

## Case Report

# Two Long-Term Survival Cases of Gastric Carcinoma Treated with Hyperthermo-Chemo-Radiotherapy

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**Abstract :** The basic treatment for gastric carcinoma is surgical resection. Recently however, in order to shrink the tumor, combined modality therapy has been performed for far-advanced gastric cancer and recurrent tumor following surgery. We report two cases of gastric carcinoma treated with remarkably effective hyperthermo-chemo-radiotherapy. The patients had advanced gastric cancer with invasion to the esophagus and stomal recurrent tumor after total gastrectomy. The tumors completely disappeared after the treatment, and the two patients have survived more than a decade since the beginning of treatment. It is considered that hyperthermo-chemo-radiotherapy is useful for some gastric cancers as an option in combined modality therapy.

**Key Words :** gastric cancer, hyperthermo-chemo-radiotherapy, long survival

## Introduction

Hyperthermia is an optional treatment in combined modality therapy for malignant tumor and produces an antitumor effect in cancer therapy. There are several reports of long-term survival cases treated with hyperthermotherapy<sup>1-4)</sup>. Especially, preoperative combined modality therapy including hyperthermia has contributed to cancer therapy<sup>3) 4)</sup>. In this paper, we report that two patients with gastric carcinoma have survived more than a decade due to treatment with hyperthermo-chemotherapy combined with radiotherapy.

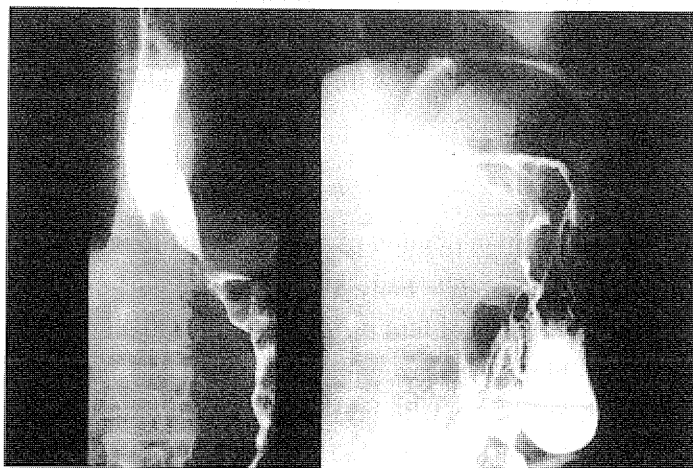
## Case 1

A 62-year-old woman complaining of anorexia was admitted to our hospital in August 1988. Upper G-I series revealed a gastric tumor occupying the upper and middle body of the stomach with invasion to the esophagus [Fig. 1-A]. An endoscope could not be inserted into the stomach. The pathological finding of esophageal invasive lesion by endoscopic biopsy showed poorly differentiated adenocarcinoma. Finally, she was diagnosed with type 3 gastric carcinoma with invasion to the lower esophagus. She was treated with hyperthermo-chemotherapy ten times for preoperative therapy. Hyperthermia was

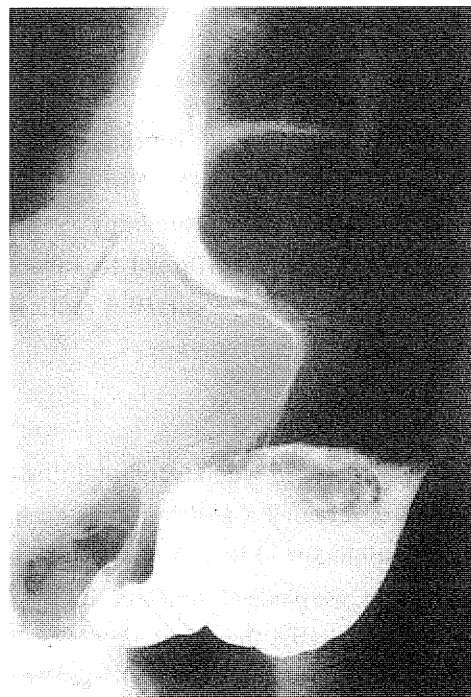
performed using a RF-capacitive heating apparatus (Thermotron RF-8) twice a week for 60 minutes. The electromagnetic power was applied between two external disk-electrodes 21cm in diameter placed on opposite sides of the upper abdominal region. The output power ranged from 800 to 900W. Intragastic temperature was kept at 40~41°C by monitoring a thermosensor through a naso-gastric tube. MMC and 5-FU were administered during hyperthermia. The gastric tumor and esophageal lesion remarkably decreased in size after the treatment. We estimated the effect of the treatment as complete response and she left the hospital at her own request. The hyperthermo-chemotherapy was carried out a total of 30 times until September 1989. The total dose of MMC and 5-FU were 64mg and 4250mg, respectively [Fig. 1-B]. However, a relapse of gastric carcinoma was recognized in December 1989 [Fig. 2-A], so we resumed the hyperthermo-chemotherapy combined with radiotherapy. The radiotherapy was given in fraction of 2 Gy once a day for five days each week (a total of 60 Gy). The hyperthermia was performed twice a week after the irradiation fraction. UFT was administered in the period of the hyperthermo-radiotherapy (a total of 7.8g). There were no side effects in a series of the therapy. The gastric tumor completely disappeared after the combined therapy [Fig. 2-B, C]. She has been alive for thirteen years since the beginning of the treatment.

#### Case 2

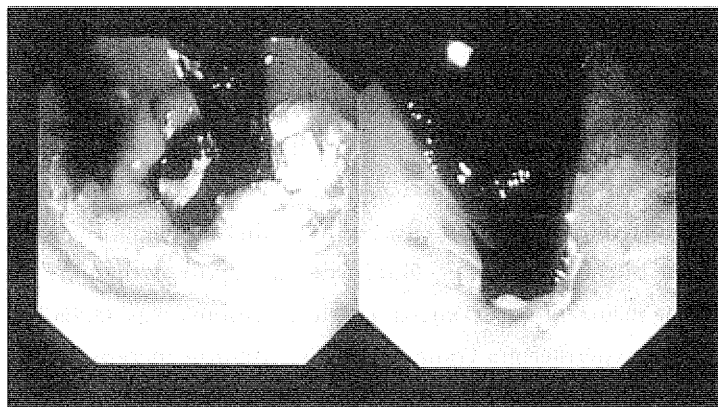
The patient was a 66-year-old woman who underwent total gastrectomy with splenectomy for gastric carcinoma in October 1989. Recurrence of gastric carcinoma was recognized on the esophago-jejunosomy anastomosis by endoscopic examination in October 1991 [Fig. 3-A]. She was treated with hyperthermo-chemotherapy combined with radiotherapy for the recurrent tumor from December 1991 to



**Fig. 1-A :** Upper G-I series showed type 3 gastric carcinoma with invasion to lower esophagus (August 1988).

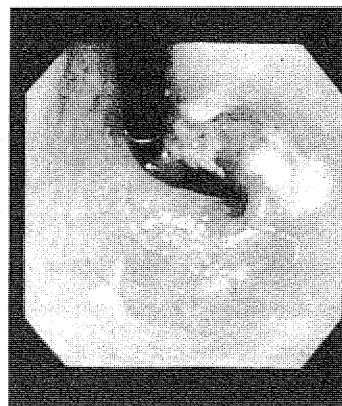


**Fig. 1-B :** No gastric tumor was observed after hyperthermo-chemotherapy (September 1989).



**Fig. 2-A :** Endoscopy demonstrated relapse of gastric cancer (December 1989).

**Fig. 2-B :** Gastric tumor completely disappeared after hyperthermo-chemo-radiotherapy (February 1990).

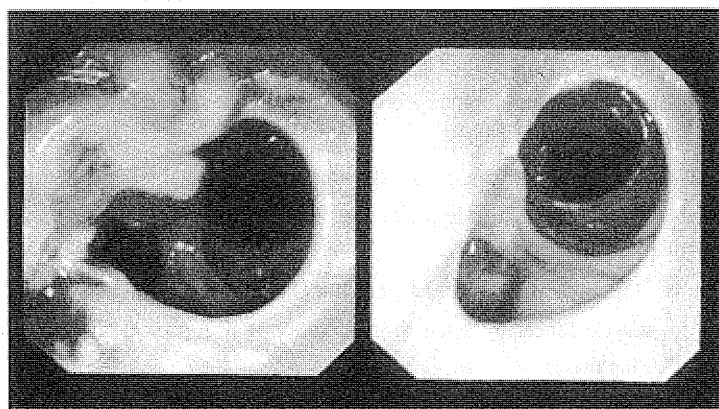


**Fig. 2-C :** No relapse of gastric tumor was observed (August 1999).

January 1992. The hyperthermia was performed twice a week for 60 minutes using the electrodes of 25cm in diameter. The output power ranged from 600 to 800W. The temperature near the tumor was kept at 40~42°C. The radiotherapy was given in fraction of 2.5 Gy once a day (a total of 52.5 Gy). UFT was administered in the period of the hyperthermo-radiotherapy (a total of 7.2g). During the treatment, she contemporarily complained of anorexia and abdominal pain. The recurrent tumor completely disappeared after the combined treatment [Fig. 3-B, C], and no tumor cells have been found in biopsy specimens since May 1992. She has been alive for ten years since the beginning of the treatment.

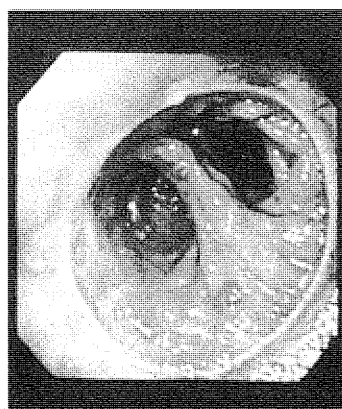
## Discussion

Surgery is the first choice of therapy for gastric cancer. However, it is difficult to cure advanced gastric carcinoma with invasion to other organs by surgery alone. We performed hyperthermo-chemotherapy as preoperative combined therapy in case 1, although the following surgical treatment was



**Fig. 3-A :** Endoscopy revealed stomal recurrent tumor occupying a half of lumen (November 1991).

**Fig. 3-B :** Recurrent tumor significantly decreased after hyperthermo-chemo-radiotherapy (May 1992).



**Fig. 3-C :** Endoscopy demonstrated normal anastomosis of esophago-jejunostomy (September 1999).

not performed due to the rejection from the patient. Besides, surgical resection of stomal recurrent tumor following total gastrectomy is rare because of the risk of dissemination or lymph node metastasis<sup>5) 6)</sup>. Therefore, we treated two patients with hyperthermo-chemo-radiotherapy to decrease primary or recurrent gastric tumor. Hyperthermo-chemo-radiotherapy produced successful results with an antitumor effect and long-term survival in both cases.

Mukojima et al.<sup>7)</sup> and Kakehi et al.<sup>8)</sup> reported the antitumor effect of hyperthermo-chemotherapy for advanced gastric carcinoma with a response rate of 39~40%. Nagata et al. reported that the local response rate to hyperthermo-radiotherapy for recurrent or advanced gastric carcinoma was 88.9%<sup>9)</sup>. In addition, Shchepotin et al. reported that local hyperthermia combined with radiation therapy followed by surgery for gastric cancer produced a significant improvement in 5-year survival of 21.3% in comparison with surgery alone<sup>10)</sup>.

Regarding our cases, we speculate that hyperthermia and radiotherapy operate on gastric tumor with a synergistic effect. Especially in case 1, it is notable that the tumor relapsing after hyperthermo-chemotherapy disappeared by adding radiotherapy. Moreover, it is considered that the lack of distant metastasis in the two cases contributed to the favorable outcome.

Hyperthermo-chemotherapy combined with radiotherapy is recommended to treat invasive gastric carcinoma or local recurrence following surgery in some cases of gastric cancer.

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## References

- 1) Hayashi M., Nishimura Y., Hiraoka M., Abe M. : A case of recurrent rectal cancer who survived more than 5 years following thermoradiotherapy. Jpn J Hyperthermic Oncol, 10 : 143-149, 1994. (Japanese)
- 2) Ueda K., Okamura T., Ishiguro M., Kawai N., Kohri K., Tajima K., Saitou K. : A case of retrovesical malignant sarcomatous tumor demonstrating long survival after receiving more than 50 treatments of hyperthermia. Jpn J Hyperthermic Oncol, 14 : 41-45, 1998.
- 3) Nozoe T., Itoh S., Futatsugi M., Kimura Y., Ishida M., Saeki H., Ohga T., Kitamura K., Sugimachi K. : Clinicopathological features of five-year survivors with T4 esophageal carcinoma --- contribution of preoperative hyperthermo-chemo-radiotherapy ---. Jpn J Hyperthermic Oncol, 17 : 77-84, 2001.
- 4) Fujita K., Kuwano H., Asao T., Nakamura J., Hirayama I., Morinaga N., Masuda N., Ide M., Sakurai H., Kurosaki H., Tamura J., Mitsunashi N. : The combined effect of preoperative hyperthermia and radiation therapy on advanced rectal carcinoma. Jpn J Hyperthermic Oncol, 17 : 151-157, 2001.
- 5) Kusuyama A., Nashimoto A., Wakabayashi M., Tsuchiya Y., Tsutsui M., Tanaka O., Sasaki Z. : Surgical resection of stomal recurrence after total gastrectomy for gastric cancer by a left thoraco-abdominal approach-report of two cases. J Jpn Surg Assoc, 56 : 2628-2632, 1995. (Japanese)
- 6) Chida T., Kodama M., Koyama H., Sone S., Kikuchi T., Sakusabe M., Arakawa A., Koyama K. : The influence of the residual cancer at the surgical margin on the prognosis of patients with gastric cancer. J Jpn Surg Assoc, 55 : 1678-1681, 1994. (Japanese)
- 7) Mukojima T., Mizuguchi N., Itoh M., Takeda M., Niizawa M., Kumagai T., Kakehi M., Masamune O. : Effect of

hyperthermic treatment using 8 MHz RF Thermotron combined with chemotherapy on inoperable gastric carcinoma. "Hyperthermic Oncology" Ed. T. Sugahara and M. Saito, Taylor & Francis, pp439-441, 1989.

- 8) Kakehi M., Ueda K., Mukojima T., Hiraoka M., Seto O., Akanuma A., Nakatsugawa S. : Multi-international clinical studies on hyperthermia combined with radiotherapy or chemotherapy in advanced cancer of deep-seated organs. *Int J Hyperthermia*, 6 : 719-740, 1990.
  - 9) Nagata Y., Hiraoka M., Nishimura Y., Masunaga S., Akuta K., LiY. P., Koishi M., Mitsumori M., Okuno Y., Takahashi M., Ade M. : Clinical experiences in the thermoradiotherapy for advanced gastric cancer. *Int J Hyperthermia*, 11 : 501-510, 1995.
  - 10) Shchepotin I. B., Evans S. R. T., Chorny V., Osinsky S., Buras R. R., Maligonov P., Shabahang M., Nauta R. J. : Intensive preoperative radiotherapy with local hyperthermia for the treatment of gastric carcinoma. *Surg Oncology*, 3 : 37-44, 1994.
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## 温熱化学放射線療法により 長期生存が得られている胃癌の 2 症例

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**要 旨：**胃癌治療の基本は外科的切除であるが、高度進行胃癌や術後再発胃癌に対しては、最近では腫瘍縮小効果を目ざした集学的治療が行なわれている。今回、我々は、放射線治療併用温熱化学療法が著効を示した食道浸潤胃癌と胃全摘術後吻合部再発胃癌の 2 症例を経験した。2 例は腫瘍の完全消失を認め、10 年以上生存中である。

胃癌に対する集学的治療の一選択肢として本治療法の有用性が示唆された。