Metropolitan Detroit MDONS Oncology Nursing Society

CHAPTER CAPSULE

Celebrating 32 Years

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

NEURO-ONCOLOGY EMERGENCIES

SANDRA REMER, RN, BSA, OCN®

There are approximately 688, 000 people who have been diagnosed with a primary or central nervous system tumor. Of those, 155,000 have a malignant tumor and 550,000 are benign tumors. 20-40% of all other solid tumors will develop brain metastases. For these patients two of the most devastating complications will be increased intracranial pressure or intracranial hypertension and spinal cord compression.

INTRACRANIAL PRESSURE

Intracranial Pressure (ICP) is the pressure normally exerted by the cerebrospinal fluid (CSF) that circulates around the brain and spinal cord and within the cerebral ventricles referenced to the atmosphere on which the cardiac and respiratory components are superimposed. Increased ICP is a symptom rather than a separate disease entity.

In the normal adult, ICP ranges from 0-15 mmHg or 10-20 cm H20, with 15 mmHg being the high side of normal. In the normal adult intracranial pressure may change in response to activity. Changes in ICP are associated with changes in intrathoracic pressure such as occurs with coughing and valsalva maneuvers. Postural changes that affect the ICP are reflected in trendelenburg, prone, extreme hip flexion and angulation of the neck, while changes related to arterial and venous pressure are demonstrated by compression of neck veins. Other changes causing a rise in ICP are blood gases (hypoxia), body temperature (fever) and respiratory procedures such as suctioning, intubation, and PEEP. These elevations however do not cause neurologic dysfunction or brain damage because the pressure is being distributed equally throughout the brain and cord. Common causes of increased ICP outside the changes from normal function are primary brain tumors, metastatic lesions or as a consequence of metabolic or infectious complications in patients with cancer (Lee & Armstrong, 2008).

In the normal adult, ICP ranges from 0-15 mmHg or 10-20 cm H20, with 15 mmHg being the high side of normal.

The average intracranial volume in the adult is approximately 1700 mL, with 1400 mL being the brain and CSF and blood add 150mL. each. The Monro-Kelli hypothesis states that the skull, a rigid compartment, is filled to capacity with essentially noncompressible contents, brain and interstitial fluid (80%), intravascular blood (10%), and CSF (in the ventricles and subarachnoid space; 10%). The volume of these three components remains nearly constant in the state of dynamic equilibrium. If the volume of any one of these components increases, one of the other components must decrease reciprocally for the overall volume and dynamic equilibrium to remain constant (Hickey 2003). For the patient with a very slow growing lesion (meningioma) intracranial equilibrium may be accommodated over many years before the patient experiences any symptoms, however the patient with a hemorrhage or malignant tumor will experience increased intracranial pressure immediately.

Intracranial pressure can be increased by the following conditions: (1) an increase in brain volume (mass effect) as the result of a brain tumor, hemorrhage, hematomas, abscess, cerebral edema or aneurysm (2) increased venous failure resulting from sagittal sinus thrombosis (obstruction of venous blood flow), heart failure or superior vena cava obstruction; (3) increased production of CSF such as Choroid plexus papilloma 4) obstruction of the flow of cerebral spinal fluid and 5) decreased absorption resulting in communicating hydrocephalus and subarachnoid hemorrhage.

A change in ICP from any cause disturbs brain function through the disruption of the cerebral blood flow or by herniation of the brain. As ICP rises, blood flow decreases resulting in decreased cerebral perfusion pressure (CPP). CPP results from a failure of auto-regulation, which is the blood vessels intrinsic capacity to regulated and maintain normal blood flow.

The most common symptoms associated with increased ICP are headache, nausea, and vomiting. Headaches are most severe in

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WHAT'S INSIDE...

FROM THE EDITOR

CAROLE BAUER

RN, MSN, ANP–BC, OCN, CWOCN

Recently I was listening to someone talk about the concept of transformation. While at the time, the talk was not about oncology in any way, it made me begin to think about the concept of transformation and how it applies to us as oncology nurses. The dictionary defines transformation as a "metamorphosis" or as a "thorough or dramatic change in form or function."

ONS is a great resource for any one wanting to expand their knowledge and base of evidence to support the nursing interventions which are utilized.

Transformation of nursing has happened many times throughout my career as an oncology nurse. We have seen transformation in where oncology care is delivered with a move away from inpatient care to more and more care being provided in an outpatient setting. We have seen transformation in the types of drugs that are given to control or cure cancer with a move to targeted therapies and "personalized" medicine.

In fact transformation has happened in the way we deliver nursing care too. While we can talk about transformation in documentation with a move to electronic medical records, that is probably not our greatest move in care. Probably our greatest nursing transformation is our use of a strong base of evidence to support our practice. The concept of translation of basic and grounded nursing research at the bedside is what is really transforming nursing care. While nursing theories have been around even as far back as when I went to nursing school, today we see nurses really applying the theories and searching evidence to support practice.

ONS is a great resource for any one wanting to expand their knowledge and base of evidence to support the nursing interventions which are utilized. From on-line learning, to PEP cards, to articles in the forum or in CJON, ONS has a wealth of resources to help one transform practice at the bedside.

I guess you can also say that ONS is working on transforming the way that it is run too. It is so great to have so many new members with the new chapter structure. As I talk to people who are new to the chapter but maybe not new to ONS, I am encouraged that this is a great move for our chapter and for ONS in general. It is another transformation to embrace. Isn't change great?

NEURO–ONCOLOGY EMERGENCIES

Continued from front page

the morning because ICP typically increases during the night as a result of lying in a recumbent position during sleep and from the increased partial pressure of carbon dioxide from depressed respiration during sleep. Other signs and symptoms are mental status changes, weakness, restlessness, aphasia, visual disturbances and incoordination. The presence of papilledema is usually indicative of increase ICP and more common when brain tumors interfere with CSF flow causing hydrocephalus. Late findings are Cushing response of hypertension with a wide pulse pressure, bradycardia and irregular respirations. (Lee & Armstrong 2008; Hickey 2003)

Assessment is critical to uncover the cause, and provide appropriate treatment. Diagnostic tests include a chemistry panel, complete blood count, antiepileptic drug levels, oxygen saturation and imaging of the brain with CT scan or MRI. CT's are quick and inexpensive and are used in an acute situation to evaluate for hydrocephalus or hemorrhage. MRI however provides a finer assessment of circulation, anatomy and the characteristics of a brain tumor.

Baseline and ongoing neurological assessment are the foundation of patient management. In patients with subtle signs of increased ICP demonstrated by headache and focal neurologic symptoms, corticosteroids are used to reduce cerebral edema. If the tumor is large and associated with mass effect, surgical debulking may also be required to reduce the pressure and prevent herniation. Measures to control increased ICP include hyperventilation to decrease the partial pressure of the carbon dioxide, elevating the head of the bed to improve venous flow and corticosteroids, which decreases vasogenic edema. In addition osmolar therapy is implemented in order to promote the movement of water out of the brain tissue by creating a gradient between the blood and the portion of the brain with an intact blood-brain barrier i.e. mannitol. Other therapies that may be utilized include diuretics in the presence of cerebral edema, placement of interventricular catheter to monitor ICP and drainage of CSF as well as neuromuscular blockage to control muscular activity preventing further increases in ICP. Barbiturate therapy is no longer used due to prolonged effects such as hypotension and required intensive monitoring of patients receiving them (Lee & Armstrong 2008; Hickey 2003).

Oncology nurses with knowledge and skill in neurologic emergencies can detect early signs and symptoms of increased ICP. Complete, concise neurologic assessments and detection of any subtle neurologic changes leads to timely intervention and management. Early detection can prevent cerebral herniation and even death. Nurses should monitor patients for side effects of drug management such as dehydration, hypersensitivity, electrolyte imbalance, fluid retention and hypotension as well as seizure control. Oncology nurses may also assist patients and families with education to help them cope with disease processed and alleviate fears and provide emotional support.

SPINAL CORD COMPRESSION

Spinal cord compression (SCC) is compression of the thecal sac by a tumor in the epidural space at the level of the spinal cord or cauda equine. Primary tumors of the spine constitute about 0.5% of newly

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HIGHLIGHTING A MEMBER

ALICIA DECARIIA RN, BSN, NE-BC

Outstanding oncology nurses may be found in a variety of practice settings, which may also include those in leadership positions. Alicia L. DeCaria, RN, BSN, NE-BC is such a nurse and is our 2014 Outstanding Oncology Nurse Award recipient. Alicia (Lee) is committed to the assurance of the provision of quality patient care through evidence-based practice in her role as Administrative Nurse Manager of Oncology Services at Beaumont Health Systems.

Lee always wanted to be a nurse. She says: "My mother was diagnosed with colon cancer when I was in 8th grade and given 3 months to live. She battled with numerous surgeries and metastasis for 9 years. Throughout my high school years, our nurse neighbor, Louise, would visit my mother daily to attend to her needs and administer morphine and since I was the oldest child of 11 currently living in the house, Louise looked to me for support. I admired Louise and wanted to be able to help people the way she did. As fate would have it, my father had different plans for my future and nixed any notion of my going to college and secured me a job in the local steel mill so that I could live at home and take care of 5 younger siblings. It wasn't until I was in my late 30's that I attended college, graduating at the age of 42". In addition to nursing Lee has a busy family life. Lee has four "beautiful" adult children with wonderful spouses who gave her ten grandchildren so far.

Her colleagues describe Lee as an excellent role model and mentor. The ONS core values of integrity, innovation, stewardship, advocacy, excellence, and inclusiveness are evident in her visionary leadership style, as she consistently fosters an environment conducive to enhance the professional development of her staff. Lee is among the first to acknowledge the accomplishments of her colleagues. She will frequently submit letters of recommendation or nominations to highlight the achievements of others. Lee further demonstrates leadership abilities by serving on professional committees. Currently she is on the American Society of Therapeutic Radiation Oncology Nursing Committee, Michigan organization of Nurse Executives (MONE), and Nurse Executive Leadership Council among others. She is involved in MDONS on the program and virtual community committees. Lee also demonstrates professionalism by holding certification as NE-BC/ Nurse Executive Board Certified from the American Nurses Credentialing Center.

Lee is engaged in quality initiatives to improve patient outcomes. She is a principal investigator for a randomized control trial for prevention of radio-dermatitis, assisted in development of the Cancer Survivors Program, served on the task force to recruit participants for the Cancer Prevention Study-3, and is a member of the Cancer Committee at Beaumont Health Systems.

Lee advice for nurses and especially new oncology nurses is: "Find a good work/life balance!!!! Life is too short and too precious...take care of YOU and your family first!!!!!" In addition she encourages every nurse to find their niche and become certified in what challenges them and makes them happy. She recently attended ONS Congress and described a feeling of pride, sense of belonging, and finding her nursing niche. Lee says "I am so proud to be an Oncology Nurse!" ● *Angela Maynard, RN, MSN, OCN, CBCN*

MEETING SUMMARIES >>>>>>>>>>>>>>>>>>>>

September

UPDATES AND CONTROVERSIES IN CANCER SCREENING

PRESENTED BY MICHAEL KRAUT, MD
SUMMARIZED BY RITA DUNDON, RN, MSN

The prevention of cancer is accomplished by three methods.

1. Primary cancer prevention has a focus on inhibiting the carcinogenic process by modifications. Life style strategies such as a healthy diet which includes plenty of fruit and vegetables and weight control (avoidance of obesity) and no smoking are examples.

2. Secondary cancer prevention involves early detection of cancer by screening high risk populations and careful follow up after diagnosis.

3. Tertiary cancer prevention is to preclude recurrence and screen for second primary malignancies.

Health care costs money and so does cancer screening. It is important to make sure that cancer screening is effective and based on research.

EFFECTIVE CANCER SCREENING TOOLS:

a. Identify high risk populations for example smokers for lung cancer.
b. Find cancer at an early stage.
c. Screening procedures are safe.
d. The cost is reasonable.
e. The screening improves outcomes.
f. The screening is widely available.

MEETING SUMMARIES

September *Continued from previous page*

Clinical practice guidelines are intended to translate research into practice. There are more than 180 guidelines for early detection of cancer. Three organizations The American Cancer Society (ACS), The United States Preventive Service Task Force (USPSTF), and the National Comprehensive Cancer Network (NCCN) publish cancer screening guidelines for breast, cervical, colon, lung and prostate cancer which identify the merits of preventative measures. For example USPSTF guidelines utilize A, B,C, D, I to identify research based preventative measures.

A	it works
B	it probably works
C	it probably doesn't work
D	it does not work
I	there is insufficient evidence to evaluate it

Cancer screening controversies arise around which tests are effective and when to stop or withhold treatment. For example, do you screen for lung cancer in patients with end stage heart disease or emphysema?

Breast cancer is the second cause of cancer death for all malignancies. In terms of screening it is important to distinguish between average versus high risk populations. High risk women are those with BRCA1 and BRCA2 gene mutations and those who have received chest radiation for Hodgkin's disease. These patients need screening with MRI. Most guidelines recommend mammograms for average risk populations but they differ about age and frequency.

There are more than 180 guidelines for early detection of cancer.

Cervical cancer declined by nearly 70% between 1955 and 1992 due to Pap smear testing. High risk populations are women with a history of HPV or HIV infection, a compromised immune system, in utero exposure to Diethylstilbestrol and post treatment of high grade precancerous or cervical cancer. Most guidelines now recommend Pap smears for women of average risk between 20 and 30 years of age.

Colon cancer is the 3rd leading cause of cancer death. High risk populations include those with a history of adenomatous polyps, colorectal cancer, inflammatory bowel disease, family history of colorectal cancer, Lynch and Li Fraumel syndrome and polyposis. Colonoscopy every 10 years is recommended for those over 50years with average risk. High risk populations should receive more frequent screening and start at an earlier age.

Lung cancer is the leading cause of cancer death. ACS lists those 55-74 years with a 30 pack year smoking history who have quit smoking less than 15 years ago, history of radon exposure, occupational history of exposure to toxic materials and family history as high risk for lung cancer. Screening with Helical CT is recommended for high risk individuals. However CT screening has shown only modest effectiveness.

Prostate is the second leading cause of cancer related death in men. For men at average risk, USPSTF does not recommend screening with PSA. This is due to the inability to distinguish between low grade and high grade tumors lending to overtreatment with surgery and radiation that may result in impotence and or incontinence. Elderly men with prostate cancer frequently die from other causes. Before ordering a PSA, risks and benefits need to be discussed with the patient. High risk prostate cancer men include: African American race, family history, and those taking 5 Alpha-reductase inhibitors.

The Affordable Care Act ensures that more cancer screening will be available to underserved populations in the future. It is estimated that in 2030 there will be 72 million seniors. Cancer is more wide spread in the elderly. Research is needed to ensure the effectiveness, safety, and cost benefit of cancer screening.

MEETING SUMMARIES

October

ASSESSMENT AND MANAGEMENT OF INDIVIDUALS WITH HIGH RISK FOR BREAST CANCER

PRESENTED BY HEATHER LOWRY, RN, MSN, WHNP
AND SARAH CAMPIAN, MS
SUMMARIZED BY ANGELA SWANTEK, RN. BSN. OCN

In Michigan in 2013 there were 8140 new cases of breast cancer diagnosed. Unfortunately there were also 1360 deaths due to breast cancer. The identification of patients at high risk is an essential concept in the diagnosis and treatment of patients with breast cancer. While risk factors continue to be identified, today we are aware of many risk factors associated with breast cancer. Some of these risk factors are modifiable such as weight, smoking, alcohol intake, the others are not. Some examples of risk factors that are not modifiable are age, gender, and family history.

5-10% of breast cancers are caused by hereditary factors such as the BRCA 1 & 2 gene. There are several methods to assess if a patient is at high risk. The Breast Cancer Risk Assessment Tool (Gail Risk Score) was designed by researchers at the National Cancer Institute and the National Surgical Adjuvant Breast and Bowel Project. It is a tool that calculates the risk for developing breast cancer within the next five years and within the person's life time. It takes into account seven key risk factors. These risk factors include age, age at first period, age at the time of the birth of first child, family history of breast cancer, number of past breast biopsies, number of breast biopsies showing atypical hyperplasia and race/ethnicity. Another tool to measure risk is Claus Risk Assessment. This model was used to explore a subpopulation of people who have an autosomal dominant genetic allele that increases their risk from 10% to 92%. The model which concentrates on family history has a major drawback that it does not include any of the nonhereditary risk factors. A third tool, BRCA Pro, looks at risk to have the genetic mutation. A risk assessment is based on family history to include first, second and third degree detailed medical history.

Each patient should be counseled on all of the risk factors and benefits of each step in their screening, diagnosis and treatment.

NCCN has set guidelines for breast and ovarian cancer for further genetic risk evaluation. 5-10% of patients have a hereditary component, 15-20% have familial or multi-factorial component and 70-75% are sporadic by chance. For those patients who have a sporadic cancer, the genetic damage is acquired while those with a hereditary cancer have an inherited genetic damage.

In most recent studies, BRCA only contributes to 25% of breast cancer. Both men and women can carry BRCA mutations. Those who carry the BRCA mutation have a 50% chance of passing on the mutation. For BRCA carriers there are options to lower cancer risk such as increased surveillance. Prophylactic mastectomy reduces new breast cancer by 90-95%. Prophylactic oophorectomy reduces the risk for ovarian cancer 80-85% and reduces risk of breast cancer 50-60% if performed premenopausal. Tamoxifen can be used as chemoprevention. It can decrease the chance of developing cancer by 35-50%. Oral contraception can decrease risk by 60%.

There are many ethical dilemmas related to genetic testing. The patient has an obligation to report the findings to family members so they can do what is needed and recommended. Another issue to be considered has to do with notification of insurance companies and employers. Can insurance companies report one's risk to one's place of employment? What if the results come back that the person was not anticipating, could that change one's outlook on life? This is why patients need to be and are counseled prior to testing being done so these issues can be discussed.

There is a myriad of issues surrounding caring for patients who are at high risk to develop breast cancer. While genetic mutations only account for a small percentage of newly diagnosed cancers each year, it does not make it less meaningful for the oncology nurse to be sensitive to issues that surround the diagnosis of high risk for the development of cancer. Each patient should be counseled on all of the risk factors and benefits of each step in their screening, diagnosis and treatment.

Enroll in a New Course on Blood Stream Infections

Are you successfully preventing central line-associated blood stream infections (CLABSIs)? Our new online course beginning December 2 will teach you the types of central venous access devices, the pathogenesis of CLABSIs and their risk factors, and diagnostic and assessment criteria. **Enroll Now>>**

Chemotherapy for Non-Oncology Conditions

Chemotherapy and biotherapy are now being administered for a number of non-cancerous conditions. Nurses caring for these patients should be familiar with the conditions and why the drugs are being used. Chemotherapy for Non-Oncology Conditions will help you develop an understanding of the treatment options for several non-malignant conditions.

Read More>>

FROM THE PRESIDENT
GAYLE GROSHKO, RN, BSN, OCN

As your current President, this is my last "letter" to our members. Reflecting on 2014, I have found it helpful to review our mission so as to celebrate our achievements and identify those areas that need strengthening.

MISSION

MDONS will afford a foundation for promoting excellence in oncology nursing and quality cancer care. Through various programs and activities, MDONS will provide direction to the oncology nurse, in providing high quality, evidence based cancer care.

- Promote knowledge, leadership, quality, and technology for both the profession of oncology nursing and people with cancer.
- Promote evidenced based oncology nursing.
- Study, research and exchange information, experiences ideas leading to improved oncology nursing.
- Encourage nurses to specialize in the practice of oncology nursing.
- Foster the professional development of oncology nurses, individually and collectively
- Foster a culturally diverse organization that is responsive to the changing needs of ONS members and the population they represent and serve.

I believe we admirably achieve our goals of promoting knowledge of evidence-based cancer care through: monthly program meetings on topics selected by the members from the yearly needs survey. In addition to these CE opportunities, we act as a liaison with industry to disseminate availability of programs that may not offer CE credits but will advance our knowledge. In addition to our monthly meeting we offer yearly an all-day conference on topics selected to strengthen our practice and promote quality cancer care. We nurture ourselves at the President's Dinner with a topic selected to speak to our souls. We also expand our reach and understanding by meeting yearly with the Oncology Social Workers group.

We meet our leadership goals by board meetings four times a year. These meetings are open to all and everyone is encouraged to attend. All committee chairs are accessible and would love to mentor new members. The Virtual Community committee and Newsletter Committee were able to add new co-chairs this year—thank you to Susan Wozniak and Alicia DeCaria and Carole Bauer and Denise Weiss! The Program and Conference Committees meet yearly to design our monthly meetings and conference. This committee is an excellent starting point for anyone interested in becoming involved but unsure of where to start. In addition, we were able to send three members; me as President, President-elect Heather Lowrey, and Alicia DeCaria to ONS Leadership Weekend. I would like to take this opportunity to give kudos to Michelle Wallace, current Director-at-large. She was selected by ONS to be one of the guest lecturers at Leadership weekend.

We encourage our members and our nursing colleagues to specialize in oncology nursing by offering numerous awards and scholarships:

ELAINE VALDEZ SCHOLARSHIP

Recipients Elizabeth Kotenko

Sara Long

Jennifer Hudson

Keisha Harris

CONGRESS SCHOLARSHIP

Recipient Alicia DeCaria

ONCOLOGY NURSE OF THE YEAR

Recipient Alicia DeCaria

ADVANCED PRACTICE NURSE OF THE YEAR

Recipient Heather Lowry

As an organization we have much to offer to each and every member. Yet, while conference attendance is robust, monthly meeting attendance is dwindling. I see a future goal for MDONS: determine how to remain relevant, useful, and desired. It is your organization. Please get involved.

Gastrointestinal Cancers

1 in 5 of newly-diagnosed patients with cancer will have a gastrointestinal cancer. The GI Cancers online course will help you understand the complexities of screening, risk, prevention, diagnosis, treatment, and symptom management of various types of gastrointestinal (GI) cancers. Throughout this self-paced course, you'll work along with the accompanying eBook, Site Specific Cancer Series: Gastrointestinal Cancer (2007), and engage in reading assignments, activities, and interactive learning opportunities. **Learn More>>**

When Things Aren't Quite What They Seem

Oncology nurses have the opportunity to interact with a unique variety of people. Cancer does not pick on just the feeble; healthy people, young and old, can be plunged into a dark and scary place by hearing the word: cancer. **Read More >>**

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diagnosed tumors and about 7% of primary central nervous system tumors (Hickey 2003). Spinal cord tumors are classified as primary or metastatic tumors.

Primary spinal cord tumors are categorized according to their location to the dual meningeal covering, the spinal cord itself and the vertebral column. Extramedullary tumors are located outside the cord and account for 80-90 % of the primary spinal cord tumors. These are divided into: 1) Extradural, which means outside the dura, within the epidural space. These tumor may be chordomas, sarcomas, epidermoids and vascular tumors and represent 20% of spinal tumors. 2) Intradural, which is within the spinal dura, but not within the spinal cord. This type of tumors is mostly meningiomas or neurofibromas and constitutes 60% of all spinal tumors. Intramedeullary tumors are located within the body of the spinal cord and are mainly ependymomas and gliomas and comprise the remaining 20% of tumors (Hickey 2003).

The spine is less tolerant of radiation than the brain or other organs. Clinical studies have suggested that 4500 cGy is the maximum tolerated dose and it is given over a couple of weeks.

Metastatic tumors involved in the vertebral column are distributed in a usual fashion; 30% are cervical, 50% thoracic, and 20% lumbosacral. The most common cancers metastasizing to the spinal column are from breast, colon, kidney, lung, prostate, and uterus and well as lymphomas and multiple myelomas.

Common mechanisms of spread are hematogenous spread as an embolic process from the primary site, through the paravertebral and extradural venous plexus to bone marrow, which then causes vertebral body collapse and an epidural mass; adenopathy of the prevertebral lymph nodes, which can cause growth into the epidural space (lymphoma) and seeding of the CSF may occur with cancers of the central nervous system with subsequent spreading to the subarachnoid space and along the brain and spinal cord (Flounders & Ott, 2003).

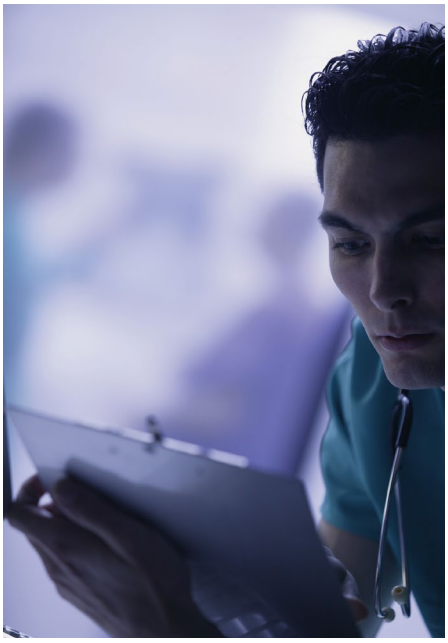
Regardless of the tumor type or location spinal cord tumors result in dysfunction and neurological deficits. These changes result from direct cord compression, ischemia secondary to arterial or venous obstruction and direct invasion of the cord. Cord compression can cause traction on or irritation of the spinal roots, displacement of the spinal cord, interference with blood supply, or obstructions of CSF circulation. Edema associated with cord compression is seen in both extramedullary and intramedullary tumors and can travel upward along the cord causing additional deficits to the delicate cord. Control of edema is one a major focus of management.

Signs and symptoms related to spinal cord compression are pain, motor weakness, sensory deficits, bowel, bladder and sexual dysfunction. Symptoms can aid in diagnosing the location of the lesion, however they can be misleading. Pain is the initial symptom in about 95% of all vertebral or spinal cord tumors. The sequencing of neurologic symptoms is pain, motor weakness, sensory weakness, motor loss and then autonomic dysfunction. Motor weakness is heaviness or stiffness of the extremities and may lead to loss of coordination and ataxia. Sensory loss is numbness and tingling and loss of thermal sensations then loss of proprioception and deep pressure and vibratory sensations.

Sensory dysfunction begins at the toes and ascends as it reaches the level of the lesion. In cauda equina compressions, the loss is bilateral and follows the dermatome pathway to the posterior thigh and the lateral aspect of the leg. Signs of autonomic dysfunction include impotence, and bowel and bladder dysfunction which may include hesitancy, retention, overflow and incontinence. Bowel dysfunction includes lack of urge to defecate and inability to bear down. Late dysfunction is loss of sphincter control and is associated with a poor prognosis. (Hickey 2003; Floundes & Ott 2003; Marrs 2006; Strobel 2009)

The most critical factor in SCC is neurological status before initiation of therapy, therefore early diagnosis is paramount. Physical examination and history of disease and symptom onset including intensity, quality, and duration should be obtained. Assessment includes muscle strength and abnormal tone (flaccidity or spasticity) and signs of muscle wasting. Testing of deep tendon reflexes, superficial abdominal reflexes and the Babinski reflex are a critical part of the exam. Sensory assessment including pain, vibration, position, light touch should begin at the toes and move upward to determine the highest level of intact function. Also assessment of bowel, bladder function and sexual function should be undertaken.

Diagnostic studies initially include x-rays of the spine, which can detect up to 85% or all vertebral lesions. Bone scans are more sensitive than x-rays. Magnetic resonance imaging (MRI), computerized tomography (CT) and myelography are the definitive diagnostic test for SCC. Once history, physical examination, and diagnostic studies have been completed the goal of treatment is to preserve neurological function, control pain and initiate a treatment plan focused on tumor removal or control. Treatment options are surgery, radiation or chemotherapy. Surgery is undertaken to establish the diagnosis so that further treatments may be planned according to the type of tumor and its' sensitivity to radiation, chemotherapy or any of the targeted agents. Advances in surgical techniques as well as the use of intra-operative MRI, spinal cord evoke potential with motor/sensory monitoring and the use of lasers and ultrasound are refining the approach and completeness of the resection. These improvements are also protecting the delicate structures and preserving the quality of life for patients. Unfortunately, poorer outcomes are likely if neurological deficits already exist.



Corticosteroids are usually the initial treatment until a more definitive treatment can be established. They are used to reduce edema and inflammation, which cause pain and neurological

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symptoms. Corticosteroids may also have an oncological effect on tumors such as lymphomas. Dexamethasone is the primary steroid used and it is tapered slowly once additional treatments are completed. Chemotherapy is used after the radiation and is focused on the systemic disease status. (Hickey 2003; Strobel 2009; Floundes & Ott 2003)

Side effects from radiation are fatigue, skin alterations, and dry or moist desquamation.

Radiation therapy may not be necessary for primary tumors of the spine; however it is the core treatment for spinal cord compression caused by metastatic tumors as well as some primary tumors such as gliomas and ependymomas. The spine is less tolerant of radiation than the brain or other organs. Clinical studies have suggested that 4500 cGy is the maximum tolerated dose and it is given over a couple of weeks. Higher doses are associated the radiation myelopathy, which is an irreversible complication which begins insidiously at least 6 months after radiation but more frequently 12-15 months. Radiosurgery to the spine continues to evolve. The current recommended doses are kept below 10Gy with doses up to 14Gy for lesions in the cauda equina. Although, these dose levels are likely conservative estimates of true spinal cord and cauda equina tolerance, given the disabling nature of radiation-induces myelitis, one should always err on the side of caution. (Hickey 2003; Strobel 2009; Berstein & Berger, 2008)

Radiation fields usually cover the area of the SCC and one or two vertebral bodies above and below the compression level. Radiation may result in improvement or maintenance of neurological function status and improvement in pain within about five days from the start of treatment. Side effects from radiation are fatigue, skin alterations, and dry or moist desquamation. Goals of management are minimizing symptoms, promoting healing and prevention of infection.

Nursing management is focused on early recognition of neurological changes through ongoing monitoring of pain, sensory, motor and bowel and bladder function and their impact on a patients activities of daily living. Patient with either primary or metastatic spinal cord tumors need long-term follow-up and management. From the nursing standpoint, functional ability to perform ADL's, nutrition, comfort (pain management) and quality of life provide a framework to establish assessment and care. Any persistent problems may necessitate a referral to another discipline (physical therapy, pain clinic, dietary consults) and community resources may be helpful.

Tumors and metastatic disease of the central nervous system continue to be devastating problems for patients with cancer. Timely and accurate diagnosis of these disorders, including increased intracranial pressure and spinal cord compression is essential to maintain the patient's function and quality of life. New diagnostic procedures and treatments are making it easier for clinicians to diagnose and treat these complex disorders.

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THE CHAPTER CAPSULE

...is a publication of the Metropolitan Detroit Chapter of the Oncology Nursing Society. MDONS is devoted to improving the quality of care given to patients experiencing cancer. This newsletter is published four times a year, in spring, summer, fall and winter. Letters and articles from members are welcomed. All material is subject to editing for space and clarification. Neither the Metro Detroit Chapter nor the ONS National Office assumes responsibility for opinions expressed herein. Acceptance of manuscripts does not indicate or imply endorsement. Materials may be submitted to:

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