



## Receiver Operating Characteristic Curve and Odds Ratio Should Be Used with Caution

Wandong Hong<sup>1</sup>, Jiansheng Wu<sup>1\*</sup>, Xiangrong Chen<sup>1</sup>

<sup>1</sup> Department of Gastroenterology and Hepatology, the First Affiliated Hospital of Wenzhou Medical College, Wenzhou, Zhejiang, China

### ARTICLE INFO

#### Article Type:

Letter to Editor

#### Article history:

Received: 29 Jun 2011

Revised: 30 Jun 2011

Accepted: 09 Jul 2011

#### Keywords:

ROC curves

Odds ratio

#### ► Please cite this paper as:

Hong W, Wu J, Chen X. Receiver Operating Characteristic Curve and Odds Ratio Should Be Used with Caution. *Hepat Mon.* 2011; 11(9):757. DOI: 10.5812/kowsar.1735143X.735

© 2011 Kowsar M.P.Co. All rights reserved.

### Dear Editor,

We read with interest the article by Abu El Makarem MA *et al.* (1) entitled, "Platelet count/bipolar spleen diameter ratio for the prediction of esophageal varices: The special Egyptian situation." This study evaluated noninvasive predictors of esophageal varices in cirrhotic patients by multivariate logistic regression and receiver operating characteristic (ROC) curve analysis. However, in our opinion, some aspects of the statistical analysis could be clarified. The first issue concerns the ROC analysis. The full area under the ROC curve (AUC) is a measure of the performance of the diagnostic test because it reflects the test performance at all possible cutoff levels. The AUC lies in the interval [0.5,1], and the larger area, the better performance. A perfect test has an AUC of 1.0, whereas random chance gives an AUC of 0.5 (2, 3). In Abu El Makarem MA *et al.*'s (1) paper, the AUC for age is 0.33, which is less than 0.5. Therefore, we think that something might have gone wrong when the authors performed the ROC analysis with the SPSS software. Because both the

univariate analysis and multivariate logistic regression identified age as a valuable predictor of varices, older patients experienced a higher risk having varices. We presume that the AUC for age may be 0.67 (1-0.33) rather than 0.33. The second issue has to do with the odds ratio. The odds ratio refers to a ratio of the odds of the outcome occurring in one group divided by the odds of the outcome occurring in the other group with a 1-unit increase in x (4). The odds ratio for age was 1.205 in Abu El Makarem MA *et al.*'s (1) paper, but no statement such as "for a one year increase in age" was mentioned.

### Financial Disclosure

None declared.

### References

1. Abu El Makarem MA, Shatat ME, Shaker Y, Abdel Aleem AA, El Sherif AM, Moaty MA, et al. Platelet count/bipolar spleen diameter ratio for the prediction of esophageal varices: The special Egyptian situation. *Hepat Mon.* 2011;11(4):278-84.
2. Bewick V, Cheek L, Ball J. Statistics review 13: receiver operating characteristic curves. *Crit Care.* 2004;8(6):508-12.
3. Lasko TA, Bhagwat JG, Zou KH, Ohno-Machado L. The use of receiver operating characteristic curves in biomedical informatics. *J Biomed Inform.* 2005;38(5):404-15.
4. Peat JK, Barton B, Elliott EJ, Ebrary I. *Statistics workbook for Evidence-based Health care.* Wiley Online Library; 2008.

\* Corresponding author at: Jiansheng Wu, Department of Gastroenterology and Hepatology, The First Affiliated Hospital of Wenzhou Medical College, No.2, Fu Xue Road, 325000, Wenzhou, Zhejiang, China. Tel: +86-13868465258. Fax: +86-1057788069816. E-mail: [hepati@163.com](mailto:hepati@163.com)

DOI: 10.5812/kowsar.1735143X.735

Copyright © 2011, BRCGL, Published by Kowsar M.P.Co. All rights reserved.