Evaluation and Treatment of Frey Syndrome

Abstract

Frey syndrome (FS) is a localized cervicofacial hyperhidrosis and erythema during mastication in the preauricular area, which corresponds to the region of distribution of the auriculotemporal nerve. FS occurs most commonly after surgical procedures involving the parotid gland but may also be encountered after neck dissection or rhytidectomy procedures, or as a result of trauma to the preauricular region. Misdirected nervous regeneration is thought to be the underlying cause of this syndrome. FS is confirmed with the Minor's test, also known as the starch-iodine test. Several surgical approaches including increased skin thickness flap, sternocleidomastoid muscle flap, superficial musculoaponeurotic system flap, platysma muscle flap, temporal muscle fascia flap, the use of acellular dermal matrix or free fat grafts are described to prevent the development of FS. Although the local fascia and muscle flaps have their own share of limitations and risks of complications, several authors previously reported decrease in the incidence of FS after utilization of these techniques. Once FS develops, it may be managed medically or surgically. Medical management comprises of topical application of antiperspirants, or injections with alcohol, scopolamine, glycopyrrolate, or Botulinum toxin type A in the affected area. Surgical treatment options including transection of the auriculotemporal nerve, tympanic nerve, and greater auricular nerve, are also described in the literature although they are less commonly practiced for the management of FS.

Keywords: Frey syndrome; Auriculotemporal syndrome; Gustatory sweating; Parotidectomy; Salivary glands

Mini Review

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Abbreviations: FS: Frey Syndrome; SCMMF: Sternocleidomastoid Muscle Flap; SMAS: Superficial Musculoaponeurotic System; BTX-A: Botulinum Toxin Type A

Introduction

Hyperhidrosis or gustatory sweating in the region of the parotid gland was first mentioned by Kastremsky in 1740, Duphenix in 1757 and then by Baillarger in 1853. It was, however, the Polish neurologist Lucja Frey who described this condition as a new syndrome in 1923 [1,2]. Frey syndrome (FS) is characterized by localized cervicofacial hyperhidrosis and erythema during mastication in the area of distribution of the involved auriculotemporal nerve, a branch of the mandibular nerve (V_3) [3]. Misdirected nervous regeneration, mostly as a result of parotid surgery, is thought to be the underlying cause of FS [4,5].

Discussion

Frey syndrome or auriculotemporal nerve syndrome is defined as an auriculotemporal nerve dysfunction. Its main symptoms are transient flushing, warmth and sweating of the face in the preauricular area in response to mastication or a salivary stimulus [1,6]. These symptoms arise characteristically a few seconds after eating and last for a few minutes. Acidic, spicy and sour foods are more commonly reported to induce symptoms [1]. FS usually manifests after surgical procedures involving the parotid gland but may also less commonly occur after neck dissection or rhytidectomy procedures, or as a result of trauma to the preauricular region [6].

The incidence of FS after parotid surgery varies highly in the literature and is reported to be between 5-100% [7,8]. This divergence depends on several factors including the study design, the use of preventive surgical treatments, and the criteria used for diagnosis [9]. The size of a parotid tumor may also be a possible predictor for FS development, with a nearly doubled incidence in patients with tumor size of 4 cm or greater [10]. Overall, the mean worldwide incidence of FS development after surgical procedures involving the parotid gland is approximately 66% [11,12].

Anamnesis and medical history, which may reveal previous parotid surgery play an important role in the diagnosis of FS[1]. The confirmation of FS may be done with the Minor's test (starch-iodine test). The test is done by first painting the patient's post-surgical affected region with iodine and when dried, applying dry starch to the painted area. Then the patient is given a salivary stimulus. The presence of sweat along with the pre-applied iodine will make the starch turn blue/brown [6]. Although it is considered to be the most effective test to diagnose FS, it still has several limitations including the possible effect of room temperature on sweating. It should be kept in mind that without the use of a negative control in warm temperatures, false positive results may occur [13].

In order to avoid FS, several surgical preventive methods are described aiming to create a barrier between the parotidectomy bed and the skin [14]. These methods are increased skin thickness flaps, local fascia or muscle flaps, such as sternocleidomastoid muscle flap (SCMMF), superficial musculoaponeurotic system (SMAS) flap, platysma muscle flap, or temporal muscle fascia flap, or the use of acellular dermal matrix or free fat grafts [6,14]. Many

studies indicate that these preventive surgical procedures are associated with a decrease in the clinical symptoms of FS [14-18]. However, there are also several others, which found no evidence of such an association [19,20]. Like any other surgical procedure, these procedures have their own share of limitations and risks of complications. The injury of the spinal accessory nerve is a well-recognized complication of SCMMF interposition [21]. Temporoparietal fascia flap may cause functional complications such as facial nerve paralysis, haematoma and cosmetic complications including alopecia and extension of the surgical scar in the temporal region, even though its use is reported to decrease the incidence of FS [22,23]. The use of SMAS flaps on the other hand, are limited to benign parotid diseases, due to anatomical considerations [24,25].

Once FS develops, post-surgical interventions are focused more on ameliorating the symptoms, rather than providing an actual cure for FS. These interventions may be medical or surgical. Medical management options include topical application of antiperspirants, or injections with alcohol, scopolamine, glycopyrrolate, or Botulinum toxin type A (BTX-A) at the affected area [6]. The use of BTX-A has been considered an effective alternative to preventive surgical procedures for the past two decades. According to a recent meta-analysis of 22 published articles on the subject, BTX-A is shown to improve the symptoms of patients with FS, even in recurrent cases, with acceptable efficacy and safety [2]. Surgical treatment options, such as transection of the auriculotemporal nerve, tympanic nerve, and greater auricular nerve, are also described in the literature but remain less commonly practiced [6]. Although recent studies report complete resolution in more than 50% of FS patients, who underwent the transposition procedure, these studies are limited in number and too varied to warrant conclusions [26]. It should also be kept in mind that these surgical alternatives possess an increased risk of facial nerve injury, therefore should only be considered for cases that are refractory to conservative treatment options [6].

Conclusion

Frey syndrome is a post-operative condition, which may occur following parotid gland surgery, rhytidectomy, neck dissection or trauma to the preauricular area [6]. It presents with gustatory sweating and flushing of the skin on the lateral aspect of the face and upper neck, which corresponds to the area of distribution of the auriculotemporal nerve [14]. Several surgical techniques are utilized to prevent development of FS aiming to provide a barrier between the skin and surgical field [6]. FS may be managed medically or surgically, and among the alternatives, subcutaneous botulinum toxin type A injections stand out as a highly effective and safe option.

Acknowledgment

Not applicable.

Conflict of Interest

Not applicable.

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