The Challenges of Long-Term Treatment Outcomes in Adults With Malignant Gliomas

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Malignant gliomas are among the most devastating tumors, with survival only one to three years after diagnosis even with the best of treatments. For this reason, long-term follow-up has not been established. Patients who do survive have significant disabilities, which compromise patient and family quality of life (QOL). Side effects from a brain tumor are dependent on the location of the tumor in the brain and can cause significant cognitive, emotional, and social effects on patients and families. Surgical treatment options also are dependent on the location of the tumor in the brain, and some sites remain inoperable (e.g., brain stem, motor strip). Radiation therapy continues to remain the mainstay of treatment for this patient population. The advent of newer technologies in radiation and chemotherapy and the development of novel treatments have increased survival. As survival increases, QOL issues become more important to patients and families. Impairment, disability, and handicap are measurements of QOL used by healthcare professionals. A multitude of studies has produced evidence regarding the impact of tumor location and size on QOL, whereas other studies have demonstrated the effects that various treatment modalities have on QOL. Few studies actually have provided insight into the everyday consequences that tumors pose on patients. Understanding the significance and causes of these impairments, disabilities, and handicaps will assist oncology nurses in caring for this special population.

Key Words: brain neoplasms, quality of life, radiation-induced abnormalities

Tumor Association, this number comes from databases counting only malignant brain tumors (Segal, 2004). About 12,690 patients will die from their malignant brain tumors, with malignant gliomas among the most devastating tumors (Jemal et al.). Malignant gliomas are reported as the leading cause of cancer-related death in men aged 20–39 and the fifth-leading cause of death in women aged 20–39 (Jemal et al.; Segal, 2004). The reported five-year survival rate for patients diagnosed with malignant gliomas from 1974–1976 was 22%. For patients diagnosed with malignant gliomas from 1992–1997, the five-year survival rate is reported to have increased to 32%. This is a significant statistical increase in survival over the past 20 years (Segal, 2004). However, the future for patients diagnosed with malignant gliomas still remains uncertain.

The natural course of events for a malignant glioma is that of progressive neurologic deficits, repetitive treatment, further neurologic decline, and eventual death. Long-term follow-up for patients with malignant glioma is not well established because...
most patients do not live more than one to three years after diagnosis even with the best of treatments. Patients who survive most often are left with significant disabilities that compromise patient and family quality of life (QOL). As healthcare providers strive to produce more effective treatment modalities, QOL for patients and families has become one of the primary endpoints of treatment strategies.

Tumor location and tissue type pose considerable challenges in the management of brain tumors. The tumor also poses significant challenges to patients and families who must learn to cope with life that truly will never be the same again. Significant cognitive changes, emotional and social impacts of the disease and treatment side effects, and changes in patient functionality require close observation and a heightened sense of awareness to achieve the best outcomes. Understanding areas of function in the brain and side effects of the disease and treatments will aid nurses in assisting patients and families to improve QOL for this special population.

The Brain

The brain is made up of two hemispheres called the cerebral hemispheres. Each hemisphere is comprised of four sections called lobes: frontal, temporal, parietal, and occipital (see Figure 1). Each lobe controls specific activities. The right hemisphere controls activities on the left side of the body, and the left hemisphere controls activities on the right side of the body.

The second area in the brain is the cerebellum, which is located at the back of the head and is connected to the brain stem. The cerebellum also is divided into two hemispheres. The brain stem is the bottom portion of the brain that connects the brain to the spinal cord. The brain stem is comprised of the midbrain, pons, medulla oblongata, and reticular formation. Cranial nerves III–XII originate in these structures (see Figure 2).

The brain has four ventricles, cavities containing cerebrospinal fluid (CSF) that are connected. The function of the ventricles is to produce CSF and transport it throughout the central nervous system (CNS) (see Figure 3). CSF is a clear fluid that bathes and cushions the brain and spinal cord, protecting them from injury caused by movement. Two lateral ventricles exist, one on each side of the brain. The third ventricle is located below the corpus callosum (the area of the brain made up of nerve fibers that pass through and connect the two cerebral hemispheres). The final ventricle is the fourth ventricle, which is an expansion of the medulla oblongata and allows CSF to flow down into the spinal canal.

Function

Figure 4 provides a general overview of human function and behavioral locations in the brain. The frontal lobe of each hemisphere controls voluntary movement, usually on the opposite side of the body. The frontal lobe of the dominant side controls language and writing. Most right-handed individuals and some left-handed individuals have their dominant side in the left hemisphere. The remainder of left-handed individuals have their dominant hemisphere on the right side. Other frontal functions include affect, behavior, concentration, initiative, memory, speech, reasoning, judgement, thought, and abstraction. The posterior aspect of the frontal lobe involves movement, and the sense of smell is located in the base of the lobe.

The temporal lobe is the location of the hearing and vision pathways (understanding of sounds and the spoken word), along with other functions such as behavior, emotion, taste, creativity (music and art), and past memory. Sensory perceptions are found in the parietal lobes. Sensory interpretations are of pain, pressure, touch, temperature, and awareness of body parts and their location (spatial relations). Additional perceptions are of size, shape, weight, texture, and consistency. The parietal lobe also is the location for activities such as hearing, memory, and reasoning, as well as language and the ability to write and do arithmetic. The left parietal lobe is the location for motion, speech, and sensation. The right parietal lobe is the location for abstract concepts.

The primary function of the occipital lobes is vision, not only to see but also to...
The established treatment for malignant gliomas is surgery (see Table 2). Surgery is performed not only to obtain a tissue diagnosis, but also to reduce the tumor burden to make any other treatment modalities more effective. The extent of surgical resection is based on tumor location and size (see Figure 4). Gross total resection without harming the patient is the optimal treatment. A biopsy is carried out for tissue diagnosis only if a tumor is located in a critical area of the brain, such as the brain stem or motor strip.

Adjuvant radiation therapy with or without a boost is the most effective treatment for malignant gliomas. External beam radiation therapy is the treatment of choice. With the advent of newer technology, radiation has evolved from treatment of the whole brain to current three-dimensional conformal and intensity-modulated radiotherapy (IMRT) techniques. These techniques provide maximal treatment to the tumor while minimizing the degree of normal tissue involvement, reducing the risk of radiation damage (radiation necrosis). Other types of radiation such as stereotactic radiosurgery.

**Tumor Effects**

The most common symptoms related to brain tumors are headaches, often associated with vomiting; seizures with or without altered level of consciousness; and changes in cognitive or functional ability. These symptoms by themselves are not classic signs specifically of a brain tumor diagnosis. Symptoms declare themselves according to location, tumor size, amount of edema or mass effect associated with the tumor, degree of infiltration into brain tissue, and whether the tumor is located on the right or left side of the brain.

Headache is a commonly reported symptom and can vary in severity and quality. No actual pain centers are located in the brain tissue itself. Headaches are thought to be associated with local swelling and distortion of the nerve endings associated with blood vessels primarily in the meninges (Hickey, 1992; Levin et al., 2001).

Headaches usually are worse in the morning or upon waking from sleep and may be associated with vomiting. An exact relationship has not been established between the location of the headache and the location of the tumor. As pressure in the head builds up (intracranial pressure), a headache may be bifrontal or bioccipital, regardless of tumor location (Hickey, 1992).

Seizures may be a presenting symptom and occur in about 20%–60% of adult patients with brain tumors (Hickey, 1992; Levin et al., 2001; Meyers, 2000b; Segal, 2003). A seizure is an alteration in the normal electrical potential of cells caused by the tumor, which then results in cell hyperactivity. Two major types of seizures exist: partial and general. Partial seizures are classified into either simple partial or complex partial seizures. Simple partial seizures involve any of the senses (i.e., visual, smell, hearing, taste, and touch) or movement of one part of the body. No loss of consciousness occurs during a simple seizure, which generally lasts a few seconds (Leppik, 1998). A complex-partial seizure involves loss of consciousness and is accompanied by purposeless automatic movements followed by a state of confusion. This type of seizure may last for a few seconds or as long as one minute (Leppik).

The second type of seizure is a general or grand mal seizure. A grand mal seizure may begin as a partial seizure but quickly progresses to the rest of the brain and produces tonic-clonic (twisting-relaxing) muscle contractions with shallow breathing, biting of the tongue, and possible loss of body functions. It comes on suddenly, may last several minutes, and is followed by limpness, confusion, and fatigue, which may last for several hours to days (Leppik, 1998).

Changes in cognitive or functional abilities are related to tumor location in the brain, size, and the mass effect distorting surrounding normal brain tissue. Cognitive or functional changes may be among the symptoms that cause patients to seek medical advice.

**Effects of Treatment**

The established treatment for malignant gliomas is surgery (see Table 2). Surgery is performed not only to obtain a tissue diagnosis, but also to reduce the tumor burden to make any other treatment modalities more effective. The extent of surgical resection is based on tumor location and size (see Figure 4). Gross total resection without harming the patient is the optimal treatment. A biopsy is carried out for tissue diagnosis only if a tumor is located in a critical area of the brain, such as the brain stem or motor strip.

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The neurologic toxicities of radiation are categorized by the timing of their presentation as acute (days to weeks), early delayed (one to six months after radiation), and late delayed (more than six months to many years). The acute or immediate side effect is encephalopathy. It usually appears in the first two weeks of radiation treatment and may last six to eight weeks. Signs and symptoms include nausea, vomiting, drowsiness, headache, dysarthria (impaired speech), and worsening of preexisting deficits (see Figure 4). Because these side effects are well documented, radiation oncologists usually prescribe dexamethasone (a steroid) at the start of treatment to prevent or minimize these early symptoms.

Early-delayed reactions are the result of temporary demyelinating processes and altered capillary permeability associated with loss of the blood-brain barrier. Reactions are described as somnolence syndrome, temporary cognitive impairment, subacute rhombencephalitis, and worsening of preexisting symptoms. Somnolence syndrome is seen in 8%–84% of patients after radiation and is a collection of symptoms including headache, nausea and anorexia, drowsiness, lethargy, and excessive sleeping (18–20 hours a day) (Behin & Delattre, 2002). Fever and papilledema also may be seen. Other possible symptoms include irritability, attention deficits, difficulty with recent memory, and a general sense of “not feeling well.” Somnolence syndrome usually resolves on its own in a few weeks, and the use of steroids may assist with symptom management (Behin & Delattre; Stewart-Amidei, 1995).

Temporary cognitive impairment may be related to swelling in the brain as a result of radiation treatment, previous surgery, or the brain tumor. Subacute rhombencephalitis is the effect of radiation on the brainstem for patients with tumors located in this area, usually occurring one to three months after radiation. Symptoms include ataxia (gait abnormalities), dysarthria (speech disorder caused by weakness or incoordination of speech muscles), diplopia (double vision), nystagmus (involuntary movement of the eyeball), and hearing loss. Symptoms generally improve over a few weeks to a few months (Behin & Delattre, 2002).

Late-delayed side effects of radiation therapy include radiation necrosis, severe cognitive impairment, and radiation-induced dementia. Radiation necrosis is a devastating consequence usually seen one to two years after radiation therapy, but it also can be seen as early as three months or as late as 30 years after treatment (Behin & Delattre, 2002). Radiation necrosis is challenging because it often is difficult to distinguish from recurrence of the tumor. Magnetic resonance imaging (MRI) alone cannot diagnose this complication; therefore, other types of studies are necessary. Positron emission tomography (PET) and magnetic resonance spectroscopy (MRS) are two newer imaging studies used to differentiate tumor progression and necrosis (see Figures 5–7). PET uses glucose to distinguish between metabolically active and inactive tissue. Tumor is reflected as a hot (red) or metabolically active area. Radiation necrosis is referred to as a cold area (blue or green) or metabolically inactive on a PET scan.

MRS is seen as increases (spikes on a graph) in enzyme activity of choline, lactate, creatine, and N-acetyl aspartate. Increases in lactate and N-acetyl aspartate levels and decreases in choline levels are indications of radiation necrosis rather than tumor. With an active tumor, choline levels increase (see Figures 6 and 7).

Although these newer techniques are helpful, tissue diagnosis remains the only accurate way to determine radiation necrosis. Surgery for debulking of the necrotic tissue reduces the mass effect and the source of free radicals (Stewart-Amidei, 1995) and is the basic treatment for necrosis (see Table 2). Other treatments now are being used for radiation necrosis. These include anticoagulation (IV heparin followed by oral warfarin), Trental® (pentoxifylline, Aventis Pharmaceuticals Inc., Bridgewater, NJ), and vitamin E as medical therapy. Hyperbaric oxygen therapy also may be used to increase the tissue partial pressure of oxygen and promote angiogenesis (Behin & Delattre, 2002). A limited number of studies has assessed the efficacy of these newer therapies on radiation necrosis, survival, and quality of life.

Currently, the most significant long-term adverse event for patients receiving radiation to the brain is cognitive impairment. Behin and Delattre (2002) and Surma-aho et al. (2001) described postoperative radiation as posing a significant long-term risk for leukoencephalopathy (white matter dysfunction) and cognitive impairments, and they suggested that the risk’s importance is growing as survival is lengthening in many patients receiving radiation. They also suggested that
the impact of chemotherapy associated with radiation, as well as preexisting cognitive deficits, cannot be discounted (Behin & Delattre; Surma-aho et al.). Postma et al. (2002) found postradiation cognitive impairments to be exhibited as short-term memory loss, attention deficit, and information-processing capacity. Although their study was small, they were able to predict a correlation between radiation-induced radiologic cerebral abnormalities and cognitive performance. Brown, Buckner, Uhm, and Shaw’s (2003) study on low-grade gliomas concluded that cognitive damage can take years to develop and was related to the amount of radiation given, both volume and dose. With advanced techniques such as SRS, IMRT, and threedimensional beam shaping, radiation can be delivered to precise targets with limited exposure of surrounding areas. Armstrong et al. (2002) also suggested that the use of current radiation techniques has decreased toxic effects to normal tissue.

Weitzner, Meyers, and Byrne (1996) compared patients who received only surgery and radiation with those who received adjuvant chemotherapy. Of special interest to the researchers was that although the addition of chemotherapy was related to the histology of the tumor and the time since diagnosis (factors that did not affect quality of life), those patients receiving chemotherapy had more impairment, not only in health and functioning, but also in overall QOL. The Oncology Nursing Society (2002) wrote about cognitive impairment, specifically related to chemotherapy in patients with cancer, indicating that direct and indirect factors contribute to it. The direct factor in cognitive impairment is the actual brain tumor, either a primary CNS tumor or one that has metastasized from another part of the body. It suggested that the common cognitive impairments from chemotherapy include losses of memory, concentration, attention span, organizational ability, and arithmetic and language skills, deficits which contribute to diminished QOL in activities of daily living, interpersonal relationships, work and profession, and future education. Nutritional deficits and hematologic, metabolic, and endocrine abnormalities were indicated as indirect factors, which also contributed to cognitive impairment of patients. Meyers (2000a) suggested similar findings about patients with cancer in general. However, she specifically addressed the QOL of patients with brain tumors and the effects of chemotherapy, which she reported as memory loss, decreased information-processing speed, reduced attention, anxiety, depression, and fatigue (Meyers, 2000b). These studies stress the need for careful cognitive and functional assessment and management of patients receiving chemotherapy as part of treatment for malignant glioma.

Meyers and Abbruzzese (1992) studied the effect of previous treatment on cognitive functioning of patients with cancer. They concluded that the type of previous treatment, whether it was surgery, radiation, or chemotherapy, could affect cognitive function.

FIGURE 5. EXAMPLE OF A PATIENT WITH PREVIOUS RADIATION THERAPY AFTER GLIOBLASTOMA MULTIFORME (GBM)
Note. Image courtesy of David Hearshen, PhD, magnetic resonance imaging physicist in the Department of Radiology at Henry Ford Hospital in Detroit, MI.

FIGURE 6. EXAMPLE OF A PATIENT WITH GLIOBLASTOMA MULTIFORME (GBM) WITH PREVIOUS RADIATION THERAPY
Note. Image courtesy of David Hearshen, PhD, magnetic resonance imaging physicist in the Department of Radiology at Henry Ford Hospital in Detroit, MI.

Patient presented with new area of contrast enhancement. The clinical question was to determine whether this area of interest was recurrent tumor versus radiation necrosis. Yellow graft indicates abnormal choline (Cho) to creatine (Cr) ratio and Cho to N-acetyl aspartate (Naa) ratios, thus leading to the conclusion of recurrent tumor. Blue arrows show contralateral normal spectra for comparison. Lac/Lip—lactate/lipid; MRSI—magnetic resonance spectroscopic image.
therapy was a significant risk factor for cognitive impairment. They suggested that as the number of patients receiving multiple-agent treatment for their cancer increases, more survivors will be affected by their disease and treatments. Their study population included only patients with metastatic brain tumors. With the increased survival for patients with malignant gliomas, new studies are needed to assess specific drug and time interactions on altered neurocognitive changes.

Olin (2001) summarized how cognitive dysfunction impacts the needs of patients with cancer. She suggested that healthcare professionals should recognize that cognitive impairment occurs after chemotherapy and that a need may exist for not only neuropsychological testing but also cognitive and vocational rehabilitation and possibly psychological counseling. The fact that even subtle cognitive changes may diminish QOL for patients with malignant gliomas receiving chemotherapy is important for all healthcare practitioners and warrants further investigation.

Outcomes

The World Health Organization (2002) established a three-tiered system for recognizing the impact of neurologic dysfunction on patients with cancer. The system classifies illness around three practical domains: impairment, disability, and handicap. Impairment is defined as a deficit of the brain caused by a disease and is assessed by neurologic and neuropsychological evaluations. For a patient with a malignant glioma, this may constitute leg weakness, inability to speak, or memory loss. Disability is the impact of the deficit (impairment) on the patient’s ability to perform activities and is assessed by performance status and functional status measurements. The inability to speak may prevent a patient from talking to others and getting ideas across. Handicap is the impact of a disability on a patient’s subjective well-being and social functioning and generally is assessed by QOL questionnaires (Heimans & Taphoorn, 2002; Meyers & Hess, 2003; World Health Organization). An example that demonstrates a handicap would be a patient who is a teacher having difficulty with word finding (impairment). Not being able to choose the right word would limit the teacher’s ability to teach. This classification system lends itself to the more practical aspect of evaluating a patient’s abilities and deficits and how his or her life is being affected by the handicap(s) created by the tumor and treatment.

Quality of Life

Patients with malignant gliomas are faced with a disabling and usually fatal disease. They must learn to cope with side effects, loss of self-image, and their own mortality. Because side effects of radiation therapy usually take years to develop and survival often was quite limited, QOL assessment previously had not been addressed. With newer technology and the development of targeted therapies, survival has been extended for some. QOL assessments are included in most clinical research designs, whether for newer molecular drugs or standard therapies delivered via different methods.

In the past, QOL usually was assessed with the Karnofsky Performance Scale (KPS). This scale addresses the physical functioning of a patient. Scores range from 10–100 and indicate a patient’s ability to perform normal activities of daily living or his or her degree of dependency on others for assistance. A score is determined by a physician or advanced practice nurse caring for the patient. This tool, however, is insensitive to neurologic impairment such as memory loss, speech disturbances, and seizure activity (Heimans & Taphoorn, 2002). The KPS does not address any of the psychological or social impairments that a patient with a brain tumor must deal with on a daily basis. In recent years, many new QOL tools have been developed and tested for accuracy and validity. Figure 8 is a listing of some of the tools available to healthcare providers to measure QOL and cognitive abilities.

Impairment (a defect of the brain caused by a disease) may be the best way to measure the impact of therapy; however, the aspects most important to the patient are disability and handicap (Heimans & Taphoorn, 2002). This is an example of how healthcare providers and patients see things from different perspectives. At the present time, most researchers studying QOL in patients with brain tumors are using a multidimensional approach and are looking at not only function but also the psychological and social impact of the disease.

Salo, Niemela, Joukamaa, and Koivukangas (2002) focused on perceived QOL from the standpoint of tumor laterality. Their findings suggest that preoperatively, patients with tumors on the right side of the brain had poorer QOL than those with tumors on the left side. Similarly, patients with anterior tumors had poorer QOL than those with posterior tumors. Postoperatively, they found that the patients with anterior tumors in the right hemisphere had better QOL, and trauma to the motor cortex of the left hemisphere caused more inconvenience to the right-handed patients than corresponding trauma in the right hemisphere (Salo et al.). Current knowledge of the functions of the brain suggests that tumors located...
in the left side of the brain would cause patients to have poorer QOL than tumors located in the right hemisphere because of cognitive abilities and language skills located in that region. However, Salo et al.’s findings were unexpected and contradictory to other research findings that suggested the opposite is true (Hahn et al., 2003). Salo et al. concluded that patients with tumors on the left side had better QOL (perceived), possibly because of the patients’ cognitive inability to evaluate their own condition. In addition, they found that larger tumors impaired all dimensions of QOL and that a malignant grade also related to poorer QOL, which was consistent with other studies they reviewed.

Klein et al. (2001) studied health-related QOL and neuropsychological functioning after surgery in patients with high-grade gliomas, comparing them to those with non-small cell lung cancer. Results were similar except for social functioning, which was poorer for the patients with gliomas. Furthermore, the patients with gliomas showed deficits in basic information-processing capacity and limitations in higher cognitive abilities and executive functioning. Klein et al. also suggested that because patients with gliomas typically present with more severe symptoms than those with other histologies, these findings likely underestimated the actual impact that gliomas have on health-related QOL, especially cognitive functioning. Their conclusion was that QOL measures are indispensable for evaluating the impact of treatment of glioma on the everyday lives of patients (Klein et al.).

Weitzner et al. (1996) performed research studies looking at QOL issues from many perspectives. They suggested that the data from many QOL studies in patients with brain tumors focused on performance status. However, cognitive function declines more rapidly in patients with brain tumors than in other patients with cancer, contributing to their rapid decline in functional status. Therefore, multidimensional assessment is more useful.

Osoba et al. (1997) studied health-related QOL in relation to neurologic dysfunction. They suggested that one of the most difficult aspects for patients and families is the tendency of malignant gliomas to affect mental and motor functioning. The facts that malignant gliomas most often are incurable and that patients who receive treatment usually are left with significant mental, cognitive, and motor deficits add to the complexity of dealing with this tumor. Therefore, measuring health-related QOL in patients with malignant gliomas is appropriate (Osoba et al.).

The literature is filled with studies describing the effects that malignant brain tumors have on QOL. What these studies do not disclose are the clinical implications. Once treatment is complete, a patient may no longer be seen in chemotherapy or radiation clinics. Return visits become follow-up visits often months apart. Close observation for subtle changes in function, cognitive abilities, or mental status often is left to healthcare providers not always familiar with these subtle changes.

The fact that an MRI shows no evidence of disease does not necessarily indicate that a patient is free of side effects from disease and treatment. A patient still may have functional, cognitive, and behavioral disabilities, as illustrated by the following examples.

A patient’s wife said in the clinic, “It is wonderful to know that the MRI looks great and that he is doing so well. That is what everyone says, but they don’t know that some mornings, he doesn’t know that he has to put his pants on first.” Another patient struggles with the concept that his family members may lose their health insurance if he continues to refuse a medical retirement. To a patient with deficits in executive skills
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Armstrong, C.L., Hunter, J.V., Ledakis, G.E., Cohen, B., Tallent, E.M., Goldstein, B.H., et al. (2002). Late cognitive and radiographic chance of both husband and wife learning to cause of patients’ cognitive impairment, the spair, and the characteristics of the couples’ concerns with their spouses were cognitive deficits, changes in personality, feelings of despair, and the characteristics of the couples’ relationships. In addition, patient and spouse also believed that getting prognostic information did not make life easier and that talking about grave situations was having to face the situations.

Wideheim, Edvardsson, Pahlson, and Ahlstrom (2002) studied living with a highly malignant brain tumor. They found that because of patients’ cognitive impairment, the chance of both husband and wife learning to cope with grief and loss together, as well their ability to share their anxieties and concerns about the future, was limited greatly. Another finding was that families believed that they had too little knowledge about caring for their loved ones and felt insufficiently prepared to provide care over a long period of time.

Current Assistive Programs

Because survival for patients with malignant gliomas is limited, most patients are not referred for neuropsychological testing or rehabilitation programs. Institutions have been established to rehabilitate patients who have suffered from traumatic brain injury (e.g., stroke, accident), but few institutions work directly with impairment-challenged patients with malignant brain tumors. Sherer, Meyers, and Bergloff (1997) performed a retrospective study looking at patients with brain tumors and rehabilitation. Although their study was small, it demonstrated the potential effectiveness that rehabilitation centers can offer patients with malignant brain tumors. The results also demonstrated lower costs for patients with tumors when compared to patients with traumatic brain injuries. The study also suggested that rehabilitation has direct, indirect, and social benefits. The direct benefit for patients who received rehabilitation was improved QOL as evidenced by increased self-reliance, ability to be employed, and financial independence. The indirect and social benefits were related to diminished need for caregiver services and government services such as Social Security disability and/or employer disability benefit programs (Sherer et al.).

Meyers, Weitzner, Valentine, and Levin (1998) suggested the use of methylphenidate (Ritalin®, Novartis, East Hanover, NJ) to improve the cognitive function of patients with malignant gliomas with significant improvement in verbal memory, visual-motor speed, expressive speech function, executive function, and fine motor coordination. Meyers et al. (1998) also suggested that concentration difficulties, psychomotor retardation, and fatigue, frequently seen in patients with malignant brain tumors, improved with the use of Ritalin. Improvements were seen in walking, stamina, motivation to perform activities, and bladder control. Few side effects were seen, and patients who were on steroids were able to decrease their doses (Meyers et al., 1998).

These studies raise many questions for healthcare providers. Are patients being evaluated in all areas of performance: functional, psychological, and social skills? Are appropriate referrals being made, or do healthcare providers assume that the cognitive functioning of surviving patients with malignant gliomas cannot be rehabilitated? Are healthcare providers talking with or at patients and their families? Are healthcare providers open to dialogue concerning the many areas of life (e.g., QOL, finances, sexuality, relationships) about which patients and family members are afraid to ask? Do family members know how to talk about these issues? To truly understand the challenges that patients and families face as survivors of this devastating disease, healthcare providers must look at the whole person, not just a malignant brain tumor.

Oncology nurses often are the people with whom patients and families establish close relationships, allowing them to express their fears and needs. Understanding what patients with brain tumors experience and why may help the search for ways to provide better quality care, which, in turn, will improve QOL. The challenges that healthcare providers face in treating and caring for patients with malignant gliomas are similar to those of long-term survivors. Oncology nurses have the potential to make a difference in the QOL of patients and their families. Research continues to look for newer drugs that target only the malignant tumor, sparing normal tissues of the brain, and more sophisticated techniques to define radiation treatments. Additional QOL research needs to be conducted from the perspective of patients and families to see their world through their eyes. Nurses have the ability to assess the cognitive, functional, social, and psychological abilities of patients and families and must strive to improve QOL for both.

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References


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**Rapid Recap**

**The Challenges of Long-Term Treatment Outcomes in Adults With Malignant Gliomas**

- Malignant gliomas are among the most devastating tumors, and survival is limited even with the best of treatments.
- The advent of newer technologies in radiation and chemotherapy as well as the development of novel therapies have increased survival.
- As survival increases, quality-of-life issues become more important to patients and families.
- Understanding the significance and causes of the impairments, disabilities, and handicaps that patients endure from the disease and the treatment will assist oncology nurses in caring for this special population.