Vagal Nerve Stimulation Implantation – A likely collaboration

A. Farboud DOHNS, R. Pratap FRCS, P.Q. Montgomery FRCS
Department of ENT, Norfolk and Norwich University Hospitals, NHS Foundation Trust

Abstract

Objective: Vagal nerve stimulation implantation is a widely accepted surgical procedure performed by neurosurgeons in the UK used to treat refractory epilepsy and depression.

Study and setting: We present our experiences of the first 12 cases of VNS implantations undertaken by an ENT department in conjunction with the Neurology team in the Norfolk and Norwich University Hospital.

Subjects and methods: 12 patients with refractory epilepsy underwent implantation of the VNS device connected to a generator that was placed behind the ear. Follow-up was by the Neurologist and Otolaryngologist to activate the device and to check the wound.

Results: All devices were successfully activated in the clinic with no short term post-operative complications. All patients suffered a change in their voice (hoarseness) when the device was active. 7 out of 12 patients enjoyed a reduction in the number of seizures, with 2 patients able to terminate seizures with a magnet as part of the device. 3 out of 12 had reduced the amount of anti-epileptic medication as a result of the success of the device.

Conclusions: Overall the effects of the implantation of this device were positive. Otolaryngologists are competent to perform this procedure and to deal with subsequent complications such as wound infections and laryngeal complications associated with it.

Introduction

Approximately 1% of the general population suffer from epilepsy. In about a third of these patients, the seizures are refractory to non-pharmacological treatment for epilepsy, which is the only option for patients who have not responded adequately to drug therapy.

Before Vagal Nerve Stimulation (VNS) became available, the only surgical options were limited. The benefits of epilepsy surgery include a reduction in seizure frequency, improved quality of life, and a decrease in the use of anti-epileptic medication. However, VNS has been shown to be an effective and safe treatment for patients with intractable epilepsy.

Method

Patient selection by the referring neurology department.

Referral criteria: patients with frequent and disabling epilepsy refractory to medical therapy and those not a candidate for epilepsy surgery. 16 patients (14 male, 2 female) had received the VNS implant over a period of 18 months.

Inclusion criteria: patients with a follow-up of at least 12 months.

Primary outcome measure: degree of reduction in mean monthly seizure frequency.

Follow-up: by the neurologist. After 2 weeks, to activate the device, with subsequent consultations required to optimise the level of stimulation.

Conclusions: Overall the effects of the implantation of this device were positive. Otolaryngologists are competent to perform this procedure and to deal with subsequent complications such as wound infections and laryngeal complications associated with it.

Conclusion

Otolaryngologists can perform the procedure of vagal nerve stimulator implantation, safely and effectively. They can manage the common laryngeal complications associated with it.

References

There is good evidence from studies looking at long-term success rates of the device. These studies have shown that the effects are tolerable and improve over time.

Table 1: Number of patients with beneficial and adverse effects following VNS implantation

<table>
<thead>
<tr>
<th>Effect</th>
<th>Total ≤ 12 patients</th>
</tr>
</thead>
<tbody>
<tr>
<td>More than 50% seizure reduction</td>
<td>7</td>
</tr>
<tr>
<td>Between 25-50% seizure reduction</td>
<td>4</td>
</tr>
<tr>
<td>Total cessation of anti-epileptic medication</td>
<td>2</td>
</tr>
<tr>
<td>Severe adverse effects affecting quality of life</td>
<td>1</td>
</tr>
<tr>
<td>Minor adverse effects not affecting quality of life</td>
<td>11</td>
</tr>
</tbody>
</table>

Figures

Figure 1: Left side of the neck with landmarks (illustrated) and two horizontal incision lines a) along the skin crease at the level of the cricoid cartilage, and b) 3cm below the skin crease at the level of the mid clavicular line.

Figure 2: The exposed vagus nerve (arrow).

Figure 3: The VNS implant in situ around the vagus nerve (arrow).

Figure 4: Passing the lead from the VNS stimulator to the anterior chest wall using the tunnel.

Figure 5: The generator is connected.

Figure 6: The generator is interrogated.

Figure 7: The exposed vagus nerve (arrow).

Figure 8: The VNS implant in situ around the vagus nerve (arrow).

Figure 9: The generator is connected.

Figure 10: The generator is interrogated.