The Connection

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Current and Future Treatment Modalities For Acoustic Schwannomas

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Acoustic schwannomas (also known as acoustic neuromas or vestibular schwannomas) are a relatively rare non-cancerous tumour that arises from the vestibulocochlear nerve. These tumours grow slowly due to the over proliferation of Schwann cells, which normally wrap around nerves to provide support and insulation. Most commonly, patients present with hearing loss, sensation of fullness in the ear or ringing in the ears. In addition, the vestibulocochlear nerve runs through the cerebellopontine angle alongside important cranial nerves, blood vessels and the brainstem. Large tumours can compress these nearby structures and cause additional symptoms, such as facial paralysis and balance problems or unsteadiness. Once the preliminary diagnostic procedures including hearing tests (audiometry) and computed tomography (CT) scans are completed, the gold standard for diagnosis of acoustic schwannomas is magnetic resonance imaging (MRI) scans, which help determine the location and the size of the tumours.

Treatment options for acoustic schwannomas can range from clinical observation to surgery or radiotherapy. The treatment for acoustic schwannomas depends on the size of the tumour, patient's general health and preferences. For some small acoustic schwannomas with minimal symptoms clinical observation is acceptable, especially in elderly patients or patients with medical comorbidities where the risks of therapy may be greater. Surgery can often remove the tumour completely, through a suboccipital, translabyrinthine or middle fossa approaches. The goal of surgery is the removal of the tumour and the preservation of the facial nerve, and to preserve hearing when possible.

Current and Future Treatment Modalities For Acoustic Schwannomas

Another option is radiosurgery, where focused radiation is applied to the tumour to reduce the size or limit the growth of the tumour. It often takes months before the effects of radiosurgery are evident on the tumour. For tumours that are less than 3 cm in size, both surgery and radiosurgery are an option, with similar efficacy. For larger tumours, surgery is the only option. The risks of treatment include hearing loss, ringing in the ears, facial weakness/numbness, balance problems and treatment failure (continued growth in the case of radiosurgery).

To date, there are no effective medical treatment options established for the treatment of acoustic schwannomas. The limited understanding of the molecular drivers of tumour development, in part, is a reason for the dearth of drug development. Our laboratory is focused on uncovering the genetic alterations that lead to the growth of acoustic schwannomas.

We published a study in *Nature Genetics* (2016) characterizing the genomic landscape of sporadic schwannomas, which identified mutations in *NF2, ARID1A, ARID1B* and *DDR1*[1]. Most notably, we identified a novel genomic rearrangement resulting in a fusion gene SH3PX2DA-HTRA1 in a subset of schwannomas that was demonstrated to increase the growth of these tumours. Experiments in our lab showed that MEK inhibitors, a class of targeted therapies, is a potential therapeutic option for the subset of schwannomas with the gene fusion. This study highlights the possibility of developing targeted therapies for acoustic schwannomas based on preclinical studies focused on understanding the tumour biology.

Clinical trials studying the efficacy of a subset of targeted medical therapies are in their infancy. Bevacizumab has been demonstrated to prolong tumour stability and prolong time to hearing loss in two clinical trials[2]. Based on these trials, the Congress of Neurological Surgeons (CNS) have recommended the use of bevacizumab in patients without surgical options. In another study, a receptor tyrosine kinase inhibitor, acting on epidermal growth factor receptor, demonstrated significant reduction in tumour volume in 23.5% of patients, with a median response time of 4.5 months[3]. However, not all clinical trials have demonstrated positive results[4]. There are currently four clinical trials studying targeted medical therapies in acoustic schwannomas.

In an era of precision medicine, the most difficult step is translating bench-side laboratory research into clinical practice. The ongoing basic scientific research has identified potential molecular pathways and targeted therapies that could prove to be beneficial in treating acoustic schwannomas. However, current data from clinical trials has demonstrated mixed results with these targeted therapies. More work is needed to characterize the biological subgroups of acoustic schwannomas that are driven by different genomic alterations. One possible explanation for the mixed results in the clinical trials is that only a subset of tumours with specific genomic

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alterations respond to the specific targeted therapies. Further concerted effort is required from both biologists and clinicians to develop targeted therapies for treatment of acoustic schwannomas.

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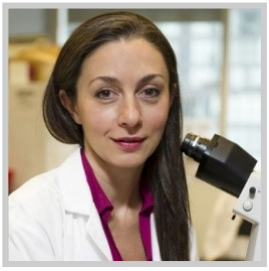

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Lebanese artist and writer, Khalil Gibran (1883-1931) offers this wisdom:

"Your living is determined not so much by what life brings to you as by the attitude you bring to life; not so much by what happens to you as by the way your mind looks at what happens."

This quote makes one pay attention to one's attitude and thoughts. Am I taking charge of what is right in front of me? Am I determined to make my life count or am I willing to just let life happen to me? How about you?

ANAC's 2018 Symposium!
The World of An Acoustic Neuroma

By: Judy Haust, ANAC President

Finally, it's what the Acoustic Neuroma community has been waiting for! As the lazy days of summer draw to a close and we once again turn our focus to more serious matters, what better way to launch into your fall activities than by attending ANAC's 2018 Symposium on Saturday, September 29, 2018.

Held just once every two years, our full-day symposium provides an invaluable hands-on learning experience for AN patients, their families and/ friends. It is also an opportunity for medical professionals in the fields of neuroscience, radiology, otolaryngology, audiology and vestibular and facial therapy to gather together and share the latest research and treatments in a setting geared to those impacted by an acoustic neuroma.

Once again, thanks to Dr. Gelareh Zadeh, Chair of ANAC's Scientific Medical Advisory Committee, we will be meeting in the state of the art BMO Education Centre which is part of the Toronto Western Hospital. Sessions will include the history of ANs, available treatment options, clinical trials, strategies for hearing loss and facial paralysis, and learning how understanding tumour biology can lead to new treatments. There will be time for you, if you wish, to stand up and "Ask an Expert." You will also be able to take part in the patient panel. Leading experts in this arena will participate in the ever-popular Multi-disciplinary Physician Panel to review and debate treatment options. Breakout sessions dealing with facial therapy, balance and vestibular rehabilitation and tinnitus will provide an opportunity to explore hands-on tips.

Just as Skype and FaceTime can't replace the feeling of having your loved ones right there beside you, the value in attending the ANAC Symposium in person could never be matched simply by surfing the net for information . . . not to mention having to sift through all the misinformation! You'll also have a chance to mingle over a light lunch buffet and snacks with others who have faced the same diagnosis of this rare tumour. As Luba G from Kelowna, British Columbia, remarked," It was so worth the time and cost to travel to Toronto to attend the 2016 symposium." **Mark Saturday, September 29 in your calendar!** More details to follow soon.

Actor and producer Michael Landon (1936-1991) once said:

"Whatever you want to do, do it now. There are only so many tomorrows."

This is a haunting quote from a talented man who passed away too early. Many people put off till tomorrow what they could do today if they simply set their minds to it. Procrastination leads to stagnation. If you feel scared and stuck, return to your dream and take the first step toward making it real. All any of us really have is TODAY, and we must grab hold of it.

In the University Health Network News

On June 20, 2018 the University Health Network (UHN) established the Krembil Brain Institute (KBI) to formally create an academic health sciences entity that harmonizes the clinical and research priorities in the neurosciences.

This new Institute will help clinicians, scientists and researchers based at Toronto Western Hospital and across UHN work together to seek better treatments and cures for diseases of the brain, spine and nerves.

Dr. Gelareh Zadeh, neurosurgeon, scientist and Program Medical Director, Krembil Neuroscience Centre at UHN, and Dr. Donald Weaver, dementia neurologist, medicinal chemist and Director of the Krembil Research Institute, will act as co-directors of the Krembil Brain Institute.

"Aligning the clinical and research priorities at Krembil is crucial to making a bigger impact in our field, the community we serve, and for improving outcomes and wellness of the aging brain," said Dr. Zadeh.

"It is important we devise strategies that accelerate and focus our research discoveries, education and training towards improving clinical outcomes and standards of care in order to advance early detection, prevention and treatment of brain conditions," she said.

It is estimated that one in three Canadians will be affected by a brain disease, disorder or injury in their lifetime and that 3.6 million Canadians are currently affected by a neurological condition.

"In this coming century, the diagnosis and treatment of brain diseases will emerge as one of the pre-eminent pursuits of modern medicine," said Dr. Weaver.

"We have the expertise, the people power and the ambition to take neurosciences to the next phase, which is to understand where we can make the biggest impact on outcomes," said Dr. Zadeh.

"The establishment of the Krembil Brain Institute allows us to position ourselves to be the predominant leader in brain medicine now, and in the years to come," added Dr. Weaver.

Nancy Lopez, 48-time LPGA winner, once said:

"Do your best, one shot at a time and then move on."

This powerfully simple advice applies no matter whether you play golf or not . If we do our best we can't fail, we can only learn from the experience and then do better next time. Here's to living without regrets.

'I Have an Acoustic Neuroma: How Can Vestibular Rehabilitation Help Me?'

By: Robynne Smith, B.Sc.P.T., B.Sc.Anat

Vestibular Rehabilitation is an exercise-based approach for treating people with dizziness and balance disorders that originated in the 1940's. Since then there have been many advances in the assessment and treatment approaches for inner ear disorders. The inner ear is housed deep in the mastoid process behind the ear and it cannot be viewed with the otoscope. The key to assessment of the inner ear is by watching the eyes through special goggles that the patient wears. Eye movements when the head is stationary or moving will indicate what conditions are or are not present.

Some of the inner ear conditions that cause dizziness or balance disorders include Unilateral Vestibular Hypofunction (UVH), Bilateral Vestibular Hypofunction (BVH), Benign Paroxysmal Positional Vertigo (BPPV), Meniere's Disease, Perilymph Fistulas and Acoustic Neuromas. This slow growing tumour deep within the inner ear along the acoustic nerve causes a gradual loss of function of the inner ear, usually on one side of the head only. When one inner ear is sending less information to the brain than the opposite ear sends, the result is conflicting signals that the brain is trying to sort out and which, in my opinion, is the cause of the sensation called 'dizziness'.

Dizziness is not a diagnosis, but a symptom that something is wrong, and it alone does not describe what a person might be experiencing. The meaning of 'dizziness' can be different for each person. Some people say they are dizzy when they are feeling off balance, unsteady, light-headedness, spinning, nausea, woozy, rocking and many other descriptions. And dizziness can be from many different causes other than the inner ear, including: - visual loss, sensory loss, mixed sensory losses, disease processes, neurological, psychological, pharmaceutical, and musculoskeletal systems. The neck may also cause dizziness, and this is called cervico-genic dizziness.

Treatment of the inner ear involves several different approaches and is individualized depending on the assessment findings:

- Adaptation which involves retraining of the eye-head coordination so that the vision will be stable when the head is moving.
- Habituation to improve tolerance to head movements.
- Balance retraining for fall prevention and overall improved function
- Substitution exercises for the body to learn to rely on the intact sensory systems when one or more of the other ones are not functioning.

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- Neck rehabilitation if needed for cervico-genic dizziness
- Maneuvers to treat BPPV
- Education and reassurance

Pre-AN Diagnosis and Pre-AN Surgery:

Some of the early signs of an AN include dizziness and imbalance for which the person might seek an assessment by a Physical Therapist or Vestibular Therapist. During the assessment, there may be indicators of AN that the therapist may bring to the attention of the physician. Vestibular treatment at this point may help with the brain to learn to compensate for the loss of function, to retrain balance control and to improve the eye-head coordination. Before surgery is indicated, the person may already have complete loss of the vestibular function on the one side and their brain may have already compensated for the loss, meaning that they have minimal balance concerns and minimal to no dizziness. If there is partial compensation, then they may be having ongoing difficulties.

Post AN Surgery:

Following the surgical removal of the AN, the level of symptoms will be determined by the level of loss they had prior to surgery. As mentioned above, if there is complete loss then the post-surgical symptoms will be minimized, and the person should be able to return to full function fairly easily. If the loss was not complete prior to the surgery, then they will be experiencing a sudden loss of function and will have more difficulties and will require more vestibular therapy.

Can I have more than one condition at the same time?

It has been both my professional and personal experience that people can have more than one condition happening at the same time. This makes the diagnosis more complicated but a systematic and thorough assessment would help discern what is involved. In my years of experience, I found that the neck is a key component for many people and some simple exercises and stretches can make a tremendous improvement for the cervicogenic dizziness. People can also have unilateral vestibular loss and BPPV which again can be seen with a complete assessment and both can be treated effectively. As well people may have weakness in their lower body or loss of sensation in the feet, which will affect their balance. Anxiety in any of these conditions will, in my opinion, magnify the symptoms they are feeling and may limit their willingness to participate in the rehabilitation process.

Who should I see?

After seeing your doctor to rule out any medical concerns that may be contributing to your symptoms, an assessment by a "Vestibular Therapist" would be of benefit. Vestibular therapists

'I Have an Acoustic Neuroma: How Can Vestibular Rehabilitation Help Me?'

typically have a background in Physical Therapy, Occupational Therapy, Audiology, or medicine (ENT). There are various levels of training from one or two-day weekend courses to more intensive 5-day training in Canada and the US. As well, the level of prior experience or training the therapist has will vary. Some courses have a competency process of testing the practical skills and written knowledge and some don't. There is no set standard of entry level practice for vestibular rehabilitation, but in my opinion, a vestibular assessment that does not use the goggles will be not be complete.

I wish everyone with AN to have a dizzy free and balanced life!

Robynne's post-graduate training includes extensive and advanced course work in Vestibular Rehabilitation in Canada and the USA. Additionally, she has completed training in FallProof which provides her excellent skills in fall prevention. She also has prior experience and course work in orthopedics, neurology, paediatrics, arthritic conditions (including osteoporosis) and chronic pain.

Robynne who ironically was treated for an acoustic neuroma in 2011 has specialized in balance and dizziness concerns, including: vestibular neuritis, BPPV, BPV, Vertigo, imbalance, unsteadiness, cervicogenic dizziness, Meniere's, and other inner ear concerns. Assisting clients in restoring their balance allows them to return to previous activities of daily living without dizziness and fear of falling. Robynne is now offering professional training on Vestibular Rehabilitation for allied health professionals through introductory to advanced level seminars, workshops and courses saskbalance@sasktel.net www.saskbalance.com

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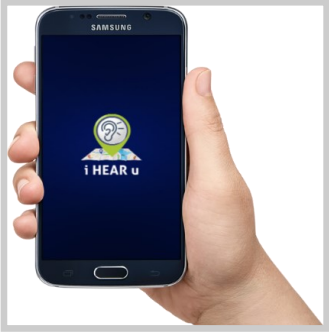

Getting sound to the brain is critical. It is key for decreasing the risk of cognitive decline, for advancing hearing health, and for facilitating interaction with colleagues, friends and family.

Unfortunately, current technology is unable to compensate for the biological changes associated with aging, or with sound deprivation, and does not sufficiently filter out unwanted noise. Amplified or electrically converted sound is imperfect. Also, finding places that provide assistive technology such as a hearing loop or locations where there is not a lot of background noise can be difficult.

The sound in restaurants, coffee houses, movie theatres, and play houses can be very loud and distorted – even for people without hearing loss. Dr. Kelly Tremblay, an advocate for people with hearing loss and a neuroscientist who studies the effects of hearing loss and hearing prosthesis on the brain states in a recent edition of Canadian Audiologist: "in a study of restaurants, bars and

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lounges in New York City, Spira-Cohen et al. reported that 49% of the venues exceeded the maximum allowable daily noise dose based on the National Institute of Occupational Safety and Health. These environments place the public at a double disadvantage.

Dr. Tremblay continues to say: "first, they are in an environment in which they cannot adequately communicate; and second, they are unknowingly in an acoustic environment that can worsen their hearing. Thus, bypassing places that are excessively loud is not only a good communication strategy for people with hearing loss; it is also a good strategy to prevent hearing loss".

A Tip for You

You may wish to check out Dr Temblay's tool to help people make use of sound. It is a free app called **iHEARu**. that allows people to use GPS to locate sound environments based on user-generated loudness. Go to: https://www.youtube.com/watch?v=zFFhOAOzaPs

Download the free app on Google Play or iTunes App Store

So What! I've Got a Brain Tumour!

Original article appeared in Canadian Audiologist Volume 5 Issue 2018 **Volume 5 / Issue 4**

By: Mitzi Jo Perritt, British Columbia

It amazes me how our journeys take unexpected turns in our lives. In March 2017, I thought my life was getting a little better after three years of family health issues, my father passing away and me turning 50.

My husband, 11-year-old stepdaughter and I had just come back from a wonderful and well-deserved vacation in Isla Mujeres, Mexico. One evening, while I was sitting on the couch browsing on my iPad, I noticed something was bothering me and later realized it was a loud ringing in my left ear. A few days later, I answered my cell phone and the person on the other end sounded like a character out of *Alvin and the Chipmunks* – high-pitched and static. That's the only way I could describe it.

I went to my doctor thinking that I'd perhaps picked up a bug in Mexico. There was no sign of infection in either ear, so I was referred to an audiologist who performed a hearing test that confirmed I had lost hearing in my left ear. She suggested trying a decongestant. When I went back a month later, a second hearing test showed further decline, so I was referred to an ENT specialist, who suggested there may be a problem with the "hammer" of my ear and referred me

So What! I've Got a Brain Tumour!

to another ENT specialist that I saw in October. After two appointments with him and a further hearing test, which revealed further hearing loss, it was concluded that there was nothing wrong with the "hammer".

Of course, with all the waiting between appointments, I turned to Mr. Google and discovered there was a tumour called an Acoustic Neuroma. Although I had all the symptoms, I didn't think I could have such a rare tumour. The ENT specialist said I could not possibly have an AN, and said my hearing loss was due to aging. However, he did say he could put me on a waiting list for an MRI exam, which could take up to a year here in Kelowna as there is only one machine at our local hospital. I told him I'd go next door and pay to have a private MRI done. He said not to waste my money – he'd try to get me in faster. Well, anyone who knows me would know that didn't fly with me! I left his office, went next door and booked an appointment.

Two days later, on November 2nd, I went to my family physician to hear the MRI results. When I saw her face, I said, "I have a tumour, don't I?" She confirmed that I had a good-sized tumour of about 3 centimetres. I went to my car and cried. I couldn't believe it . . . I did not think it would be this rare tumour I had read about. It was worth the $1,250 to confirm the diagnosis. I called my husband, who had been texting me repeatedly before going into an important meeting with his biggest client. I later learned that when his clients entered his office and greeted him, he burst into tears in front of them. I felt so badly!

Needless to say, I went home and cried all day and night for a week. Google became my best friend as I was obsessed with acoustic neuromas. I learned everything I possibly could about them, and I found the Acoustic Neuroma Association of Canada website. I emailed them and told them a little of my story to see how they could help me with resources. The next day, this woman called Carole Humphries, ANAC's Executive Director, came into my life. She phoned and talked to me and made me feel validated.

For the next three months, I drank good wine, ate bad food and cried. I was so angry at what life had given me, and that's how I coped. I talked to Carole a few times and we had some good laughs. I drove every doctor's receptionist crazy. Even the lady at the MRI clinic was getting a little upset with me, and I apologized as I got her to send discs to a whole bunch of neurosurgeons that dealt with acoustic neuromas. I couldn't believe I had to wait months to see someone. I learned that I didn't qualify for Gamma Knife because of the size of my tumour. Waiting was the hardest part. I had even considered going to the USA for surgery. I was the epitome of *needy chick*!

So What! I've Got a Brain Tumour!

Fast forward a few months to when I finally got appointments with Dr. Westerberg in February 2018 and Dr. Akagami in April, both in Vancouver. By that time, I got myself together and started to accept the fact that I had a brain tumour. Dr. Westerberg's approach gave me confidence, and when I saw Dr. Akagami, I felt even better.

During the months of waiting and appointments, I was forced to find some humour because that's the only thing that has got me through this. When Dr Akagami was listing all the complications that can happen during surgery including not being able to swallow; my first thought was "Wow I'll finally lose those 20 pounds I need to lose!" Or when he was telling me I'll need weights on my eyes when I go to sleep I thought to myself, well there goes my sex life! That's so not attractive! It's been quite a year, but I have grown and learned so much. I have loved so much. I have been loved so much. My husband and I are the closest that we've ever been, and the support of my family and my wonderful friends have been unmeasurable. I will be having surgery in September in Vancouver with Dr Akagami and Dr Westerberg. I'm thinking positively that this will be OK. Whatever happens at the end of my surgery will have to be OK, because it's where life has taken me. I've learned to not worry about the small things and except whatever the day is bringing me. It has made me a better and stronger person and I've learned to laugh a lot more because that's the only thing I have to hold onto. I'm in a new club now. The people around me and the people that I've met and those who have helped me through this are part of my life forever.

I hope this helps anyone that reads this and is struggling. I truly believe that we are all put on this earth to learn and to grow and to become more evolved beings. Our experiences and struggles are what makes us. I know I am certainly a better person and even though I am extremely scared and anxious for my surgery, I have to let it go and let the universe take over. Thank you for listening to my story, and I hope you learn to embrace whatever life throws at you and not take it too seriously.

I leave you with my favourite words of Deepak Chopra. "Live in the present. The past and the future don't exist."

Dodinsky, a man with insight, humour, and an inspiring way with words, cautions us to:

"Be there for others, but never leave yourself behind."

Here is a brilliant reminder to treat ourselves as well as we treat others, for unless we are good and true to ourselves we cannot give to anyone else regardless of how hard we may try.

Being a Patient—Alex's Story

By: Alex Medjessi, Ontario

I am a 66-year-old retired family physician who was diagnosed in October 2017 with a right-sided acoustic neuroma, approximately 2 cm in size. I had been experiencing hearing loss in the right side with some buzzing.

I was fortunate to talk with ANAC's Executive Director, Carole Humphries, very soon after my diagnosis. She was very supportive and knowledgeable and put me in touch with the fantastic support group in Kitchener, which just happened to be meeting one week after my diagnosis. I found it so helpful to chat with others who have an acoustic neuroma. Some were "watching and waiting"; others had decided to undergo Gamma Knife Radiotherapy or surgery.

With Carole's help, I obtained an appointment in November to see Dr. Zadeh, a neurosurgeon oncologist at Toronto Western Hospital. We discussed the risks and benefits of Gamma Knife and surgery, and she recommended a follow-up MRI in six months.

I also saw Dr. Parnes, ENT specialist at University Hospital in London, Ontario. He recommended a follow up MRI in April 2018 with the possibility of having surgery, explaining to me the benefits, risks and complications of having surgery to remove the acoustic neuroma. Stereotactic radiation surgery is not available in London.

After learning about both procedures, I felt that Gamma Knife Radiosurgery would be my choice for treatment. Gamma Knife Radiosurgery is a very precise form of radiation therapy that focuses intense beams of gamma rays with pinpoint accuracy to treat lesions in the brain.

While away in Florida for five months, my condition stayed the same. Upon returning, I had a repeat MRI done in April 2018 with a follow up appointment with Dr. Zadeh. My acoustic neuroma had grown slightly and, after discussing my options with Dr. Zadeh, I decided to go ahead with radiosurgery. She expressed that "I was a good candidate for treating the tumour with Gamma Knife."

In May, I attended the Gamma Knife Clinic at Toronto Western Hospital (TWH) where I met with Dr. Gentili, a neurosurgeon and Dr. Tsang, a radiation oncologist. An appointment was made for June 26 for pre-op and planning MRI, followed by Gamma Knife on June 27.

The Leksell Gamma Knife is designed specifically for treating lesions in the brain and has the greatest precision and accuracy of any radiosurgery system to date. Although each beam has very little effect on the brain tissue it passes through, a strong dose of radiation is delivered to the place where all the beams meet. Radiosurgery for tumour treatment works by damaging or destroying

Being a Patient—Alex's Story

the DNA of tumour cells so that these cells cannot reproduce or grow. Over time, the brain tumour shrinks.

I arrived at the Toronto Western Hospital very early in the morning and was greeted by the nurse who would follow me throughout my procedure. She offered me some Ativan, which I declined. Dr Gentili injected the local anesthetic where the pins would be placed and put on the Leksell frame with four pins to secure it to my skull. At this point I wished I had taken the Ativan!!

I was taken for a CT scan. The next two hours to determine my individualized plan and start treatment seemed like an eternity, i.e., the radiation necessary for my acoustic neuroma —the strength of the beams, the angles from which they arrive, the number of times they are discharged, and the exact destination based on Dr. Tsang's orders.

Next, I was helped onto the table and made comfortable while they put on my mp3 player and started treatment. Halfway through my procedure I had to urinate; however, they were able to stop and continue to finish the procedure afterwards. Thankfully, I did not have to be catheterized – a medical procedure that no man or woman relishes that facilitates direct drainage of the urinary bladder.

Once the procedure was finished, Dr. Tsang removed the frame from my head and I was wheeled back to the post-op area where the nurse took my vital signs. My blood pressure was high, most likely due to the pain. I was given a narcotic intravenously. Steri-strips, which are very small and thin, were applied on the pin sights on my forehead. After about an hour, my vital signs were normal, and I was discharged. A follow-up MRI was arranged for March of 2019.

From the hospital, I walked back to the car with my wife and had no balance problems. I felt good except for the pain and some bleeding from the pin sights. While traveling back home, hunger set in and my wife and I stopped for dinner. I was feeling fine.

By the time we arrived home, the only problem I had was that there was still some bleeding from the site and some pain, for which I took some Tylenol #3. Sleeping was difficult that evening due to pain where the pins had been inserted.

However, I felt well enough to go golfing in the morning and walked a whole nine holes. My balance was slightly affected but it did not interfere with my game. After 36 hours there was no bleeding and the pain had subsided. No further medication was needed. The following morning, I went golfing again. My balance was back to normal and I felt about the same as before my surgery. I still have some hearing loss and buzzing in my right ear.

I would like to thank Dr. Zadeh, Dr. Gentili, and Dr. Tsang and the whole Gamma Knife clinical staff. Also, I would like to thank all the wonderful people from the ANAC Kitchener – Waterloo Support Group for their caring and continued support.

Acoustic Neuroma Research Abstracts

PubMed.*gov*

U.S. National Library of Medicine, National Institutes of Health

Radiosurgery as Treatment for Acoustic Neuromas—Ten Years' Experience

Llópez Carratalá I[1], Escorihuela García V[2], Orts Alborch M[2], de Paula Vernetta C[2], Marco Algarra J[2].

Objective:
The acoustic neuroma is a benign tumour that usually affects the vestibular portion of the vestibulocochlear nerve. It represents 8% of all intracranial tumours and 80% of those arising at the cerebellopontine angle. There are 3 treatment options: microsurgery (the technique of choice), radiosurgery and observation. The objective of the study was to evaluate the results and side effects obtained using radiosurgery as treatment for acoustic neuroma.

Method:
We performed a review of all patients treated with radiosurgery (Gamma Knife and linear accelerator) at doses of 1200-1300 cGy for unilateral acoustic neuroma in our hospital from January 1999 until January 2010. In all patients we evaluated the overall state, tumour growth control rate (tumour smaller or remaining the same size), the involvement of v and vii cranial nerves and central nervous system disorders. We also assessed follow-up time and changes in hearing thresholds after radiosurgery.

Results:
From a total of 35 patients studied, with a mean age of 58.29 years and lacking statistically significant differences in gender, the tumour growth control rate was over 90%. The main reason for visit (65.71%) was unilateral and progressive hearing loss. After treatment, 34.28% of patients had hearing loss. The involvement of the cranial nerves (v-vii) was transitory in 100% of cases. Gamma Knife radiosurgery was administered in 82.85% of patients.

Conclusion:
Although microsurgery is the treatment of choice for acoustic neuroma, we consider radiosurgery as a valid alternative in selected patients (elderly, comorbidity, small tumour size and sensorineural hearing loss, among others).

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A Comprehensive Analysis of Hearing Preservation after Radiosurgery for Vestibular Schwannoma: Clinical Article.

Yang I, Sughrue ME, Han SJ, Aranda D, Pitts LH, Cheung SW, Parsa AT.

Objective:
Gamma Knife surgery (GKS) has evolved into a practical alternative to open microsurgical resection in the treatment of patients with vestibular schwannoma (VS). Hearing preservation rates in GKS series suggest very favorable outcomes without the possible acute morbidity

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associated with open microsurgery. To mitigate institutional and practitioner bias, the authors performed an analytical review of the published literature on the GKS treatment of vestibular schwannoma patients. Their aim was to objectively characterize the prognostic factors that contribute to hearing preservation after GKS, as well as methodically summarize the reported literature describing hearing preservation after GKS for VS.

Method:
A comprehensive search of the English-language literature revealed a total of 254 published studies reporting assessable and quantifiable outcome data obtained in patients who underwent radiosurgery for VSs. Inclusion criteria for articles were 4-fold: 1) hearing preservation rates reported specifically for VS; 2) hearing status reported using the American Association of Otolaryngology-Head and Neck Surgery (AAO-HNS) or Gardner-Robertson classification; 3) documentation of initial tumour size; and 4) GKS was the only radiosurgical modality in the treatment. In the analysis only patients with AAO-HNS Class A or B or Gardner-Robertson Grade I or II status at the last follow-up visit were defined as having preserved hearing. Hearing preservation and outcome data were then aggregated and analyzed based on the radiation dose, tumour volume, and patient age.

Results:
The 45 articles that met the authors' inclusion criteria represented 4234 patients in whom an overall hearing preservation rate was 51%, irrespective of radiation dose, patient age, or tumour volume. Practitioners who delivered an average ≤ 13-Gy dose of radiation reported a higher hearing preservation rate (60.5% at ≤ 13 Gy vs 50.4% at > 13 Gy; $p = 0.0005$). Patients with smaller tumours (average tumour volume ≤ 1.5 cm3) had a hearing preservation rate (62%) comparable with patients harboring larger tumours (61%) ($p = 0.8968$). Age was not a significant prognostic factor for hearing preservation rates as in older patients there was a trend toward improved hearing preservation rates (56% at < 65 years vs 71% at ≥ 65 years of age; $p < 0.1134$). The average overall follow-up in the studies reviewed was 44.4 ± 32 months (median 35 months).

Conclusions:
These data provide a methodical overview of the literature regarding hearing preservation with GKS for VS and a less biased assessment of outcomes than single-institution studies. This objective analysis provides insight into advising patients of hearing preservation rates for GKS treatment of VSs that have been reported. Analysis of the data suggests that an overall hearing preservation rate of ~ 51% can be expected approaching 3-4 years after radiosurgical treatment, and the analysis reveals that patients treated with ≤ 13 Gy were more likely to have preserved hearing than patients receiving larger doses of radiation. Furthermore, larger tumours and older patients do not appear to be at any increased risk for hearing loss after GKS for VS than younger patients or patients with smaller tumours.

Upcoming Chapter Meetings Planned

KITCHENER—WATERLOO CHAPTER

Date: **Saturday, October 20, 2018**—10am—12pm followed by a potluck lunch
Location: Home of Tom & Helen Horlings
#30—50 Bryan Court, Kitchener, ON N2A 4N4
For more info: Linda Darkes
(519) 696-3445 / pdarkesc659@rogers.com
Helen Horlings
(519) 954-5581 / healto@rogers.com

BRITISH COLUMBIA: COURTENAY/NANAIMO CHAPTER

Date: **TBD**—12 noon—3pm
Location: Atrium at Crown Isle Resort & Golf Community
399 Clubhouse Drive, Courtenay, BC
For more info: Evalyn Hrybko
(250) 282-3269 / wehrybko@saywardvalley.net

TORONTO CHAPTER

Dates: **Tuesday, September 25, 2018**
Tuesday, November 27, 2018
Location: Canadian Hearing Society
271 Spadina Road, Toronto, ON (Parking in the rear)
For more info: Lynda Nash
(416) 282-0036 / lynda_lu123@sympatico.ca
Kathryn Harrod
(905) 891-1624 / kath.harrod@live.ca

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