Interactive Dosimetric Evaluation Scorecard Interface Based On Clinical Goals Defined in an External Database

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PURPOSE/OBJECTIVE(S)

Our objective is to develop an interactive dosimetric evaluation interface, i.e. comprehensive scorecard, within RaySearch - RayStation (RS) our treatment planning system (TPS) that would be based on standardized and contextualized clinical goals. The clinical goals would need to be easily modifiable by clinicians and automatically selected based on clinical context.

MATERIALS/METHODS

Our scorecard interface was integrated into an already existing in-house software called LINK that runs within RS. LINK is a comprehensive software that augments RS functionality through scripting. It connects and fetches data from a second in-house software called CDe where the clinical and technical contexts are stored and paired. LINK (**Figure 1**) is designed for automation as it aligns all the required steps to generate a treatment plan. Our scorecard interface uses data within the clinical context for plan analysis and to display the result.

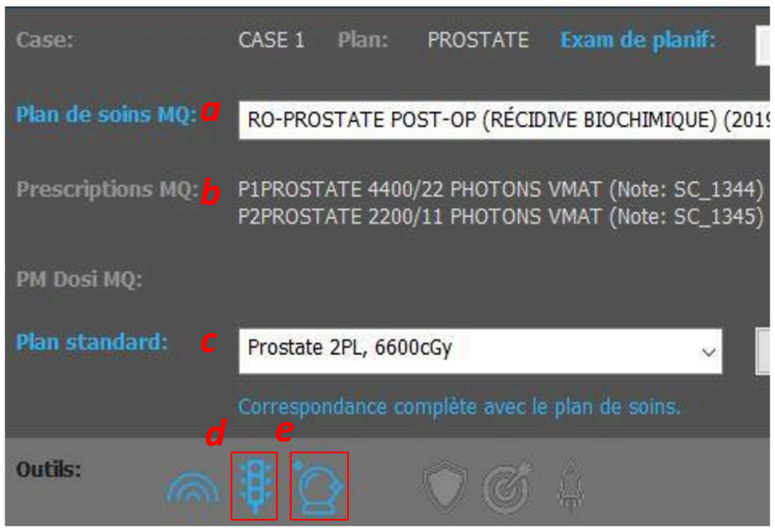

Figure 1: in-house software LINK running within RayStation. Using the unique patient ID, it gets the careplan information (*a*) and the prescriptions (*b*) from the Oncology Information System. It then automatically associates a dosimetric standard from CDe (*c*). The scorecard (*d*) and predictions (*e*) windows become available when dose has been computed.

The data contains standardized clinical goals, i.e. target dose coverage objectives and organs at risk dose tolerances, defined within CDe by an interdisciplinary group of radiation oncologists, physicists and dosimetrists. For each target and organs at risk (OAR), minor and major deviations were defined for each dose prescription as standard in the database.

The scorecard interface (**Figure 2**) queries RS dose volume histograms to obtain specific values defined in the standards and displays the results with a traffic light color scheme (green, yellow and red) representing minor or major deviations from the defined tolerances.

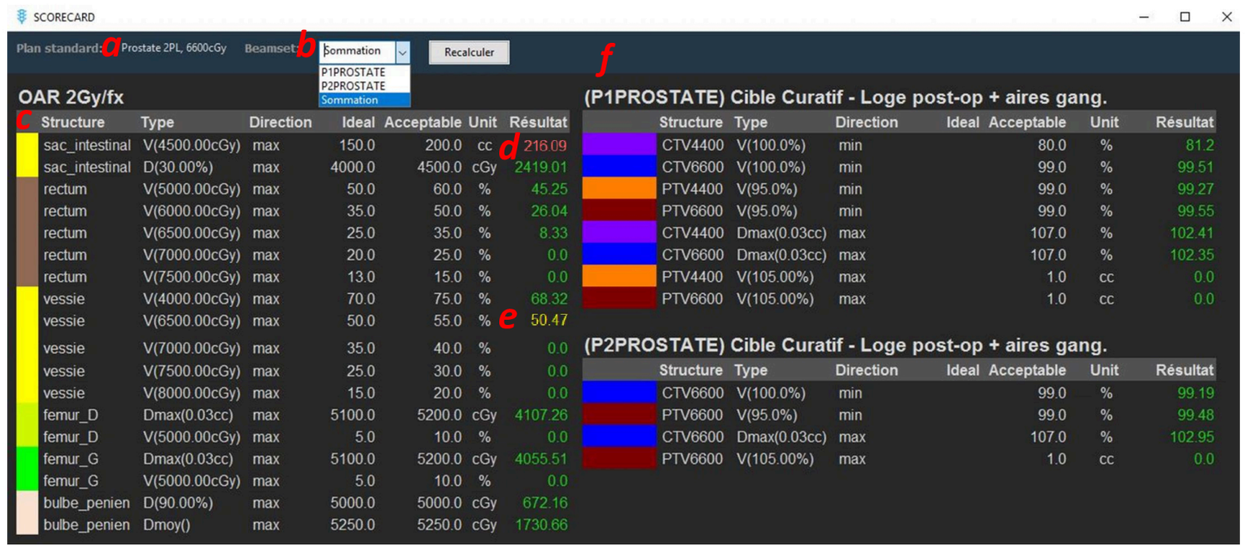

Figure 2: Scorecard window. In the top section: (*a*) dosimetric standard from CDe that was used to calculate the dose in respect with the clinical goals. (*b*) Drop-down list allowing to display the dose of the individual plans or the sum. Bottom section: (*c*) Organ at risk dose guidelines with the actual TPS values (major (*d*) and minor (*e*) deviations shown in yellow and red respectively). (*f*) Targets guidelines with the actual TPS values. All beamsets are being shown since summation is selected.

RESULTS

With our interactive scorecard interface, it is possible to analyze a plan according to the actual clinical context and the corresponding clinical standards defined in an external database.

Our scorecard interface provides multiple benefits. First, it is interactive in the sense that the clinical context is automatically updated depending on what patient, plan and dose is being planned. That creates a quick and smooth planning experience for the clinicians with minimal interactions. Second, the clinical standards are defined outside of our TPS in a secure database that keeps a history of all modifications. And since each clinical goal is entered only once by a designated user with proper access rights, it minimizes the risk of errors. And finally, the scorecard interface being an improvement from the available tools in our TPS, it is possible to incorporate minor as well as major clinical goals and display the results in a detailed and meaningful way.

CONCLUSION

We developed an interactive dosimetric evaluation scorecard based on an independent database allowing a simplified management of the standards and a customised display resulting in a more adapted and effective analysis of a radiotherapy plan.