Quality of Life Following Surgical Treatment of Benign Parotid Disease

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Abstract To evaluate the quality of life after surgery for benign neoplastic disease of the parotid gland. Forty-nine patients who underwent surgery for benign parotid disease between January 2004 and December 2008 were included in this retrospective study. EORTC QLQ-C30 and EORTC QLQ-H&N35 questionnaires were used to determine the quality of life. The variables of these questionnaires were compared with age, gender, educational status, histopathologic diagnosis and Frey syndrome. A statistically significant correlation was noted between the female gender and post-surgical pain, sleeplessness and the use of non-steroid anti-inflammatory drugs ($p < 0.001$). There was a significant difference between age and difficulties in moving the mouth ($p < 0.001$). Frey syndrome related to social functions, economical difficulties, speech defect, reduced sexuality, and nutritional parameters were found to be statistically significant ($p < 0.001$). Frey syndrome is the most common complication that affects the quality of life in patients who had parotidectomy due to a benign parotid

disease. Therefore, all patients should be informed about Frey syndrome before parotidectomy.

Keywords Quality of life · Benign parotid gland disease · Parotidectomy · Complications

Introduction

Parotid gland neoplasms constitute 3 % of all head and neck tumors [1]. Benign masses account for 80 % of parotid gland neoplasms [1]. Besides benign tumors like pleomorphic salivary adenoma, inflammatory and autoimmune diseases also require parotidectomy. The aim of parotid surgery in benign diseases is to remove the diseased gland while preserving the facial nerve function and preventing tumor recurrence. Possible complications of parotid gland surgery include facial nerve paralysis, recurrent disease, gustatory sweating (Frey syndrome), great auricular nerve anesthesia and salivary fistula. These complications can affect the quality of life [2].

Although objective measures of success in parotidectomy have been frequently reported in the literature [1], relatively little attention has been paid to understanding the patient's perception of their surgical results. In this respect, quality of life studies may be helpful; but such studies in literature are limited.

This study was designed to determine the surgery-related changes in quality of life after surgery for benign neoplastic disease of the parotid gland.

Materials and Methods

Study Design

The medical records of patients, who had surgery due to a benign parotid disease between January 2004 and December

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2008, with a minimum 12-month follow up period were retrospectively evaluated. Age, gender, tumor localization and histological types of tumor, complications and treatment modalities were recorded.

Outcome Measures

The quality of life study group of the European Organization for Research and Treatment of Cancer (EORTC) has developed a measurement strategy for the assessment of quality of life in clinical trials [3, 4]. We used the core quality of the life questionnaire (QLQ-C30) (European Organization for Research and Treatment of Cancer Quality of Life C30) in combination with head and neck cancer specific questionnaire module EORTC QLQ-H&N35 (European Organization for Research and Treatment of Cancer Quality of Life Head and Neck 35) [5]. The EORTC QLQ-C30 is a 30-item questionnaire measuring the health-related quality of life. This questionnaire includes six functional scales, three symptom scales, and six single items. The EORTC QLQ-H&N35 is a 35-item questionnaire covering seven multiple-item scales in addition to eleven single items.

Statistical Analyses

Data were analyzed using the Statistical Package for Social Sciences (SPSS) software (version 15.0 for Windows) (Customer number:114094). All differences associated with a chance probability of .05 or less were considered statistically significant. Data were shown as mean $\pm$ SD and number of cases with percentages. The normality of the distributions of continuous variables was determined by using Shapiro–Wilk test. The median differences between groups were compared by using Mann–Whitney *U* test. Kruskal–Wallis test was applied when the number of independent groups was more than two. When the *p* value from the Kruskal–Wallis test was statistically significant, Kruskal–Wallis multiple comparison test was used to determine the group which differs from other groups. Multiple linear regression analysis was applied to establish the independent predictors which mostly affected the quality of life. Coefficient of regression and 95 % confidence intervals for each independent variable were also calculated.

Results

The study included 49 patients (25 men and 24 women) with a median age of 47.7 ± 12.7 years (age range, 20–71 years). Seventeen patients were younger than 45 years, sixteen patients were 55 years of age or older.

Table 1 The distribution of histopathologic diagnoses of patients

Diagnoses	Number of patients	%
Pleomorphic adenoma	29	59.2
Warthin's tumor	11	22.4
Chronic sialoadenitis	3	6.1
Lymphoepithelial lesion	2	4.1
Basal cell adenoma	1	2
Granulomatous lymphadenitis	1	2
Lipoma	1	2
Reactive lymph node	1	2

Twenty-seven (55.1 %) patients were primary school graduates, 9 (18.4 %) were secondary school graduates, 7 (14.3 %) were high school graduates and 6 (12.2 %) were university graduates. The most common indication for parotidectomy among patients with tumors was the diagnosis of pleomorphic adenoma (59.2 %). The other benign indications included Warthin's tumor (22.4 %), chronic sialadenitis (6.1 %), lymphoepithelial lesion (4.1 %), basal cell adenoma (2 %), granulomatous lymphadenitis (2 %), lipoma (2 %), and reactive lymph node (2 %) (Table 1). Superficial parotidectomy was performed on 43 patients (87.8 %). Total parotidectomy was performed on 6 patients (12.2 %) who were treated for a deep lobe tumor.

In our study, complications included salivary fistula (2 %), hematoma (2 %), paresis in the marginal mandibular branch of facial nerve (22.4 %), and facial nerve paresis (24.5 %). The salivary fistula through the wound scar resolved after the application of pressure dressing. The facial nerve paresis was temporary. Frey syndrome was detected in 7 patients (14.3 %). The greater auricular nerve was not preserved intraoperatively. Although there was sense impairment in 36 patients (73.5 %) due to scarification of the greater auricular nerve, no complaints were received from any of these patients. Seven (14.3 %) surgical site depression, 15 (30.6 %) alterations of the facial shape and 30 (61.2 %) hypertrophic cicatrix were reported by the patients. None of the patients responded “yes” to the question addressing dry mouth and xerostomia.

The results of the EORTC QLQ-C30 and the head and neck module QLQ-H&N35 are listed in the Tables 2 and 3. A significant statistical correlation was noted between female gender and post-surgical pain ($p < 0.001$), also a significant statistical correlation was noted between sleeplessness and the use of the Non-Steroid Anti-Inflammatory Drugs (NSAID) ($p < 0.001$). There was a significant difference between age and difficulties in moving the mouth ($p < 0.001$). Frey syndrome related to social functions, economical difficulties, speech defect, reduced sexuality and nutritional parameters were statistically significant ($p < 0.001$).

Table 2 QLQ-C30, EORTC quality of life level according to age, gender, education level, diagnosis and Frey syndrome

Variables	<45 age (n = 17)	45–55 age (n = 16)	>55 age (n = 16)	p	Men (n = 25)	Women (n = 24)	p	Primary/ secondary school (n = 36)	High school/ university (n = 13)	p	Pleomorphic adenoma (–) (n = 20)	Pleomorphic adenoma (+) (n = 29)	p	Frey (–) (n = 42)	Frey (+) (n = 7)	p
Global health status	71.1 ± 17.95 ^a	70.8 ± 20.18 ^b	83.9 ± 12.35 ^{a,b}	0.031	79.3 ± 17.20	70.8 ± 17.89	0.087	74.3 ± 19.25	77.6 ± 13.77	0.863	74.6 ± 20.32	75.6 ± 16.36	0.992	78.2 ± 15.93	57.1 ± 19.50	0.012
Physical function	93.3 ± 7.07	93.3 ± 5.44	89.2 ± 8.39	0.133	93.6 ± 6.23	90.3 ± 7.86	0.191	91.7 ± 7.87	92.8 ± 5.06	0.774	91.0 ± 8.17	92.6 ± 6.51	0.472	92.1 ± 6.79	91.4 ± 9.97	0.916
Role function	97.1 ± 8.81	99.0 ± 4.17	100.0 ± 0.00	0.371	100.0 ± 0.00	97.2 ± 8.03	0.071	98.6 ± 6.14	98.7 ± 4.62	0.806	99.2 ± 3.73	98.3 ± 6.82	0.769	99.2 ± 3.59	95.2 ± 12.60	0.302
Emotional function	87.3 ± 13.21 ^a	91.7 ± 10.97 ^b	98.4 ± 6.25 ^{a, b}	0.003	94.7 ± 11.25	89.9 ± 11.26	0.037	93.3 ± 11.06	89.7 ± 12.34	0.164	93.8 ± 11.11	91.4 ± 11.68	0.313	93.1 ± 10.72	88.1 ± 15.11	0.318
Cognitive function	94.1 ± 11.70	94.8 ± 11.74	89.6 ± 15.96	0.609	90.7 ± 14.50	95.1 ± 11.50	0.220	91.7 ± 14.09	96.2 ± 9.99	0.334	92.5 ± 13.76	93.1 ± 13.00	0.914	94.0 ± 12.11	85.7 ± 17.82	0.171
Social function	96.1 ± 11.07	97.9 ± 8.33	100.0 ± 0.00	0.378	98.7 ± 6.67	97.2 ± 9.41	0.531	97.2 ± 9.34	100.0 ± 0.00	0.288	98.3 ± 7.45	97.7 ± 8.60	0.788	100.0 ± 0.00	85.7 ± 17.82	<0.001
Fatigue	18.3 ± 14.13 ^{a, c}	5.6 ± 9.94 ^c	4.2 ± 5.56 ^a	0.003	4.9 ± 5.63	14.4 ± 15.19	0.062	6.5 ± 10.07	17.9 ± 14.01	0.006	5.0 ± 6.72	12.6 ± 14.16	0.092	8.7 ± 11.91	14.3 ± 13.93	0.218
Nausea and Vomiting	0.0 ± 0.00	1.0 ± 4.17	0.0 ± 0.00	0.357	0.0 ± 0.00	0.7 ± 3.40	0.307	0.5 ± 2.78	0.0 ± 0.00	0.548	0.0 ± 0.00	0.6 ± 3.09	0.406	0.4 ± 2.57	0.0 ± 0.00	0.683
Pain	16.7 ± 15.59 ^a	9.4 ± 12.12 ^b	1.0 ± 4.17 ^{a, b}	0.004	2.7 ± 6.24	16.0 ± 15.13	<0.001	6.9 ± 11.53	15.4 ± 15.90	0.072	5.8 ± 8.16	11.5 ± 15.50	0.342	8.7 ± 12.88	11.9 ± 15.85	0.617
Dyspnea	5.9 ± 13.10	2.1 ± 8.33	0.0 ± 0.00	0.177	4.0 ± 11.06	1.4 ± 6.80	0.322	0.9 ± 5.56	7.7 ± 14.62	0.023	1.7 ± 7.45	3.4 ± 10.33	0.506	3.2 ± 9.90	0.0 ± 0.00	0.399
Sleeplessness	13.7 ± 16.91	6.2 ± 13.44	4.2 ± 11.39	0.135	1.3 ± 6.67	15.3 ± 16.97	<0.001	6.5 ± 13.38	12.8 ± 16.88	0.176	1.7 ± 7.45	12.6 ± 16.46	0.009	7.1 ± 13.84	14.3 ± 17.82	0.227
Nutrition parameters	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000
Constipation	0.0 ± 0.00	2.1 ± 8.33	0.0 ± 0.00	0.357	0.0 ± 0.00	1.4 ± 6.80	0.307	0.9 ± 5.56	0.0 ± 0.00	0.548	1.7 ± 7.45	0.0 ± 0.00	0.229	0.8 ± 5.14	0.0 ± 0.00	0.683
Diarrhea	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000
Financial difficulties	3.9 ± 11.07	2.1 ± 8.33	0.0 ± 0.00	0.378	1.3 ± 6.67	2.8 ± 9.41	0.531	2.8 ± 9.34	0.0 ± 0.00	0.288	1.7 ± 7.45	2.3 ± 8.60	0.788	0.0 ± 0.00	14.3 ± 17.82	<0.001

^a A statistically significant difference between <45 age group and >55 age group ($p < 0.01$)^b A statistically significant difference between 45–55 age group and >55 age group ($p < 0.05$)^c A statistically significant difference between <45 age group and 45–55 age group ($p < 0.001$)

Table 3 EORTC QLQ-H&N35 quality of life level according to age, gender, education level, diagnosis and Frey syndrome

Variables	<45 age (n = 17)	45–55 age (n = 16)	>55 age (n = 16)	p	Men (n = 25)	Women (n = 24)	p	Primary/secondary school (n = 36)	High school/university (n = 13)	p	Pleomorphic adenoma (–) (n = 20)	Pleomorphic adenoma (+) (n = 29)	p	Frey (–) (n = 42)	Frey (+) (n = 7)	p
Pain	6.9 ± 7.36 ^a	9.4 ± 13.22 ^b	0.0 ± 0.00 ^{a, b}	0.004	2.7 ± 7.10	8.3 ± 10.71	0.028	5.1 ± 10.02	6.4 ± 7.72	0.288	6.7 ± 12.27	4.6 ± 6.90	0.961	5.4 ± 9.88	6.0 ± 6.30	0.327
Dysphagia	0.5 ± 2.02	4.7 ± 10.08	0.0 ± 0.00	0.131	1.0 ± 5.00	2.4 ± 7.16	0.292	2.3 ± 7.07	0.0 ± 0.00	0.215	3.8 ± 9.16	0.3 ± 1.55	0.134	1.8 ± 6.52	1.2 ± 3.15	0.588
Emotional problems	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000
Speech defect	1.3 ± 3.69	0.0 ± 0.00	0.0 ± 0.00	0.146	0.0 ± 0.00	0.9 ± 3.14	0.145	0.6 ± 2.58	0.0 ± 0.00	0.390	0.6 ± 2.48	0.4 ± 2.06	0.789	0.0 ± 0.00	3.2 ± 5.42	<0.001
Eating difficulties	2.5 ± 7.07	0.5 ± 2.08	0.0 ± 0.00	0.364	0.0 ± 0.00	2.1 ± 6.14	0.071	1.4 ± 5.08	0.0 ± 0.00	0.288	1.3 ± 4.08	0.9 ± 4.64	0.378	0.2 ± 1.29	6.0 ± 10.45	0.007
Difficulty in social contacts	3.9 ± 5.80 ^a	0.8 ± 2.28	0.0 ± 0.00 ^a	0.017	1.1 ± 2.49	2.2 ± 5.08	0.756	1.1 ± 3.38	3.1 ± 5.18	0.105	1.0 ± 3.26	2.1 ± 4.40	0.327	1.1 ± 3.26	4.8 ± 6.34	0.035
Less sexuality	2.0 ± 5.54	0.0 ± 0.00	0.0 ± 0.00	0.146	0.0 ± 0.00	1.4 ± 4.71	0.145	0.9 ± 3.87	0.0 ± 0.00	0.390	0.8 ± 3.73	0.6 ± 3.09	0.789	0.0 ± 0.00	4.8 ± 8.13	<0.001
Teeth	5.9 ± 13.10	2.1 ± 8.33	2.1 ± 8.33	0.463	5.3 ± 12.47	1.4 ± 6.80	0.176	2.8 ± 9.34	5.1 ± 12.52	0.476	1.7 ± 7.45	4.6 ± 11.70	0.323	2.4 ± 8.69	9.5 ± 16.27	0.086
Movement of mouth	19.6 ± 16.91 ^{a, c}	4.2 ± 11.39	0.0 ± 0.00	<0.001	4.0 ± 11.06	12.5 ± 16.48	0.040	4.6 ± 11.69	17.9 ± 17.30	0.004	3.3 ± 10.26	11.5 ± 16.12	0.053	7.1 ± 13.84	14.3 ± 17.82	0.227
Dry mouth	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000
Sticky saliva	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000
Cough	7.8 ± 14.57	2.1 ± 8.33	0.0 ± 0.00	0.072	4.0 ± 11.06	2.8 ± 9.41	0.675	2.8 ± 9.34	5.1 ± 12.52	0.476	3.3 ± 10.26	3.4 ± 10.33	0.969	2.4 ± 8.69	9.5 ± 16.27	0.086
Feeling sick	17.6 ± 17.15 ^a	12.5 ± 16.67 ^b	0.0 ± 0.00 ^{a, b}	0.004	6.7 ± 13.61	13.9 ± 16.79	0.103	6.5 ± 13.38	20.5 ± 16.88	0.005	6.7 ± 13.68	12.6 ± 16.46	0.185	10.3 ± 15.60	9.5 ± 16.27	0.900
Analgesic drugs	64.7 ± 49.26	56.3 ± 51.23	50.0 ± 51.64	0.697	32.0 ± 47.61	83.3 ± 38.07	<0.001	55.6 ± 50.40	61.5 ± 50.64	0.712	70.0 ± 47.02	48.3 ± 50.85	0.135	59.5 ± 49.68	42.9 ± 53.45	0.414
Nutritional support	11.8 ± 33.21	0.0 ± 0.00	0.0 ± 0.00	0.146	0.0 ± 0.00	8.3 ± 28.23	0.145	5.6 ± 23.23	0.0 ± 0.00	0.390	5.0 ± 22.36	3.4 ± 18.57	0.789	0.0 ± 0.00	28.6 ± 48.80	<0.001
Feeding tube	0.0 ± 0.00	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000	0.0 ± 0.00	0.0 ± 0.00	1.000

Table 3 continued

Variables	<45 age (n = 17)	45–55 age (n = 16)	>55 age (n = 16)	p	Men (n = 25)	Women (n = 24)	p	Primary/secondary school (n = 36)	High school/university (n = 13)	p	Pleomorphic adenoma (–) (n = 20)	Pleomorphic adenoma (+) (n = 29)	p	Frey (–) (n = 42)	Frey (+) (n = 7)	p
Weight loss	11.8 ± 33.21	6.3 ± 25.00	0.0 ± 0.00	0.378	12.0 ± 33.17	0.0 ± 0.00	0.083	2.8 ± 16.67	15.4 ± 37.55	0.108	5.0 ± 22.36	6.9 ± 25.79	0.788	7.1 ± 26.07	0.0 ± 0.00	0.470
Weight gain	5.9 ± 24.25	0.0 ± 0.00	0.0 ± 0.00	0.390	0.0 ± 0.00	4.2 ± 20.41	0.307	0.0 ± 0.00	7.7 ± 27.74	0.096	0.0 ± 0.00	3.4 ± 18.57	0.406	2.4 ± 15.43	0.0 ± 0.00	0.683

^a A statistically significant difference between <45 age group and >55 age group ($p < 0.05$)

^b A statistically significant difference between 45–55 age group and >55 age group ($p < 0.05$)

^c A statistically significant difference between <45 age group and 45–55 age group ($p < 0.01$)

Discussion

Parotid masses are excised more easily today due to the advances in technology and surgical techniques. In the past, the emphasis with regard to parotid gland surgery for benign lesions was on technical issues [6] and postoperative complications [7–9] rather than global quality of life. The patients who underwent parotidectomy had excellent general health before the operation and had minor complaints in the postoperative period. Operating on such patients is unlikely to improve their quality of life, and additional symptoms related to surgery will always be a source of disappointment for these patients [10].

The complications associated with parotidectomy are diverse. There was no questionnaire which evaluated the global health with regard to parotid tumors except in patients with malignant tumors [10]. The global health quality is a questionnaire for evaluating economic, social, personal, physical and psychological conditions. The multidimensional assessment of operational tests are described for the measurement of the quality of life [3, 11]. The quality of life questionnaire reported by the European Organization for Research and Treatment of Cancer consists of general and area-specific modules. The questionnaire has previously been validated and used in several studies [12]. SF-36 is a non-specific questionnaire which includes 36-items [13].

Facial nerve paralysis has a significant functional and emotional impact on patients. The most frequent complication is temporary facial nerve paresis after parotidectomy, and facial paralysis is observed to be the most important complication [14]. Patients with facial nerve paralysis often complain about compromised mastication, dysphagia, poor eye closure and the social ramifications of cosmetic deformity [15]. In the study of Gaillard et al., the incidence of postoperative facial nerve dysfunction was reported as 42.7 % on the first postoperative day, 30.7 % in month one after parotidectomy, and 0 % in month six after parotidectomy [16]. The incidence of temporary facial palsy was calculated in one study as 46.1 % and of permanent facial palsy as 3.9 % [17]. In our study, the most common dysfunction was paresis in a single nerve branch (11 patients), the marginal mandibular branch in particular. Facial nerve paralysis was reported in 12 (24.5 %) patients. There was no permanent palsy in the postoperative period.

The great auricular nerve arises from the second and third cervical rami. It is distributed to the facial skin over the parotid gland and auricula. The reduced ability to feel temperature and pain on the ear can also give rise to serious burns and injuries. The posterior branch of the nerve can safely be dissected from the gland along its course to the ear, and then be retracted while the parotidectomy is performed. Marshall et al. [7] reported that 66.2 % of patients

commented on noticing a sensory deficit in the cheek area immediately after surgery, but that incidence decreased to 30.6 % one year after surgery. Some authors reported that the scarification of the greater auricular nerve had no effect on the quality of life [2, 18]. The greater auricular nerve was not preserved in patients who underwent parotidectomy. There is no statistical significance between age, gender, status of education, diagnosis, Frey syndrome and the parameter of sensory ($p > 0.05$).

Frey syndrome is a well-known complication of parotidectomy. The true incidence of postoperative Frey syndrome is unknown, but it is estimated to be 35 and 60 %. Frey syndrome is characterized by unilateral sweating and flushing of the facial skin in the area of the parotid gland during eating. Frey syndrome may lead to social failure because of sweating and flushing [19]. The probable pathogenesis involves aberrant cross-reinnervation between the postganglionic secretomotor parasympathetic fibers to the parotid gland and the postganglionic sympathetic fibers supplying the sweat glands of the skin [20]. Some authors have suggested that transposition of sternocleidomastoid muscle or fascia into the wound may effectively reduce the symptoms [21, 22]. There is no standard questionnaire for the evaluation of Frey syndrome [19]. In our study, seven (14.3 %) patients had Frey syndrome. EORTC QLQ-C30 questionnaire parameters on social functioning and financial difficulties, and EORTC QLQ-H&N35 questionnaire parameters on speech problems, reduced sexuality, and nutritional support revealed statistically meaningful results ($p < 0.001$). When we compared the parameters of difficulty in social contacts and eating with Frey syndrome, we found a statistically significant correlation ($p < 0.05$). The comparison of Frey syndrome and the global health status revealed a statistically significant relationship ($p < 0.012$).

A parotid fistula is a communication between the skin and a salivary duct or gland, through which saliva is discharged. Parotid salivary fistula is a relatively common complication after parotidectomy. Laskawi et al. [23] reported persistent parotid fistula in 4 % of the patients following parotidectomy. Various forms of treatment have been described for parotid gland fistula, including tympanic neurectomy with or without chorda tympani section, the use of pressure dressings, anticholinergic drugs, botulinum toxin, radiotherapy, and even completion of the parotidectomy [24, 25]. Salivary fistula developed in one of our patients. Fistula was treated with a pressure dressing. We found no statistically significant correlation between the parameters of dry mouth, sticky saliva and age, gender, education level, histopathological diagnosis, and Frey syndrome.

Many factors can affect post-surgical pain. For example, Erkan et al. [2] found a statistically significant correlation between gender and post-surgical pain. In our study, there

was a statistically significant correlation between age, gender and post-surgical pain ($p < 0.05$). A statistically significant correlation was found especially between the <45 year-old group and the others ($p < 0.05$). We also found a significant correlation between female gender and the use of analgesic drugs ($p < 0.001$).

Unsightly scar is rarely encountered in properly performed parotid surgery. Wound closure should include approximation of subcutaneous tissues and careful reapproximation of the epithelium with fast-absorbing sutures. When we compared the global health status with age groups, we concluded that the health scores of patients in the age group of 45–55 years were lower than those of other age groups ($p < 0.031$). Similarly, Nitzan et al. [26] also reported a significant correlation between patients' age and appearance.

Frey syndrome is the most common complication that may adversely affect the quality of life in patients who have undergone parotidectomy for benign parotid disease. Therefore, patients undergoing parotidectomy should be comprehensively informed about Frey syndrome before the operation.

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Conflict of Interests The author(s) declare that they have no competing interests.

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