Hemostatic Radiotherapy Used Twice for Inoperable Progressive Gastric Cancer with Bleeding

Osamu Tanaka, Kana Matsuura, Akihiko Sugiyama, Tomohiro Kato, Eiichi Tomita & Masayuki Matsuo

Journal of Gastrointestinal Cancer

ISSN 1941-6628
Volume 50
Number 1

J Gastrointest Canc (2019) 50:151-155
DOI 10.1007/s12029-017-9994-x

Springer

J Gastrointest Canc (2019) 50:151–155
DOI 10.1007/s12029-017-9994-x

CASE REPORT

Hemostatic Radiotherapy Used Twice for Inoperable Progressive Gastric Cancer with Bleeding

Osamu Tanaka[1] · **Kana Matsuura**[2] · **Akihiko Sugiyama**[2] · **Tomohiro Kato**[2] · **Eiichi Tomita**[2] · **Masayuki Matsuo**[3]

Published online: 15 August 2017

Introduction

Both men and women suffer from high morbidity as a result of gastric cancer in Asian countries, including Japan. The first choice of treatment of gastric cancer without distant metastasis is surgery, and adjuvant chemotherapy is performed in stage II and stage III.

Radiotherapy as an adjuvant therapy of the surgery is not provided for standard treatment in Japan. Reports on the effect of radiotherapy performed to achieve hemostasis in gastric cancer exist, but few are prospective [1–3]. Additionally, to our knowledge, only one patient in Japan has been irradiated twice so far [4].

Herein, we report a case of gastric cancer with bleeding during the management of which we administered radiotherapy twice and successfully achieved hemostasis.

✉ Osamu Tanaka
c.bluered@gmail.com

[1] Department of Radiation Oncology, Gifu Municipal Hospital, 7-1 Kashima-cho, Gifu City, Gifu 500-8513, Japan

[2] Department of Gastroenterology, Gifu Municipal Hospital, 7-1 Kashima-cho, Gifu City, Gifu 500-8513, Japan

[3] Department of Radiation Oncology, Gifu University School of Medicine, 1-1, Yanagido, Gifu City, Gifu 501-1194, Japan

Case Report

At a medical screening CT examination, we accidentally discovered a thickened stomach wall in a man in his 60s. He was admitted to our hospital without any melena or hematemesis. The initial diagnosis from upper gastrointestinal tract endoscopy is shown in Fig. 1. There was progressive stomach cancer of type 3 with bleeding. The enlargement of the perigastric lymph nodes was also detected in the CT. We diagnosed gastric cancer type 3 stage IV, a poorly differentiated adenocarcinoma (liver metastasis). CT showed that the liver metastasis was extensive and was associated with a mild decrease in liver function (serum protein and albumin levels were low and AST, ALT, and LDH levels were high). Hematological data was as follows: red blood cell count, 378 × 10^4/mm^3/μl; hemoglobin, 7.5 g/dl; MCV, 70 fl; MCH, 20 pg; MCHC, 28%; Fe, 11 μg/dl; ferritin, 7 ng/ml; and UIBC, 418 μg/dl.

We started a combination of S-1 and CDDP as chemotherapy for 2 months because the case was inoperable due to specific surgical irresectability and no prospect of R0 resection; however, liver metastasis increased, and we therefore changed the therapy and performed 6 cycles of paclitaxel and ramucirumab 2 months after the initial diagnosis, but the tumors subsequently enlarged.

We performed 3 cycles of S-1 and oxaliplatin 7 months later but we were forced to perform transfusion for persistent bleeding 10 months after the initial treatment (Fig. 2).

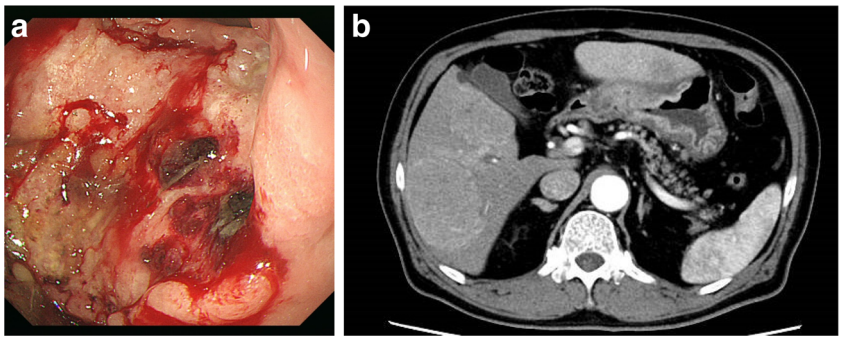

Fig. 1 **a** Upper gastrointestinal endoscopy at the initial examination. Type 3 gastric cancer with ulcers and bleeding were detected in the vestibular region of the stomach. **b** Dynamic enhanced CT. A thickening of the stomach wall and multiple liver metastases were found.

We administered radiotherapy of 20 Gy/5 fraction (fx) for hemostasis (Fig. 3c). The radiation treatment of 20 Gy/5 f. was approved by our institutional review board, and written informed consent was obtained from the patient.

CPT-11 was given 11 months later, but we detected myelosuppression [hypocellular bone marrow, grade 3; NCI Common Terminology Criteria for Adverse Events (NCI-CTCAE v4.0)] and performed additional radiotherapy of 15 Gy/5 f. in the same month because bleeding had increased. We planned additional radiotherapy 1 month after the initial radiotherapy for hemostasis (Fig. 4c).

The progression of anemia was halted, and hemostasis was achieved after the second radiotherapy (Fig. 5). The patient subsequently received home care. The patient passed away at home 10 days after discharge, immediately after a suit for sudden stomachache at home; hematemesis and bloody bowel discharge were not observed. The patient had a normal meal the day before he passed away. We examined the cause of death in group conference and concluded that acute coagulation disorder might have influenced the death. The condition of the patient is summarized in Fig. 6.

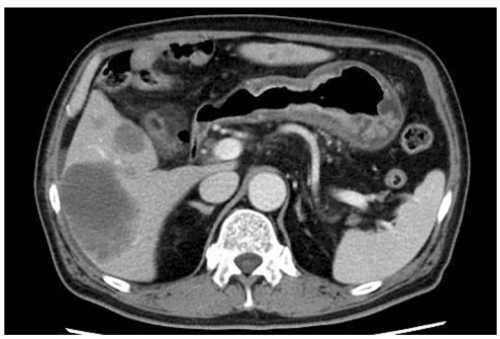

Fig. 2 Dynamic enhanced abdominal CT (after third line chemotherapy). Progression of liver metastases and thickening of the stomach wall were still found

Discussion

In reports of endoscopic hemostasis techniques for gastric cancer, the re-bleeding hemostatic response rate is high (about 41–80%) [1–5]. Although re-bleeding reportedly occurs in 40–75% of cases after vascular embolization for gastric cancer, it is almost never found to be the cause of death [1–3]. The use of surgery, endoscopic hemostasis techniques, and vascular embolization may be standard treatments with wide adaptation but are ineffective.

Retrospective studies on palliative radiotherapy for gastric cancer with bleeding report a 50–91% hemostatic response rate and a re-bleeding rate of 30–50% [1–3, 5, 6]. We were able to discharge the patient after two treatments of radiotherapy. Compared to a past study, 20 Gy/5 f. may be a low dosage. A dose of 20 Gy/5 f. is equal to 28 Gy in terms of biological effective dose (BED). We experienced a similar case with radiotherapy of 20 Gy/5 f. for gastric bleeding. However, his anemia continued to progress after 6 months of radiotherapy; hence, we introduced a second radiotherapy of 15 Gy/5 fx, and the patient was safely discharged. A dose of 30 Gy/10 f. was used for palliative radiotherapy, such as bone metastasis, and 10 days are required to deliver this dose. BED of 30 Gy/10 f. is equal to that of 39 Gy. The hypo fractionate radiotherapy is reasonable in terms of treatment time. In our experience, a dose of 25 Gy/5 f. (BED equivalent of 37 Gy) may

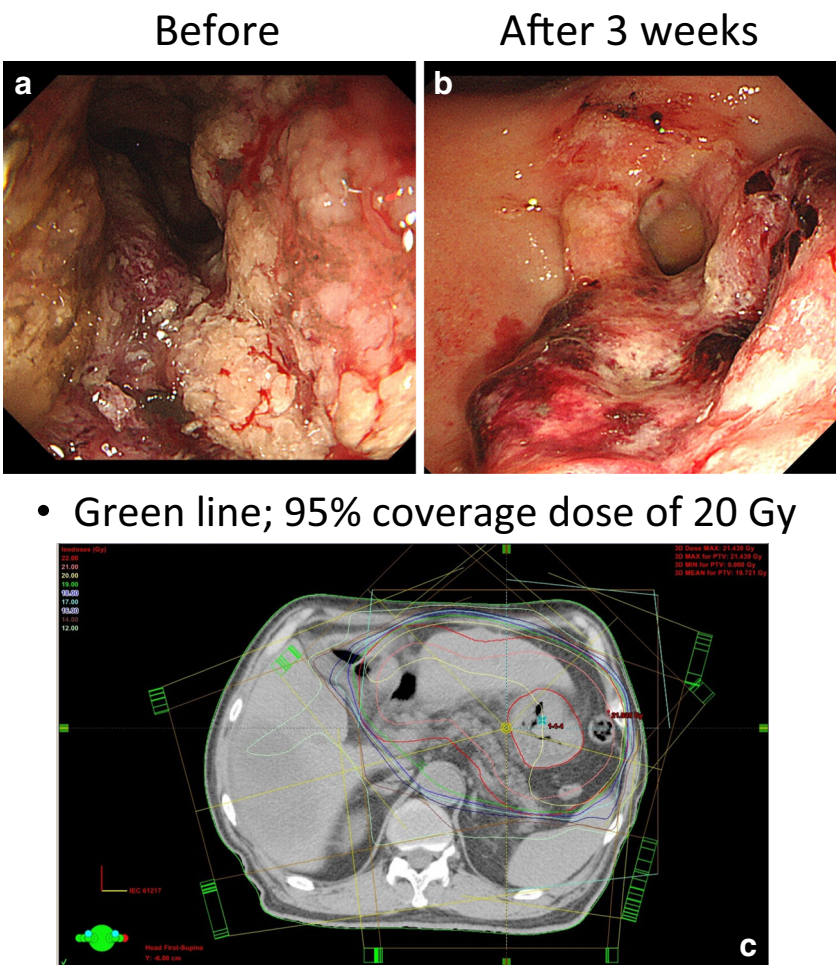

Fig. 3 First radiotherapy was administered. Prescribed dose was 20 Gy of 5 fractions. **a** Before RT: bleeding was revealed by endoscopic findings. **b** After RT: the tumor was reduced and bleeding was slightly decreased as observed on endoscopic findings. **c** Dose distribution of radiotherapy. The target site was the whole stomach. Red line: gross target volume (GTV), pink line: clinical target volume (GTV) (whole stomach), planning target volume (PTV) (2 cm margin for CTV), green line: 95% coverage of planning dose (20 Gy/5 fx)

be reasonable for initial radiotherapy for treating gastric cancers with bleeding.

Hemostatic confirmation was carried out with an additional 15 Gy/5 f. dosage, and higher dosages may be viable. However, we chose 20 Gy/5 f. because of the risk of gastric perforation by the collapse of the tumor caused by the cancer itself. Also, there were two lesions in the stomach, and the stomach is a moving organ even when empty. We irradiated an empty stomach (before breakfast). The initial radiation fields include the whole stomach. Because the spread of tumor was not measured using contrast-enhanced CT, the second radiation field was determined by clipping and reducing the radiation range. The method of narrowing fields by clipping from the initial field is thought to be necessary. In addition, we cannot avoid radiation to the liver when we assume treatment of the whole stomach. Cases presenting with multiple liver metastases and a decrease in liver function may be affected by radiation. But radiation-induced myelosuppression was not found. Future research should investigate the impact of the setting of the fields by clipping, dosage increases, and irradiation.

His sudden severe abdominal pain could have occurred because of many factors, with one possibility being a vascular disease, which could be the reason of death; however, this could not be definitely determined. The patient had a normal meal the day before he passed away; thus, regarding the quality of life, hemostasis due to radiotherapy for the gastric cancer should be considered.

Additionally, examination of bleeding from tumor using endoscope may be helpful; however, the patient status was not suitable for multiple endoscopic

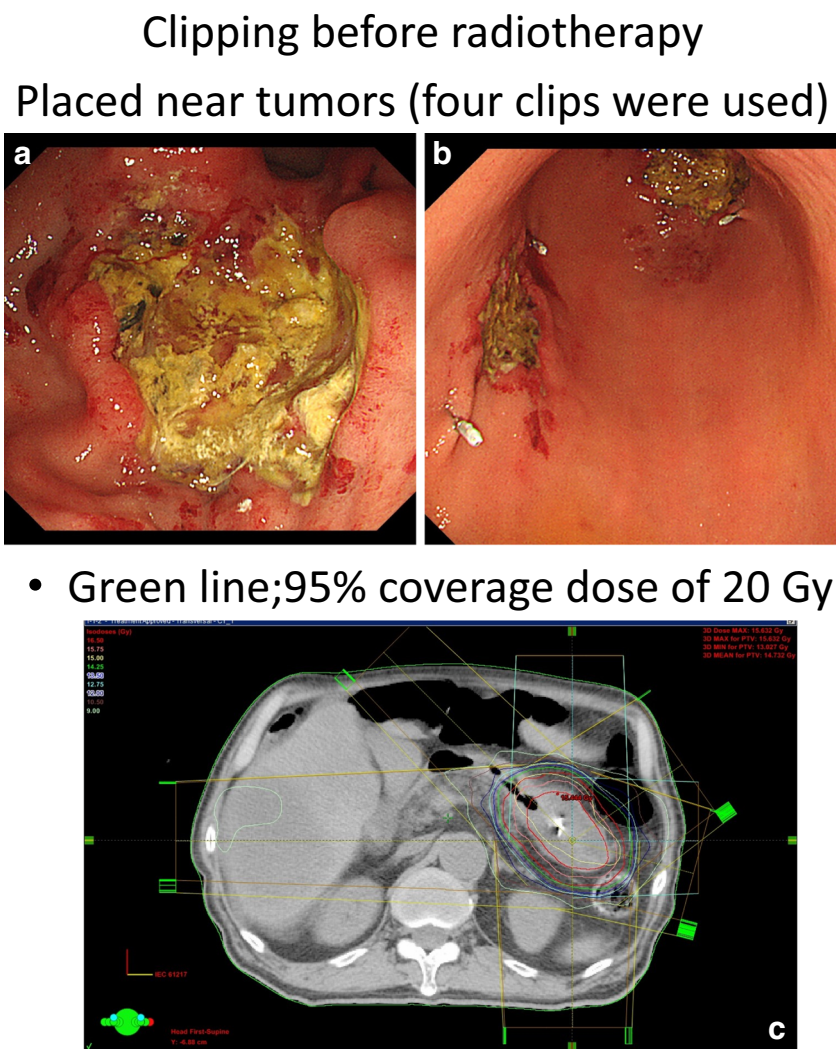

Fig. 4 **a** Tumor regression was evident, but bleeding was still found. **b** Clips were placed to minimize the radiation field. **c** Re-irradiation field of second therapy (1 month after initial radiotherapy). Prescribed dose was 15 Gy of 5 fractions. Red line: gross target volume (GTV); GTV was conducted by guidance of clips, which were placed near two lesions of gastric cancer. Two clips were attached at each site 2 cm from the front and the back sides of each tumor. GTV includes four clips, and CTV was the margin of 2 cm within GTV. PTV was the margin of 1 cm within CTV. Green line: 95% coverage of planning dose (15 Gy/5 fx)

examinations, and we could only check the color of feces and performed blood examination, especially determining hemoglobin levels. We decided to discharge the patient because we did not find any sign of bleeding.

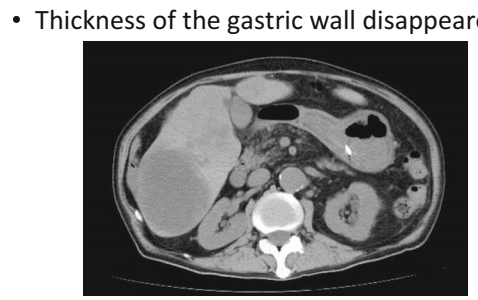

Fig. 5 Plain CT; thickness of the gastric wall disappeared compared with previous examination

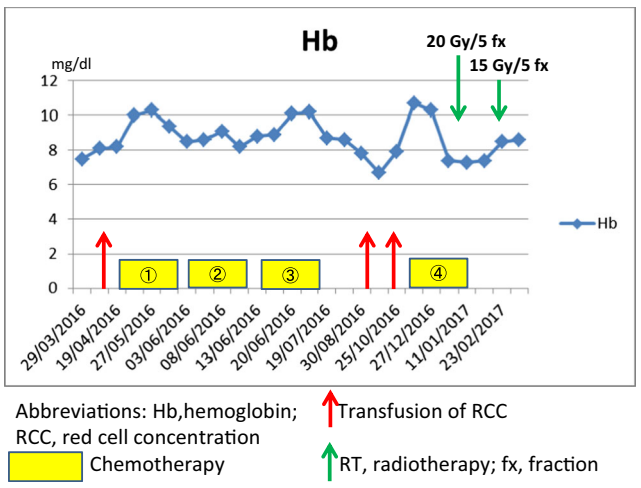

Fig. 6 Summary of the time line for the patients. Chemotherapy. ① S-1 and cisplatin.② Paclitaxel and ramucirumab. ③ S-1 and oxaliplatin. ④ CPT-11. Radiotherapy: 20 Gy/5 fx; 4 Gy sequential daily dose and total is 20 Gy (5 days). 15 Gy/5 fx; 3 Gy sequential daily dose and total is 15 Gy (5 days)

Conclusion

We administered radiotherapy for inoperable gastric cancer with bleeding. After failing to achieve long-term hemostasis with 20 Gy/5 fx, we added radiotherapy of 15 Gy/5 fx. Thereafter, we confirmed hemostasis and were able to discharge the patient from the hospital. More prospective studies determining the optimal dosage are warranted in the future.

Compliance with Ethical Standards The radiation treatment of 20 Gy/5 f. was approved by our institutional review board, and written informed consent was obtained from the patient.

Conflict of Interest The authors declare that they have no conflict of interest.

Financial Support None.

References

1. Hashimoto K, Mayahara H, Takashima A, et al. Palliative radiation therapy for hemorrhage of unresectable gastric cancer: a single institute experience. J Cancer Res Clin Oncol. 2009;135:1117–23.
2. Lee JA, do Lim H, Park W, et al. Radiation therapy for gastric cancer bleeding. Tumori. 2009;95:726–30.
3. Asakura H, Hashimoto T, Harada H, et al. Palliative radiotherapy for bleeding from advanced gastric cancer: is a schedule of 30 Gy in 10 fractions adequate? J Cancer Res Clin Oncol. 2011;137:125–30.
4. Nakanowatari M, Ozaki S, Fukuhara T, et al. A case of unresectable advanced gastric cancer treated with palliative radiation therapy twice for the purpose of hemostatis. Palliative Care Res. 2013;8:538–43. (in Japanese)
5. Hiramoto S, Kikuchi A, Yoshioka A, et al. Efficacy of palliative radiation for advanced gastric cancer patients. Palliative Care Res. 2015;10:10514–7. (in Japanese)
6. Chaw CL, Niblock PG, Chaw CS, et al. The role of palliative radiotherapy for hemostasis in unresectable gastric cancer: a single-institution experience. Ecancermedicalscience. 2014;8:384.