

PARTNERSHIP HIGHLIGHTS

RAYSEARCH AND C-RAD

Our innovative collaboration with C-RAD has resulted in the first clinical use case, applied on a bilateral breast treatment, as described below. The patient surface from the C-RAD surface guided radiation therapy system, Catalyst+, guides the algorithm in RaySearch products that extends a daily CBCT beyond its limited FOV. The increased anatomical accuracy has the potential to improve dose calculations and clinical decision-making.

CLINICAL USE CASE: BILATERAL BREAST TREATMENT

Breast swelling is a common side-effect during treatment and could require replanning to keep target coverage throughout the treatment. Typically, Cone-beam CT (CBCT) used for positioning has a field-of-view (FoV) which does not cover the full patient outline. FoV is represented by the red contour in Fig. 1.

LIMITED FOV CHALLENGES

The missing anatomical information outside of the FoV is of great importance. Without the complete patient outline, it becomes difficult to estimate whether the replanning of an initial treatment is needed. This can lead to either a suboptimal treatment for the patient, or unnecessary rescan CTs being acquired for plan adaptation. RaySearch products already have an algorithm (corrected CBCT) to compensate for the missing anatomy, but the method can be improved even further.

PARTNERSHIP SOLUTION

The surface scan of the patient at the time of treatment is available in Catalyst+. By incorporating this information into RaySearch products and combining it with the corrected CBCT algorithm, a more detailed and complete representation of the patient's anatomy can be achieved. This is clearly illustrated in Fig. 1, where the pink lines represent the outline of the patient. In the upper image, only anatomical information from the planning CT was used, while in the lower image, the planning CT data is supplemented with the surface scan.

ADDED CLINICAL VALUE

A more accurate estimation of the patient's anatomy can enhance the overall calculation of the delivered dose. This allows the physician to make a more informed decision about whether a replanning of the treatment is necessary. An example of the calculated dose difference when the surface scan is included and not (as shown in Fig. 2).

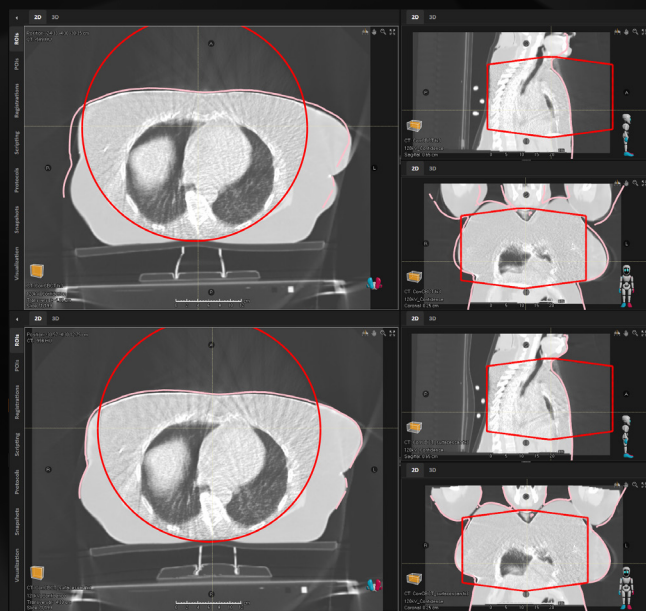


Fig. 1. The CT images of a breast patient. In the image above, outside of the FoV (red line), the corrected CBCT algorithm used data only from a planning CT, while in the image below, the planning CT is supplemented with the surface scan data.

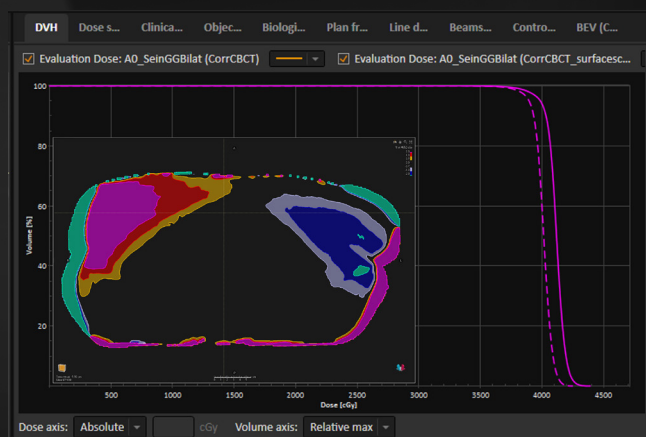


Fig. 2. DVH curves of the target dose, where the dashed and solid lines represent the estimated dose with surface scan data and without, respectively. The image inset illustrates the difference in dose distribution between these two anatomical representations.