editor:

In a recent article in *Medicina Intensiva*,[1] Professor Ramos-Vera introduced the clinical use of Bayes factors, also known as likelihood ratios (LR). The author modified the classic Jeffreys scale[2] to make LRs more interpretable in the daily clinical practice. With this idea of applicability, it seems apparent the so-called ''Weights of Evidence'' should also become more widely accepted in intensive care medicine.

The weight of evidence (WoE) is no more than ten times the decimal logarithm of an LR. Its unit of measurement is the deciban. Therefore,

Positive WoE = 10 * log10 (positive LR) decibans

Negative WoE = 10 * log10 (negative LR) decibans

It was Alan Turing who invented the WoEs as the basic statistical method used to decipher the Nazi's ''Enigma'' code.[3] A deciban is the smallest change in the weight of evidence that can be directly perceived by human intuition.

Let's look at a specific example comparing the use of LVs and WoEs in a clinical case. In a recent *Medicina Intensiva* publication,[4] the diagnostic accuracy of 6 massive haemorrhage (MH) prediction scales in polytraumatised patients was evaluated. With the data from 4 of these scales, we have prepared Table 1.

We can see by looking at it that the meaning of LRs, especially LR for negatives, is a little difficult to interpret. The fact that the measurement scale is different for the positives (from 1 to infinity) and for the negatives (from 0 to 1) greatly contributes to this. The authors in using the inverse of negative LR might have caused even more confusion.

On the contrary, the use of decibans here could be very illustrative. The logarithmic transformation of the LRs means that both WoEs are expressed in a single measurement scale. A positive deciban could be used to confirm a disease and a negative one to rule it out. And in magnitude, decibans are interpreted similarly to the marks obtained in secondary school. All pupils know that an eight is not the same as obtaining a three. A weighting of +7.5 decibans means passing an exam of ''confirmatory test'' with a good grade, whereas a weighting of −3.5 decibans is not passing an exam of ''rejection test''. Like in school, the thresh-

Table 1 Comparison between the performances or LRs and WoEs in evaluating the diagnostic accuracy of four clinical scales for prediction of massive bleeding in trauma patients:.

	ETS (1)			TASH (2)			PWH (3)			Larson (4)		
	Median	Int Cred 95%		Median	Int Cred 95%		Median	Int Cred 95%		Median	Int Cred 95%	
Sample size (n)	186			128			126			378		
Prevalence of massive haemorrhage	0.1			0.098			0.1			0.1		
Area under ROC (AUROC)	0.85	0.79	0.90	0.82	0.74	0.88	0.82	0.74	0.88	0.81	0.77	0.85
Sensitivity (%)	95	78.1	97	92.9	69.9	95.3	92.9	87,4	94,2	76.5	59.4	78.8
Specificity (%)	60.8	53.9	64	59.8	53.3	65.3	59.8	50.6	62.8	77	72.3	78.5
LR positive	2.42	1.90	3.03	2.40	1.73	3.19	2.25	1.63	2.95	3.22	2.42	4.16
LR negative	0.096	0.0084	0.359	0.132	0.0106	0,49	0.138	0.0113	0.514	0.333	0.18	0.53
WoE positive (decibans)	3.83	2.78	4.81	3.80	2.38	5.03	3.51	2.12	4.70	5.07	3.84	6.19
Probability of being CONFIRMATORY...												
Good	0.00987			0.0278			0.00757			0.548		
Excellent	0			0			0			0		
WoE negative (decibans)	−10.6	−17.4	−8.4	−8.78	−19.7	−3.10	−8.59	−19.5	−2.89	−4.77	−7.45	−2.76
Probability of being REJECTION...												
Good	0.956			0.875			0.861			0.424		
Excellent	0.517			0.386			0.367			0.00036		

(1) ETS scale: Emergency Transfusion Score; (2) TASH scale: Trauma Associated Severe Haemorrhage; (3) PWH scale: *Prince of Wales Hospital/Rainer*; (4) Larson scale; LR positive: Likelihood Ratio of a positive result; LR negative: Likelihood Ratio of a negative result; WoE positive: weight of the evidence of a positive result; WoE negative: weight of the evidence of a negative result; good as a confirmatory test: WoE positive ≥ + 5 decibans; excellent as a confirmatory test: WoE positive ≥ +10 decibans; good as a rejection test: WoE positive ≤ −5 decibans; excellent as a rejection test: WoE positive ≤ −10 decibans.