Prediction of toxicity in oncological treatments.

Case Study /Oncology

Chemotherapy drugs act on cancer cells, which are derived from healthy cells and share metabolic and functional processes with these cells. Any drug that acts on these cells will also act to a greater or lesser degree on all the other cells in the body, which is why chemotherapy treatments have a series of more or less serious effects on the body: toxic or side effects.

The clinician specialist often **does not know exactly the keys** to why some patients have severe toxicity.

Therefore, **controlling the toxicity associated with chemotherapy treatment is a very important aspect**, mainly because of the negative influence it has on the quality of life of patients, as well as the vital risk it can pose in some circumstances.

Data used

The data for this study consisted of 53 cycles of FOLFIRINOX, corresponding to patients with advanced colorectal cancer.

Supported by various demographic data, blood markers and pharmacokinetic parameters resulting from a non-compartmental pharmacokinetic study of CPT-11 and its metabolites (SN-38 and SN-38-G).

Models used

We use machine learning techniques to predict high degrees of toxicity in leukopenia, neutropenia and diarrhea.

For this study, NNBi applied different types of Artificial Intelligence model architectures that learn from the large volumes of data collected by the clinicians and establish the necessary relationships between them, which is necessary to know the pre-established target.

Results obtained

Preliminary models carried out in advanced colorectal cancer and validated with patients from international reference centers have made it possible to establish a first approximation for this pathology. **The model's accuracy rate is able to predict high degrees of toxicity with the following accuracies: leukopenia with an accuracy of 76%, neutropenia of 75% and diarrhea of 91%.** Continuous feeding of new data to the machine learning model will allow the algorithm to improve and increase the accuracy rates.

Brings together information and generates knowledge to improve the clinical care of cancer patients.

Related scientific paper:

Oyaga-Iriarte, E., Insausti, A., Sayar, O., Aldaz A. Prediction of irinotecan toxicity inmetastatic colorectal cancer patients based on machine learning models with pharmacokinetic parameters. Journal of Pharmacological Sciences (2019); In Press. DOI:10.1016/j.jphs.2019.03.004.

Esther Oyaga-Iriarte, Asier Insausti, Onintza Sayar, Azucena Aldaz. Population pharmacokinetic model of irinotecan and its metabolites in patients with metastatic colorectal cancer. European Journal of Clinical Pharmacology (2019); 75:529-542. DOI: 10.1007/s00228-018- 02609-6

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