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Case Report

Radiotherapy of Hepatic Lymphoma

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Abstract

The objective of this work is to study the feasibility of a conformational liver radiotherapy through a clinical case with a review of the literature.

Observation: A 72-year-old patient was followed for large cell B lymphoma. Computed tomography scan revealed a mass of the V segment of the liver, measuring 10x14 cm, with peripheral and irregular enhancement of contrast and hepatic hilar and celio-mesenteric adenopathies of 3 cm. The liver test was normal. The LDH level was 602 IU/L.

She had 6 courses of chemotherapy type RCHOP 21. After chemotherapy hepatic mass measured 6x7x5 cm.

The patient received radiotherapy, using 3D conformal technique and delivering a dose of 39.6 Gy in 22 fractions. A ballistic with 4 beams of high energy (18 MV) was used. In dosimetry, the target volume was covered by 100% of the prescribed dose. The constraints on organs at risk (stomach, right kidney, spinal cord) have been respected. The average dose received by the healthy liver was 16 Gy. The volume of the liver receiving 5 Gy, 10 Gy, 15 Gy and 25 Gy was respectively 65%, 60%, 50% and 30%. After 3 years, the patient was alive without symptoms. The abdominopelvic CT showed a stable hepatic mass of 4X4X2 cm since the end of radiotherapy.

Conclusion: Hepatic conformational radiotherapy is feasible with a good clinical response and respect for the average dose received by the entire hepatic volume. New radiotherapy techniques can significantly reduce the dose received by the liver.

Keywords: *Radiotherapy; Toxicity; CT*

Introduction

The indication of hepatic radiotherapy was limited to palliative cases with poor results and severe toxicity [1-3]. Radio-induced hepatopathy is the serious complication of this radiotherapy, which can lead to death in75% of cases and constitutes the clinical event limiting the dose to be delivered.

The objective of this work is to study the feasibility of a conformational liver radiotherapy through a clinical case with a review of the literature.

Observation

A 72-year-old patient was admitted in 2012 for pain in the right hypochondrium with asthenia and poor appetite. On physical examination, he was in a good general condition. No heart murmur, palpable liver or spleen, or lymphadenopathy was noted. Abdominopelvic computed tomography (CT) scan revealed a mass of the V segment of the liver, measuring 10x14 cm, with peripheral and irregular enhancement of contrast and hepatic hilar and celio-mesenteric adenopathies of 3 cm. The liver test was normal. The LDH level was 602 IU/L. A liver biopsy was performed and showed proliferation of uniform round cells with abundant cytoplasm and a large

nucleus. The cells expressed CD20 and CD45. The rest of the parenchyma was the site of chronic active hepatitis with cirrhogenic septal fibrosis. The diagnosis of a single hepatic B-cell lymphoma was retained. The treatment included 6 courses of RCHOP21 chemotherapy (Rituximab, Adriablastine, Endoxan, Oncovin, Prednisone every 21 days).

After chemotherapy CT revealed treatment reponse and showed hepatic mass regression at 6x7x5 cm.

Radiotherapy of this residual mass has been indicated. And the patient received adjuvant radiotherapy, using 3D conformal technique and delivering a dose of 39.6 Gy in 22 fractions (1.8 Gy per fraction/5 fractions per week). A ballistic with 4 beams (180°, 250°, 320° and 40°) of high energy (18 MV) was used. In dosimetry, the target volume was covered by 100% of the prescribed dose. The constraints on organs at risk (stomach, right kidney, spinal cord) have been respected. The average dose received by the healthy liver was 16 Gy. The volume of the liver receiving 5 Gy, 10 Gy, 15 Gy and 25 Gy was respectively 65%, 60%, 50% and 30%. The positioning control between the fractions was done by portal imaging, three times a week. The patient had Grade I abdominal pain with correct liver function during radiotherapy. This radiotherapy was completed in May 2013. And then the patient was the patient was regularly followed.

After 3 years, the patient was alive without symptoms. The abdominopelvic CT showed a stable hepatic mass of 4X4X2 cm since the end of radiotherapy.

Discussion

Hepatic radiotherapy has long been indicated in a palliative and analgesic situation because of the poor radiation tolerance of adjacent normal liver, its high toxicity, such as hepatitis and the difficulty of tumor localization [1-3]. With recent technological radiation therapy (conformationel 3D, with intensity modulation, stereotactic radiotherapy), patients with hepatic tumors can benefit from this focused hepatic radiotherapy [1-4,7,9]. It improves radiation treatments by conforming the delivered radiation dose distribution tightly to the tumor or target volume outline while sparing normal liver tissue from high-dose radiation [1-4,7,9]. The main indications are hepatocellular carcinoma and hepatic metastases [1,4,7]. Our patient was irradiated in 3D technique for single hepatic B-cell lymphoma wich was a radiosensitive tumor.

The irradiation dose varied according to the indication from 40 to 60 Gy [5,9-11]. A high dose may be delivered in conformational or stereotactic radiotherapy at well-defined volumes without restriction due to topography, size, presence of satellite nodules or associated segmental venous thrombosis [8-10]. Data from Liu., *et al*. trial of 44 patients with hepatocellular carcinoma confirmed the feasibility and efficacy of 3D radiotherapy with a total dose of 40 to 60 Gy in cirrhotic patients [8]. Our patient had 40 Gy for his lymphoma associated with hepatic cirrhosis.

To date, there is no exact definition of the target volumes to be contoured in radiotherapy of hepatic tumors [1]. The macroscopic tumor volume corresponds to the tumor and contrast enhancement after injection [1,9]. The previsionel target volume includes the clinical target volume with a margin of 1.5 to 2 cm (respiratory motion of the liver should be taken) [1,6,9].

In 3 D conformational radiotherapy, there is no standard ballistics, the majority used 3 to 6 bundles [1,11]. A four field technique was commonly used. For our patient, we used a ballistic with 4 beams (180°, 250°, 320° and 40°) with a good coverage of the target volume and respect of the constraints to the organs at risk. The average dose received by the healthy liver is 16 Gy.

In a Chinese study, the authors found that the average dose received by the healthy liver is 21 Gy [11]. The majority agree that this average healthy liver tolerance dose should be less than 26-28 Gy [1,11]. The University of Michigan study has shown that the average dose received by the normal liver associated with a 5% risk of radiation hepatitis is 28 Gy [12]. The volume of the liver receiving 16 Gy and 32 Gy should be less than 66% and 33% [1,13]. In addition, Cheng., *et al.* suggested that V30 <42% could avoid the occurrence of radioinduced liver disease [13].

A Phase II European Study, RTF-1 (Liver-1 Radiation Therapy) clearly demonstrated that 3D conformal radiotherapy is an effective treatment for patients with hepatocellular carcinoma, with complete tumor response rates of 80% and adverse reactions acceptable [7]. Another Chinese study, concluded in the efficacy of 3D radiotherapy in the treatment of hepatic carcinoma in 68 patients, with an objective response of 35% [9]. Side effects were grade 1-2 with nausea, vomiting, fatigue and anorexia [9].

In Liu's study, the objective response rate was 61%, with radiation-induced toxicities remaining mild and reversible [8]. Overall, grade 1-2 toxicity rates reported in the literature range from 0 to 27%, with pain, fever and chills, requiring no treatment, in 14% of cases [7-9]. Radiation therapy in our patient was well tolerated with an objective and durable response of 84%.

Conclusion

Hepatic conformational radiotherapy is feasible with a good clinical response and respect for the average dose received by the entire hepatic volume. Most studies recommend not exceeding 26 Gy. New radiotherapy techniques (stereotactic or image-guided) can significantly reduce the dose received by the liver.

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