



ISSN : 0300-1652

Indexed and archived with PubMed/MEDLINE

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NIGERIAN MEDICAL JOURNAL

Vol. 59, Number 6, November - December 2018

The Role of Preoperative Evaluations in Otorhinolaryngological Procedures

***Waheed Atilade Adegbiyi, Gabriel Toye Olajide, Fatai Olatoke,
Olubunmi Kolawole Ogundipe, Sulyman Biodun Alabi***

59-63

Evaluation of Diagnostic Accuracy of Rapid Diagnostic Test for Malaria Diagnosis
among Febrile Children in Calabar, Nigeria

***Anthony Achizie Iwuafor, Okokon Ita Ita, Godwin Ibitham Ogban,
Ubong A. Udoh, Chimereze Anthony Amajor***

64-69

Awareness, Attitude and Knowledge Regarding Oral Health among Pregnant Women: A
Comparative Study

***Gautami S. Penmetsa, K. Meghana, P. Bhavana, M. Venkatalakshmi,
Vivek Bypalli, B. Lakshmi***

70-73

Prevalence and Pattern of Late-Stage Presentation in Women with Breast and Cervical
Cancers in Lagos University Teaching Hospital, Nigeria

***Opeyemi Awofeso, Alero Ann Roberts, Omolola Salako, Lanre Balogun,
Paul Okediji***

74-79

A PUBLICATION OF NIGERIA MEDICAL ASSOCIATION

Currently listed in Index Copernicus, African Index Medicus, AJOL and Bioline

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The Role of Preoperative Evaluations in Otorhinolaryngological Procedures

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Abstract

Background: Routine laboratory investigations are important in preoperative preparation of otorhinolaryngological, head and neck patients to assess and to prevent operative risks. This study aimed at determining the American Society of Anesthesiologist (ASA) classification of the preoperative patients, causes of delayed surgery, associated comorbidity and abnormal laboratory investigation results in ear, nose, and throat surgical practice in a low-resource setting. **Materials and Methods:** This is a prospective hospital-based study of patients being worked up for elective surgical procedures in Ekiti State University Teaching Hospital, Nigeria, from January 2014 to December 2016. Patients that gave consent were enrolled into the study. Interviewer-assisted questionnaires were used to obtain data from the patients. Data obtained were collated and statistically analyzed by using SPSS version 16. **Results:** A total of 424 patients were enrolled into the study. Males constituted 61.8% and male to female ratio was 2:1. Majority, i.e. 69.8% of the patients belonged to the ASA Grade I. Preoperative findings leading to delayed surgery occurred in 17.9% of the patients. They were due to 2.4% arterial hypertension and 6.4% delayed routine laboratory investigations results. The overall comorbid illness was 21.2%. Major comorbid illnesses were 2.4% arterial hypertension and 6.8% diabetes mellitus. The types of surgery in the patients were 14.6% ear surgery, 12.3% nasal surgery, and 59.2% throat surgery. Delayed surgery occurred in 25.5% of the patients. The most common findings were 6.8% anemia, 6.3% abnormal prothrombin/international normalized ratio, and 5.7% blood electrolyte and urea. **Conclusion:** All surgical conditions are peculiar with different comorbid illnesses which can lead to untoward outcome. Adequate preoperative evaluation and preoperative laboratory investigation of ear, nose, and throat conditions are mandatory to detect subclinical illnesses in poor-resource setting.

Keywords: Comorbid illnesses, delayed surgery, laboratory investigations, preoperative

INTRODUCTION

All otorhinolaryngological patients who are scheduled for surgery need adequate preoperative preparation. This is to avoid perioperative complications. Patients are different in pathology, physical and socioeconomic statuses hence possess different risk to both surgery and anaesthesia.¹⁻³ Assessment of both surgical and anesthetic risks is an essential component of preoperative evaluation of otorhinolaryngological surgical patients. Preoperative evaluations of patients aim at identifying potential conditions that can affect both surgical and anesthetic outcome. This evaluation is achieved by good history of present and past illness, physical examination, and laboratory investigations. The clinical status of each patient would determine the extent of preoperative laboratory investigation. However,

some studies have shown that systematic preoperative laboratory investigations were excessively requested, dogmatic, and should not be routinely ordered.^{1,2} Most of the practice of the preoperative patient's evaluation are based on studies performed in developed countries and were not locally evaluated.² In Africa and other developing countries, preoperative assessment is mostly challenging due to patient's poor history of present and past illnesses, poorly managed past medical records, inadequate family and

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Access this article online

Quick Response Code:



Website:
www.nigeriamedj.com

DOI:
10.4103/nmj.NMJ_183_17

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How to cite this article: Adegbiyi WA, Olajide GT, Olatoke F, Ogundipe OK, Alabi SB. The role of preoperative evaluations in otorhinolaryngological procedures. Niger Med J 2018;59:59-63.

social history, poor drug history, and lack of insight into the chemical composition of consumed local herbs.³⁻⁷

In otorhinolaryngological, head and neck surgical practice, there are various comorbid pathologies which are associated with some surgical conditions. These may be subclinical in which routine laboratory investigation would assist in their detection. In addition to these, some diseases which impact postoperative outcome are endemic in some countries.¹⁻⁴ Example of these forms of diseases includes diabetes mellitus, sickle cell disease, anemia, renal failure, human immunodeficiency virus (HIV) infection, and hepatitis B virus (HBV) among others. It is essential that all comorbid pathology which could adversely affect surgical outcome be preoperatively diagnosed and treated.⁸⁻¹⁰ Therefore, preoperative laboratory investigations such as full blood count, electrolyte and urea, partial thromboplastin time, prothrombin time, international normalized ratio (INR), HIV screening, HBV screening, fasting blood sugar, genotype, and urinalysis are requested routinely. This must be judiciously requested because of the cost and discomfort to the patients.¹¹⁻¹⁴ However, chest X-ray and electrocardiogram (ECG) are also requested for in cases of children with history suggestive of obstructive sleep apnea (OSA) and for elderly patients especially when there is history of increase in arterial blood pressure.

There is paucity of literature on the preoperative preparation and preoperative laboratory investigation on elective otorhinolaryngological, head and neck surgical cases in developing countries including Nigeria. This study aimed at determining the American Society of Anesthesiologist (ASA) classification of the preoperative patients, anatomical location of pathology in the preoperative patients, preoperative evaluation finding leading to delayed surgery, comorbidity of the preoperative patients, and abnormal laboratory investigation result in otorhinolaryngological, head and neck surgical practice in a low-resource setting like Nigeria.

MATERIALS AND METHODS

This is a prospective hospital-based study which was carried out in the Ear, Nose, and Throat Department of Ekiti State University Teaching Hospital, Ado Ekiti Nigeria. This is the only state-owned tertiary institution in the state serving over 2 million people. This is a major civil servant state without major industries. The study was carried out over a period of 12 months (from January 2014 to December 2016). Ethical clearance was sought for this study and obtained from the ethical committee of the institution.

The research procedures were explained to patients/parents/guardian. Confidentiality of the findings was assured. Oral consent was obtained from the consecutive patient before their enrollment.

The individuals include all the patients scheduled for elective otorhinolaryngological, head and neck surgery. Consented patients who were scheduled for elective surgery were

evaluated. Detailed history on biodata, history of presenting complaints, past medical and surgical history, drug history, occupation history, family and social history were obtained. This was followed by complete physical examination and laboratory investigations which were requested based on clinical findings on each patient. The investigations included packed cell volume (hematocrit), white blood cells' count, platelets' count, electrolyte and urea, HIV screening, genotype, fasting blood sugar, urinalysis, and HBV screening. However, chest X-ray and ECG are also requested for in cases of children with history suggestive of OSA and for elderly patients especially when there is history of increase in arterial blood pressure. The laboratory normal range value of the hospital was used as reference. Excluded from this study are those that did not gave consent, those that required extensive investigations such as computed tomography scan, magnetic resonance imaging, and angiography.

Data obtained were collated and analyzed using Statistical Package for the Social Sciences (SPSS, Version 16.0. for Windows, Chicago II, USA). The results were expressed in simple tables and charts.

RESULTS

A total of 424 consented patients were enrolled into the study. There were 262 (61.8%) males and 162 (38.2%) females, given a male to female ratio of 2:1. The highest number of patients (29.2%) was recorded in the age group 1–10 years followed by age group of ≥ 61 years (23.9%). The age group distribution is shown in Table 1. Figure 1 showed score for participants based on comorbid using ASA.¹⁵

Majority, i.e. 296 (69.8%) of the participants had no comorbid illnesses and hence belonged to the ASA Class I. Others are Class II in 126 (29.8%) and Class III in 2 (0.5%), respectively. The remaining participants were classified into Class II and Grade III and their value were 126 (29.8%) and 2 (0.5%), respectively.

Preoperative clinical evaluation findings which lead to delayed surgery occurred in 76 (17.9%) of the studied population. The preoperative evaluation findings which lead to delayed surgery were identified as active chest infection in 4 (0.9%) patients, seizures disorders in 1 (0.2%) patients, poorly controlled diabetes mellitus in 5 (1.2%) patients, severe arterial hypertension in 10 (2.4%) patients, delayed routine laboratory investigation results in 27 (6.4%) patients, surgical fee in 22 (5.2%) patients, and lack of surgical materials in 7 (1.7%) patients. This is showed in Table 2.

The overall comorbid illness was 94 (21.2%). The comorbid illnesses that were recorded were active chest infection in 43 (10.1%), diabetes in 29 (6.8%), and arterial blood in 10 (2.4%); this is shown in Table 3.

The type of surgery scheduled for each participant was classified into ear, nose, throat, head and neck. Figure 2 showed the distribution of the surgery being proposed by anatomical

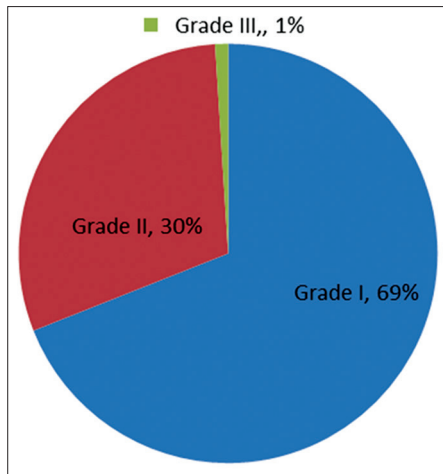


Figure 1: American Society of Anesthesiologists' classification of the preoperative patients

location. About 62 (14.6%) patients are for ear surgery, 52 (12.3%) for nasal surgery, 251 (59.2%) for throat surgery, and 59 (13.9%) for head and neck surgery. One hundred and twenty-one (28.5%) laboratory results were found to be abnormal and lead to delayed (cancellation/postponed) surgery among the participants. The abnormal laboratory investigations were hemoglobin in 29 (6.8%) of patients, white blood cells' count was abnormal in 11 (2.6%) of patients, platelets' count was abnormal in 15 (3.5%) of patients, prothrombin/INR was abnormal in 16 (6.3%) of patients, blood electrolyte and urea was abnormal in 24 (5.7%) of patients, genotype Sickle cell haemoglobin (HbSS) was abnormal in 4 (3.2%) of patients, blood virus screening for HIV-tested positive in 8 (1.9%) of patients, fasting blood sugar was elevated in 14 (10.1%) of patients, and no patient was positive for HBV test. This is illustrated in Table 4.

DISCUSSION

The importance of preoperative investigations for patients undergoing minor, intermediate, and major otorhinolaryngological surgical procedures cannot be overlooked. As it may assist in reducing unnecessary investigation and may specify which tests to offer patients before such procedures, taking into consideration specific comorbidities. This work on otorhinolaryngological, head and neck preoperative laboratory investigations cut across all age groups, although in this study, majority fell within the age group of 1–10 years and ≥ 61 years representing 29.2% and 23.9%, respectively. There is high male preponderance in this research work. This otorhinolaryngological, head and neck study revealed that in a developing country, routine preoperative investigations yield abnormal results like developed countries.¹⁶⁻²⁴ Delayed surgery was caused by various findings which include 17.9% abnormal preoperative evaluation, 21.2% comorbid illnesses, and 28.5% abnormal preoperative laboratory investigations' findings. These abnormal preoperative results have led to various changes in

Table 1: Age group distribution of the preoperative patients

Age group (years)	n (%)
1-10	124 (29.2)
11-20	45 (10.6)
21-30	67 (15.9)
31-40	26 (6.2)
41-50	23 (5.3)
51-60	38 (8.9)
≥ 61	101 (23.9)
Total	424 (100.0)

Table 2: Preoperative evaluation finding leading to delayed surgery

Preoperative evaluation finding	Frequency, n (%)
Delayed investigations	27 (6.4)
Surgical fee	22 (5.2)
Arterial hypertension	10 (2.4)
Lack of surgical materials	7 (1.7)
Diabetes mellitus (uncontrol)	5 (1.2)
Active chest infection	4 (0.9)
Seizure disorder	1 (0.2)

Table 3: Comorbidity of the preoperative patients

Comorbidity	n (%)
Anemia	43 (10.1)
Diabetes mellitus	29 (6.8)
Arterial hypertension	10 (2.4)
HIV infection	8 (1.9)
Active chest infection	4 (0.9)
HIV – Human immunodeficiency virus	

Table 4: Abnormal laboratory investigation result

Investigations	Number of abnormal results (number of patients investigated)	Percentage of abnormal
Hemoglobin measurement	29 (424)	6.8
Blood electrolyte/urea	24 (424)	5.7
PT/PTT/INR	16 (254)	6.3
Platelets' count	15 (424)	3.5
Fasting blood sugar	14 (139)	10.1
White blood cells' count	11 (424)	2.6
HIV screening	8 (424)	1.9
Genotype HbSS	4 (124)	3.2
HBV test	0 (89)	0

INR – International normalized ratio, PT – Prothrombin time, PTT – Partial thromboplastin time, HIV – Human immunodeficiency virus, HBV – Hepatitis B virus, HbSS – Haemoglobin sickle cell

the line of our surgical management. Primarily, preoperative evaluation aims at identifying potential problems that can affect

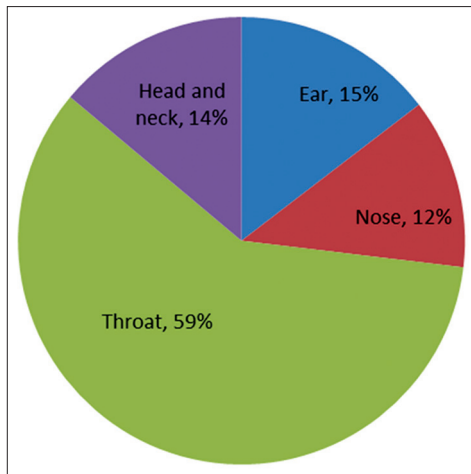


Figure 2: Anatomical location of the preoperative patients

the surgical outcome and its management. Literature review has showed that anesthetic-related mortality has been reported to be poor in developing countries than in developed countries.^{8,9} These findings were noticed to be two to three times or more in developing countries.⁴ These are mainly due to available facilities in developed countries.⁸⁻¹⁰ Despite all the criticisms over the preoperative laboratory investigations, it is still the cornerstone in surgical practice worldwide.

Preoperative evaluation of erythropoiesis, coagulation status, and platelet function can never be overlooked during preoperative evaluation of patients. Preoperative and perioperative anemia may arise from different causes of blood loss, and allogeneic blood transfusions are frequently associated with increased postoperative morbidity and mortality.²⁵ This may also be associated with prolonged hospital admission. A multidisciplinary, multimodal, individualized strategy, collectively termed “patient blood management,” may reduce or eliminate allogeneic blood transfusion and improve otorhinolaryngological, head and neck surgical outcomes. This approach comprises of detection and treatment of perioperative anemia; the reduction of peri-operative bleeding and coagulopathy; and harnessing and optimizing the physiological tolerance of anemia. Serum electrolyte derangements are common and usually asymptomatic. An elevated extracellular fluid potassium concentration is a common electrolyte disorder and is present in up to 10% of hospitalized patients.^{9,10} Elevated serum potassium concentrations are usually asymptomatic and associated with ECG changes. It may lead to life-threatening cardiac arrhythmias. Prompt recognition of this disorder, patient risk management, and administration of appropriate treatment can prevent serious cardiac complications of hyperkalemia. This may be due to renal potassium excretion. In surgical practice, hyperglycemia is associated with increased mortality and morbidity in surgical patients.²⁶ Surgical patients commonly develop hyperglycemia due to hypermetabolic surgical stress response and anesthesia, which increases glucose production and causes insulin resistance.

Hyperglycemia is associated with worse outcomes; the treatment of hyperglycemia with insulin infusions has not provided consistent benefits. Perioperative hypoglycemia is an undesirable complication of intensive insulin therapy and should be avoided.

Preoperative HIV screening of patients remains controversial in medical practice. This may be due to the implications of a positive HIV test results and the fear that HIV-positive patients would receive nonoptimal surgical treatment. The benefit to the patient includes allowing diagnosis of the disease in an early stage and prompt antiretroviral therapy. More importantly, HIV-positive patients had more postoperative complications than HIV-negative patients.^{5,11} Sickle cell disease and other hemoglobin disorders are becoming increasingly prevalent within surgical and anesthetic practice. Despite this, there still appears to be a largely varied consensus on when preoperative sickle cell testing is necessary in the pediatric population. Surgery is a time of high risk for patients with sickle cell disease because of the associated complications which include increasing painful vaso-occlusive crisis and acute chest syndrome.

CONCLUSION

This study revealed high rate of comorbid illnesses among the study population in this center. Meticulous preoperative evaluation and selective preoperative laboratory investigations should be requested and should be patient-specific. All these are still backbone to excellent postoperative surgical outcome.

Financial support and sponsorship

Nil.

Conflicts of interest

There are no conflicts of interest.

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