INTRODUCTION

First bite syndrome is a complication of parapharyngeal space and deep parotid parotid surgery which presents as intense pain in the parotid and jaw with radiation to the ear upon initiation of mastication. The pain characteristically lasts a few seconds, improves with each subsequent bite, and is at its worst with the first meal of the day. It can have a significant impact on quality of life and physical health of patients, sometimes even leading to avoidance of eating. A recent survey estimated the incidence of first bite syndrome after parapharyngeal space surgery in up to 18% of patients after parapharyngeal space surgery (1).

The parapharyngeal space is richly supplied with a complex neurovascular anatomy. Netteneville initially proposed that first bite syndrome is derived from damage to the cervical sympathetic nerves with loss of sympathetic innervation to the parotid gland, resulting in a super sensitivity of the sympathetic receptors that control myoepithelial cells (2). An intense response by the myoepithelial cells is elicited on cross-stimulation of parasympathetic neurotransmitters (such as acetylcholine) released by chewing and biting.

There has been a recent movement to find a safe and effective alternative to these treatments. Botulinum toxin type A (BTA) prevents the release of acetylcholine in synapses. BTA has been widely applicable in the field of ENT and provides a useful tool in the treatment of spasmodic dysphonia, autonomic dysfunction, Frey syndrome, hemifacial spasm, and hyper functional lines. When administered in the parotid gland, BTA injection can result in selective blockade of parasympathetic neurotransmitters, which then decreases the cross-stimulation of sympathetic receptors on myoepithelial cells in the area. In the recent years, this theory has gained popularity but there is a dearth of literature to provide safety, dosage, and efficacy results.

CASE REVIEW

Patient Selection
Five patients (3 women and 2 men) with first bite syndrome developed after head and neck surgery were identified per IRB-approved protocol and treated by injection of BTA into the parotid gland using ultrasound guidance.

![Figure 1. Marking of Injection Sites](image)

Pain Assessment
At each pre-treatment visit, the patient was asked to rate their pain on a scale of 0 to 10 (10 being the most severe) and each subsequent visit this rating was repeated. Patients were asked to visit within 4 months for evaluation. At their 4-month visit, depending on severity of symptoms, they would receive repeat dosing until complete resolution of symptoms.

RESULTS

3 out of 5 patients reported significant improvement in symptoms from severe (9-10) to moderate (4-6) in the 4 month followup visit, an average decrease of 4-5 pain grades. One patient reported moderate improvement, which was defined by a decrease of 1-2 pain grades after injection. Only one patient reported no improvement at all. None of the patients reported complete resolution of symptoms after the first injection.

Patients received between 1 and 4 repeat injections, with 4 months between injections. The patients stated that their pain continued to be significantly improved for a number of months after the injections but would begin to recur with the same intensity within the 4 month period, requiring repeat injections. This process continued until the complete resolution of the symptoms.

<table>
<thead>
<tr>
<th>Patient</th>
<th>Pre-injection Pain</th>
<th>Post-injection Pain</th>
<th>Number of Total Units/Number of Sites</th>
<th>Number of Repeat Injections</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>8-9</td>
<td>4-5</td>
<td>22.5 U/7 sites</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>6-9</td>
<td>4-5</td>
<td>20 U/4 sites</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>9-10</td>
<td>8-9</td>
<td>40 U/4 sites</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>6-9</td>
<td>6-9</td>
<td>10 U/2 sites</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>9-10</td>
<td>4-5</td>
<td>40 U/4 sites</td>
<td>3</td>
</tr>
</tbody>
</table>

Table 2. Description of Pain Scale, BTA injections and number of repeat injections.

DISCUSSION

This study reports on our experience with intra-parotid BTA injections for treatment of symptoms of first bite syndrome.

The BTA injection into the affected parotid gland is a new, safe, and effective method in the management of first bite syndrome. The BTA injection into the parotid gland blocks acetylcholine and this blockade of neurotransmitters decreases the intense myoepithelial cell responses derived from cross-stimulation of sympathetic receptors, thus relieving the pain symptoms experienced on initiation of mastication.

Previous papers have established that use of intraparotid BTA significantly improves and can resolve symptoms of first bite syndrome. In our experience, we consistently performed multi-site injections (between 2 and 7) with lower total doses (between 22.5 and 40) with significant improvement in symptoms. This was done because the limited literature has shown that despite the effectiveness of 75 U, it also results in marked and persistent pain. Thus, the optimal effective dosing of BTA for first bite has yet to be determined.

Our results compare to previous studies which have noted that while symptoms do improve/resolve, the effect lasts until about 4 months, when symptoms recur with the initial severity. This is due to the depletion of BTA effect. We managed this by repeating injections every 4 months until resolution of symptoms. We used the same dosing each time, as this seemed to improve symptoms to a manageable degree.

The use of BTA can be a safe, non-invasive, and effective temporizing measurement to alleviate symptoms of first bite syndrome. Further studies are needed to optimize the treatment protocol with respect to first bite syndrome.

CONCLUSIONS

First bite is a painful complication of parapharyngeal space surgery, involving the cross-stimulation of sympathetic receptors and subsequent intense myoepithelial contraction by neurotransmitters such as acetylcholine. Intraparotid injection of Botulinum Toxin A (BTA) is thought to block acetylcholine, suggesting that this could be an effective treatment for first bite syndrome. Our experience shows that intraparotid BTA injections produce a decrease in the severity of symptoms; it should be considered a non-invasive and effective option in the treatment of this difficult to treat condition. Future studies should be carried out to optimize the dosing protocol for the specific treatment of first bite syndrome.

REFERENCES