



Research Article

PAROTIDOMASSETRIC FASCIA AS A COVER TO PREVENT FRAY'S SYNDROME POST PAROTIDECTOMY: A NOVEL TECHNIQUE

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ABSTRACT

Objectives: To examine the role of parotidomassetric fascia in preventing gustatory flushing, gustatory sweating during eating and reconstruction of facial contour defect after superficial parotidectomy.

Material and Method: Ten patients were enrolled from December 2018 to January 2020 with tumor of parotid gland. Their evaluation criteria were Frey's syndrome (Gustatory Flushing, Gustatory Sweating), Facial nerve paralysis, wound Dehiscence, Parotid fistula. Follow up period ranged from 14 months.

Results: Ten patients were enrolled in this study. Two patients showed a temporary facial nerve weakness after a superficial parotidectomy, which completely regressed over time. None revealed Frey's syndrome. Satisfactory results were found in relation to scar, facial contour defects and overall outcomes.

Conclusion: Parotidomassetric fascia appears to be an effective method of preventing Frey's syndrome after parotidectomy. The stable long-term results and high patient satisfaction lead to the application of this operation technique in daily routine.

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INTRODUCTION

Major Salivary gland consists of parotid gland, submandibular gland, and sublingual gland. The First most common benign tumor of salivary gland is parotid tumor followed by Warthin's tumor. Tumors of salivary gland may be benign or malignant. The most common benign tumors of salivary gland is Pleomorphic adenoma (PA) which accounting for 75-80% of all parotid neoplasms^{1,2,3} 44-68% of submandibular tumors, and 38-43% of minor salivary gland neoplasms⁴. It is also called mixed salivary gland tumor due to presence of variety of components such as mucoid, myxoid, chondroid and sometimes osseous tissue. When epithelial cells pre-dominate, the neoplasm transformed into carcinoma ex-pleomorphic adenoma in 1.6% of cases with a clinical duration of less than 5 years and in 9.6% of cases with a history longer than 15 years⁵. The stromal or Myoepithelial cells rarely transform into carcinosarcoma⁶. The mean age at the initial diagnosis is 46 to 51 years^{6,7,8} and women are affected more often than men^{2,9}. PA presents as a slow growing, well defined, ovoid, round, or multilobulated, painless mass.

small tumors are typically smooth, immobile, firm lumps, but larger tumor becomes bosselated. In a very large tumor fluctuant areas may be present due to cystic degeneration of stroma. the most common site of origin is the tail of superficial lobe of parotid. It may be arises from deep lobe. when tumor involves both superficial and deep lobe of parotid then described as Dumbell tumor. The size of tumor variable at time of first diagnosis, it grows slowly. inspite of large size, facial nerve does not involved. the larger tumors have a typical multinucleated appearance and it does not sag down, but stands out inspite of its large size and weight due to the presence of chondroid tissue. Superficial parotidectomy is the most common procedure done for parotid pathology. Suprafacial parotidectomy also known as partial parotidectomy is especially useful for lesions in the lower pole of the gland. This involves not dissecting the upper division of the nerve with consequently, minimal of trauma to the facial nerve. Defects of soft tissue after parotidectomy can be reconstructed with different alloplast, allografts material and autologous graft with various distant and local flaps. alloplastic materials such as silicone, polyethylene, polyacrylamide, or titanium elements are may be used. On the other hand, allografts such as Allo Derm®¹⁰ can be used. This acellular dermis is

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processed from human cadaver skin after removing the epidermis and the cellular components of the dermis through afreeze-drying process. It is utilized particularly in reconstructive procedures such as abdominal surgery, breast surgery, and periodontal surgery. In addition, various distant and local autologous grafts such as a superficial temporal fascial flap¹¹sternocleidomastoid muscle flap¹²,superficial muscular aponeurotic system (SMAS) flap¹³ microvascular flaps, AlloDerm® grafts¹⁰, porcine dermal collagen grafts¹⁴, silicone implants, and free fat grafts. More and more autologous dermis-fat grafts are being used in the reconstruction of facial contour defects, thus fulfilling most of the requirements of an ideal graft. The choice of a suitable transplant or implant can be difficult, because none meets the requirements of an ideal filling material. This should be, insofar as possible, biocompatible, inexpensive, always available, non-infectious, non-allergenic, nontoxic, cosmetically, variable in size, and not undergoing any resorption. These materials and grafts used to cover the resected parotid gland in an attempt to create a physical barrier between the overlying dermis and the transected nerve fibers within the parotid. Thus preventing the incidence of Frey's syndrome.

Aim and objectives: The aim of this study was to evaluate Parotidomasseteric fascia after superficial parotidectomy can prevent Frey's syndrome and restore soft tissue defect .

MATERIAL AND METHODS

A simple nonrandomized and observational study was conducted at the Department of Dentistry, IGIMS, Patna from December 2018 to January 2020. In this study, 10 patients without any systemic complications, who strictly met the inclusion criteria, were included.

The inclusion criteria was patients with involvement of superior lobe of parotid gland, and patients who consented for the surgical treatment and postoperative follow-up. The exclusion criteria were patients with history of diabetes, hypertension, prolonged steroid therapy, compromised immunity, alcoholics and patients with recurrence of Parotid tumor, malignant tumor of parotid gland. The diagnosis was made on the basis of the clinical examination findings ,standardized ultrasonography, FNAC were performed preoperatively in all patients along with contrast magnetic resonance imaging (Fig. 1).

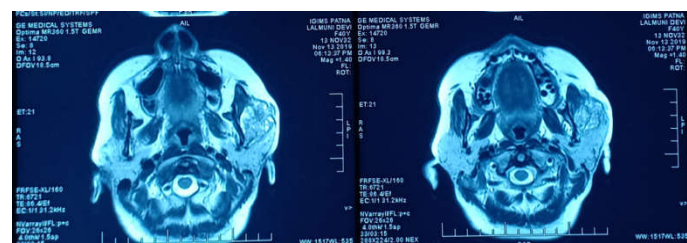


Fig.1

The dimension of surgery depended on the origin and extent of the tumor. Routine investigations were performed. All patients provided informed consent before participating in this study.To remove the bias, a single surgeon had operated on all the patients under standard aseptic conditions and protocol.Overall, 10 patients underwent a standardized

superficial parotidectomy with intraoperative facial nerve preservation. In all patients, surgical defects were reconstructed with a parotidomasseteric fascia. Tumor was exposed through Lazy-S incision (fig2), flap was raised with skin subcutaneous tissue along with parotidomasseteric fascia. Main trunk offacial nerve was identified (fig-3) by using tragal pointer and conserved, superficial lobe of parotid gland was dissected and removed(fig-4),sent for histopathological examination (fig-5). Defects were reconstructed with parotidomasseteric fascia with 4-0 vicryl suture.(Fig. 2,3,4,5).



Fig 2 (lazy-S incision)



Fig 3(identification of main trunk of facial nerve)



Fig 4 (Tumor removed)



Fig 5 (specimen send for histopathology examination)

Finally, the wound was closed in layers and drain was inserted away from facial nerve proximity to preserve facial nerve

damage. The postoperative management included prophylactic antibiotic, Analgesic, neuromodulator therapy advised for 5 days. Complications and their management were recorded during hospitalization and follow-up care. The complications were divided into wound Dehiscence, Parotid fistula, facial nerve paralysis, Frey's syndrome (Gustatory Flushing, Gustatory Sweeting). The presence of Frey's syndrome was assessed from the subjective point of view of the patients as well as by clinical examination using lemon juice. Starch iodine test was done for assessing Frey's syndrome.

RESULTS

Ten patients, seven female and three male, were included in the 14 months study. Their ages ranged from 39 to 72 years, with an average age of 55 year. All patients underwent standardized superficial parotidectomy. The outcome measures of this study was wound dehiscence, parotid fistula, facial nerve paralysis, Fray's syndrome. The right side was affected in four patients and the left side in six patients. Histological examination revealed a pleomorphic adenoma in 10 patients. The parotidomassetric fascia was harvested in 10 cases. Two patients showed a temporary facial nerve weakness after a superficial parotidectomy, which completely regressed over time.

Wound Dehiscence

| | 1st week | 2nd week | 4th week | 8th week | 20th week | 32 week | 44th week | 56 th week |
|-----------------------|---------------------|----------|----------|----------|-----------|---------|-----------|------------|
| Absent | 10 | 6 | 7 | 10 | 10 | 10 | 10 | 10 |
| Present | 0 | 4 | 3 | 0 | 0 | 0 | 0 | 0 |
| Chi square test value | 23.64 | | | | | | | |
| P value | .00131; SIGNIFICANT | | | | | | | |

Parotid fistula

| | 1st week | 2nd week | 4th week | 8th week | 20th week | 32 week | 44th week | 56 th week |
|-----------------------|----------------------|----------|----------|----------|-----------|---------|-----------|------------|
| Absent | 10 | 8 | 8 | 8 | 10 | 10 | 10 | 10 |
| Present | 0 | 2 | 2 | 2 | 0 | 0 | 0 | 0 |
| Chi square test value | 07.811 | | | | | | | |
| P value | 0.00147; SIGNIFICANT | | | | | | | |

Facial nerve palsy

| | 1st week | 2nd week | 4th week | 8th week | 20th week | 32 week | 44th week | 56 th week |
|-----------------------|----------------------|----------|----------|----------|-----------|---------|-----------|------------|
| Absent | 09 | 08 | 08 | 09 | 10 | 10 | 10 | 10 |
| Present | 1 | 02 | 02 | 01 | 0 | 0 | 0 | 0 |
| Chi square test value | 1.067 | | | | | | | |
| P value | 0.00151; SIGNIFICANT | | | | | | | |

Frey's Syndrome

| | 1st week | 2nd week | 4th week | 8th week | 20th week | 32 week | 44th week | 56 th week |
|-----------------------|--------------------|----------|----------|----------|-----------|---------|-----------|------------|
| Absent | 10 | 9 | 10 | 10 | 10 | 10 | 10 | 10 |
| Present | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |
| Chi square test value | 15.556 | | | | | | | |
| P value | 0.029; SIGNIFICANT | | | | | | | |

DISCUSSION

Parotid surgery for pleomorphic adenomas has developed considerably in the past century, passing from minimally invasive nonradical procedure to extensive radical surgery, yet with more complications¹⁵⁻¹⁸. Over the years, efforts have been aimed at finding a technique that had all the benefits of each

procedure while limiting the drawbacks. Recurrences and nerve dysfunction were the main causes that prompted change in the surgical management of parotid tumors.¹⁸⁻²³ Major advances in the surgical technique have shifted the focus from recurrence rate and facial nerve damage to management of other surgical outcomes, such as Frey syndrome or hypoesthesia/ paresthesia of the earlobe as a result of the great auricular nerve damage.^{24,25}

In this study, the ratio of female-to-male patients was 2:1, with an average age of 55 years. In comparison, a study by Govindaraj *et al*¹⁰. described a collective of 64 patients after parotidectomy with an identical sex ratio of 2:1 and an average age of 51 years. Postoperative management included standardized outflow of wound extract through a drainage, which was left for 2 days. However, Govindaraj *et al*¹⁰. left the drain for 5 to 7 days because they observed a decrease of seromas under a prolonged drainage. In addition, an antibiotic prophylaxis was started intraoperatively up to 5 days. Perhaps this procedure contributed to the fact that no infection appeared. Also, Niechajev²⁶ administered antibiotics over 5 days after dermis-fat transplantation for lip enhancement with no wound infection. In this study wound dehiscence was present in 4 (40 %) patients at second week which gradually decreases at 3rd visit. No wound dehiscence was observed on further follow up periods. Wound dehiscence was managed with proper irrigation with betadine and normal saline, prophylactic antibiotic therapy. Common cause of wound dehiscence was hematoma formation, which was managed by hemostasis control, anterior edges of flap trimmed to ensure that the edge bleeds well. We follow this procedure routinely and have had no further wound dehiscence or flap necrosis was observed. Guerrero Santos *et al*, and Davis *et al*. described no such complications²⁷. In this study parotid fistula was seen in 2 (20%) patients at second week which gradually improved by local irrigation with saline and betadine, over the period of time. Parotid fistula is rare complication after superficial parotidectomy. Its incidence was reported at about 4% after superficial parotidectomy²⁸. Deeper part of residual parotid tissues will continually secrete saliva and accumulates as sialoceles. When secretion is more than capacity of drainage via normal Stenson's duct, fistula forms. More than 90% will heal spontaneously without any intervention. Facial nerve dysfunction was the most common complication after superficial parotidectomy for pleomorphic adenoma. In this study facial nerve palsy was involved in 3 patients (30%) Although the percentage of appearance of facial nerve palsy at 1 week was 1%, second week 20%. Most of them recovered spontaneously over periods of time. Marche R *et al*, 2005 and Gaillard C 2005²⁹ conducted a study and stated that, the percentage of facial postoperative palsy varies from 10% to 70% for transient involvement, and from 0 to 19% for definitive involvement. The incidence of postoperative facial palsy in our study was low possibly due to preservation of branches of facial nerve during surgery and gentle care of nerve branches. Frey syndrome also called as gustatory sweating occurs as a result of aberrant innervation of cutaneous sweat glands overlying the parotid by postganglionic parasympathetic salivary nerves resulting in localized sweating during eating or salivation. Keeping the parotidomassetric fascia on the anterior skin flap tends to decrease the incidence of this complication. The surgical interposition of tissue like temporoparietal fascia or sternomastoid muscle flap, or implantable material (e.g.,

acellular dermis) between the skin and parotid fascia also helps. The current literature shows a variable incidence of Frey's syndrome of between 0% and 76% (Table 2).

Table 2
Incidence of Frey's syndrome in the literature.

| Author (year) | No. of patients | Reconstruction method | Incidence of Frey's syndrome | Annotations |
|-------------------------------|-----------------|--|------------------------------|---------------------------------|
| Dajani et al. (1996) | 24 | None | 5.8% | Subjective/clinical presence |
| | 7 | Isophthalated skin | 76% | Objective presence (Minor test) |
| | 7 | Ethiasorb implant | 14% | Objective presence (Minor test) |
| | 7 | e-PTFE implant | 0% | Subjective/clinical presence |
| | 32 | e-PTFE implant | 0% | Objective presence (Minor test) |
| Govindaraj et al. (2001) | 32 | None | 0% | Subjective/clinical presence |
| | 32 | Acetabular dermis | 40% | Objective presence (Minor test) |
| Papadogeorgakis et al. (2009) | 19 | Porcine dermal collagen graft | 0% | Subjective/clinical presence |
| | 8 | Dermis-fat graft | 1.3% | Objective presence (Minor test) |
| Chandrasekhar et al. (2009) | 8 | Dermis-fat graft + autologous platelet adhesives | 0% | Objective presence (Minor test) |
| | 35 | None | 2.0% | Subjective/clinical presence |
| Fardes et al. (2013) | 31 | Sternocleidomastoid muscle flap | 1.6% | Subjective/clinical presence |
| | 40 | Dermis-fat graft | 0% | Subjective/clinical presence |
| Chun et al. (2014) | 28 | Free fat | 0% | Subjective/clinical presence |

Regarding the complications, the parotidomassetric fascia seems to provide better results than AlloDerm® or alloplastic materials. Harada *et al*³⁰. presented a case in which Frey's syndrome was observed after 18 months. Therefore, longer observation periods should also be discussed. Nevertheless, the present study presents quite a representative collective with a mean follow-up period of 21 months. The transplantation of a dermis-fat graft after parotidectomy is important not only to prevent a Frey's syndrome, but also aesthetically for the restoration of facial contours. Thus, the objective of this therapy is to reach maximal quality of life and satisfaction for the patient. Chandarana *et al*³¹. also evaluated patient satisfaction in terms of scar development and facial symmetry on the basis of questionnaires in their study, even if these results played only a minor role in their study.

CONCLUSION

parotidomassetric fascia for reconstruction of facial contours after superficial parotidectomy represent a reliable method with a low complication rate. In addition, from a functional point of view, parotidomassetric fascia can certainly prevent Frey's syndrome. Superficial parotidectomy is a safe operation if performed with attention to detail, meticulous gentle dissection and avoidance of direct trauma or stretches to the nerve to prevent facial weakness. It is the procedure against which all other procedures should be compared, and certainly the procedure of choice in large and challenging tumors.

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