of about 5 to 38 mm to the plus direction in the range of 60 to 330 degrees of the maximum dose and 100% of the isodose lines (Fig. 1). On the other hand, a range of about 310 degrees in 97%, 95% and 93% of the isodose lines showed the value of about 10mm to a plus direction. The extended DTA for 97% to 80% of the isodose lines showed a value of 1 mm to the plus direction at 270 degrees (the right side). Although the extended DTA showed a large value (maximum dose and 100% of the isodose lines), this was considered a cause for concern, because the dose slope was small and the interval of the isodose lines was small. The pass rate of the gamma values is 98.8%. Therefore, a clear error was undetectable. Therefore, gamma analysis and DTA are both useful tools, but they do not allow to evaluate the displacement direction of isodose lines in the arbitrary position on dose distribution. On the other hand, extended DTA includes a 2D position and a direction for the dose difference, so it was able to detect the risk of overdose and under-dose for the target and OAR.

Conclusions: This study proposes a novel method—extended DTA—that incorporates the concept of displacement direction in DTA and might be an effective method for evaluating dose differences and directions in radiotherapy.

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Secondary scattered doses of IMRT for lung cancer cases. D. Kim, K.K. Chang, M. Yoon, S. Park
Asan Medical Center, Radiation Oncology, Seoul, Korea Republic of Korea
Results: The secondary dose per Gy (i.e., a treatment dose of 1 Gy) from IMRT for lung cancer, measured at 20 to 80 cm from the isocenter ranged from 0 to 4 cGy which is higher when the PTV volume is large or measuring point closed to field edge. The secondary dose per Gy from RapidArc and TOMO ranged from 0 to 2 cGy and from 0 to 1 cGy, respectively. It is indicating that TOMO is associated with a relatively small dose of secondary radiation than IMRT and RapidArc when the measuring point is around the field edge in spite of that tomotherapy has more than approximately 5 times larger monitor units than the other. In addition, RapidArc gives approximately 70% of monitor unit (MU) per fraction comparing to IMRT, indicating that RapidArc is associated with a smaller MU and short treatment time than other techniques.

Conclusions: In conclusion, the secondary dose from TOMO is less than the secondary dose from conventional IMRT and RapidArc around the target area in spite of that tomotherapy has relatively higher monitor units (MU) than the other modalities. In another hand, it is found that rapidarc has shorter treatment time and MU than IMRT and TOMO.