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RESEARCH ARTICLE

RADIOTHERAPY FOR PRIMARY CENTRAL NERVOUS SYSTEM LYMPHOMA

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Abstract

Introduction:-

Primary central nervous system lymphoma (PCNSL) is an uncommun subtype of extranodal non-Hodgkin lymphoma that accounts for approximately 4% of primary central nervous system tumors [1].

Because of its sensitivy to radiation therapy, whole brain radiotherapy (WBRT) at doses ranging from 36 to 45 Gy was the first-line treatment modality for primary central nervous system lymphoma (PCNSL) before the introduction of methotrexate with high proportion of complete radiographic responses, but early local recurrences have been observed [2].

Between 1983 and 1987, the Radiation Therapy Oncology Group conducted a prospective phase II study to evaluate survival in primary non-Hodgkin's lymphoma of the brain. 41 patients were treated with whole brain radiotherapy to 40 Gy and a 20 Gy boost to tumor plus a 2 cm margin [3].

Despite radiotherapy high dose and large volume irradiation, the median overall survival (OS) was only 12 months and 61% of patients had intracranial relapse. Additionally, most recurrences occurred in areas that had received the highest radiotherapy dose.

Recently, Randomized phase III study evaluates whole-brain radiotherapy (WBRT) in this therapy of primary CNS lymphoma (PCNSL) [4]. Patients with newly diagnosed PCNSL were randomized to six cycles of high-dose methotrexate (HDMTX)-based chemotherapy alone or the same chemotherapy with WBRT (45 Gy in 1.5 Gy fractions).

After a median follow-up of 81.2 months, WBRT non significantly increases OS (35.6 vs 37.1 months, HR 1.03 [95% CI 0.79-1.35], p = 0.82), progression-free survival (PFS) (median 18.2 vs 11.9 months, hazard ratio [HR] 0.83 [95% confidence interval (CI) 0.65-1.06], p = 0.14) ,but with significantly PFS from last HDMTX (25.5 vs 12.0 months, HR 0.65 [95% CI 0.5-0.83], p = 0.001).

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The use of whole-brain radiotherapy (WBRT) alone or in consolidation after high-dose methotrexate based on chemotherapy with systemic chemotherapy was the major risk factor for developing delayed neurotoxicity, especially for patients over 60 years old. [5]
Concerning the patients that received early WBRT after a high-dose methotrexate (HD-MTX)-based on chemotherapy regimen, global cognition as determined by the Mini-Mental Status Examination (MMSE) in year 2 after randomization was worse compared with no early WBRT [6].

Many studies evaluate the role and the optimal dose of whole-brain radiotherapy (WBRT) in primary therapy of primary CNS lymphoma (PCNSL) after chemotherapy and reported that reduced dose of WBRT is feasible, [1],[7],[8] .

Historically, the recommended WBRT dose was 40–45Gy, which is close to the upper limit of whole brain radiation tolerance [9].

In 2013, Morris and al reported on the advantages of reduced-dose WBRT. Radiotherapy with 23.4 Gy and 45 Gy were compared and the patients who received the reduced-dose WBRT had better PFS and OS with a decreased neurologic toxicity [7].

More recently, a korean retrospective study reported the 10-years experience of a single institution which has been treating PCNSL patients homogenously and found that reduction of the WBRT dose from 45 Gy to 36 Gy in patients who achieved partial response after high dose methotrexate, HD MTX-based chemotherapy is feasible without significant difference in treatment outcomes [8].

WBRT remains an effective treatment for patients with PCNSL because it improves progression-free survival and contributes to disease control. But if we weight this benefit against the risk of neurotoxicity, delivering WBRT to 45 Gy, it may not be the best choice that for these patients.

However, if we reduce total radiation dose for patients who have responded to initial chemotherapy, it contributes to decrease significantly the risk of neurotoxicity without compromising treatment outcomes.

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

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