Feasibility & value of whole abdomen radiotherapy using IMRT-Tomotherapy for Intestinal Lymphoma

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서 론

Non-Hodgkin's lymphoma (NHL) of the gastro- intestinal tract accounts for 4% to 20% of all NHLs and is a common extranodal site of presentation There are just few historical data of whole abdominal irradiation (WAI) for intestinal lymphoma. However, there is no confirmed indication or radiation dose schedule of WAI for intestinal lymphoma. On the other hand, there are also many reports about the serious complication of WAI. So, it is necessary to obtain more effective and less toxic WAI tool with feasible indication. The aim of this study was to implement WAI applied by tomotherapy into the multimodal treatment concept of intestinal NHL.

재료 및 방법

1. Case report

Two patients were included. The first patient was a 72-year-old man with diffuse large B cell lymphoma of small intestine and colon. He underwent 8 cycle of R-CHOP chemotherapy and 6 cycle of ICE chemotherapy. But, there were multiple small remnant mesentery lymph nodes. So, he was consulted for WAI. The second patient was a 36-year-old women with diffuse large B cell lymphoma, initially stage IV. She also underwent multiple chemotherapy, but, there was also a remnant lesion on the mesentery lymph node.

2. Simulation and planning

After immobilization in a vacuum mattress, the patient underwent a contrast-enhanced CT scan in 3 mm slice with 4-dimensional respiratory triggering. The gross tumor volume (GTV) was defined the remnant mass following chemotherapy and the clinical target volume (CTV) was defined the entire peritoneal suface, the pelvic and para-aortuc node regions. The planning target volume for remnant mass (PTV1) encompassed a margin of 1-2 cm according to 4-D CT. The PTV for whole abdomen (PTV2) encompassed a margin of 3-5 mm. The planning optimization goal was to minimize the dose to the kidneys and liver while achieving resonable PTV coverage.

3. Dose prescription

For the first patient, 36Gy/20fx was prescribed on PTV1 and 24Gy/20fx on PTV2. The latter patient received, 36.8Gy/16fx on PTV1 and 24Gy/16fx on PTV2.

결과 및 고찰

1. Dosimetric result

The dose distribution is shown in Figure 1. The PTV2 (whole abdominopelvic cavity) volume

receiving 95% of prescription dose (V95) was, 96.6% and V90 was 97.6% in both patients. The standard deviation dose for PTV2 was 1.61 and 1.52 Gy. The mean liver dose and the mean kidney doses are shown in table 1. With a very low dose to OARs and excellent target coverage, both objectives could be realized.

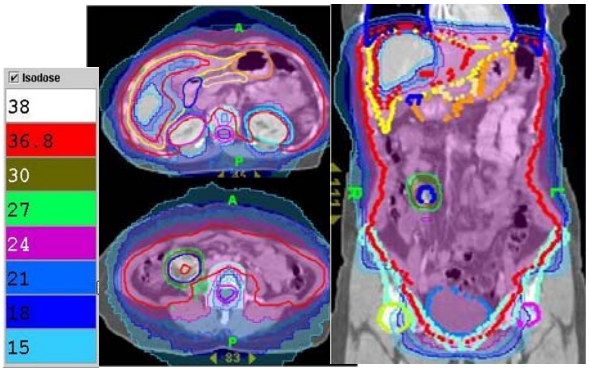

Fig. 1. Dose distribution showing the delivered tomotherapy plan in representative transverse and coronal planes (The 2nd patient case)

Organ	Patient 1		Patient 2	
	Max dose (Gy)	Mean dose (Gy)	Max dose (Gy)	Mean dose (Gy)
Liver	27.4	20.5	27.3	19.7
Rt. kidney	28.5	12.3	27.9	11.4
Lt. kidney	26.9	12.5	27.7	11.0
Cord	21.2	14.9	26.1	16.3

Table 1. The maximal and the mean dose of organ at risk.

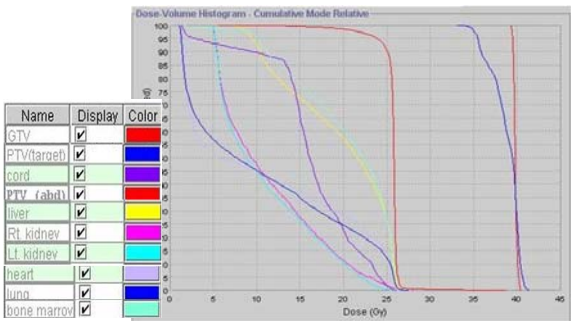

Fig. 2. Dose volume histogram. (The 2nd patient case)

2. Clinical result

The treatment was well tolerated in both patient. The patients developed no severe acute side effects. The first patient developed grade 1 leukocytopenia and the second patient experienced grade 1 diarrhea and leukocytopenia. The complications recovered completely. After follow up of 5 months and 1 month, there was no evidence of disease recurrence yet or newly developed complication.

결 론

Helical tomotherapy is feasible and valuable for WAI. Simultaneous integrated boost technique can be incoporated. Tomotherapy enabled excellent coverage of the PTV and effective sparing of liver, kidneys and bone marrow. And we will have to analyze the comparison with simple AP-PA technique WAI and also local control or survival when chemotherapy alone for intestinal NHL. Meanwhile we think more follow-up period and patients are needed for analysis of local control, survival and late RT complications in the future.

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