

Prevalence of Preoperative Anemia in Patients Admitted At Khartoum Teaching Dental Hospital

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Abstract:

Objective: The aim of this study was to evaluate preoperative anemia in patients undergoing oral and maxillofacial surgery under general anesthesia.

Material and methods: A prospective cross sectional hospital-based study was carried at Khartoum Teaching Dental Hospital. Five hundred and twenty three patients were included in the study, 324 were males and 199 were females. Patients' age was ranging from 6 months to 84 years. Children formed 34.6% of the patients. Cleft lip and palate constituted the largest number of the patients (173). There were 70 oral cancer patients, 126 trauma patients and 154 patients with benign lesions. Anemia was defined according to the WHO criteria as hemoglobin concentration (Hb) less than 13 g/dl for males, less than 12 g/dl for females while Children were diagnosed based on their age. Variables related to hemoglobin level, age, gender and related diseases were analyzed. Test of significance ($P < 0.05$) was applied using SPSS version 20.

Results: Preoperative investigations revealed a high prevalence of anemia in patients constituting 48.2% for men, 45% for females and 47% for children. Severe anemia was found in 4.5% of children and 1.4% of males. The mean hemoglobin level for males was 12.8 ± 2.1 g/dl, for females was 12.1 ± 1.4 and for children was 11.4 ± 1.6 . One way analysis of variance revealed a significant difference in the mean of hemoglobin between patients with different diseases (P -value=0.001).

Conclusion: The findings of this study indicated that anemia is a common finding among patients undergoing oral and maxillofacial surgery and most of the time it was discovered during the preoperative investigation for surgery preparation.

Keywords: Anemia, general anesthesia, oral cancer, cleft lip and palate, oral surgery.

I. Introduction

Anemia is common in patients undergoing major surgery(1). Although diagnosis and treatment of anemia preoperatively is essential to optimize the patient's condition(2), preoperative anemia treatment is not a priority for most surgeons(3). One third of all cases of anemia in older subjects result from nutritional inadequacy, one third results from chronic disease including chronic kidney disease, and the remaining cases of anemia are of undetermined etiology(4).

In 1995, nutritional anemia was among the ten major causes for hospital admission in Sudan (5). In kassala, east sudan; Abdalla et al, 2011 reported that the prevalence of anemia among adult is 36.2%, regardless of their age, sex and educational level(6). A recent study in 2015 by Mohamed et al, conducted in Rural School-aged Sudanese Children found that prevalence of anemia was 29.7%(7). Spahn et al, in a systematic review of some cohorts studies revealed that preoperative anemia is present among 50% of patients undergoing surgical hip fracture repair and is increased to 87% postoperatively(8). Another hospital based study by Vasudevaru et al, in India revealed 63% of oral cancer patients were anemic before treatment (9).

The aim of this study was to evaluate preoperative anemia in patients undergoing oral and maxillofacial surgery under general anesthesia.

II. Material And Methods

This is an observational cross sectional hospital based study. The study was conducted at Khartoum Teaching Dental Hospital (KTDH) between December 2013 and December 2014. All patients scheduled for operation under general anesthesia who met the inclusion criteria were included in the study. The exclusion criteria were: 1. Patients who had received blood transfusion within the last three months or had any treatment for anemia. 2. Patients with history of surgery, chemotherapy or radiotherapy. 3. Patients with recurrent malignancy. 4. Patients with disease other than the cause (disease) of admission. All admitted patients were screened for eligibility criteria. Later investigations and demographic data were collected. Recruitment was done serially in one year duration until the sample size was attained.

Anemia defined according to the WHO criteria (10), for males as haemoglobin concentration (Hb) less than 13 g/dl, while for females, it was defined as less than 12g/dl. Children were diagnosed based on their age. All eligible patients' data were extracted from the patients file then transferred to specific designed case record form. The assessment and data collection was carried by the principal investigator. Data were entered using Microsoft excel 2007, cleaned and analyzed using Statistical Package for Social Sciences (IBM SPSS Inc., Chicago, version (no.20) software. Data were summarized in frequency tables and pie charts. Categorical variables were reported as proportion and were compared using chi squared test. Continuous data were described as means (standard deviation). Approval obtained from the ethics committee ministry of health and information was treated with confidentiality

III. Results

Patients included in this study were 523 patients, 324(62%) were males and 199 (38%) were females. Patients' age was ranging from 6 months to 84 years and the mean age was 25.3 years. There were 181 (34.6%) children in this study and 44.8% of those children were below five years. Oral cancer patients were 70 (13.4%) of all the selected sample of patients followed by 126 (24.1%) and 154(29.4%) for trauma patients and patients diagnosed with benign lesions (others), respectively. Cleft lip and palate formed the highest percentage of the patients 173 (33.1%).

The mean of hemoglobin level was different between age groups. It was also different between males and females within the same age group as shown in table1.

Table 1: The relation between mean of hemoglobin , age and gender

	Oral cancer		Cleft lip And palate		trauma		Benign lesion	
	male	female	male	female	male	female	male	female
0-14 yrs	-	-	11.3	11.1	11.9	12.9	11.8	11.6
15-24yrs	-	12.3	12.7	13.3	12.7	11.9	12.0	13.6
25-34yrs	11.7	-	13.7	12.6	12.5	11.9	12.5	12.9
35-44yrs	12.1	13.8	14.0	12.1	12.5	13.1	12.8	12.7
45-54yrs	11.8	12.6	-	-	14.3	10.9	09.6	13.7
55+yrs	12.2	12.4	-	-	11.3	13.3	12.2	12.0

The overall mean of hemoglobin among each disease was different as shown in figure1. There was significant difference between groups (p-value=0.001) when one way analysis of variance was done.

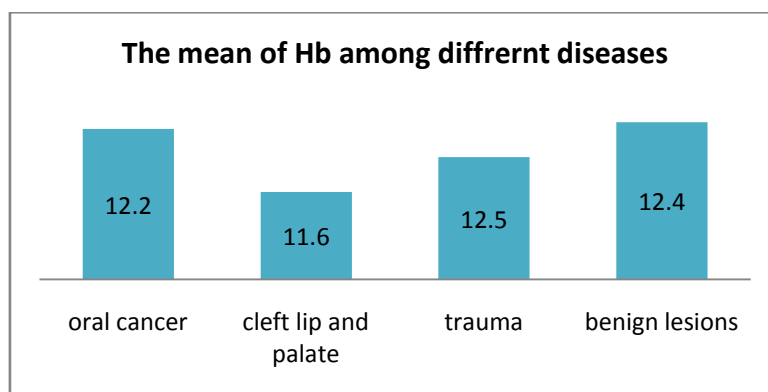


Figure 1: the mean of hemoglobin among different diseases

A comparison of hemoglobin level by diagnosis (disease) was done (bonferroni test) and the result showed a statistically significant difference in hemoglobin level between cleft patients and trauma patients (p-value<0.001).

A difference in hemoglobin level between cleft patients and patients with benign lesions (others) is found to be statistically significant (p-value=0.001) while it's not statistically significant in oral cancer patients with either cleft patients or patients with benign lesions (others). Table2.

Table 2: comparison of hemoglobin level by diagnosis (diseases)

Col mean	Oral cancer	Cleft patients	trauma
Cleft patients	-0.595		
	0.151		
Trauma	0.303	0.898	
	1.000	0.000	
Others	0.209	0.803	-0.094
	1.000	0.001	1.000

In this study, there were 216 males; the mean age was 33 years. The chi square test was done to correlate age with diseases and results are statistically significant (p-value=0.000). In males, the mean of hemoglobin was 12.8±2.1 and anemia was found in 48.2% of males. The chi square test was done to correlate anemia with diseases and results were statistically insignificant (p-value=0.309). Table 3

Table 3: Correlation between anemia and diseases among males

hemoglobin	Oral cancer%	Cleft lip/palate%	Trauma%	Others%	Total sample
Non-anemic	17.1	12.6	39.6	30.6	111(100%)
Mild anemia	22.2	9.5	47.6	20.6	63(100%)
Moderate anemia	15.4	10.3	59	15.4	39(100%)
Severe anemia	0	0	100	0	3(100%)
Total	18.1	11.1	46.3	24.5	216(100%)

Pearson chi²(9)10.5301Pr=0.309

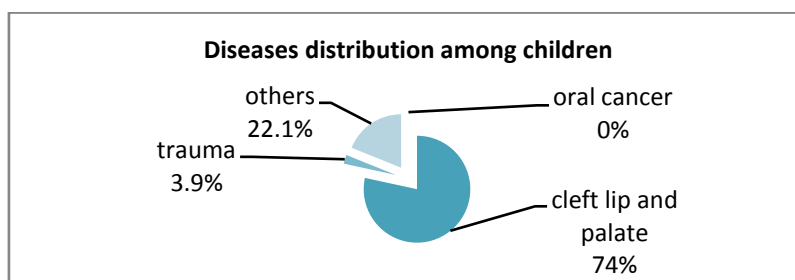
There were 129 females in this study. The mean age was 38.4 years and the mean hemoglobin level was 12.1±1.4. Chi square test was done to correlate age with disease and result was found to be statistically significant (p value=0.000). In females, the mean of hemoglobin was 12.1±1.4. Anemia was found in 45% of females. The chi square test was done to correlate anemia with diseases and results were statistically insignificant (p-value=0.309). Table 4

Table 4: Correlation between anemia and diseases among males

hemoglobin	Oral cancer%	Cleft lip/palate%	Trauma%	Others%	Total sample
Non-anemic	19.7	18.3	16.9	45.1	71(100%)
Mild anemia	25.7	11.4	8.6	54.3	35(100%)
Moderate anemia	34.8	4.3	17.4	43.5	23(100%)
Severe anemia	0	0	0	0	0(0%)
Total	24	14	14.7	47.3	129(100%)

Pearson chi²(6)6.090 Pr=0.413

Children constituted 34.6 % (181) of all patients and 61.3% of them were males. The most common disease in children was cleft lip and palate forming 74% of children. Figure2.



The correlation between age and disease was found to be statistically significant when chi square test was done (p-value=0.000) Table 5. Anemia was found in 47% of children and the mean of hemoglobin was 11.4±1.6. The correlation between anemia in children and disease was found to be statistically not significant when chi square test was done (p-value=0.148).

Table 5: The correlation between age and diseases among children

Children	oral cancer%	cleft lip/palate%	Trauma%	Others%
<5	0	88.9	0	11.1
5-11	1.8	71.4	5.4	21.4
12-14	0	50	0	50

Pearson chi²(6) = 33.163 Pr = 0.000

IV. Discussion

Data on the epidemiology of anemia in hospitalized patients in Sudan is scarce and among maxillofacial patients is almost lacking, most of the studies were children and pregnancy related. This was the first study conducted at Khartoum Teaching Dental Hospital (KTDH) to assess the hemoglobin level among patients undergoing surgery under general anesthesia.

In the present study anemia was found in about half of the patients admitted at KTDH. Anemia was found in 48.2% of males, 45% of females and in 47% of children. In 2004, a systematic review done by Shander et al, revealed that the prevalence of preoperative anemia ranges from 5% to 75% depending on patient susceptibility and the proposed surgical procedure(11). Another meta analysis by Gaskell et al, showed that the overall prevalence of anemia in the older population was 17% and as high as 40% in hospitalized patients(12). In USA ; Dunne et al, found that preoperative anemia is 33.9%(13), and Sahadevan et al, reported a prevalence of anaemia of more than 30% in a hospitalised population, with a large proportion being nutritional anemias (14), which is in agreement with what was found in the present study.

It's important to consider the prevalence of anemia in normal population in Sudan in order to justify the results of the present study. In 1995, nutritional anemia was among the ten major causes for hospital admission in Sudan (5). Munsoor et al, found that the mean hemoglobin level in Port Sudan city (2012-2014) is 10.6 mg/dl and 15.3% of the population was anemic. In kassala; eastern Sudan a study was done in 2011 by Abdalla et al, revealed high prevalence of anaemia among adults (36.2%) regardless of their age, sex and educational level(6). Therefore it is not infrequent to find a patient with anemia among the hospitalized patients. Hemoglobin level was found to be different between the different age groups in the same category of patients. Our results were compatible with the findings in the literature regarding the relation between age and anemia; which is in agreement with the findings of Balducci et al, who reported increase in incidence and prevalence of anemia with increasing age (15).

What is in common among oral and maxillofacial patients are the eating and sometimes swallowing difficulties they face because of their oral diseases .There was significant association between age and disease. Oral cancer patients were among the old groups, trauma was in teenagers and young adults and cleft lip and palate were in younger age groups. In the present study one way analysis showed a significant difference in hemoglobin level between the four categories of patients.

V. Conclusion

Prevalence of anemia in patients admitted at KTDH was 48.2% for males, 45% for females and 47% for children. The results of the present study indicated the role of the underlying disease (oral cancer, cleft lip and palate, trauma and benign lesions) as a causative factor for anemia. Age was strongly associated with anemia. Anemia was found in approximately half of the patients admitted to KTDH and most of the time it was discovered during the preoperative investigations for surgery preparation.

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