

Initial publication

Peritoneal carcinomatosis of gastric origin treated with a combination of Capecitabine and oncological hyperthermia: a case report

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Abstract

My objective in this article is to present and discuss a clinical case of peritoneal carcinomatosis originated from gastric cancer. The case was treated with complex therapy, combined whole-body and local hyperthermia treatments with chemotherapy. The applied multimodal approach achieved complete remission of the disease with a good quality of life.

Introduction

Recurrences and metastases in gastric cancer most frequently involve peritoneal carcinomatosis and are regularly detected only in the advanced gastric cancer stage [1]. These cases are often considered incurable. A clinical study shows that the mean survival is only 6.5 months [2], or even much less (2.2 months, [3]). A meta-analysis also shows the poor therapeutic outcome [4]. The patients with this disease have an extremely poor prognosis. The conventional palliative treatments' effect could provide some improvement when the disease is diagnosed in early stages [5]. These results are significantly worse than cases of other metastases. The peritoneal-plasma barrier [6] is probably one of the factors of poor clinical success. The relatively early detection could be obtained by pathologic investigation of tissue specimens, which may detect microscopic peritoneal carcinomatosis, which is usually not detectable in surgical interventions. The texture analysis could be a useful tool also for early diagnosis [7], and the therapy could be optimized with neoadjuvant treatments, including the hyperthermic intraperitoneal chemotherapy (HIPEC) [8]. It is also shown that in the cases of microscopic carcinomatosis, HIPEC has curative benefit after surgery, too [9]. The German database shows that the combination of cytoreductive surgery and HIPEC improves survival more than HIPEC alone [10]. The concomitant application, using intraoperative HIPEC with cisplatin is also feasible and safe [11].

The high cellular heterogeneity of the intraperitoneal carcinomatosis complicates the disease [12], and probably this is why surgery and HIPEC are relatively effective treatments.

My goal is to present a case showing a non-HIPEC oncological hyperthermia solution with success. The patient had advanced peritoneal carcinomatosis of gastric cancer.

Case presentation

72 years old male patient was diagnosed with stomach cancer by gastroscopy in 2009 May. The patient performed a partial gastric resection not followed by adjuvant chemotherapy as the removed locoregional lymph nodes were disease-free, and there was no evidence of spreading disease in other body regions. In November 2009, he began malaise, progressive weight loss, loss of appetite, abdominal pain until he came to emergency surgery for intestinal obstruction. The surgeon detected extensive peritoneal carcinomatosis, and although he had made a necessary temporal restore, he made a poor prognosis and predicted a very short survival. The patient came to my attention for supportive and palliative care. The therapy set at that moment was a combination of Capecitabine (1000 mg/m² bid per os), deep radiofrequency oncological hyperthermia (Oncotherm EHY-3010 ML device) twice a week for one hour without rest and three hours whole-body infrared hyperthermia (Heckel HT 3000 device) for five consecutive days for a month. The disease went into complete remission. The patient gained his weight by eight kg, had good and has continued appetite, with significantly improved quality of life. A CT scan documented the remission with contrast. The therapy continued for eighteen months with persistent remission. After eighteen months, a resurgence of the disease occurred, which proved intractable and led to death after three months.

Discussion

The prognosis of peritoneal carcinomatosis of gastric origin is extremely poor in such advanced cases as the patient reported above. My strategy differed from the usual hyperthermia applications. My hyperthermic idea was a combination of local, cellularly selective modulated electro-hyperthermia (mEHT) [13] and the whole body homogeneous heating [14] treatments. Deep radiofrequency capacitive hyperthermia is employed in combination with other methods (chemotherapy and radiotherapy) for years now and has proven to be a

valuable complementary therapy. The mEHT had proven as a local treatment in many clinical studies of various cancers [15], [16], and its locality enhanced by immunogenic effects [17]. Case reports proved its particular applicability [18], [19], and a Phase II study was performed to show how mEHT is effective in peritoneal carcinomatosis with malignant ascites [20]. The whole body hyperthermia with its physiological effect to increase the blood flow and through this, the drug delivery to the tumor is also well proven [21]. In contrast, the most common chemotherapies in HIPEC are Mitomycin C, Cisplatin, Doxorubicin, Paclitaxel, and 5-FU [22]. I had chosen Capecitabine in my hyperthermia protocol, as used by others too [23]. Capecitabine has a proven effect on gastric cancer, and it is very indicated for this clinical situation for the favorable tolerability profile [24] [25] [26].

The temperature rises from 40 to 43°C during the hyperthermic treatments in the irradiated tissue and the selected malignant cells. This temperature triggers apoptosis in diseased cells. There is an enhancement for any radiotherapy treatment. Locoregional vasodilatation favors the penetration of the drug where needed [27] [28] [29] [30] and also there has been a strengthening of local immunity, induced by the heat-mediated release of cytokines [31]. Vasodilation is even more crucial in poorly vascularized body districts than the peritoneum. Whole-body mild hyperthermia also enhances immune system activity, primarily through dendritic cell activation, and promotes drugs' penetration into tissues [32] [33].

Conclusion

The case report presented describes an unusual and very favorable clinical history. I had remarkable success with this protocol without using invasive surgical or laparoscopic HIPEC application. This case report may suggest a new approach to peritoneal disseminated cancer pathology and indeed may be the starting point to investigate further the effectiveness of this complex therapy protocol in other tumors with peritoneal dissemination.

Key words: gastric cancer, peritoneal carcinosis, hyperthermia, Capecitabine

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