

Gastric Cancer: IMRT versus Conventional Radiotherapy

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Purpose:

IMRT (Intensity Modulated Radio Therapy) is a promising new technique and increasingly applied in treatment planning in postoperative chemoradiation for gastric cancer, where large target volumes are treated, IMRT has the ability to conform the radiation dose to concavities and to better avoid critical organs.

We have started a clinical routine for treatment of gastric cancer with IMRT. The purpose is to compare IMRT and conventional (AP-PA) radiotherapy with respect to doses in organs at risk (OAR), in particular both kidneys.

Material & Methods:

For one patient who had had surgery for gastric cancer and was irradiated with IMRT (45 Gy/ 25 fractions) on an (Elekta SL 18) accelerator, both a conventional plan (two field conformal technique) and an IMRT plan were constructed (Pinnacle®) (Fig.1a & b).

Dose Volume Histograms (DVH) for the right and left kidney and the liver were compared to evaluate the benefit of IMRT (Fig.2).

Patient received 45 Gy, in 25 fractions 5 days a week over a period of 5 weeks, which was combined with daily chemotherapy (cisplatinum 5 mg/ m² i.v. and capecitabine 800 mg/ m² bid orally).

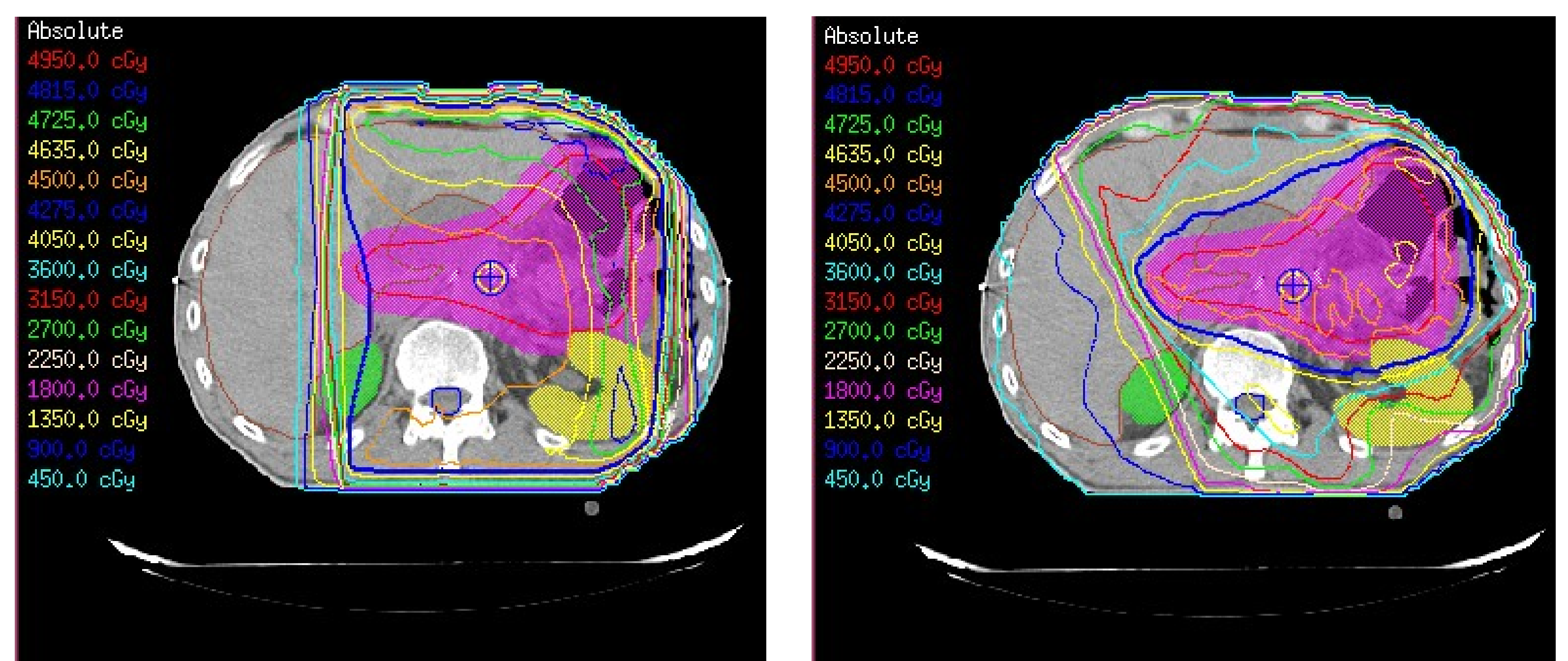


Fig.1a: 2 Field Conventional

Fig.1b: IMRT

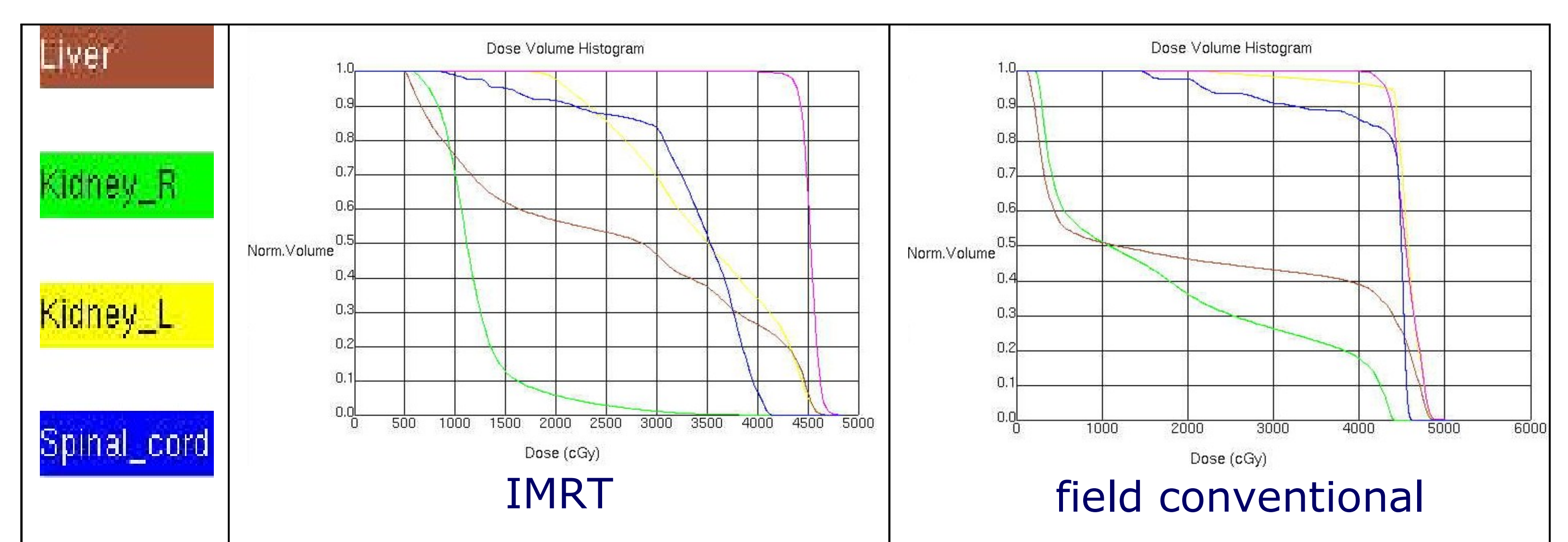


Fig.2: Dose Volume Histogram, comparing IMRT versus conventional

Results:

The DVH shows that the dose to the right kidney decreases with IMRT.

The volume irradiated to ≥ 20 Gy (V20): V20 of the left kidney with IMRT is 97% and 99% for the conformal technique. The V20 of the right kidney with IMRT is 5.7% and for the conformal technique 22%. With IMRT the mean liver dose is 25,6 Gy, and for the conformal technique 19,9 Gy. Both doses remain below the tolerance dose of the liver (i.e. mean dose of 30 Gy). (Fig. 3)

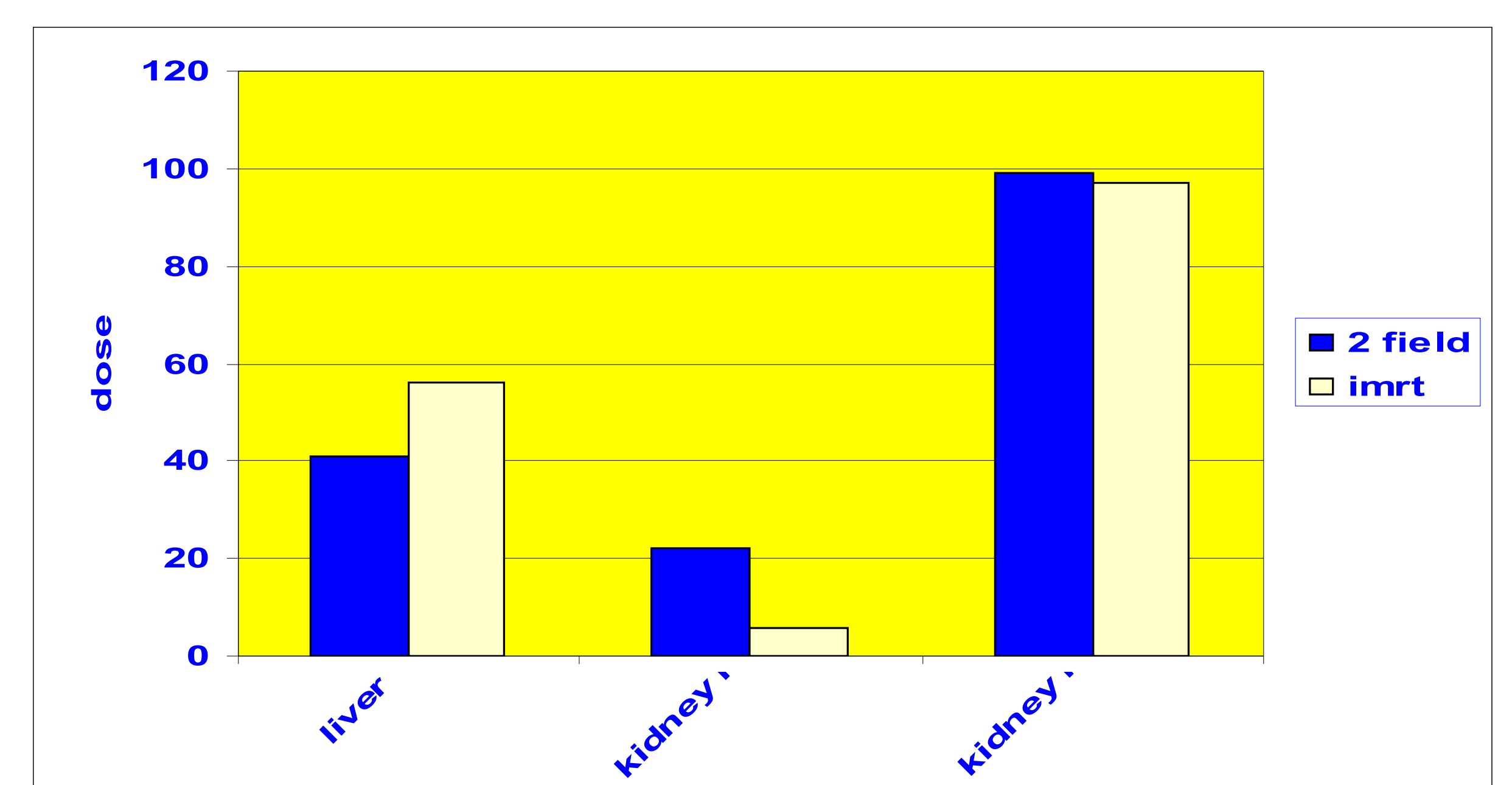


Fig.3: Chart showing the V20 (% volume dose at 20 Gy)

Conclusion: In postoperative chemoradiation of gastric cancer, IMRT is potentially able to reduce doses to critical organs, which ultimately can result in better tolerance of this treatment and a decrease in long-term toxicity.