An audit of Whole Brain Radiotherapy in patients with Non-small cell lung cancer

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Background

Non-small cell lung cancer (NSCLC) has an incidence of brain metastases of up to 40%, which negatively affects the quality of life (QoL) and survival.

QUARTZ study showed that routine use of WBRT in NSCLC patients did not confer a survival or QoL benefit compared with best supportive care only.[1]

Despite concern about neurocognitive toxicity and the controversy of additional survival and quality of life benefits in the modern era, WBRT is still widely used and reported to be the primary treatment for brain metastases in 23.6-25.2% of patients in recent studies.[2,3]

Audit standard

The audit standard is in accordance with the NICE guideline (2021), which recommends that WBRT should be omitted for NSCLC patients with KPS of under 70 who are unsuitable for surgery or SRS/SRT.

Aim and Objectives

1. Ensure the judicious use of WBRT in appropriate patients
2. Analyse the patient and disease characteristics and their survival outcome
3. Identify opportunities for improvement in patient selection

Method

The audit includes all patients with NSCLC who received WBRT in Tuen Mun Hospital from July 1, 2021, to December 2023. Patients were identified from electronic records.

Performance status was quantified as Karnofsky Performance Status (KPS) upon attending the radiotherapy planning clinic. Survival was defined from the first day of WBRT to death from any cause or when censored. Survival distribution will be estimated using the Kaplan-Meier method and compared using the log-rank test. (SPSS v26; IBM).

Result

Eighty-seven patients received WBRT during the audit period in Tuen Mun Hospital (median age 63 years, 62.1% male). Twenty-nine patients (33.3%) did not meet the audit standard. Seven patients (8.0%) did not complete WBRT, all of them did not meet the audit standard. 88.5% of patients had symptoms from brain metastasis.

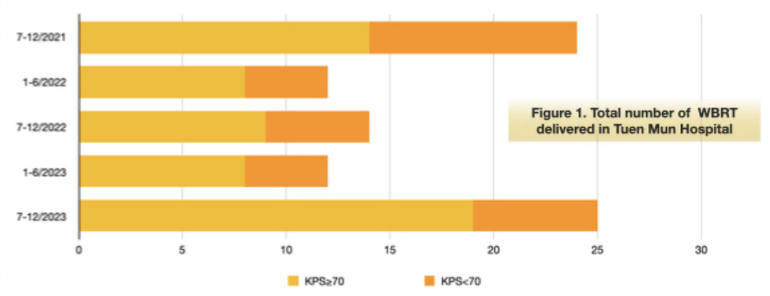

Figure 1. Total number of WBRT delivered in Tuen Mun Hospital

The median survival for the overall population was 112 days (95% CI 72-152 days). There was a significant difference in survival between those meeting the audit standard and those who did not, **34 days** (95% CI = 21.7-46.3) vs **138 days** (95% CI = 108.7-167.3), p=.0004. The 30-day mortality was **44.8%** vs **8.6%** (p< .001).

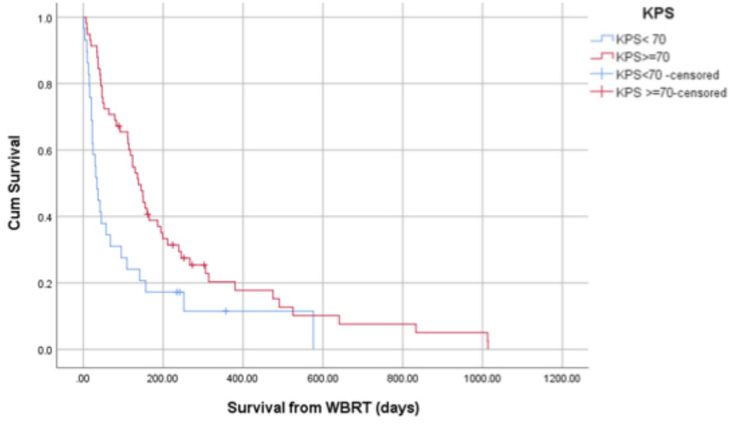

Figure 2. Kaplan Meier curve displaying the difference in overall survival between those meeting the audit standard and those who did not

Discussion

Reason for non-compliance :

1. Disease acceptance, on best supportive care but eager for WBRT. (17%)
2. Plan review fitness for systemic anti-cancer treatment (SACT) after WBRT, but condition deteriorated (31%), continue SACT for isolated CNS progression (17%), started new SACT after WBRT (21%)
3. Pathology was not fully available to formulate a complete treatment plan before WBRT (14%)

Suggestions

1. Communication training should be enhanced.
2. Encourage the use of prognostic indices to predict outcomes, guide clinicians' choice of appropriate treatment, and provide patients with perspectives to better inform their decision on WBRT.
3. Liaise with clinicians and pathologists for early biopsy and pathology results. Consider the use of liquid biopsy.
4. Department sharing on the audit result & the latest evidence of WBRT for NSCLC patients in the modern era
5. Re-audit for monitoring

Conclusion

The audit report highlighted room for improvement in the judicious use of WBRT in NSCLC patients with KPS <70 in our department. However, WBRT remains an effective treatment in NSCLC patients with good performance status.

Acknowledgement

Tuen Mun Hospital clinical oncology and palliative care team, Mr Jay Huang and NTWC Clinical Research Team.

References

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2. Sperduto PW et al. *Int J Radiat Oncol Biol Phys*, 2022, 114(1): 60-74.
3. Steindl A et al. Eur J Cancer. 2022;162:170–181.