



CHAPTER CAPSULE

Celebrating 30 Years

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Providing optimal care through promotion of professional standard, networking and development

METASTATIC BRAIN TUMORS

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Introduction

According to the American Cancer society 1.66 million persons will be diagnosed with cancer in 2013 with 57, 560 living in the State of Michigan. There will be an estimated 580, 350 thousand deaths in 2013 of which 20,570 patients residing in Michigan.

National Cancer Institute describes metastatic brain tumors as outnumbering primary brain tumors by at least 10 to 1, and they occur in 20% to 40% of cancer patients. The exact number of cases is currently unknown since there is no data base collecting this information, however based on autopsy and clinical data it is estimated that there are well over 100,000 new cases of metastatic brain tumor in the Unites States each year. This number may be increasing due to the improvement in cancer treatments with improved survival and the improvement in imaging diagnostics including the magnetic resonance imaging (MRI) which has become the gold standard for diagnosing brain tumors.

Metastases to the brain are most common in patient with lung cancer (50%), breast cancer (15%–20%), unknown primary cancer (10%–15%), melanoma (10%), and colon cancer (5%). Eighty percent of brain metastases occur in the cerebral hemispheres, 15% occur in the cerebellum, and 5% occur in the brain stem. Single brain lesions occur in over 30 percent of newly diagnosed cases with 70% having multiple lesions.

Epidemiology

Risk factors of the development of metastatic disease include younger age at cancer diagnosis, larger size of primary tumor of higher histological grade with lymph node involvement and higher number of non-brain metastatic sites.

Significant prognostic factors for patient surviving their metastatic brain tumors are performance status, age, controlled status of primary tumor, the number of brain lesions involved and time from cancer diagnosis to brain metastases. In general if brain metastases are treated, the majority of patients will die from their primary tumor not their brain tumors.

Pathophysiology

Pathophysiology is defined as the physiological processes or mechanisms through which a disease condition develops and progresses. In metastatic spread there is a specific set of steps a cancer cell must take in order to travel to a distant site. First the

cell must break off from its existing primary tumor and then enter into the systemic circulation either through the blood, lymph or cerebrospinal fluid (CSF). To do this a cell must free itself from its cell- cell or cell-basal lamina constraints imposed by the parent epithelial tissue, cut its anchor to the basement membrane, invade through underlying mesenchyme and pass between the endothelia cells to seep into the blood stream.¹ Once in the circulation it must avoid apoptosis which is driven by the loss of cell contact (anoikis), escape immune recognition and arrive intact at is final location. Once there it must then escape out of the vessel and into the surrounding tissue to implant. Final invasion into the brain tissue is completed by attaching to the extracellular matrix and recruiting new blood vessels by means of angiogenesis in order to survive and grow.

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Brain tumors tend to undergo extravasation in the narrow cerebral microvasculature with 80% of brain metastasis located in the hemispheres, 15% in the cerebellum and 5% in the brainstem. Lung, renal cell, breast, melanoma and colorectal cancers have a

predisposition to metastases. Cancers such as prostate, ovarian, uterine, thyroid, liver, bladder, gastric, skin and pancreatic tend not to metastasize to the brain, however cases have been seen.

Typically, a patient will present with brain metastasis after the primary tumor has been diagnosed. It is not uncommon for a patient to present with both primary and metastatic disease at the same time and with brain metastasis a patient may even present without evidence of a primary neoplasm. These patients present with a new on-set of neurological symptoms. Symptoms may include seizure,

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FROM THE EDITOR

CAROLE BAUER

RN, MSN, ANP-BC, OCN, CWOCN



Have you ever noticed how the busyness of life somehow always seems to get in the way of the things that are the most important to you? Some time ago, I remember listening to someone talk about the important things in life and the urgent things in life. So many things in my life- both professionally and personally- have seemed important but in reality were only urgent! For me one of the important things has always been my membership in MDONS.

For this article I have decided to steal from a famous nighttime TV personality and give you the TOP TEN IMPORTANT (not urgent) reasons you should become more active in your MDONS chapter.

1. By being active in MDONS you have an opportunity to stay up to date in your professional practice.
2. By being active at MDONS you will have an opportunity to apply for scholarships to advance your knowledge of oncology nursing either for formal education or conference attendance.
3. By being active in MDONS you will be able to network with other oncology nurses in your area.

4. By being active in MDONS you will be able to hear cutting edge information pertinent to oncology nursing
5. By being active in MDONS you will feel more satisfied with your career
6. By being active in MDONS you will have an opportunity to give back to the community at large through our community involvement projects
7. By being active in MDONS you will have an opportunity to make a difference in a school age child's decision not to smoke
8. By being active in MDONS you will gain ONC-PRO points to make it easier to renew your ONS certification
9. By being active in MDONS you will have the opportunity to mentor others to the profession.
10. By being active in MDONS you will have an opportunity to shape our chapter for the future.

Now it is up to you! Join a committee, attend a meeting, read the newsletter, browse the website, or friend us on Facebook. How you decide to be active or how active you decide to be is up to you. But, I assure you, you will never regret becoming active in this organization. ●

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headache, cognitive impairment, hemiparesis, gait ataxia, aphasia, and visual disturbances. Many times these symptoms are thought to be the result of a stroke until further diagnostic steps are taken.

Initial metastasis is diagnosed by means of a computed tomography (CT) usually without contrast, followed by a magnetic resonance imaging (MRI) with and without contrast. MRI is the standard of care for brain lesions as it provides high resolution imaging, which picks up small lesion missed by the CT and can help physicians determine whether a lesion is primary or metastatic. Once an imaging diagnosis has been obtained plans can be derived for treatment.

Indications for surgery

Currently patients with a single metastatic lesion, with well controlled systemic disease and good functional status (KPS) are primary candidates for surgery. For lesions causing significant neurological complications, surgical resection is the only effective method of providing relief from these life threatening symptoms. Patient experiencing refractory seizures, compression of the brain stem and obstructive hydrocephalus often benefit from immediate resection of their lesion. The primary indication against surgery is multiple metastatic lesions. Patient may also benefit from surgical resection at recurrence. Surgical mortality and morbidity is low, thus surgery remains one of the feasible options for treatment of brain metastasis.

Surgery is generally done in one of two ways, piecemeal, (without violating the tumor capsule) or en bloc (circumferential resection). Each has its place. En bloc resections are useful in lesions located in the posterior fossa or those in contact with the CSF pathways

and tumors that are likely to produce leptomeningeal spread after surgery. Piecemeal resection may be unavoidable if the lesion is adherent to or infiltrating eloquent areas of the brain such as the motor strip, sensory or speech centers. En bloc resection provides a far greater chance at limiting local recurrence than piecemeal resections.

Stereotactic Radiosurgery (SRS)

Indications for stereotactic radiosurgery are advanced systemic disease, neurological instability or the presence of multiple lesions. SRS represents a non-invasive way to control local disease. SRS has been traditionally reserved for lesions less than/or equal to 3 centimeters and 1-3 lesions. Radiosurgery may be done as a single dose or as fractionated dose delivered in 2-5 fractions. Doses vary between 12 and 24 Gray and dose are based on findings from the Radiation Therapy Oncology Group. There are several types of equipment used for radiosurgery and these include the Cyberknife, Gamma knife, Brainlab, LINAC systems and the VMAT (Volumetric Modulated Arc Therapy). There are pluses and minuses to each system with most systems only able to treat one lesion at a time and multiple lesions take longer to treat.

Whole Brain Radiation (WBRT)

Whole brain radiation had its beginnings in the 1950s with varying doses and schedules; however by the 1970s WBRT had become the primary treatment for brain lesions. It is used for patients who have multiple lesions in the brain addressing both macroscopic and microscopic disease. The most common dose/fraction schedule is 30 gray delivered in 10 fractions over 2 weeks. WBRT is also used to treat patients who are at risk for developing brain metastasis such as with small cell lung cancers and it is used to treat metastases after surgery. Radiosensitizing chemotherapeutic agents, such as temozolomide have been used, however based on the available data there is currently no established role combining chemotherapy with WBRT. Clinical trials continue to evaluate its use and efficacy.

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Acute toxicities are fatigue (most common), alopecia, and dermatitis, nausea, vomiting and decreased appetite and cerebral edema (controlled with steroids). These symptoms are self-limiting and resolve or are managed medically. Early–delayed toxicities experienced within the first weeks to months after treatment are fatigue, somnolence, and neurocognitive deficits such as memory loss. There can be radiological changes in 1-4 months post treatment. Late toxicity is defined as any toxicity that occurs after 90 days of treatment and are seen in the form of neurocognitive decline, leukoencephalopathy, and radiation necrosis which is the most extreme local toxicity and relatively uncommon.

Controversies in management of brain metastases

The National Comprehensive Cancer Network (NCCN) has developed algorithms for oncology care for brain lesions including

1-3 metastases, multiple metastases (>3) and leptomeningeal metastases for both initial and recurrent treatments. The algorithms incorporate the complexity of treating metastatic disease using surgery, chemotherapy, and radiation. Physicians currently consider the goal of treatment of brain lesion as palliative rather than curative. Clinical trials are underway to determine the most efficient ways to diagnosis, treat and improve progression free as well as overall survival for patients who develop metastases. The determination of biomarker tests, chemotherapy agents, dose and treatment timing are a few of the challenges of Neuro-oncology. Most patients with brain metastases succumb to their systemic disease. The multidisciplinary team including, Neuro-oncologist, neurosurgeons, radiation oncologist and medical oncologist will produce the most effective overall treatment plans.

¹ Neuro-oncology supplement: Surgical Neurology International June 2013 (1); American Cancer Society 2013; National Comprehensive Cancer Network, 2010 Guidelines; Journal of Neuro-Oncology 2010

HIGHLIGHTING A MEMBER LYNNE CARPENTER



Lynne Carpenter, this year's AOCNS, is one of the original members of MDONS when it was known as MONA in 1976. She is currently the treasurer of MDONS and was the also first treasurer of our group when MDONS formed in 1980. She feels her success as an oncology nurse is credited to MDONS. She feels the networking in MDONS has helped her with her career in oncology nursing.

When she was first a member she remembers when all the nurses picked certain symptoms related to treatment to research and they all shared their research on managing those symptoms. She remembers hers was nephrotoxicity of the kidney which helped lead her research about hydration which was her interest for her PHD.

Lynne recalls she always wanted to be a nurse. As a child she was sick but she had a really good day nurse although the night nurse was somewhat obnoxious. She received such great care from her day nurse that she decided she wanted to be that good nurse. She also remembers reading books about Cherry Ames that were all about a nurse in different types of situation such as a student nurse, an office nurse and a bedside nurse. Lynne wanted to be Cherry Ames. Lynne graduated from the University of Michigan with her BSN in 1974 and started her career at St. Joseph Mercy Hospital in Pontiac Michigan. She decided to pursue her education while working full time. She went back for both her master's degree and her PhD in nursing. She decided to do both together and mix up the classes. She graduated from University of Michigan with her Master in Nursing in 1987 and her PHD in nursing 1994.

Lynne's work history is varied. She started working in 1974 on a general medical floor. In 1976 she became the first oncology nurse at that hospital. She says she became an oncology nurse by chance.

Her director of nursing gave her three choices because she thought Lynne was a go getter. The choices were be a primary care nurse, nurse manager or an oncology nurse. After thinking about it, Lynne decided that she thought it would be intellectually challenging and interesting to be on the front end of something new so she decided to be the oncology nurse. She wrote an article about coordinating cancer care in the community hospital without a cancer floor. Here she educated other nurses on how to care for their oncology patients and how to manage side effects from their treatments.

She left there in 1987 and when to work at the University of Michigan where she was a Clinical Nurse Specialist with the Breast Center. Here she helped develop the MDT Breast Care center in 1985. She had a wonderful 11 years there. In 1998 she worked with Schering Plough as a clinical consultant educating people on melanoma, brain tumors and breast cancer. Then in 2009 till 2010 she work with Meda as a consultant on pain management. In her final two years before she retired she spent working with Oncology Home Care, helping them get started. Here she educated the staff and also went back to patient care specializing in oncology care. She stated this was a good way to end her oncology career. She has written chapter on breast cancer for Luckmann and Sorenson and also wrote a couple of articles on Developing a MDT Breast Center. She retired in 2012.

Now that she is retired she is spending a lot of time with her parents who are in their nineties. They have been married for 66 years. She is helping them as they get older and they are her priority now. She has one brother and two sisters. She has a passion for downhill skiing and she has been able to do this more now that she is retired. She has skied out west, in Alaska as well as Switzerland. She also likes to read and rake her leaves in the fall and spring. She has also started ballroom dance lessons and a senior stress and tone class that she enjoys. She has recently purchased a black and yellow tricycle that she uses to do her errands close to home.

Lynne Carpenter has been an active member in both MDONS and ONS throughout the years. Her dedication and accomplishments to her field are some of the many reasons that she is this year's AOCNS. Thank you for your hard work and dedication to the oncology field. ● STACEY SUSHAM, RN, BSN, OCN



THE LATEST FROM MDONS



MDONS Congress Scholarship

The Metropolitan Detroit chapter of the Oncology Nursing Society offers a Congress scholarship for MDONS members. The amount of the scholarship is a maximum of \$1000 to apply toward registration, travel to and from Congress and lodging, and per diem expenses. This is a self-nominated award. Go to <http://metrodetroit.vc.ons.org/1881135> to view the application.



ONS Leadership Opportunities

We know you're busy, but we encourage you to make time to get involved with ONS. Participating in the Society will help you improve oncology nursing and patient care. Some take only a few hours, while others require a larger time commitment. You pick the ones that fit your schedule.



Honor a Colleague With an ONS Commemorative Resolution

ONS has many ways to recognize a professional colleague, including honorary ONS embership and the many awards for which members can nominate candidates each year. However, there is one other way to recognize colleagues: drafting and submitting a Commemorative Resolution recognizing an individual's achievements.

A Commemorative Resolution is a statement that recognizes significant past contributions at a national or international level of member(s), individual(s), or organization(s). These contributions should have made a significant change and/or contributed to the body of knowledge of oncology nursing or the field of cancer care. Commemorative resolutions are awarded at a memorable point in time (e.g., death, retirement, major achievement) of an individual or organization. These achievements may include but are not limited to

- Excellence in clinical practice, education, administration, or research through innovation, leadership, or publication
- Serving as a role model or enhancing the image of oncology nursing
- Legislation that affects oncology nursing practice or cancer care
- Advancement of the science of oncology nursing
- Community contribution.

Commemorative resolutions are approved by the Board and may be submitted throughout the year. Those honored by commemorative resolutions are announced at the annual business meeting at Congress.

An instruction kit details the process of drafting and submitting the resolution. For a free copy of the Resolutions Information Kit, contact ONS Customer Service toll free at 866-254-4ONS or customer.service@ons.org.



ONS Advisory Panels and Project Teams

Advisory panel members provide consultation to staff and assess priority oncology nursing issues and ways to address them in the areas of cancer care issues, professional issues, membership/leadership, publishing, and research.

Members interested working on organizational projects identified by the ONS Board or the staff should apply for a **Project Team**. Project teams will fall under the following areas: cancer care issues, professional issues, membership/leadership, and research.



Call for ONF Reviewers

Reviewers are needed for all topic areas and from all educational levels, especially those who are doctorally prepared. Experienced reviewers, members new to reviewing, and associate members with specific expertise are most welcome.

THE CHAPTER CAPSULE

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