Reviewer’s report

Title: Using Ordinal Logistic Regression to evaluate the performance of laser-Doppler predictions of burn-healing time

Version: 3 Date: 15 December 2008

Reviewer: Jacek Ruminski

Reviewer’s report:

The paper is a case study supporting previously known LDI effectiveness which is presented by authors at page 2: “(...) LDI can enable predictions of healing time that are correct over 90% of the time”. The final result of the work described in the paper confirms it (~92%). Authors also indicate that results presented in other studies suggest that the healing time depends on gender which was also confirmed in the presented manuscript. Concluding authors analyzed existing LDI-based investigations using different statistical models and discussed the results of statistical analysis.

The paper is interesting however some corrections and comments are necessary.

There are some important aspects which should be discussed regarding the manuscript:

1. (P2LB3 – page: 2, 3rd line from bottom) Text: “(...) five burn centers, two in the UK, one in Belgium and two in the USA”. Why did authors present in table 1 only 4 centers (encoded 1,2,3,4), giving in total all 310 LDI results for burn areas?

2. Medical procedure should be described more accurately, i.e. a burned patient was evaluated using LDI; and what then? I understand that patients were also assessed using clinical evaluation (however not used in statistics) and those patients with the “clear” indication for surgical treatment (based on traditionally used methodology) were excluded for further LDI studies. If so, only a specific group of patient (preliminary assessed as possibly self-healing cases) was investigated. It should be clearly described and properly analyzed in the paper!

3. (P3LB18 – CR model formula) The CR model formula is not important in the context of the paper and in my opinion should be deleted. The literature reference should be enough (the model was not better than PO model). The same remark for probit model.

4. (P11LT2) Text: “the coefficient B in the equation 1” - in (1) there is a vector of coefficients – please use the proper notation or comment it for better clarity.

5. In the paper the mean flux over the region was used as a reference measure. The a’ posteriori method was used to define ROIs in 3 healing groups. This method is good for analyzing relation between mean flux in the given region and the wound class (observed). Could authors describe how to specify a region to calculate mean flux for real, clinical measurements (if we don’t want to use color...
maps but the mean-based methodology). Is the region area important (significant?). Is there any difference between self-healing of burn area 4 cubic mm (low perfusion) and 400 cubic mm, surrounded by the similar buffer of moderate (e.g. IIa) burn area (better perfusion that center)? Those problems are important for latter interpretation of color maps.

6. How authors verified/evaluate the model? Did all observations were used to build the model? Why not to divide the model into training and test sets, and use the test set to evaluate the accuracy, sensitivity, specificity, etc.? There is a lot of data (299 regions). The chosen PO model fits better than others – ok. But it could be more interesting if authors use some splitting method (e.g. two sets, k-fold, leave one out) to build a model with training set and evaluate the model with other set. This could help a reader to understand how to use his/her data for evaluation of the model proposed by authors. Co-authors published many similar reports (http://www.moor.co.uk/products/burnassessment/moorldi2) so we know that there is a significant relation between PU and healing prognosis.

7. (P12) In figure 1 we observe 6 colors (dark blue, blue, …), typical for LDI. Please give another figure example or modify the text.

8. (P13) Please change symbols for “pixel below cut 1(p1)”. The “p” symbols were earlier defined as probabilities of 3 healing times. This will be more clear for a reader.

9. (P13) Authors build the PO model – showing (fig.4) relation between PU/gender and healing probabilities. Why this information is not used for color maps composition/interpretation? If gender is significant it means that another rule should be used to compose/interpret maps for males and females? Am I right?

10. (P9LB1 LB3) Please explicitly indicate what the “z” symbol means for better clarity.

11. (P3LB1) Please delete the upside down “!” sign.

Level of interest: An article whose findings are important to those with closely related research interests

Quality of written English: Acceptable

Statistical review: Yes, and I have assessed the statistics in my report.

Declaration of competing interests:

I declare that I have no competing interests.