PREVALENCE OF FLAP SURGERY AMONG PATIENTS WITH DIABETES AND HYPERTENSION

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ABSTRACT

Aim: The aim of the present study was to assess the prevalence of flap surgery among patients with diabetes mellitus and hypertension. The purpose of the study was to determine the prevalence of flap surgery among patients with diabetes mellitus and hypertension.

Materials: A hospital based cross-sectional study was conducted for 48 patients with diabetes and/or hypertension attending Saveetha Dental College and Hospital from June 2019 to March 2020 were included in the study. The data were gathered through semi-closed ended questionnaires and clinical examinations. Prevalence rate of flap surgery among patients with diabetes and hypertension was assessed by student’s independent t-test or one way analysis of variance.

Results: Results showed that the prevalence of diabetes and hypertension among patients undergoing flap surgery were majorly males with a history of diabetes mellitus. Data analysis was done using a chi square analysis between gender and prevalence of diabetes (chi-square-6.750;df-1;p=0.009) we found the results were statistically significant (P<0.05). Discussion: Prevalence of diabetes mellitus and hypertension among patients undergoing flap surgery were found to be higher in patients with diabetes.

Conclusion: Therefore, additional care should be taken into consideration when it comes to dealing with patients with underlying systemic conditions like diabetes and hypertension.

Keywords: diabetes mellitus, flap surgery, hypertension, prevalence

I. INTRODUCTION

Hypertension and Diabetes Mellitus (DM) are two chronic non-communicable diseases with increasing incidence worldwide (Shimoe et al., 2007)(Mealey and Ocampo, 2007), but also frequently coexist in many individuals. The possible reason for their coexistence may be their shared common risk factors such as obesity, sedentary lifestyle, and poor dietary choices (Shaw, Sicree and Zimmet, 2010)(Thamaraiselvan et al., 2015). About 75% of diabetes patients will develop hypertension over time, through diverse mechanisms such as the activation of tissue-based renin-angiotensin-aldosterone axis, volume expansion secondary to hyperglycemia, reduced baroreceptor response, loss of circadian rhythm without the normal night time depression in blood pressure, endothelial dysfunction and vascular oxidative stress (Smyth and Heron, 2006)(Ramesh, Sheeja Saji Varghese, et al., 2016). The rate at which hypertension co-exists with DM is such that diabetes are 1.5 to 2 times more likely to be hypertensive than their non-diabetes counterparts (Bakris and Gonzalez, 2007)(Simonson, 1988). The coexistence of diabetes mellitus and hypertension varies among different races, cultures and groups of people, but it is generally high (Unadike, Ohwovoriole and Eregie, 2011)(Varghese et al., 2015). A high incidence
Periodontal disease is a chronic bacterial inflammatory disease with severe chronic periodontitis affecting almost every periodontal structure such as alveolar bone, cementum, gingiva and periodontal ligament (Dye, 2012)(Khalid et al., 2016). It is characterized by slow-to-rapid but irreversible progression of destruction of the supporting bone with more than 5 mm of clinical attachment loss (Preshaw et al., 2012)(Ramesh, Sheeja S. Varghese, et al., 2016)

The symptoms are usually red, swollen gums that can bleed easily. However, gingivitis does not affect the underlying supporting structures of the teeth and is reversible. When gingivitis is not treated, it can advance to periodontitis (Jowett et al., 2009)(Kavarthapu and Thamaraiselvan, 2018). Periodontitis results in loss of connective tissue and bone support and is a major cause of tooth loss in adults. According to the Centers for Disease Control and American Academy of Periodontology definition, the prevalence of severe periodontitis 1.9% for the age group of below 50 years of age, 11.7% for ages 50-65 and 11.2% for the 65 years and above age group in the United States (O’Dowd et al., 2010)(Ramesh, Ravi and Kaarthikeyan, 2017). Previously our team has a rich experience in working on various research projects across multiple disciplines (Neelakantan et al., 2015; Ramamoorthi, Nivedhitha and Divyanand, 2015; Abdul Wahab et al., 2017; Eapen, Baig and Avinash, 2017; Manivannan et al., 2017; Patil et al., 2017; Ezhilarasan, Sokal and Najimi, 2018; Jeevanandan and Govindaraju, 2018; Ravindiran and Praveen Kumar, 2018; Wahab et al., 2018; Malli Suresh babu et al., 2019; Mehta et al., 2019; Rajeshkumar et al., 2019; Samuel, Acharya and Rao, 2020; Sethish and Karthick, 2020).

There is surprisingly little information on the correlation between flap surgeries with patients having underlying conditions such as diabetes mellitus and hypertension in India. Therefore the aim of the study was to assess the prevalence of diabetes mellitus and hypertension among patients undergoing periodontal surgery at a private dental institute.

II. MATERIALS AND METHODS

This study was carried out by collecting data from record management software at Saveetha Dental College and Hospital from June 2019 till April 2020. A project was evaluated and approved by the committee of the private dental institute. Ethical approval for this study was obtained from the institutional ethical committee (ethical approval number: SDC/SIHEC/2020/DIASDATA/0619-0320). Informed consent was obtained from the study participants. The present study was conducted among 48 patients aged 18 and above with a history of diabetes and hypertension.

The downside of the study is the geographic restriction as the study was only conducted in one specific area/region that is in and around Chennai, India. The data to be obtained was passed through the institutional ethics committee at the Saveetha Dental College and Hospital.

There were 2 reviewers involved in the study with data taken from patients visiting the Saveetha Dental College and Hospital from June 2019 to March 2020. Cross checking of data was done by random verification. Patients
with incomplete follow ups were called on the telephone. Random verification was done for 10% of the patient samples.

The internal validity is done by creating a study design followed by complete data collection and validation of data. The external validity is done by creating a study design followed by forming a clinical setup.

Data collection was done by entering the data into Microsoft Excel and then transferred into Statistical Package for Social Sciences (SPSS) software for statistical results. The independent variables were diabetes and hypertension prevalence while dependent variables present were age and gender. The analysis used for data collection was the chi-square test. The statistical SPSS software used was one-way ANOVA within the SPSS software. The steps for data analysis are as follows, data tabulations are done with data entered into excel sheets. Cross-tabulation of data into specific subgroups. Data analysis was done using a chi square analysis between gender and prevalence of diabetes (chi-square-6.750;df-1;p-0.009) we found the results were statistically significant (P<0.05)

III. RESULTS AND DISCUSSIONS

Figure 1: The histogram depicts the age distribution of the patients who underwent flap surgery. X-axis shows the age of the patient and Y-axis shows the frequency. The mean age was 51.92 years.
Figure 2: The graph bar shows the gender distribution of patients with diabetes and hypertension undergoing periodontal flap surgery. X-axis shows gender and Y-axis shows the percentages of patients with diabetes and hypertension who underwent periodontal flap surgery. This graph shows males 31 (64.58%) and females 17 (35.42%). Males have a slightly higher prevalence of diabetes and hypertension compared to females.

Figure 3: Bar graph showing the association between diabetic patients who underwent periodontal flap surgery among males and females. (X-axis: Prevalence of diabetics; Y-axis: Number of patients; Blue: Males; Red: Females). The final study sample size included a total of 48 patients with 31 males and 17 females of which 19 (61%) of males had diabetes mellitus and 14 (82%) of females were diabetic. Chi-square-6.750; df-1; p-0.009; the results were statistically significant (P<0.05) which implies gender and patients with only diabetes had an association. There was a higher prevalence of females with diabetes compared to males.
Figure 4: Bar graph showing the association between hypertensive patients who underwent periodontal flap surgery among males and females. (X-axis: Prevalence of hypertension; Y-axis: Number of patients; Blue: Males; Red: Females). Among 48 patients, 15 of the 31 males (48%) were hypertensive and 6 of the 17 females (35%) were hypertensive. Chi square value-0.750;df-1;p-0.386; the results were statistically not significant (P>0.05) which implies gender and patients with only hypertension had an association. There was a higher prevalence of males with only hypertension compared to females.

Figure 5: Bar graph showing the association between diabetic and hypertensive patients who underwent periodontal flap surgery among males and females. (X-axis: Prevalence of diabetics and hypertension; Y-axis: Number of patients; Blue: Males; Red: Females). In a bar graph involving patients with both diabetes and hypertension in the final study sample, it was noted that only 3 % of males were both diabetes and hypertensive while for the females in the same category, 18% were known diabetes and hypertensive patients. Chi-square-27.0;df-1;p-0.000; the results were statistically significant (P=0.000) which implies there is an association between gender and patients with both diabetes and hypertension. There was a higher prevalence of diabetes and hypertension in females when compared to males.
Epidemiological studies have consistently shown that diabetes is associated with increased risk of periodontitis. The majority of research has focussed on type 2 diabetes, although type 1 diabetes appears to have an identical effect on risk for periodontitis and is known to be dependent on the level of glycemic control, as it is with the risk of all complications of diabetes (Fernandez-Feijoo et al., 2010). Thus, in well controlled diabetes with HbAlc if around 7% or lower, there appears to be little effect of diabetes on the risk for periodontitis. However, the risk increases exponentially as glycemic control deteriorates. (Vernillo, 2003) Overall, the increased risk of periodontitis in patients with diabetes is estimated to be between 2-3 fold, that is, it increases the risk for periodontitis by 2-3 times. (Greenwood and Lowry, 2002).

In a study conducted by Chunjie Li et al, evaluated the periodontal status in 303 hypertensive patients revealed that 85.6% had to undergo some form of periodontal therapy with 20.64% undergoing periodontal flap surgery. (Ship, 2003)(Ramesh et al., 2019)

Based on our study, the majority of the patients were males who had diabetes mellitus undergoing periodontal flap surgery. The prevalence of gender showed that the males were more than females with 64.6% of the patients undergoing periodontal flap surgery. The mean age of the patients with systemic conditions undergoing periodontal flap surgery is 36 years old. The prevalence of diabetes, hypertension and/or both systemic conditions were found to be at 68.8%, 43.8% and 12.5% respectively making diabetes mellitus the most common systemic disease. There was also a positive statistically significant correlation between gender and systemic diseases.

Based on the graph showing distributions of prevalence that has been mentioned in the results section, it could be observed that the prevalence of flap surgery against positive diabetes mellitus cases, 54.28% of males out of the total study group had diabetes mellitus and 40% of females were diabetes. When comparing the prevalence of flap surgery against hypertension, 31.25% of the total males were hypertensive but only 12.5% of females had hypertension. Flap surgery prevalence against positive diabetes mellitus and hypertension showed that the females had 17.44% prevalence against the 9.68% of prevalence among males. Ol Opeodu et al I’m 2015, reported that the majority of the patients undergoing periodontal therapy had diabetes mellitus (Opeodu and Adeyemi, 2015)(Priyanka et al., 2017). Most of the previous studies conducted show that the majority of patients who have diabetes were males in contraindication with our present study, patients without any systemic diseases.
usually undergo flap surgery and this statement was agreed by the consensus. (Gurav and Jadhav, 2011)(Gajendran, Parthasarathy and Tadepalli, 2018). Some of the possible reasons that patients are diagnosed with diabetes mellitus and hypertension is due to improper diet as well as increased sodium and hypochlorite levels. Not having control in these aspects will most likely lead to systemic conditions such as diabetes mellitus and hypertension. In a correlation done between gender and systemic diseases by Heitz-Mayfield et al among patients undergoing flap surgery, most of the patients who were diabetes and hypertensive were males. (Ramamurthy and Mg, 2018) This result agreed with our study. Our institution is passionate about high quality evidence based research and has excelled in various fields (Pc, Marimuthu and Devadoss, 2018; Ramesh et al., 2018; Ezhlarasan, Apoorva and Ashok Vardhan, 2019; Ramadurai et al., 2019; Sridharan et al., 2019; Vijayashree Priyadharssini, 2019; Mathew et al., 2020). We hope this study adds to this rich legacy.

The limitations found in the present study are geographic restrictions as the patients are from around the same region. Besides, there was only a single ethnicity as the group of people are from the same ethnicity group. A limited sample size was one of our biggest limitations.

The future scope of exploration with regard to the prevalence of diabetes mellitus and hypertension among patients undergoing periodontal flap surgery is by providing awareness towards patients who are on the borderline of diabetes and hypertension and by carrying out a study with a larger sample size.

IV. CONCLUSIONS

Within the limitations of the present study, it was encountered that the majority of the male patients who underwent flap surgery were diabetes and hypertensive. Therefore, additional care should be taken into consideration when it comes to dealing with patients with underlying systemic conditions like diabetes and hypertension.

REFERENCES