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Hyperbaric Oxygen Treatment for Osteomyelitis, Osteoradionecrosis and Recurrent Ear Infections

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علاج الْتِهابُ العَظْم و النِّقْي ، النَخَرٌ العَظْمِيٌّ إشْعاعِيٌّ المَنْشَأ ، وعدوى الاذن الراجعة - بالاوكسجين مُفْرِطَ الضَّغْطِيَّة وجهة نظر مريض

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Editor's Note: *To highlight a patient's experience to health care professionals is to get a patient's perspective on symptom perception, symptom action, symptom formation, response to illness and response to treatment. The present narrative not only vividly describes a patient's behaviour during illness, but also shows how the information age can enhance a patient's choice of treatment. While Internet surfing in Australia in her quest to find 'answers,' she serendipitously uncovered an article published in the January 1999 Sultan Qaboos University Medical Journal (Malignant Otitis Externa and Temporal Bone Osteomyelitis: complete Recovery Following the Adjunctive Use of Hyperbaric Oxygen and Antibiotics, p. 47) on hyperbaric oxygen therapy (HBOT). She convinced her attending physicians to 'treat' her using HBOT. She attributes the recent improved quality of her life to this treatment.*

In July 2003, I noticed the small pea-sized lump that I had had behind my left ear for several years, had grown rapidly over the weekend. On 2 September, I underwent surgery to remove an adenoid cystic carcinoma of the left superficial parotid gland, Grade II Stage II. The general surgeon who undertook the procedure was recommended to me by the family general practitioner (GP), not an ear, nose and throat (ENT) specialist surgeon. The surgery was completed without the use of a drain, with radiotherapy strongly recommended.

After surgery, I had a fluid-filled lump, pain, swelling, slight palsy and, following the removal of the stitches, a salivary leak developed. The surgeon removed some of the fluid from the lump and recommended over the following weeks increasing doses of hysocine butyl bromide, universally recommended to dry saliva over the following weeks. He did not think I should be prescribed antibiotics. My local GP, however, prescribed 2 courses of cephalexin. During this time, I had to increase my pain medication, taramadol hydrochloride , to counteract the increasing pain and swelling.

As neither the GP nor the surgeon were investigating my slow recovery and suspected infection, an obstetrician friend from Brisbane and a pain management specialist in Sydney expressed that I should have recovered within 2 to 3 weeks as the surgeon had advised.

Four weeks later, following 6 appointments to both surgeon and GP and an outpatient visit to the local hospital (the latter two stating that I should re-consult the surgeon), I finally sought a third opinion from another local GP, also a respected surgeon, who is now my family doctor. He immediately took a swab; the results indicated that *Enterobacter aerogene*s, a bowel bacterium, was infecting the surgical site and inhibiting recovery. A double course of ciprofloxacin and raberprazole, to counteract the hysocine butyl bromide, was prescribed. In response to the antibiotics, the wound closed and

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the redness and pain subsided considerably. Thankfully, the salivary leak ceased on 18 October, though I still had overnight discharges.

By the end of October, about to commence 27 treatments of radiotherapy, I suffered a week of severe dizziness and vertigo; this was relieved with metaclopramide. Less than two weeks into radiotherapy my ear discharged an extremely smelly yellow thick mucus. It took until nearly the end of my radiotherapy for my oncologist to prescribe triamcinolone+nystatin+gentamicidin+neomycin drops for the discharge. He did not, at the time, believe the infection was serious. The oncologist and resident hospital doctor prescribed 5 courses of oral nystatin for the developing fungal infection in my mouth area.

When I returned home the left side of my face was severely burnt from the radiation treatment and my ear was continuing to discharge. My GP eventually relieved the discomfort by syringing my ear and prescribing amphotericin B, a stronger anti-fungal treatment.

In January 2004, my ear leaked the same yellowish mucus as during my radiotherapy. I was prescribed 2 courses of Ciprofloxacin by my GP's partner, yet by the end of the month my condition was worsening. I then obtained a referral to see a Sydney ENT specialist, the first of six ENTs!

After my consultation in February 2004, I finally felt I was receiving appropriate medical attention for my ear infection which had plagued me since October and which was now diagnosed as chronic otitis media, the severest form of ear infection. Tests confirmed the presence of both *Pseudomonas aeruginosa* and *Candida parapsilosis* in my ear. The Sydney ENT immediately admitted me to Royal North Shore Hospital, North Sydney. A grommet was inserted and a central line for an assortment of intravenous (IV) antibiotics which included tazocin, gentamicin and meropenem combined with oral fluconazole, an even stronger anti-fungal than previously prescribed. Following the insertion of the grommet, my ear leaked for several days with the same fluid as post-surgery. It was several days after the grommet surgery before the ENT registrar advised me to wear ear plugs to keep the ear dry during bathing to reduce infection. I continue to do this using a special swimming silicone ear plug in my left ear only. After 9 days in hospital, my head specialist of infectious diseases and microbiology explained I had soft tissue infection and possibly bone infection. During my 4½ weeks hospitalisation, I discussed my complicated medical history with a group of ENT specialists, who viewed my CT, MRI and gallium scans and offered to write me a medical plan, but I never saw them again. Following my discharge, I was prescribed multiple courses of Ciprofloxacin and Fluconazole. I returned to Sydney several times throughout 2004 for follow up appointments with my head specialist. On 2 August 2004, eleven months after my initial surgery, I finally returned to work, but with greatly reduced hours.

On a website I discovered that severe otitis media leading to bone infection is a third world disease which is relatively unheard of in the western world. My condition was further complicated by radiotherapy. Internet research led to the discovery of a more potent anti-fungal, Caspofungin, successful in treating *Candida parapsilosis.* Consequently my head specialist organised hospital admission in November to receive Caspofungin medication and further IV antibiotics. About 2 months before my admission, I had suffered from another *Candida* ear infection. Concerned, I then phoned the Sydney ENT who prescribed triam cinolone+nystatin+gentamicidin+neomycin drops. However these drops blocked the grommet; it was subsequently removed leaving a hole in my eardrum. In the first week of hospitalisation, one of the resident doctors said I should be sent home as I "looked so well"! Prior to my discharge, 3 weeks later, the same resident doctor accompanied the ENT registrar, who sat on my bed (you know it's not good when doctors do that!) and explained that recent x-rays confirmed the presence of a bone infection. The diagnosis at this time described my condition as osteomyelitis (temporal bone), osteoradionecrosis, mastoiditis and prone to recurrent ear infections.

On 1 February, 2005 due to liver function abnormalities appearing in my weekly blood tests, I ceased all prescribed treatments including pain medication and advised my head specialist; however, I sought the opinion of a local ENT, who used boracic powder to dry the ear discharges and several other times during 2005/06. Although my ear continues to discharge intermittently, rather than seek medical treatment I just deal with the discomfort and symptoms, hoping it will not develop into another infection.

My local ENT referred me to a professor of otology, who dismissed my diagnosis saying I only had temporomandibular joint (TMJ) problems, even though I

explained that I had been using a dental retainer for years. When I touched the triangular area in front of my ear it felt and sounded like a moist sponge; now it only feels spongy when the swelling worsens. I believe the pressure from the swelling surrounding the surgical site intensifies my muscle and jaw soreness. Sometimes my jaw sounds like a creaky door.

In January 2005, I wrote to my head specialist requesting hyperbaric oxygen therapy (HBOT), for osteomyelitis and osteoradionecrosis researched via the Internet. He referred me to the Prince of Wales Diving and Hyperbaric Unit, Randwick, sadly the sole hospital facility in New South Wales, only able to treat a maximum of 20 patients per day. I underwent 36 treatments in May-July 2005 and 19 treatments in October-November 2005 without IV or oral medication.

The HBOT did not relieve me of tinnitus but greatly improved the visible post-surgical swelling and the developing 'palsy' around my mouth. The HBOT was conducted in both the multiplace and the monoplace chambers. The treatment was initially a very frightening experience but the compression and decompression fortunately did not affect my ear as much as I thought it would. The monoplace chamber seemed to be the most comfortable method for me.

Gallium, MRI and CT brain scans of July 2005 and July 2006 were compared and showed signs of bone regeneration and no sign of cancer. The conclusion was that significant improvement had occurred following HBOT although opacification or fluid was still noted.

During 2006, a neurologist noted that the anvil and hammer in my left ear appeared distorted. He also noted that my eyes correct the imbalances caused by vertigo and, as a consequence, I frequently suffer from sore and tired eyes. I notice the dizziness more when the swelling and/or ear aching is more intense.

I continue to experience speech difficulties: slurring words, having difficulty with enunciation unless I talk very slowly and loudly (partly due to temporary deafness caused by the swelling). I also continue to experience intermittent tingling and numbness around my mouth, tongue and lips. The allodynia, 'strange' swellings, moisture in what feels like the eustachian tube and the hole in my ear drum following the removal of the grommet, has left me with hearing difficulties and tinnitus which varies in intensity and symptoms and in response to physical activity. I often suffer from nausea similar to that of all-day morning sickness.

CONCLUSION

I believe that HBOT had significant impact on my condition and resulted in a much more positive prognosis. I recommend HBOT for others suffering similar medical complications. To relieve my symptoms I undertake complementary therapies: chiropractic, naturopathy and more recently acupuncture.

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LIST OF WEBSITES USED

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