Expert Review

It Medical Team
https://www.itmedicalteam.pl/

Journal of Biomedical Sciences
2254-609X

2023
Vol. 12 No. 1: 103

A Note on the Diagnosis of Tumor Metastatic Disease

Natasha Nikon*

Department of Radiation Oncology, University of Arizona, 1501 N Campbell Ave., Tucson, AZ 85724, USA

Corresponding author: Natasha Nikon

NatashaNice@edu.in

Department of Radiation Oncology, University of Arizona, 1501 N Campbell Ave., Tucson, AZ 85724, USA

Citation: Nikon N (2023) A Note on the Diagnosis of Tumor Metastatic Disease. J Biomed Sci, Vol. 12 No. 1: 103

Abstract

Not only are brain metastases the most common intracranial neoplasm in adults, but they are also very common in lung cancer patients. The presence of prognostic factors like control of the primary tumor, functional performance status, age, and the number of brain metastases have been used to classify patients. Because some of these patients have a good prognosis, they may benefit from receiving more aggressive treatment. We will go over all of the treatment options for treating brain metastases, which are mostly caused by a lung cancer primary, in this review. We will specifically concentrate on the selection of patients for combined modality treatment of brain metastases, such as stereotactic radiosurgery (SRS) and whole brain irradiation; utilizing radio sensitizers; and the neurocognitive impairments that resulted from either SRS or whole brain irradiation. Both small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC) benefit from prophylactic cranial irradiation (PCI) and its potential neurotoxicity are discussed, as is the combination treatment of intrathoracic primary disease and solitary brain metastasis. WBRT with an integrated boost to the gross brain metastases, SRS to the surgical bed, fractionated stereotactic radiotherapy, and WBRT with epidermal growth factor receptor (EGFR) inhibitors are also investigated.

Keywords: Lung cancer; PCI; Neurotoxicity

Received: 06-Jan-2023, Manuscript No. Ipjbs-23-13398; **Editor assigned:** 09-Jan-2023, PreQC No. Ipjbs-23-13398; **Reviewed:** 23-Jan-2023, QC Ipjbs-23-13398; **Revised:** 25-Jan-2023, Manuscript No. Ipjbs-23-13398 (R); **Published:** 31-Jan-2023, **DOI:** 10.36648/2254-609X-12.01-89

Introduction

The most common intracranial neoplasm, brain metastases account for 8–10 percent of cancer patients worldwide and are a significant cause of cancer-related morbidity and mortality [1, 2]. The annual incidence of brain metastases ranges from approximately 170,000 to 200,000 in the United States. This is due to a Combination of factors, such as the addition of bevacizumab to chemotherapy as the first-line treatment for metastatic non-small cell lung cancer, which improves therapeutic efficacy and increases survival rates; and failure at a potential sanctuary site for systemic therapy, as well as more frequent brain surveillance for particular cancers that are more likely to spread to the brain via metastases; and advancements in current imaging technology, which made it possible to diagnose brain metastases earlier. However, not all studies have observed such an increase in the incidence of brain metastases in recent years, and it may be due to under-diagnosis in earlier years. Primary lung, breast, skin (melanoma), and GI tract cancers are the most common causes of brain metastasis. Up to 65% of patients with lung cancer will eventually develop brain metastases, making primary tumours in the lung the most common cause of brain metastases [3].

Lung cancer was responsible for an estimated 161,840 deaths and a 215,020 incidence rate in 2008 in the United States, making it the leading cause of cancer-related death and the most common cancer in men. In addition, in 2002, approximately 1.35 million cases were identified worldwide, resulting in 1.18 million deaths. As a result, brain metastasis is a significant issue in the treatment of lung cancer as a whole. Small cell lung cancer (SCLC) is the most likely histology to spread to the brain, with an 80 percent chance of brain metastasis two years after diagnosis. About 30% of patients with non-small cell lung cancer (NSCLC) develop brain metastases. Patients with adenocarcinoma and large cell carcinoma had significantly higher rates of brain metastases than patients with squamous cell carcinoma among the various histologists of NSCLC.

Discussion

The majority of patients present with significant neurological symptoms linked to the location and extent of brain involvement. As a result of elevated intracranial pressure, they include both specific neurological changes and more general symptoms [4]. Table 1 lists the most common clinical presentations. Contrast-enhanced MRI is more effective than non-enhanced MRI or computed tomography (CT) scans at identifying brain metastases and distinguishing them from other CNS lesions in the diagnosis of brain metastases. T2-weighted and T1-weighted sequences are included in the recommended pre gadolinium studies, and fluid-attenuated inversion-recovery (FLAIR) sequences are included in the recommended post gadolinium studies. In order to locate the tiniest lesions, thinner axial slices without skips may be required. A biopsy should be considered if the diagnosis is still uncertain. With narrow margins and large amounts of cacogenic enema for their size, brain metastases typically occur at the junction of the white and grey matter. As a result of a lung primary, they typically present as multiple lesions [5].

Patients with no treatment have a median survival time of 4–7 weeks [6, 7]. Typically, the treatment can be broken down into therapeutic and symptomatic strategies. Corticosteroids, which reduce peritumoral enema, and anticonvulsants, which prevent recurrent seizures, are the two medications most frequently used to provide relief from symptoms. Systemic steroids are all that are needed to improve neurological function and extend survival to about two months. As the primary treatment for brain metastases, whole brain radiotherapy (WBRT) improves neurological function and increases median survival to three to five months. More aggressive treatments for patients have been sought and investigated due to the poor survival outcomes of brain metastases. The number and location of metastases, as well as the extent of extra-cranial tumor involvement, generally determine the therapeutic approach. Prognostic factors that may influence treatment selection and the various treatment approaches will be discussed in the following sections [8].

In clinical practice, surgical resection is recommended for the immediate relief of neurological symptoms brought on by elevated intracranial pressure and for histological diagnosis confirmation when the diagnosis is in doubt. After the publication of several prospective studies evaluating the role of surgery combined with WBRT in the treatment of brain metastases, resection of a single brain metastasis has become a standard treatment option. Conducted a prospective study on 48 patients, Patients were assigned at random to undergo radiotherapy or needle biopsy and radiotherapy after the brain tumor was surgically removed. Patients in the WBRT alone arm began radiotherapy 48 hours after biopsy or study entry, whereas patients in the WBRT alone arm began radiotherapy 14 days after surgery. For the surgery arm and the WBRT alone arm, the recurrence rates at the site of the initial metastasis were 52% and 20%, respectively. The WBRT alone arm had a significantly shorter time lag between treatment and the initial brain metastasis recurrence than the surgical arm (median 21 weeks versus >59 weeks, p 0.0001) [9]. After surgery and adjuvant WBRT, the median survival was 40 weeks, compared to 15 weeks for WBRT alone (p 0.01). In addition, the surgical group's patients remained functionally independent (KPS score of 70) for a significantly longer period of time than the radiation-only group's patients (median, 38 weeks versus 8 weeks, p 0.005). Another study by confirmed the findings of this one. 42], which showed that surgery increased median survival (10 months versus 6 months, p = 0.04). Patients under the age of 60 and those with stable extracranial disease exhibited the greatest advantage in survival. Study of 84 patients, on the other hand, failed to demonstrate a survival advantage over radiation alone with surgery. This is probably because a lot of the patients who participated in the study had active systemic disease and lower functional performance scores than in the other two studies. Patients with a single brain metastasis and favourable prognostic factors, such as control of extracranial disease and young age, are more likely to benefit from surgical resection followed by WBRT than from WBRT alone, according to the findings of all three studies [10].

Conclusion

Patients with advanced lung cancer's overall prognosis will be significantly impacted by their choice of treatment. In prospective randomized studies, the survival of patients with single lesions, good functional performance status, and controlled extracranial disease has been significantly improved by combined modality treatment of brain metastases based on current evidence. WBRT SRS patients with excellent functional performance status continue to be concerned about neurocognitive deterioration. However, in a select group of patients who present with neurological impairment from brain lesions at baseline shortly after treatment, radiotherapy may improve neurocognitive function. PCI for NSCLC is still under investigation, whereas PCI for SCLC is currently standard of care. Patients with only brain metastasis and early-stage intrathoracic disease should consider local therapy. Options like fractionated stereotactic radiotherapy, WBRT with a simultaneous integrated boost, and an SRS boost to the surgical bed alone are being investigated to further improve treatment outcomes for brain metastasis. For large lesions, fractionated stereotactic radiotherapy is a more biologically sound option because it delivers a high dose in a few fractions. Because a lower dose is delivered per fraction over multiple fractions, this method may also reduce SRS toxicity, greatly reducing the risk of late normal tissue damage. Dose optimization is made possible by WBRT with a simultaneous integrated boost. This means that a high dose is given to the target volume while the dose to the whole brain stays below a certain threshold. To avoid neurological toxicity from radiotherapy, this achieves increased tumor dose while sparing as much normal brain tissue as possible. In the future, this strategy holds great promise. Radio sensitization is currently not recommended for clinical use. WBRT with EGFR inhibitors, on the other hand, has demonstrated a favourable response to intracranial disease in patients with EGFR mutations; further clinical investigation is also warranted for this approach.

Acknowledgement

None

Conflict of Interest

None

References

1 Temin HM, Baltimore D (1972) RNA-directed DNA synthesis and RNA tumor viruses. Adv Virus Res ADV VIRUS RES 17: 129-86.

2 Barré-Sinoussi F, Chermann JC, Nugeyre MT, Chamaret S, Gruest J, et al. (1983) Isolation of a T-lymphotropic retrovirus from a patient at risk for acquired immune deficiency syndrome (AIDS). Science 220: 868-71.

3 Houghton M (2009) the long and winding road leading to the identification of the hepatitis C virus. Journal of Hepatology 51: 939-48.

4 Higgs D, Thein S, Woods WJTtsteO (2001) the molecular pathology of the thalassaemias England: Blackwell Science. Am J Hum Genet 133-91.

5 Saeed U, Manzoor SJGJMR (2014) Risk factors associated with transmission of hepatitis B and hepatitis C virus in Pakistan. HIV AIDS (Auckl) 14: 14-9.

6 Clauditz TS, Wallace MB (2021) Lauwers GY Inflammatory Disorders of the Stomach. Gastrointest Pathol 73-98.

7 Schleiss MR (2019) Cytomegalovirus Matern Immun 11: 253-88.

8 Bernard S, Germi R, Lupo J, Laverrière MH, Masse V et al. (2015) Symptomatic cytomegalovirus gastrointestinal infection with positive quantitative real-time PCR findings in apparently immunocompetent patients: A case series. Clin Microbiol Infect 21: 11-21.

9 Péter A, Telkes G, Varga M, Sárváry E, Kovalszky I, et al. (2004) Endoscopic diagnosis of cytomegalovirus infection of upper gastrointestinal tract in solid organ transplant recipients: Hungarian single-center experience. Clin Transplant 18(5): 580-4.

10 Boaretto Teixeira Fernandes M, Nogueira Moisés Cardoso PA, Bassani Altoé L, Almeida Rosa Da Silva G (2018) Gastrointestinal CMV Disease and Tuberculosis in an AIDS Patient: Synergistic Interaction between Opportunistic Coinfections. Case Rep Med.