



# Current Perspectives in the Management of Brain Metastases

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Brain metastases (BMs) are diagnosed in 10%–40% of all patients with cancer, and the incidence continues to increase along with the number of long-term survivors. When BMs occur, they are often associated with a myriad of symptoms, including neurologic dysfunction and functional decline; both are difficult to manage and can be distressing for patients and their caregivers. Although clinically significant findings have not kept up with the rapid pace of scientific breakthroughs in understanding the mechanisms of BMs, novel approaches that affect the prognosis of patients with BMs have been introduced in clinical practice.

## At a Glance

- Screening for brain metastases (BMs) is not routinely performed in patients with no neurologic symptoms. However, screening is indicated in lung cancer and possibly in the context of high-risk cancers.
- Individual differences in patients warrant a personalized approach in the management of BMs.
- Whole brain radiation therapy and steroids are considered to be the cornerstones of treatment for BMs.

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cancer (7%) (American Brain Tumor Association, 2010; Smedby, Brandt, Bäcklund, & Blomqvist, 2009). Table 1 presents the most common sites of origin for BMs.

BMs commonly present metachronously (developing at different times) with known systemic cancer (greater than 80% of all brain metastases), but may also be the first manifestation of cancer (precocious presentation in 5%–10% of all patients); alternatively, they may present synchronously with systemic and intracranial cancer (5%–10% of all patients with brain metastases) (Chamberlain, 2010; Thomas & Dunbar, 2010). Anatomically, the pattern of BMs corresponds to the volume of brain parenchyma and vascular flow (80% presenting within cerebral hemispheres, 15% within cerebellar hemispheres, 5% within brain stem) (Brastianos, Cahill, & Brastianos, 2015; Nabors et al., 2014). About 20%–50% of patients have a solitary lesion, whereas 20%–30% have oligometastatic BMs (two or three metastatic sites), and 30% or more have polymetastatic (four or more metastatic sites) BMs (Chamberlain, 2010; Fink & Fink, 2013).

## Clinical Presentation

Generally, healthcare providers do not routinely screen for BMs in patients with cancer who have no neurologic symptoms, with the exception of patients with lung cancer (Gavrilovic & Posner, 2005). However, in the current age of targeted therapies and extended survival, this concept may be in need of comprehensive review. Although the use of screening to detect occult BMs remains controversial, screening may be indicated in the setting of high-risk cancers (e.g., overexpressed or amplified HER2/neu) (Duchnowska et al., 2015).

While the life expectancy of patients with primary cancers improves, the likelihood that patients will live long enough to develop brain metastases (BMs) increases. Therefore, the diagnosis and management of BMs has evolved for healthcare providers, patients, and caregivers. Although the incidence of BMs in the United States is unknown (Davis, Dolecek, & McCarthy, 2010), about 170,000 patients receive this diagnosis each year (Al-Shamy & Sawaya, 2009; Santarelli, Sarkissian, Hou, Veeravagu, & Tse, 2007).

## Epidemiology

BMs are the most frequently occurring neurologic complications associated with cancer. They are 10 times more common than gliomas and can be observed in as many as 40% of all patients with systemic cancer (Chamberlain, 2010; Loriger & Felding-Habermann, 2010). The most common origins of BMs in men are lung cancer (44%), malignant melanoma (12%), and colorectal cancer (9%). In women, BMs often develop from lung cancer (33%), breast cancer (33%), and colorectal