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A Case Report

Occipital Nerve Stimulation Using a Medtronic Resume II® Electrode Array

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Subcutaneous stimulation of the occipital nerve has been reported using percutaneously placed spinal cord stimulator electrodes. Occasionally, gradual loss of effectiveness has been noted possibly due to scar formation around the contacts. We report on the use of the Medtronic Resume II®,peripheral nerve / spinal cord stimulator electrode for causing peripheral stimulation of the occipital nerve in the suboccipital region. Initial results suggest improved stimulation with lower power requirements using this larger electrode. The larger contact size might lessen the effect of scar formation and offer improved stimulation over a longer period.

KeyWords: Occipital Neuralgia, Occipital Stimulation, Peripheral Nerve Stimulation, Head Ache, Peripheral Neuromodulation, Resume II electrode

Subcutaneous sub-occipital stimulation of the occipital nerve as described by Weiner (1) has been used in selected patients in the management of headache pain related to occipital neuralgia. Occipital neuralgia pain is most often unilateral but can be bilateral. The pain often originates from the posterior base of the skull and radiates to the top of the head. At its worst, the pain will involve the ipsilateral posterior orbital region causing eye and frontal pain. It has been suggested that occipital neuralgia may act as a migraine trigger. Weiner described passing spinal cord stimulator leads through a bent needle passed within the subcutaneous fat at approximately the C2 level. These patients are afforded pain relief by what is believed to be peripheral stimulation of the occipital nerve. Using this technique, some patients have experienced decay in the quality of the stimulation within the first year. Surgically moving the electrodes has been required to reestablish effective stimulation. Over time, scar tissue formation around the electrode may impede the generation of an effective stimulating field. By using a larger electrode, this scar formation may have less of an effect allowing the electrode to function longer.

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We report on the use of the Medtronic Resume II® Lead in place of a percutaneously placed lead. The Resume II is flat and insulated on the side opposite the contacts. This configuration tends to create a more directed, efficient and broader field of stimulation. The Resume II electrode is larger and may offer more stability when implanted in the mobile subcutaneous neck tissue.

Generally we have developed the following procedure for the surgical implantation of these leads. The patient is placed supine and their head held in an x-ray translucent padded face cradle with the chest padded to place the neck in a slightly flexed position. A slight reverse Trendelenburg position makes the patient more comfortable and affords better operative access. Pre-operative antibiotics are given and monitored conscious sedation started. A line connecting the inferior projections of the mastoid processes is drawn. This line represents approximately the C2 spinal level. The hair in the area is shaved as needed. Sterile lubricating jelly and tape are used to keep the hair away from the operative site. Drapes including a bacteriostatic impregnated plastic drape are used to assure an appropriate operative field. Local anesthesia with epinephrine, if not contraindicated, is infiltrated only within the vertical midline skin. A four-centimeter vertical midline incision is made bisecting the line connecting the two mastoid processes. A 1 cm flap is developed on both sides of the incision. Following the administration of an appropriate short acting sedative, Metzenbaum scissors are passed within the subcutaneous fat above the fascia toward the mastoid process. The scissors are opened slightly and withdrawn to create a tunnel into which the Resume II can pass. The lead is carefully handled with atraumatic vascular type forceps. The lead is placed such that the proximal portion is approximately 1cm from midline. A trial stimulation current is applied and the lead position is adjusted to optimize the "warm or full" sensation that is perceived as pleasant by the patient over the distribution of the greater and if desired lesser occipital nerves. The small two-hole plastic anchor is sutured to the fascia with 0-silk. Two 0-silk ties are placed around the anchor to secure the lead to the anchor. The electrode wire is made to form a coil within the incision to act as a strain relief. The wire is passed through a hollow passer to an incision at about the C7 level four cm from midline on the ipsilateral side. We normally place IPG devices subcutaneous within the upper buttock. For this distance, forethought is given as to the required extension lengths and if an alternative location for the IPG should be used.

We have implanted four electrodes in three patients using this technique. Two patients were implanted for unilateral disease and one for bilateral. Each patient has experienced excellent coverage with low amplitudes. Two of these patients were previously implanted with the percutaneous technique and had failed. To date, the quality and stability of stimulation have been excellent. Initial success with percu-

taneously placed electrodes offered hope for this painful and difficult to treat disease. Significant long-term failure was seen with percutaneous lead placement. We are again encouraged by the initial success using this larger surgically implanted electrode.

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