P2438 Predicting infections caused by *Pseudomonas aeruginosa* in haematological patients with high risk neutropenia via the use of neuronal networks

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Background: The aim of this study is to evaluate if the use of neuronal networks might be helpful in predicting which patients with high risk febrile neutropenia (HRFN) will have *Pseudomonas aeruginosa* (PA) infection.

Materials/methods: A large set of structured data (7 millions) from patients with HRFN were extracted directly from data stored in electronic health records (EHRs) (January 2008-December 2017) at a tertiary hospital in Barcelona (110 SCT and 60 AL intensive chemotherapy per year). Patients were randomly selected, with 70% of whom were used for the learning stage and 30%, the training stage. A feed forward network consisting of 9 neurons in the intermediate hidden layer was used, using 12 input parameters previously selected by multivariate analyses. Afterwards, it was determined if the parameters used were significant for the network and those not significant were eliminated and the network was trained again.

Results: A total of 3235 episodes of hematological patients with HRFN were documented (median age: 57 [IQR 44-67] years: 56.9% males, 38% acute leukemia and 28% stem cell transplant). PA infections accounted for 167 (5%) episodes and 93 (56%) were caused by multidrug-resistant strains. Table 1 summarized the main results of the prediction model. The calculation for object from the test set provides a prediction with an accuracy of 96%. The model predicts that 272 (8%) patients will have PA infection (4% corresponds to false positives) and 2963 will not have this infection (5% correspond to false negatives). Calibration was excellent.

Conclusions: Neuronal networks are helpful in predicting which patients with HRFN will have PA infections. This tool might analyze data from EHRs in real time and provide a revolutionary approach to be used as an artificial intelligence decision support system for optimizing microbiological testing for faster diagnoses and antibiotic treatments.

Table 1. Prediction of patients who will suffer PA infection by deep neuronal networks.

Prediction of patients who will suffer PA infection	
Overall episodes	3235
Episodes with PA infection	167
Accuracy training	96%
Prediction of no-PA infection	2963
Prediction of PA	272
FP	114 (4%)
FN	9 (5%)