

Effect of BMI on Parotidectomy Outcomes: A Retrospective Study

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ABSTRACT

Introduction: Body mass index (BMI) is known to influence the prognosis of several surgical outcomes. The effect of BMI on the treatment of parotid tumors is still controversial and poorly understood. We aim to find the effect of BMI on a wide range of parotidectomy outcomes.

Methods: A single-center, multi-surgeon retrospective cohort study was performed on primary parotid tumor patients who underwent parotidectomy from 2004 to 2022. The primary focus was evaluating the association of BMI with parotidectomy complications. Univariate and logistic regression analysis tests were used to compare complications in the different BMI subgroups, adjusted logistic was finally performed to identify the factors associated with an increase in overall complications. Spearman's rank coefficient was used to see the correlation between BMI and the number of complications.

Results: We accessed our database of 969 parotid cases. Of these, 589 patients met the inclusion criteria of primary parotid tumor. The mean age of the patients was 65.7 years (SD, 15.39). With respect to BMI: Patients with a BMI of greater than 30 and normal BMI had no statistical difference in parotidectomy complication (OR: 1.07 95% CI 0.69 – 1.65, p=0.114) and patients with a BMI of 25-29.9 and normal BMI patients also have no statistical significance difference in parotidectomy outcomes (OR: 1.26 95% CI, 0.81 – 1.97, p=0.276). The univariate and logistic regression analysis did not show a significant association between BMI and overall and each primary complication and adjusted multivariate analysis showed that diabetes mellitus (DM), hypertension (HT), and obstructive sleep apnea (OSA) are associated with increased complications (OR: 2.94 95% CI 1.50 – 5.7, p=0.002), (OR: 3.09 95% CI 1.94 – 4.94, p< 0.0001), (OR: 4.28 95% CI 1.97 – 9.2, p< 0.0001), respectively. There was no correlation between BMI and the number of complications (r= -0.028, p=0.494)

Conclusions: Hence evidence suggests that there is no association between BMI and overall complications. We found that patients with DM, HT, and OSA have a significantly greater chance of developing complications after parotidectomy.

OBJECTIVES

- Our primary aim is to find an association between BMI and parotidectomy complications.
- We also wanted to evaluate secondary risk factors which might influence the outcomes

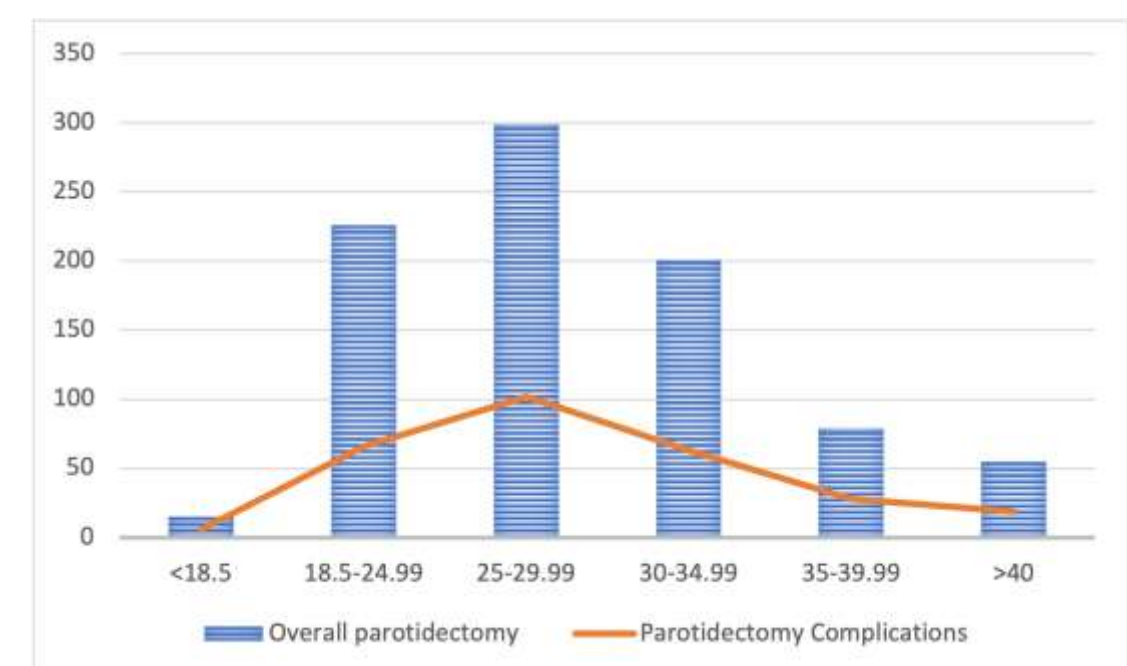
METHODS

- **Study design and population:** This was a retrospective cohort study conducted to evaluate the association between Body Mass Index (BMI) and complications arising post-parotidectomy. The study population consisted of patients who underwent parotidectomy in our facility from 2004 to 2022.
- **Data Collection** Medical records were reviewed to extract relevant data, including demographic information, BMI at the time of surgery, post-operative complications. BMI was categorized into predefined subgroups (e.g., underweight, normal weight, overweight, and obese) based on World Health Organization criteria.
- **Outcome Measures** The primary outcome was the occurrence of post-parotidectomy complications. Complications were further classified into categories (e.g., Facial nerve palsy, Frey's syndrome, abscess, wound infection.) for detailed analysis.

- **Statistical Analysis** Univariate analysis examined complications across BMI subgroups. Logistic regression then compared complication risks among these subgroups, using 'normal weight' as a reference. An adjusted logistic regression model was used to account for significant confounders. The relationship between BMI (categorical) and complications was evaluated using Spearman's rank coefficient. A p-value <0.05 was considered significant. Analysis was done using STATA v14.

- From the multivariate analysis (**Table 1**), none of the examined variables (including gender, age, and the various risk factors) show a statistically significant association with the BMI categories, as all p-values are above the typical significance threshold of 0.05.

Figure 1. Parotidectomy complications in groups



- **Figure 1.** shows the increasing number of parotidectomy complications with increasing number of cases. But there was no statistically significant correlation (Spearman's rho=0.02, P = 0.47).

RESULTS

- Of the 875 patients who underwent parotidectomy for tumor or non-tumor conditions, the mean age was 67.5 years, with a standard deviation (SD) of 15.6 years. Of these, 467 were males (53.4%).
- Based on BMI groups: 299 patients (34.17%) fall within the 25-29.99 BMI range; 226 (25.83%) in the 18.5-24.99 range; 201 (22.97%) in the 30-34.99 range ; 79 (9.03%) in the 35-39.99 category; 55 (6.29%) in >40 category and 15 in the <18.5 category (1.71%). The majority are concentrated in the 25-29.99 and normal BMI ranges.
- The univariate and logistic regression analyses did not indicate a significant relationship between BMI and the overall or specific primary complications.

Table 1. Multivariate Analysis of BMI with Parotidectomy outcomes

Variables	25-29.99 (95% CI)	P-value	30-34.99 (95% CI)	P-value	35-39.99 (95% CI)	P-value	>40 (95% CI)	P-value
Gender								
Male vs Female	1.29 (0.88-1.89)	0.17	1.13 (0.74-1.71)	0.55	1.35 (0.78-2.33)	0.27	1.29 (0.69-2.41)	0.42
Age								
>= 60 vs <60 years	1.25 (0.86-1.82)	0.23	1.1 (0.72-1.67)	0.63	1.33 (0.77-2.29)	0.30	1.28 (0.68-2.39)	0.43
Risk factors								
Smoking	1.25 (0.86-1.82)	0.23	1.1 (0.73-1.67)	0.63	1.33 (0.77-2.29)	0.30	1.28 (0.68-2.39)	0.43
Alcohol	1.25 (0.86-1.82)	0.23	1.1 (0.73-1.67)	0.63	1.13 (0.77-2.29)	0.30	1.28 (0.68-2.39)	0.43
Anemia	1.25 (0.86-1.82)	0.23	1.1 (0.73-1.67)	0.63	1.34 (0.78-2.32)	0.28	1.28 (0.68-2.39)	0.43
Diabetes	1.22 (0.84-1.77)	0.29	0.99 (0.65-1.52)	0.99	1.19 (0.69-2.08)	0.65	1.18 (0.62-2.22)	0.60
Hypertension	1.21(0.83-1.77)	0.30	1.05 (0.69-1.60)	0.80	1.27 (0.73-2.20)	0.38	1.17 (0.61-2.22)	0.63
Asthma	1.25 (0.86-1.81)	0.23	1.09 (0.72-1.65)	0.67	1.31 (0.76-2.26)	0.32	1.25 (0.67-2.35)	0.47
Hyperlipidemia	1.25 (0.86-1.82)	0.22	1.12 (0.74-1.70)	0.56	1.34 (0.78-2.32)	0.28	1.29 (0.69-2.43)	0.41
Obstructive sleep apnea	1.25 (0.86-1.82)	0.23	1.1 (0.73-1.67)	0.62	1.33 (0.76-2.33)	0.31	1.28 (0.67-2.43)	0.44
Cardiac disease	1.25 (0.86-1.82)	0.22	1.11 (0.73-1.68)	0.61	1.32 (0.77-2.28)	0.30	1.30 (0.69-2.45)	0.40
Stroke	1.26 (0.87-1.84)	0.21	1.14 (0.75-1.72)	0.53	1.31 (0.76-2.26)	0.31	1.26 (0.67-2.36)	0.45
Major depression	1.25 (0.86-1.81)	0.23	1.09 (0.72-1.65)	0.68	1.31 (0.76-2.26)	0.32	1.26 (0.67-2.36)	0.46

Discussion

- A thyroid cohort found that there was no relationship between BMI and thyroidectomy complication in line with our study¹
- In another gynecological cohort, morbidly obese patients had 30% more intraoperative complications compared to normal BMI patients²
- Hence, BMI had varied effects in the surgical outcomes of different systems

Conclusions

- We found no association between BMI and parotidectomy complications. In addition, secondary risk factors did not influence the outcome. Hence, the development of complications in either the normal BMI or obese group is not related to BMI itself.

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