The Connection

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The Current Landscape of Vestibular Schwannoma Therapy: Development of Novel Targeted Therapies

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An acoustic neuroma, also known as a vestibular schwannoma, is a benign tumour that arises from Schwann cells of the vestibulocochlear nerve. In the majority of cases, these tumours occur sporadically, but the presence of bilateral tumours is pathognomonic for a genetic condition called neurofibromatosis type 2(NF2). The loss of the *NF2* gene is linked to pathogenesis of acoustic neuromas, both in sporadic and genetic conditions. About 60% of sporadic unilateral acoustic neuromas have mutations in the NF2 gene. Mutations of the *NF2* gene lead to deregulation of important pathways that regulate tumour growth such as RAS and mTORC1 pathway.

Regardless of the etiology, acoustic neuromas are typically located in the cerebellopontine angle (CPA) and lead to progressive hearing loss, vertigo, tinnitus, ataxia and sometimes facial nerve dysfunction.

The optimal treatment options for patients with acoustic neuromas is dependent on the size and growth of tumours, symptomology including ataxia and facial nerve dysfunction, and patient preference. Generally, the goal of treatment is to preserve neurological function as long as possible with tumour control. As such, small tumours with minimal symptomology is often treated with close observation and serial imaging. Previous studies have identified that

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at the mean growth rate of these tumours is approximately 1-2 mm/year with up to 75% of tumours showing no further growth. Although observation can increase the risk of tumour progression and mass effect, it is a safe approach due to the minimal growth rate. Furthermore, studies have demonstrated that delaying surgical intervention appears to have no increased risk in mortality. However, when there is evidence of substantial growth with no compression on the brainstem, then radiotherapy or surgery is considered. When the tumour is compressing the brainstem with associated worsening of neurological symptoms, the preferred treatment is surgical resection.

Historically, the medical treatment options for vestibular schwannomas have been limited due to the tumours often benign and chronic nature. Bevacizumab, an intravenous chemotherapy, is a monoclonal antibody against the vascular endothelial growth factor (VEGF). The initial clinical trial was conducted in 10 patients with confirmed neurofibromatosis type 2 with evidence of tumour progression. The trial demonstrated 90% of patients had reduction in tumour volume and 57% patients had improvement in hearing. This landmark clinical trial led to the completion of a number of studies, which also reported decrease in tumour volume and improvement in hearing response in patients with neurofibromatosis type 2. Therefore, it is difficult to know whether the results will translate to majority of the sporadic vestibular schwannomas.

In theory, Everolimus is another promising treatment as it is an mTORC1 inhibitor. Activation of mTORC1 has been implicated in tumour growth. However, Phase II trials in NF2 patients have shown mixed results. One study showed no response to Everolimus on tumour growth or hearing improvement, while another study found a 66.5% reduction in tumour growth during Everolimus treatment. At this time, there is no strong data to support the use of Everolimus in management of vestibular schwannomas, and further long-term studies are needed to provide more robust evidence.

Vestibular schwannomas are a clinically important disease with an evolving knowledge base. Further work is needed to understand the biological alterations that are driving the tumour development, in order to better develop targeted therapies that will effectively treat this disease process.

Suganth, Suppiah MD *has since 2018 provided tremendous support to ANAC. He is the Senior Neurosurgery resident at University Health Network, University of Toronto, focusing on peripheral nerve surgery. He is currently completing his PhD under the supervision of Dr. Gelareh Zadeh on the molecular profile of peripheral nerve sheath tumours.*

Gelareh Zadeh, MD, PhD, FRCS(C), FAANS *is an internationally renowned neurosurgeon and neuroscientist who also happens to be chair of ANAC's Scientific Medical Advisory Committee. Dr. Zadeh recently became the first female chair of neurosurgery at University of Toronto, which is the largest department in Canada. She is also the medical director for the*

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Krembil Brain Institute, TWH and head of surgical oncology at the University Health Network. In addition, Dr. Zadeh holds the Wilkins Family Brain Tumour Research Chair.

Her clinical practice focuses on skull base neuro-oncology, with a dedicated brain tumour clinic and many multidisciplinary clinics that she has established including skull base, pituitary, brain metastases, gamma knife and neurofibromatosis clinic.

ANAC Welcomes Adam Rochacewich to the Board of Directors

A great big virtual welcome to Adam Rochacewich, who joined the ANAC Board at our September meeting. Diagnosed with an acoustic neuroma in 2019, Adam is following the Watch and Wait treatment option. He noted that ANAC has been his key source of information, medical research and support. Adam graduated from Queen's University with a BComm and subsequently earned CPA and CA designations. His corporate career focuses on the international resource sector, and he currently serves as Chief Financial Officer of Revival Gold Inc., Toronto.

Adam offers a wealth of experience not only in the corporate sector, but also in small business. He is a professional chocolatier, and also completed the Ice Cream Technology Short Course at the University of Guelph. Since 2012, Adam and his wife, Sarah, have owned and operated Aunt Sarah's Chocolate Shop in Trinity, Newfoundland; in 2016, they opened Sweet Rock Ice Cream in Bonavista. What a sweet addition to the ANAC Board!

We are delighted that Adam accepted our offer to share his skill sets with us.

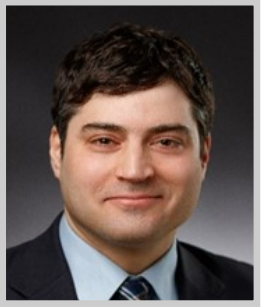
Brandon Burchard, one of the most-followed personal development trainers in the world has this to say about the importance of giving thanks:

"Walking the grounds of Gratitude, I came upon the Palace of Happiness."

He equates gratitude with happiness, suggesting that when we focus on the things we have to be grateful for, we will find happiness. And when we are happy we are in a position to create, inspire, and influence others by our attitude and actions.

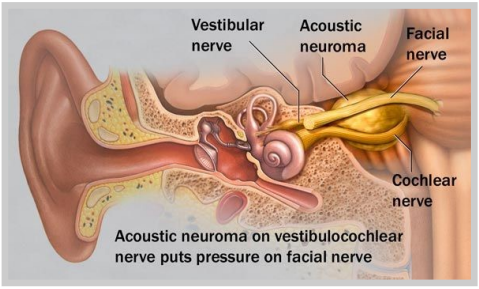
Near-Total Resection of Large Vestibular Schwannomas for Facial Nerve Preservation

By: Michael S. Harris MD, Nathan T. Zwagerman MD
Medical College of Wisconsin, Milwaukee, WI



Patients with newly identified vestibular schwannomas (VSs) discuss the optimal management strategy with their care team to create a treatment plan tailored to their specific tumour and circumstances. Observation, stereotactic radiation, and microsurgical resection are the mainstays of treatment for VSs. When tumour size, growth rate, and patient factors such as age and degree of symptoms are appropriate, surgery may be the most suitable option. The modern surgical philosophy for benign disease, such as VS, balances two goals: maximal tumour resection and maintaining functionality of the closely involved cranial nerves.

In all cases of VSs, the tumour is in direct contact with the facial nerve. For this reason, facial weakness or paralysis (total lack of facial motion) on the side of the tumour are always risks of surgical resection of VSs. Whether temporary or permanent, facial nerve impairment may have a significant cosmetic, psychological, and functional impact. The association of facial nerve impairment to lower overall quality of life is well-recognized.



Facial nerve function is most often classified by clinicians using the House-Brackmann (HB) Facial Nerve Grading System. The HB scheme is used to quantify the strength and functional integrity of the facial nerve (Table 1). Reported rates of facial weakness or paralysis following surgical resection for VSs vary, but tumour size, pre-operative facial weakness, and prior radiation therapy are well-known risks factors for facial nerve impairment after surgery. A recent report that pooled data from several different medical centers found that 67% of patients with large VSs (≥2.5 cm) had good facial nerve function (≤HB III) immediately after surgery, and 81% had good function one year after surgery.

Wayne Dyer, American self-help author and speaker reminds us that:

"Your body has natural healing capacities that nobody in the field of medicine can pretend ultimately to understand."

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Table 1 House-Brackmann (HB) Facial Nerve Grading System.

Grade	Description	At Rest	With Motion
1	Normal	Normal	Normal
2	Mild Dysfunction	Normal	Slight Asymmetry Mild Synkinesis (Abnormal Muscle Movement) Complete Eye Closure with Minimal Effort
3	Moderate Dysfunction	Normal	Obvious Asymmetry of Mouth ,Forehead with Effort Eye Closes with Maximal Effort
4	Moderately Severe Dysfunction	Normal	Asymmetric Mouth ,Forehead Incomplete Eye Closure
5	Severe Dysfunction	Asymmetric	Barely Noticeable Movement Incomplete Eye Closure
6	Total Paralysis	Asymmetric	No Movement at All

In the interest of decreasing the risk of facial nerve impairment associated with surgery for VSs, some surgeons have taken to performing near-total tumour resections rather than a gross-total tumour removal. Gross-total tumour resection implies that all visible tumour tissue is completely removed; near-total tumour resection implies that greater than 95% of the visible tumour is resected but a minute portion of tumour is left behind. A third category of resection is debulking, whereby the tumour volume is reduced, but a substantial proportion of tumour is left in place. In our practice, the goal is gross-total resection whenever possible, but we selectively apply near-total resection when there is elevated concern for risk to the facial nerve.

Concern for facial nerve integrity may be raised during surgery based on a number of indicators. For example, the degree to which the nerve is adherent to the tumour may signify that more aggressive resection could lead to permanent facial nerve impairment. Concern may also be raised by safety monitoring systems that are routinely used in such cases to monitor the nerve. For example, when the facial nerve experiences tension, stress or irritation, an electrophysiologic response can be detected from the facial muscles it controls, which the surgical team can monitor and track during surgery.

There is good evidence that less-than-total tumour resection can lead to superior facial nerve function after surgery. A study by Monfared and colleagues examined the records from a multi-institutional sample of patients with large VSs (≥2.5-cm) to determine the relationship between extent of tumour removal and facial nerve outcomes. They considered two points in time: the first post-surgery appointment and at ≥1-year post-surgery. Superior immediate post-operative facial function was associated with a larger percentage of tumour left behind as demonstrated on follow up magnetic resonance imaging (MRI) scans. Schwartz and colleagues similarly found

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significantly higher rates of "good" facial outcomes (considered HB 1 or 2) with less-than-total resections on both early and late follow-up compared to patients who had total-resections. In this study, treatment to ensure eye protection (required when facial weakness is severe enough that the eyelid does not close naturally) was also needed more often with total resections.

An important distinction must be made between near-total resection and debulking. While the judicious use of partial tumour resection appears to be a safe means of preserving functionality of the facial nerve, tumour regrowth is a risk. Rate of tumour recurrence appears to be closely related to the amount of tumour that is left behind, which is greater with debulking relative to near-total resection.

A study by Syed and coinvestigators looked at the records of patients with medium-size VSs who underwent less-than-total tumour resections. They reviewed follow-up MRIs for an average of >5-years to monitor for post-surgery regrowth. Regrowth was seen in 3 of 42 patients overall, all of whom had essentially undergone debulking, rather than a more substantial, near-total resection. Monfared and colleagues also found a three-times higher rate of tumour regrowth in patients who had debulking (28.2% regrowth) versus patients who had near-total (9.1% regrowth) or total resections (8.3% regrowth). A third study of 103 patients found that those who underwent debulking were >13 times more likely to demonstrate regrowth than those who underwent near-total resection. From a residual tumour regrowth standpoint, therefore, there appears to be support for the benefit of near-total resection over any lesser degree of tumour removal.

Following surgery, regardless of the extent of tumour resection, monitoring must be performed for recurrence or progression of disease. This is accomplished with regular follow-up MRIs, at least on an annual basis for the first several years. Most tumours treated in such a fashion do not show further growth, and when they do, regrowth tends to be very slow. If residual tumour growth is detected, this is usually amenable to stereotactic radiation to achieve long-term control. Tumour control success rates using radiation as stand-alone therapy range from 81% to 99%, but tumour control with radiation following partial tumour resection is less well-studied.

A recent publication by Troude and coauthors addressed this question. These investigators looked at a series of VSs treated surgically with less than total resection. Patients were then either simply followed with MRIs over time, or they received radiation early, once healing from surgery was complete. For patients followed with imaging alone, at time points 1-, 5-, and 7-years after surgery, "no-growth" rates were 95%, 82%, and 76%, respectively. For patients that received radiation right after surgery, "no-growth" rates were 99%, 81%, and 78%, respectively. Because the difference in tumour control between these two groups is very small, we advocate for post-

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operative observation with imaging in cases of near-total resection, reserving radiation if growth is eventually detected.

In summary, the existing data supports the selective use of near-total tumour resection for VSs to best achieve the dual goals of maximal tumour removal and optimal facial nerve function. The greater the amount of residual tumour remaining, however, the higher the likelihood for recurrence. Whenever safely possible, therefore, near-total resection is recommended over lesser degrees of removal or tumour debulking. The extent of resection is typically surgeon-determined based on how the tumour and facial nerve behave during surgery, but patients and their families should be made aware of the concept of total-versus near-total resection versus debulking along with the relative advantages and risks of each scenario. As with all aspects of VS treatment, the patient and their care team should have an in-depth discussion about facial nerve outcomes and strategies, such as selective use of near-total resection in order to be fully informed decision makers.

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***Michael Harris, MD**, who is with the Department of Otolaryngology & Communication Sciences; Division of Otology, Neurotology & Skull Base Surgery completed his fellowship training at The Ohio State University in adult and pediatric otology, neurotology, and cranial base surgery. He has advanced training in surgery for hearing restoration including the placement of cochlear implants (CIs), bone-anchored aids, brainstem implants, and implantable hearing aids. He also has extensive training in the diagnosis and treatment of vestibular disorders and skull base disorders that affect the hearing, facial, and balance nerves.*

***Nathan T. Zwagerman, MD**, who is with Department of Neurosurgery; is assistant Professor and Director, Pituitary and Skull Base Surgery. He joined the faculty at the Medical College of Wisconsin in 2017 after completing his fellowship in endoscopic endonasal pituitary and endoscopic and open skull base surgery at the University of Pittsburgh. His research has been focused on evaluating patient outcomes after endoscopic skull base surgery and developing improved techniques to repair injured peripheral nerves.*

Mindful Minute

Next time when you're tired in the middle of the day, try this:
Stop what you are doing. Give in to the tiredness totally.
Drop your head, relax your shoulders. Now look up, refreshed.
Repeat if necessary.

Irene Au

Lessons Learned

By: Anna Gurdon, Woodbridge, Ontario

Arriving at an AN diagnosis often requires the "Squeaky Wheel" approach. After a boating accident in 2012, I immediately developed tinnitus and muffled hearing on my right side. I did go see my family doctor as well as an ENT specialist, but unfortunately there was no official diagnosis. My symptoms showed signs of a concussion as a result of the boating accident. As the years went on, I noticed my hearing getting worse, the tinnitus was unbearable some days, and I was getting headaches all the time.

Once again, I followed up with my doctor in 2016, who sent me to a second ENT specialist. My symptoms were again related back to the accident. Although the loss of hearing was noted, nothing further was investigated.

In January 2019, I went back to my family doctor and expressed, "something is really wrong with me". I re-explained my symptoms and shared with my doctor, "I feel like I have a bad day, *every day*". At the same time, I continued to do my own research, and everything pointed to an Acoustic Neuroma. When I had a third ENT specialist appointment, I went in telling him that I think I have AN. He gave me some validation and ordered a balance (VNG) test, and an MRI. The immediate data from the VNG test indicated my balance was significantly compromised. Both tests eventually confirmed my suspicion, and I was officially diagnosed in August 2019 with an acoustic neuroma. It was 2.2cm in size.

Like everyone, I was overwhelmed with emotions and not sure on next steps. I just kept thinking, how can this happen? We have so much going on at home. I have two teenage children, a very stressful job, and so many family commitments. What are we going to do? I didn't want this to change my world. My husband and I decided to talk to the kids and the extended family; we told them what was going on and used the ANAC website to help explain the issue. Our kids were old enough to understand the severity, and we assured them that I was going to be just fine. I also talked to my work, and they were extremely understanding. I decided to slow down at work to part-time, affording me time to do some research, attend appointments, and take some time to myself.

Thankfully, I also had ANAC to help. I reached out and had a very lengthy conversation with Carole Humphries, Executive Director about my diagnosis. Timing worked out for me; that week there was a support group meeting which helped me understand my prognosis and options.

Lessons Learned

I was referred to Sunnybrook, and had appointments with two surgeons. I learned that the two best options, based on my age, tumour size, and amount of hearing loss, were either radiation or surgery. The approach for surgery was explained in detail. After my appointment, I did my own research and elected to undergo surgery using the translabryinthine approach. Accepting the fact that my hearing was not serviceable, and that I would be single sided deaf (SSD), was not an easy pill to swallow.

In the months leading up to surgery, I prepared as much as possible. I exercised daily, prepared freezer meals, arranged a support system to help with the kids and their sports commitments, while I was recovering. Thankfully I have an amazing, caring, and understanding family, all willing to help.

My surgery was on December 5, 2019 and lasted 8 hours. We couldn't have asked for a better outcome. The full tumour was removed and the facial nerve was preserved. I am forever grateful to the team of surgeons, nurses and medical staff at Sunnybrook Health Sciences Centre.

One week post-operatively, I developed mild facial paralysis. My right side showed signs of palsy, with difficulty to blink my eye, and a sloped smile. During my post op appointment, I was advised it was temporary and would go away with warm compress and massaging. This all happened during the holidays, so I did my best to still attend family gatherings. However, it was only three weeks post-op so I was fatigued and felt a little awkward with the facial palsy. At the fourth week, I really feel like I made a turnaround. On New Year's Eve, we celebrated and I went out for dinner with my family.

My recovery consisted of long walks every day and going to the mall before it opened and doing laps of power walking. By the sixth week, I returned to the gym: did longer walks on the treadmill; increasing intensity; introduced gentle yoga and engaged in social activities with friends and family. I started to re-gain my balance and also saw a vestibular therapist. In addition, I returned to normal parental activities by driving my kids to and from school and attending their competitive sports games.

The SSD has taken some time to get used to, and I can honestly say that at ten weeks post-op I am still not completely used to it. I have learned to use an ear plug in noisy situations such as my son's hockey games. In social settings, I selectively pick my seat knowing that I can't hear out of my right side. As well I have learned to be honest with colleagues and friends by telling people upfront of my SSD, or telling people to have one conversation at a time.

Lessons Learned

Finding out about your AN diagnosis and options is not an easy process, but going through this has taught me some very valuable lessons.

1) Be an advocate for your own health and get a second, sometimes third opinion.
2) Use a support system of family and friends, and be thankful for their love and support.
3) ANAC is an excellent resource for help, and their services are invaluable too.
4) We are lucky to live in Canada; we have access to excellent health care.

My greatest advice and learning from all this are to embrace the change, do your research, and find your new normal. It won't be easy, but please remember there is support.

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My Journey with an AN: The Silver Lining

By: Nicole Poulin, Retired Registered Nurse, Hawkesbury, Ontario

I was asked to share my journey with an acoustic neuroma and I agreed because if this could only help one person, it was totally worth it. First, let me share with you a little bit about me. I am a single mom of two beautiful daughters I adopted from China who are now both university students. They are my pride and joy and cannot imagine my life without them. I worked as a registered nurse for 39 years in different departments such as ICU, and dialysis followed by 5 years, in a diabetic clinic of a hospital in my hometown in Eastern Ontario. I was still working when I started my AN journey in July 2017.

I was enjoying a beautiful summer with my girls and friends and by mid-July I started feeling a numbness on the right side of my tongue. I had been to the dentist a few weeks before so I thought it was probably related to the freezing for the tooth repair. I was feeling good except for headaches, but this wasn't unusual to me so I thought nothing of it. A few more weeks went by and the numbness became more pronounced. I consulted my dentist as the numbness was on the same side the freezing was done. After some x-ray and exams, the dentist told me he did not think it had anything to do with the freezing. I still believed nothing serious was going on, as I was feeling good except for the numbness. For a few months, I had noticed some slight balance issues when I was walking to work but I had not related that to the numbness. I became concerned at the end of August, when the right side of my face also started to be numb and there was a feeling of fullness in my right ear.

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I had been planning for retirement, so at the end of August, I notified human resources that I was officially retiring January 1st 2018 and taking the month of December for holidays. I was so excited about the last few months left at work after 39 years. Suddenly, one morning, getting ready for work I started having tinnitus in my right ear. At that moment, I knew it was time to call my doctor and after listening to my symptoms, he wanted to see me at the end of my shift. My wonderful family doctor that I had known for the past 30 some years looked quite concerned and asked for an urgent MRI and audiogram. Since the beginning of the tinnitus I had started to be worried and now it was getting worse by the minute.

The next day, I called for an audiogram appointment. They had a cancellation that morning and they offered me the spot. As soon as the audiogram was done, the audiologist told me I needed to see a specialist asap. I came out of that office thinking the worst. Back in my department at work, I was in tears when I called one of my best friends at the hospital. After we hung up she happened to see two doctors who I had worked with before and they arranged for me to see an ENT that same day.

I was very anxious. My MRI which was scheduled for Sunday September the 24th. I am sure that all of you know it can be quite a claustrophobic experience. As I was leaving the x-ray department, the technician looked at me and in a very soft voice she said, '' Good luck madam, your doctor will get the result within a week.'' Right then I had a feeling it wasn't good news. The next day, I went to work and in the afternoon my doctor called and asked me to drop in at the office at the end of my shift. I was so anxious but managed to finish my work, and got my charts ready for the next day not knowing that would be my last day at work. I called my sister and asked her to come with me to my appointment as I knew I needed support. As I entered my doctor's office, being the last appointment of the day, it was very quiet. The lights had been dimmed and as I sat in the waiting room, I told my sister, that this was not normal. The secretary and nurse I had known for many years were also avoiding eye contact with me. After a few minutes, my doctor, not the nurse, came to get me and I knew it was not going to be good news. I had shared many things with my doctor, we worked together, he helped me with the adoptions of both my girls and had always been very good to me and my family. He told me the MRI showed a brain tumour but he could not tell me what type of tumour at that time. He told me he would arrange for me to see a neurosurgeon in Ottawa, gave me a note for sick time for my work, and told me we would keep in touch.

Leaving the office, I was devastated. I tried very hard to calm down as it was time to go home to my youngest daughter. She could not see me like that as we were still not sure of the final diagnosis and I didn't want to worry her too much. I will spare you the next few weeks where I had very bad days thinking the worst. I had a lot of support from my family and daughters but especially from my oldest daughter who was studying biology at university and said that all

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my symptoms looked more like an acoustic neuroma, something I had never heard about before. Doing some personal research, I had hope. By now however, I had completely lost my hearing on the right side.

Finally, my appointment on October 2 with the neurosurgeon, Dr John Sinclair at the Ottawa Hospital arrived. I was so anxious waiting to see him because in a few minutes I could receive the worst news ever and my life would never be the same BUT it turned out to be one of the best days of the last few weeks. He was one of the most reassuring doctors and proceeded to tell me all about my tumour, which was most probably an acoustic neuroma. The tumour was approximately 3 cm and compressing my brainstem. He ordered an MRI with contrast. He indicated the need to proceed to surgery urgently due to the compression if the next test confirmed his diagnosis. He discussed radiosurgery but according to him, the tumour was too large and the compression of the brainstem was too severe. He indicated surgery would be done with facial nerve monitoring to protect the facial nerve function and that they would most probably have to leave a small residual tumour to protect my facial nerve.

Depending on the size of the remaining tumour and further MRI post-surgery there could be indication for radiosurgery called CyberKnife to make sure the remainder of the tumour would not grow back. I was told that I would most probably not regain my hearing, but believe it or not I left the office in a state of euphoria thinking I will get through this. I did not have a glioblastoma (cancerous tumour), something that had been on my mind for the past few weeks. I did not mind the surgery at that time, as there was a cure and I was so relieved. I called my girls, my family and friends and from that point on I felt positive about the whole thing. Life was good to me after all.

Within the next few days, I had another MRI with contrast, a scan, and I was back in Dr Sinclair's office a week later; on the 19th of October to get the final diagnosis of a 3 cm vestibular schwannoma with compression on the brainstem. I was told the surgery would be booked within the next few weeks but to go to the emergency room if I ever got worse headaches, nausea and vomiting. I came home, got ready for the surgery, and spent time with friends and family.

Finally, on November 9th, I underwent surgery for eight hours. Everything went smoothly, 92% of the tumour was removed with no facial nerve damage. I spent the first 24 hours in an acute care recovery room. I was a little nauseated and the pain was well managed with the medications. I was transferred to an intensive care neuro floor for the next three days and things continued to improve. Six days post operatively I was discharged home.

The road to recovery went well. By January 2018, I officially became a retired nurse and I started to walk on a training track in my hometown to regain my strength. In late January, I got another

My Journey with an AN: The Silver Lining

MRI and at my second post op follow up appointment, it was discussed that the CyberKnife radio treatment could be a good option for me to make sure the remaining tumour would not grow back. Six months after the surgery, on May 1, 2018, after more scans and a head mask molding done, I received a 45-minute CyberKnife treatment. I was a little apprehensive but the technician took her time explaining what was going to happen throughout the treatment. She was very reassuring. It was pain free, and time passed quickly as I was invited to select a movie to watch on the ceiling during the treatment. I experienced no side effects.

MRIs have been scheduled every 6 months since my surgery, and on my last one it showed the remaining tumour was now getting slightly smaller and I have graduated to once yearly. I cannot thank enough both my doctors for the great care I have received. I am now enjoying my retirement; life is really beautiful. The deafness on the right side is not a big problem for me at the moment so I have not yet looked into any kind of hearing aid. As time goes by, my balance is getting much better and I can say I feel like my own self again.

Acoustic Neuroma Research Abstracts

Assessment of Visual Sensation, and Quality of Life following Vestibular Schwannoma Surgery in Patients Prehabituated by Chemical Vestibular Ablation

Zuzana Balatkova, Zdenek Cada, Silvie Hruba. Martin Komarc, Rudolf Cerny

Aims: Preoperative chemical vestibular ablation can reduce vestibular symptoms in patients who have gone through vestibular schwannoma resection. The goal of this study was to determine whether chemical vestibular prehabituation influences the patients' post-operative perception of visual stimulation, mental status and quality of life. We also tried to find out whether increases of optokinetic nystagmus, measured by routine electronystagmography, correlate with subjective symptoms.

Methods: We preoperatively administered (2 months prior to surgery) 0.5 - 1.0 mL of 40 mg/mL nonbuffered gentamicin in three intratympanic instillations in 11 patients. Head impulse and caloric tests confirmed reduction of vestibular function in all patients. The control group consisted of 21 patients. Quality of life in both groups was evaluated using the Glasgow Benefit Inventory, the Glasgow Health Status Inventory and the Dizziness Handicap Inventory questionnaires. Visual symptoms and optokinetic sensation were evaluated using a specific questionnaire developed by our team and by measuring gains preoperatively and postoperatively in both groups using routine electronystagmography. The psychological profile was evaluated using various assessment tools.

Acoustic Neuroma Research Abstracts

Results: There were no statistically significant differences between both groups with regards to the results of the questionnaires. Patients who received preoperative gentamicin were less sensitive to visual stimulation and many of them had a significantly higher gain in the optokinetic nystagmus than the control group in the preoperative stage.

Conclusion: Pre-treatment with gentamicin helps to lower anxiety levels in patients and improves their general postoperative status. Pre-treated patients are also less sensitive to optokinetic stimulation.

* * * * *

Otology & Neurotology. 41(6):813-847, July 2020.

Rising Incidence of Sporadic Vestibular Schwannoma: True Biological Shift Versus Simply Greater Detection

Marinelli, John P.; Lohse, Christine M.; Grossardt, Brandon R.

Objective: The incidence of sporadic vestibular schwannoma (VS) has increased significantly over recent decades. The rising incidence of VS has been largely attributed to the increasing use of magnetic resonance imaging (MRI), especially with regard to incidentally diagnosed tumours. However, no study to date has directly investigated this supposed etiology beyond the observation that VS incidence rates have risen in the post-MRI era. Therefore, the primary objective of the current study was to characterize the incidence of head MRIs over the previous two decades in Olmsted County, Minnesota and compare this trend to the incidence of asymptomatic, incidentally diagnosed VS over the same time period.

Setting/Patients: Using the unique resources of the Rochester Epidemiology Project, procedure codes for head MRIs and diagnostic codes for VS among residents of Olmsted County, Minnesota between Jan 1, 1995 and Dec 31, 2016 were retrieved. Incidence rates of head MRI and incidentally diagnosed VS were calculated on a per-year basis.

Results: A total of 43,561 head MRIs among 30,002 distinct persons were identified from 1995 to 2016. The incidence of head MRI significantly increased between 1995 and 2003, but remained stable between 2004 and 2016. Over the same time interval, 25 cases of incidentally diagnosed VS were identified. The incidence of asymptomatic VS increased over time from 0.72 per 100,000 person-years between 1995 and 1999 to 1.29 between 2012 and 2016. No plateauing of incidence rates was observed in incidental tumours over the study period. The size of incidentally diagnosed tumours did not change over the study period, suggesting that the increasing incidence of asymptomatic tumours is not explained by improved diagnostic capability of more recent MRI studies.

Conclusions: Despite the plateauing of head MRI incidence rates after 2004, the incidence of asymptotic, incidentally diagnosed VS continued to increase. Our findings suggest that there may be additional contributory etiologies for the rising incidence of VS beyond greater detection alone.

Support Groups Gone Virtual

In the midst of a global pandemic that seems only to be digging its heels in further, it's more important than ever for all of us to stay focused on the **positive** . . . to look for a silver lining . . . to see the proverbial glass as half-full as opposed to half-empty!

ANAC's Chapter meetings, the heart and soul of our association, are a place where we can do just that. While it's hard to beat face-to-face communication setting, we've found that by offering our chapter meetings virtually, in response to the nationwide protocols for COVID-19, we've been able to reach far more members across Canada.

After considerable research and testing by our Executive Director, Carole Humphries, along with Nick Kucharew, our techy board member, we were ready to hold our first Virtual Group Support Meeting on June 2nd, a belated 17th Anniversary celebration of the Toronto Chapter! We used Pragmatic's Unified Meetings which is a cost-efficient webcast platform ANAC has used for its board meetings.

For the first meeting, Gavin Donatelli and his mother, Laura, who discovered ANAC after her son's diagnosis, were able to join us from Winnipeg and Victoria! At the September virtual meeting members joined us from BC to the Maritimes. In addition, the Kitchener/Waterloo and BC Support Groups have used the same platform successfully and expanded their reach.

If you've always wanted to attend an ANAC Chapter meeting, please call Carole Humphries directly at 416-806-5071 or director@anac.ca. This may well be the way of the future for ANAC, even after COVID-19 is but a distant memory, especially if it means we'll be able to reach out to so many more Canadians who are concerned about their AN diagnosis. **Even if you are unable to join by video, you can always join simply by using your telephone.**

As always, many thanks to chapter leaders Kathryn Harrod and Linda Steele, Linda Darkes and Helen Horlings in Kitchener/Waterloo, Robyn Smith in Saskatchewan and Evalyn Hrybko and Carolyn Bradfield in British Columbia.

Upcoming Chapter Meetings Planned

KITCHENER—WATERLOO CHAPTER

Date: **Wednesday, January TBD, 2021**—7pm—9pm
Location: Virtual Meeting—Details to follow.
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: **Saturday February 2021 TBD**—10am—12noon
Location: Virtual TBD—White Spot, 2299 Cliffe Ave., Courtenay, BC
For more info: Evalyn Hrybko
(250) 282-3269 / wehrybko@saywardvalley.net
Caroline Bradfield
(250) 897-3553 / digitalgal@shaw.ca

TORONTO CHAPTER

Date: **Tuesday January 26, 2021**—6:30pm—8:30pm
Location: Virtual Meeting TBD—Details to follow.
For more info: Kathryn Harrod
(905) 891-1624 / kath.harrod@live.ca
Linda Steele
(416) 993-0065 / lindasteele2@gmail.com

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