

Metastatic disease can be viewed as two simultaneously occurring diseases: brain cancer and systemic cancer (elsewhere in the body). Each disease has quite different mortality rates. Untreated brain metastases are rapidly fatal, while systemic cancer may not be.

Metastatic brain disease is a focal disease, and focal control of the tumor is paramount to patient survival. The approach in the past has been to treat metastatic brain disease as a whole brain disease with whole brain radiation (

WBR

). Because of poor local control of tumor growth when treated solely by

WBR

, brain metastases in the past were rapidly lethal. Therefore, patients with brain metastases did not benefit from many advances in cancer therapy (

immuno

therapy, chemo therapy, conformal radiotherapy, etc.) because these therapies do not effectively reach brain metastases and individuals died quickly from neurological progression.

Now, neurological progression can be effectively controlled in most patients harboring a few intracranial metastases with aggressive focal treatment (surgery or radiosurgery

) in combination with

WBR

.

WBR

can be given immediately following focal treatment or at the time of recurrence. Control can be extended by frequent MR surveillance of the brain and

radiosurgical

treatment of new metastases months or years later. With control of intracranial disease,

advances in cancer therapy will prolong survival since most patients now succumb later to systemic rather than intracranial disease. Aggressive focal treatment is only beneficial in

patients with controlled or no systemic disease and independent health (

Karnofsky

Performance Score (KPS) > 70). Age is also a determinant of outcome with better outcomes in individuals less than 60 years old.

Tumors of the brain can be divided into two categories. Tumors which arise from the tissues of the brain, its blood vessels, bony and membrane coverings are termed primary brain tumors.

These primary tumors may be benign or malignant. Examples of these tumors are glioblastomas

,

meningiomas

, pituitary tumors, and acoustic

neuromas

. Secondary brain tumors that arise from malignant sources outside the brain may invade the

intracranial cavity, usually as blood-borne metastases. Common sources of these malignant tumors are carcinoma of the lungs, breast, and skin (melanoma). There are more than 1,200,000 new cases and 130,000 deaths from brain metastases each year.

Recent outcome studies of the various treatments for brain metastasis have enlarged our understanding of the management of this disorder. Untreated, patients with metastatic brain tumors may survive only a few weeks, and the addition of steroids to treat brain swelling may add a month to survival. The sensitivity of the brain to external radiation and the failure of chemotherapeutic agents to effectively penetrate the brain greatly hinder treatment.

The development of optimal treatment strategies for brain metastases has been difficult for two reasons. Virtually all studies have been retrospective reviews of various treatment paradigms. Without prospective, controlled studies, no realistic comparisons of treatment can be made. Secondly, there are many factors which influence the outcome of treatment such as patient age, disability status, tumor origin, extent of disease outside the brain, tumor location, and prior treatment. Controlling for these multiple risk factors has made the design of scientifically controlled studies a daunting task.