History

A 40-year-old female was referred to the Jakaranda Pain Clinic in January 2011 with a history of headaches and neck pain.

The patient was first diagnosed with migraine when she was about 12 years old. In young adulthood, she experienced headaches lasting on average 4 to 8 hours, once or twice a week. The headaches became progressively worse with age and were especially severe during pregnancy. In the previous 4 years, headache frequency increased to 20 to 30 days per month and would last up to an entire day. Prior to referral to the Jakaranda Pain Clinic, there was a confirmatory diagnosis of chronic migraine.

The patient was injured in a horse riding accident in 2007. Her history of neck pain resulting from this accident included neck muscle spasm and stiffness of the neck; pain in her arm on the right side; pain in the upper arm over the shoulder in the distribution of approximately C5 and C6; and a neck fusion at the level of C56. Eighteen months after the neck fusion, the patient reported no relief from the neck pain or headaches and was referred to a neurosurgeon. Following an MRI and CT scan, the patient was referred to the Jakaranda Pain Clinic.

Pharmacotherapy interventions used in the past are listed below:

<table>
<thead>
<tr>
<th>Role in Treatment Paradigm</th>
<th>Specific Medication</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute Medications</td>
<td>Sumatriptan, Naratriptan, Rizatriptan, Zolmitriptan, (each Triptan was combined with an analgesic combination and Diclofenac)</td>
</tr>
<tr>
<td>Preventative Medications</td>
<td>Feverfew homeopathic preparation, Calcium and Magnesium Supplements Flunarizine, Carbamazepine, Pregabalin, Amitriptyline, Beta-blockers</td>
</tr>
</tbody>
</table>

- None of the preventative medications tried was effective. In particular, carbamazepine, pregabalin and amitriptyline all caused mental impairment and affected cognitive functioning.
- The acute medication combinations worked well until 7 years ago. Effectiveness ceased 4 years ago. The patient also underwent several myotomies and arterial cauterization of the superficial scalp vessels. None of these procedures was effective.

Examination

The patient reported current headache frequency of 20 to 30 days per month lasting up to an entire day and reported that headaches usually radiated from the base of the skull to the right side of the forehead. She described the pain as having a pounding quality. It was accompanied by nausea, vomiting, phonophobia, hand tremors, vertigo and cutaneous allodynia in the affected areas. Infrequently, headaches occurred on the left side.

During some weeks, the headaches were present on 7 days, sometimes continuously and sometimes for part of the day. The patient described the headaches being present for “more hours than not” in the day. The severity and duration of headaches resulted in complete loss of function. Due to extended sick leave, the patient was unable to complete her university studies.

On examination, it was found that the patient had a stiff neck with tenderness over the brachial plexus on both sides but worse on the right side. There were no serious neurological signs in her upper limbs except for the pain. She also had extremely tender trigger points in her trapezius muscle on her right side as well as significant tenderness of paravertebral joints on her right side. X-rays of her neck showed a solid fusion at C56 with a plate as well as neurocentral osteophytes at C56 projecting into the foramen (but no convincing foraminal stenosis). Osteophytes in the paravertebral joints were also visible indicating severe movement and instability.
Treatment

Pulsed radio frequency of the cervical medial branch of the paravertebral joints was carried out in March 2011. At the same time, the trigger points in her muscles were injected with cortisone. Five weeks later, the patient reported that she still suffered spasms in her neck and continuous headache. Her general practitioner injected BOTOX® into her neck resulting in some relief in the trapezius muscle trigger points.

As a diagnostic measure, cortisone and local anesthetic were injected into the trigger points resulting in successful pain relief in the shoulders but with no effect on the headache. BOTOX® injections into the trigger points were given on two subsequent occasions, the last in October 2011. Unfortunately, the patient reacted badly to each injection by passing out, rendering further treatment by injections an unsuitable option. However, it was concluded that the patient’s neck and shoulder issues were independent of the migraine.

The patient read an article detailing positive outcomes of peripheral nerve stimulation of the occipital nerves for migraine headache. Based on the patient’s severe disability and unsuccessful history of three or more prophylactic migraine drugs, this patient’s disease was appropriately categorized as intractable chronic migraine, making her an appropriate candidate for peripheral nerve stimulation of the occipital nerves that may aid in the management of the pain and disability associated with her disease. The patient consented to the procedure, and the peripheral nerve stimulation system was implanted in November 2011.

Outcomes

Since the implantation in November 2011 (8 months at time of writing), the patient has experienced only one classical migraine and has stopped all preventative medication. At 5 months post-surgery, the patient reported experiencing ordinary headaches approximately once per week that were well-managed with an analgesic combination or NSAID. The patient also reported continued neck pain and was prescribed hydromorphone.

Discussion

This case report describes a successful outcome using peripheral nerve stimulation of the occipital nerves in the treatment of intractable chronic migraine. The patient suffered progressively worsening migraine for 28 years until she lost all function. Despite the comorbidity of neck problems, the patient was an appropriate candidate for the therapy. Following the implant, the patient’s migraine episodes have almost disappeared. Her quality of life improved dramatically, and she returned to her studies in addition to working up to 9.5 hours per day.

“This case suggests that peripheral nerve stimulation of the occipital nerves is a safe and efficacious treatment option, to restore a large measure of quality of life for patients with Intractable Chronic Migraine.” (Dr. Russel P. Raath)

Acknowledgements

Written informed consent was obtained from the patient for publication of this case study.