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Introduction & Objectives: This study aimed to evaluate the usability and benefit of a new generation of auto segmentation, that automatically identifies organs and auto-contours them directly at CT simulator before creating prostate radiotherapy plans.

Materials & Methods: The prostates of 10 patients were automatically contoured based on DirectORGANS deep learning auto-segmentation at the CT simulator. And then, the CT scans were imported into the Eclipse treatment planning system (TPS) for contouring. On the same CT image sets, the prostate was manually contoured by a group of five experienced physicians. Also, MR-guided prostate contours were delineated using MRI images and used as a reference structure. The volumes of the prostate were measured, and the Overlap index (OI), Dice similarity index (DSC), and Volume difference (Dv) were calculated based on contours. The Kruskal-Wallis H test was performed with SPSS (P<0.05).

Results: MR-based contouring was accepted as a reference and the OI, DSC, Dv, and contouring time results of users and artificial intelligence were analyzed accordingly. There was no significant difference in OI, DSC, and Dv between the results of users and artificial intelligence. The most significant difference between users, artificial intelligence, and MR-based contouring was contouring time (p <0.001). MR- based contouring was time-consuming. The comparison results of the users, artificial intelligence and MRI-based contouring are shown Table 1.

Mean ± SD (min – max)

	OI	DSC	Dv	Volume	Time
User1	0.79 ± .096	0.82 ± 0.05	0.12 ± 0.07	50.9 ± 21.33	3.41 ± 1.48
User2	0.7 ± 0.12	0.75 ± 0.07	0.13 ± 0.09	53.97 ± 22.69	2.71 ± 1.14
User3	0.73 ± 0.12	0.75 ± 0.1	0.08 ± 0.07	48.88 ± 18.06	1.67 ± 0.61
User4	0.78 ± 0.07	0.83 ± 0.04	0.21 ± 0.12	54.54 ± 18.95	2.3 ± 0.45
User5	0.81 ± 0.09	0.85 ± 0.03	0.15 ± 0.08	52.0 ± 21.5	2.01 ± 0.35
AI	0.80 ± 0.07	0.78 ± 0.06	0.13 ± 0.14	49.98 ± 21.52	0.16 ± 0.01

MRI based	1 ± 0 (1-1)	1 ± 0 (1-1)	0 ± 0 (0-0)	46.18 ± 17.92	4.95 ± 2.06
P value	.211	.001	.099	.994	< 0.001

Table 1. Comparison of OI, DSC, and Dv for users, artificial intelligence, and MRI-based contouring.

Conclusions: Artificial Intelligence's automatic contouring of the prostate can be used clinically after minimal modification. Clinicians should review and confirm prostate volume using MR before it was used in the treatment plan. Artificial intelligence demonstrated its value for automated contouring of prostate volumes to save time. Artificial intelligence-based contouring showed important benefits in time-sparing combined with an improved inter-and intraobserver contouring variability.