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Communiqué de presse

An artificial intelligence predicts therapeutic response in patients with advanced rectal cancer treated with preoperative radiochemotherapy

The digestive oncology teams from European Georges Pompidou Hospital, Cochin and Ambroise Paré AP-HP, and laboratory "Information Sciences and personalized medicine" of 1138 Unit Research Center Cordeliers INSERM and Paris-Descartes University, have developed an artificial intelligence system that predict therapeutic response to preoperative chemoradiotherapy in patients monitored for rectal cancer. The work, coordinated by Dr. Jean-Emmanuel Bibault of oncology radiotherapy European Hospital Georges Pompidou AP-HP, would propose a conservative treatment rather than full rectal ablation patients complete therapeutic response.

These results thus contribute to the development of more personalized care in oncology. They were the subject of a publication August 22, 2018 in the journal Scientific Reports (Nature Review Group) .

The standard treatment of locally advanced rectal cancer comprises a preoperative chemoradiotherapy followed by surgical resection (removal) full rectum. About a quarter of patients in complete response after chemoradiotherapy they could avoid radical surgery and benefit instead of conservative treatment (surveillance or endoscopic resection) resulting in less sequelae. However, the only way to know whether these patients respond perfectly to chemoradiation currently remains the operation with removal of the entire rectum.

This study, led by Dr. Jean-Emmanuel Bibault, the radiation oncology department of the European Hospital Georges Pompidou AP-HP, Professor Philippe Giraud, the radiotherapy service HEGP and Professor Anita Burgun, head of the laboratory "information Science and personalized medicine" Unit 1138 Cordeliers research Center INSERM and Université Paris Descartes, therefore aimed to develop an artificial intelligence device which predict in advance the patients with a complete response to preoperative radiochemotherapy, to prevent their operation.

The teams have relied on clinical patient data and images radiation scanners. They then used a method of artificial intelligence-type "Deep Learning" (or "deep neural network") that has been set for identifying patients with complete response to treatment. The "Deep Learning" is part of machine learning methods that model with a high level of data abstraction.

The algorithm developed was then evaluated on patient data already supported at European Hospital Georges Pompidou, at Cochin Hospital and Ambroise Paré Hospital AP-HP. He was accurate in 80% of cases analyzed. 22 of the 95 patients included in the study had a complete response to preoperative radiochemotherapy.

This study shows that the artificial intelligence algorithms type "deep learning" could be used to predict the effectiveness of cancer treatments to further customize the care of patients.

These results may lead to further research to integrate this device into the treatment of locally advanced cancers of the rectum.

Source :

[Deep Learning and Radiomics predict complete response after neo-adjuvant chemoradiation for locally advanced rectal cancer](#)

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