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Perspective

The Babel Tower for the Management of Radiation Skin Reactions: The Need of a Close Collaboration between Radiation Oncologists and Dermatologists a New Concept of Personalized Medicine

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Despite the large number of patients treated, the management of radiation skin reactions has no internationally agreed standard care, and practice varies widely [1-3]. In the last decade remarkable advances in cancer care has created new challenges leading the clinical practice towards a personalized medicine. The process of radiobiological modeling is based on analysis of clinical and radiotherapy data that can be combined for determining dose/response models and predicting different kinds of outcome. However, Big Data efforts in radiation oncology are challenged by high degree of variability in data types and sources, in both format and quality [4]. Radiodermatitis is a significant side effect that arises directly from radiation exposure during cancer treatment, and involves almost 95% of all cancer patients receiving radiation therapy. It is particularly problematic in cancers of the breast, perineum, and head and neck region, where the skin is part of the target volume. The clinical manifestations of radiodermatitis range from dry skin and scaling desquamation, to moist desquamation and necrosis [5]. Over years, irradiated skin can evolve into atrophic mottled telangiectatic scar, which is a fertile ground for cutaneous malignancies. Qualitative research and review articles have suggested that patients with radiodermatitis may experience itching, sensitivity, pain, numbness, tenderness, warmth, tingling, throbbing, tightness, heaviness, and burning, and that skin pain may be associated with fatigue, body image disturbance, sleep problems, and emotional distress

[6]. Many factors can contribute to the severity of radiation dermatitis including the treatment technique, volume of treated tissue, dose/fractionation schedule, and patients' related factors as co-existing chronic illnesses, use of tobacco, age, nutritional status and concurrent medications. Regular skin care assessment and close collaboration between radiation oncologists and dermatologists to manage skin reactions early and throughout treatment have been repeatedly suggested to improve patient comfort, enhance quality of life, and improve clinical outcome [7]. Despite the large number of patients treated, the management of radiation skin reactions has no internationally agreed standard, and clinical practice varies widely among centers [1-3]. Previous studies aimed at reducing the level of skin toxicity by improving radiotherapy technique have successfully applied clinical assessment of epidermolysis (moist desquamation). However, patient's experience of milder levels of radiation induced skin reactions/RISR is not captured with clinical scoring systems. As RISR are generally not a dose-limiting toxicity, a management strategy aimed at relieving patients' experience of their symptoms may be more appropriate than aiming to limit a clinically assessed endpoint. In the last decade, remarkable advances in cancer care have created new challenges leading the clinical practice towards a personalized medicine [4-8]. Prediction tools such as nomograms have the potential to improve patient outcomes through enhancing the consistency and quality of clinical decision-making, facilitating equitable and cost-effective distribution of finite resources and encouraging behavior change, thus having a significant impact

on cancer care [9]. The process of radiobiological modeling is based on analysis of clinical and radiotherapy data that can be combined for determining dose/response models and predicting different kinds of outcome [10]. The scenario that we have just described opens a Pandora's box, from which emerge dermatological problems often not considered, given the cancer treatment priority, but that has a major impact on the current and future quality of life of patients. The purpose of this paper and our project is to invite to evaluate a secondary but extremely important aspect for the quality of life of our patients, to develop, validate, and continuously improve the quality of prediction models for acute and late radiation-induced skin side effects by using an integrated electronic platform to harvest large volumes of high quality heterogeneous data from routine clinical practice, without any extra-work for data extraction. Data coming from radiation treatment plans, laboratories, clinical visits and patient's perspectives would populate the database in real time. A close collaboration between radiation oncologists and dermatologists would be the extra weapon. Particularly the patient would be routinely visited according to a visit schedule by both the radiation oncologist and the dermatologist. All clinical and instrumental data would populate the database and lead to the construction of predictive models for acute and late radiation-induced skin side effects. The proposal of this new multidisciplinary work is for a more personalized medicine that takes care of the cancer patient in its entirety and improves its quality of life in such a delicate and difficult path.

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