



Causes and Clinical Presentation of Upper Airway Obstruction among Sudanese Children

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General Note



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ABSTRACT

Background: Acute upper airway obstruction regardless of the cause can be a life-threatening emergency. Complete obstruction will lead to respiratory failure followed by cardiac arrest in minutes. In contrast, a child with partial obstruction may initially have an adequate airway, which may be followed by recurrent chest infections or attacks of stridor. **Objectives:** To investigate the different causes of upper airway obstruction among Sudanese. **Patients and methods:** This is a prospective observational hospital based study conducted in ENT Khartoum Teaching Hospital from October 2017 to October 2018. 62 patients were included in the study. Data were collected from the patients and their guardians using pre coded pretested questionnaire developed specifically for this study after consulting literature and epidemiologist. The data analyzed using SPSS software program and p value of 0.05 or less considered significant. **Results:** The male: female ratio is 1.48: 1.00. The mean age of patients was found to be 2 years and 9 months,

with 87.1% of patients belonging to the age group 0- 5 years. The most common cause of obstruction was foreign body aspiration (19.4%) followed by bilateral choanal atresia and laryngomalacia (14.5%) for each and croup in (9.7 %). At presentation; all patients (100%) were dyspnoeic and distressed, 85.5% of them had obvious stridor while the remaining (14.5%) presented with cyanosis. *Conclusion:* upper airway obstruction in children affects mostly younger children less than 5 years. The most common cause is foreign body larynx aspiration. The most common presentation in this group is stridor.

Keywords: airway obstruction; partial obstruction; foreign body aspiration

1. INTRODUCTION

The upper airway extends from the nasal aperture to the subglottis (Daniel, 2013). An airway obstruction is a block that is in any part of the airway. This obstruction may be partial or total which prevents air from getting into the lungs (Cotton & Reilly, 1983). While some airway obstructions are minor, others are potentially fatal emergencies and require immediate medical attention. Several anatomical and physiologic features make a child vulnerable to develop an obstruction of upper airways (Mandal et al., 2015). The early history of tracheostomy and intubation suggested that upper airway obstruction had been in existence for a long time (Ogunleye et al., 2001). Stridor is a noisy, harsh sound produced when the airway becomes partially obstructed; resulting in turbulent airflow in the respiratory passages (Maloney & Meakin, 2007).

2. METHODS

The present cross-sectional study was carried out in October 2017– October 2018 among less than 18 years of age who presented to the emergency room of Khartoum Ear Nose and Throat (ENT) teaching hospital Sudan (the reference ENT hospital in Sudan). With response rate of 89% sixty two children with symptoms and signs of upper airway obstruction were enrolled in the study. Written informed consent was obtained from all participants before conducting the study. The questionnaire was developed specifically for the purpose of this study after having consulted the medical literature of similar studies. The questionnaire was firstly reviewed by epidemiologist and dental academics before data collection from participants. The questionnaire has two parts (A) is demographic data and B the clinical data. The data were collected from the patients and their guardians. The investigator examined the patients and made the necessary investigations to reach the final diagnosis. Data were entered into a Microsoft Excel spreadsheet and the statistical analysis was conducted using SPSS (Version 22). Statistical analysis was done using analytical and descriptive statistics. Simple frequencies and cross tabulation were done when relevant.

3. RESULTS

In this study a total number of participants were 62 patients the male: female ratio was 1.48: 1.00. The mean age of patients is 2 years and 9 months \pm STD 4 years. From the total number of the patients included in this study, 54 patients (87%) were in age group of 0-5 years, 4 patients (6.5%) were in the age group of 6-10 years and 4 patients (6.5%) 11-15 years old, and no patients above 15 years.

Concerning the causes of airway obstruction among selected group, foreign body aspiration was the most common cause with 12 patients (19.4%), followed by bilateral choanal atresia and laryngomalacia with 9 patients (14.5%) for each, followed by croup with 6 patients (9.7%), followed by recurrent respiratory papillomatosis with 4 patients (6.5%). The remaining patients were diagnosed as follow: 3 patients (4.8%) with retropharyngeal abscess, 3 patients (4.8%) with bilateral vocal cord paralysis, and 3 patients (4.8%) with hair dye poisoning, 2 patients (3.2%) with diphtheria, 2 patients (3.2%) with epiglottitis, 2 patients (3.2%) with subglottic stenosis, 2 patients (3.2%) with Arnold Chiari malformation, 1 patient (1.6%) with subglottic hemangioma and one patient with Pierre Robin sequence (1.6%), and 3 patients with stridor (4.8%) in which there was no certain diagnosis figure 3.

When presented to the ER all of the 62 patients (100%) were dyspnoeic, and distressed, 53 patients (85.5%) had obvious stridor and the remaining 9 patients (14.5%) presented with cyanosis. Twenty four patients (38.7%) showed a history of cough, nineteen of them (30.6%) were febrile, while 27 patients (43.5%) were cyanosed. The least common symptom was the voice change which appeared in only 10 of the patients (16.1%). Regarding stridor, 40 patients (64.5%) presented with biphasic stridor, 13 patients (21%) presented with inspiratory stridor, while 9 patients (14.5%) initially did not have stridor at presentation and no patients suffered from expiratory stridor table 1.

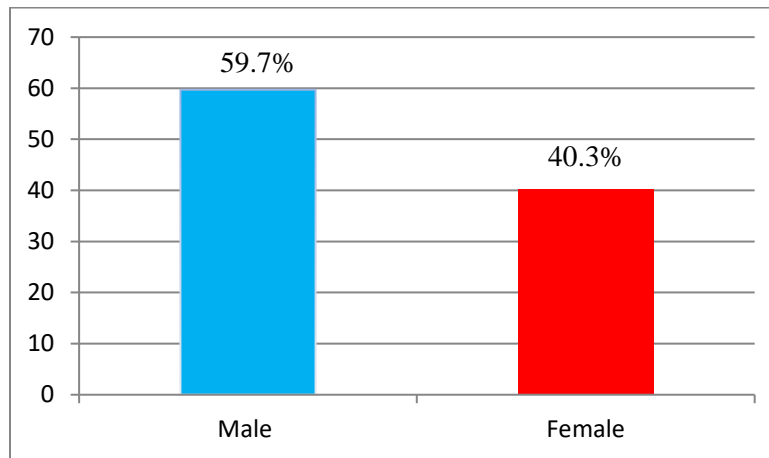


Figure 1: Gender distribution of participants

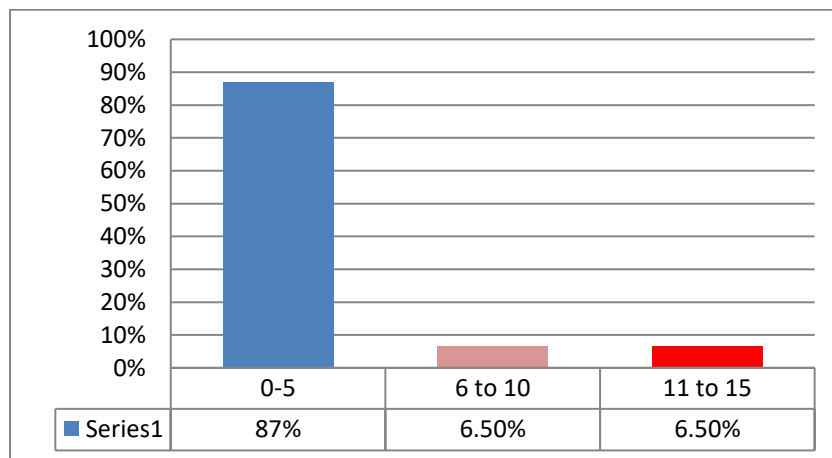


Figure 2: Age distribution of participants

Table 1: Showing the relation between diagnosis and the type of stridor

Diagnosis	Stridor Type			Total
	Biphasic	Inspiratory	No Stridor	
Laryngomalacia	0	9	0	9
Subglottic Stenosis	2	0	0	2
Recurrent Respiratory Papillomatosis	4	0	0	4
Subglottic Hemangioma	1	0	0	1
Croup	6	0	0	6
Epiglottitis	0	2	0	2
F B Aspiration	12	0	0	12
Retropharyngeal Abscess	2	1	0	3
Arnoldchiari Malformation	1	1	0	2
Hair Dye Poisoning	3	0	0	3
Diphtheria	2	0	0	2
Choanal Atresia	0	0	9	9
Vocal Cord Paralysis	3	0	0	3
Pierreroobin Sequence	1	0	0	1
Unknown	3	0	0	3
Total	40	13	9	62

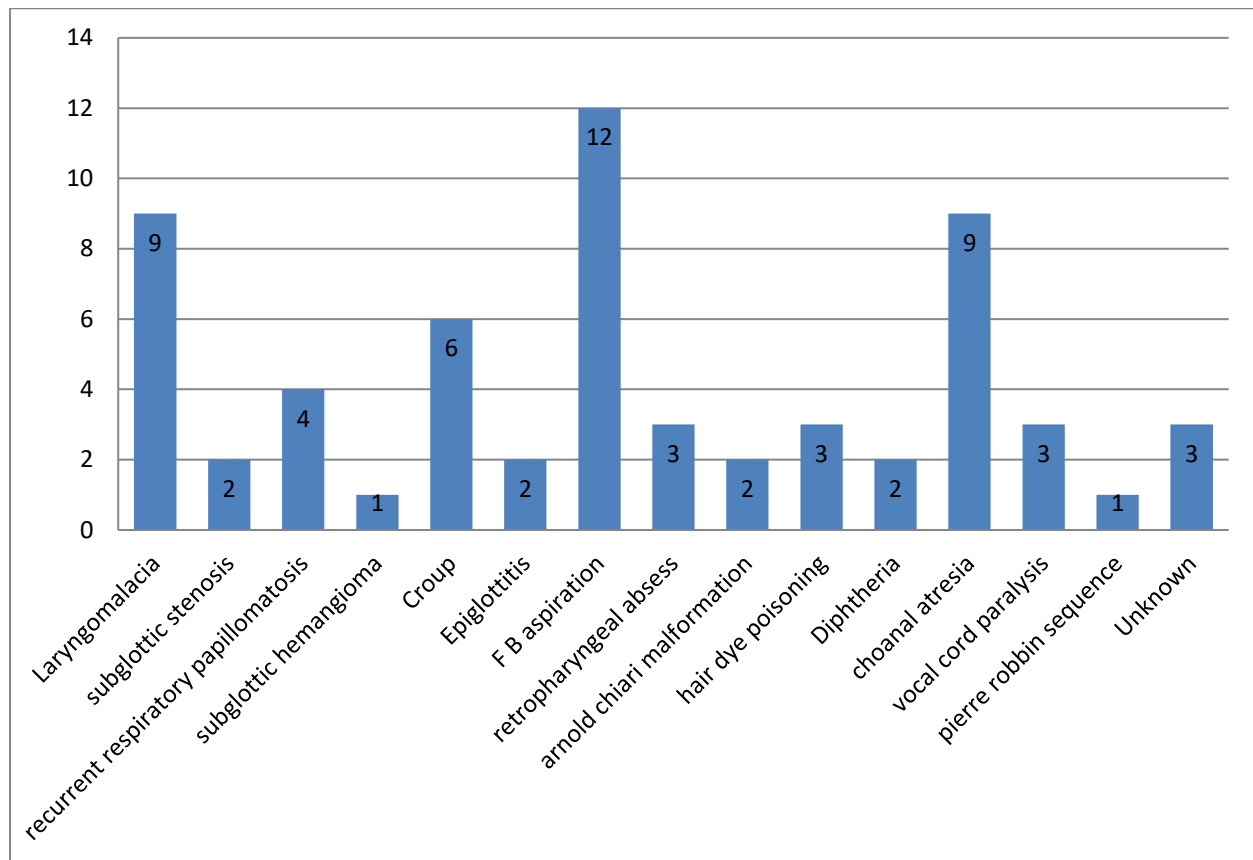


Figure 3: Diagnosis of participants with upper airway obstruction

4. DISCUSSION

Blockage of the upper airway take place when the upper breathing passages become narrowed or blocked, making it hard to breathe. The male: female ratio is 1.48 to 1; this agrees with the results of a study conducted among Nigerian children it also revealed the male predominance. The current study showed that the most affected group with upper airway obstruction is children less than 5 years unlike study by (Ibekwe & Paul, 2020) which found that the commonest affected age group is from 4-7 years age accounted for the majority of the cases.

Foreign body larynx aspiration is the most common cause of upper airway obstruction in children according to this study comprising one fifth of the cases. Similar result was found in a study by (Elango & Htun, 1994) in the University Sains Malaysia, which found that the common cause of stridor was the foreign body in the airway.

Laryngomalacia and choanal atresia were found to be the most common congenital causes for upper airway obstruction in children in this study (with a percentage of 14.5% for each). This result is in line with study by (Elango & Htun, 1994) performed in the University Sains Malaysia, which found that laryngomalacia was the commonest congenital abnormality. This result also agrees with another study conducted in the Christian Medical College Hospital, Vellore, India by (Rupa & Raman, 1991) which revealed that laryngomalacia was the commonest congenital cause for upper airway obstruction in children.

In this study croup was the commonest infectious cause for upper airway obstruction and the fifth commonest cause collectively. A study done by (the American academy of pediatrics, 2003) concluded that the commonest condition presenting with upper airway obstruction is croup, another study by (Mandal et al., 2015) also, found that the commonest cause of upper airway obstruction among children is croup.

5. CONCLUSION

From the present study, upper airway obstruction in children affects mostly the younger children mainly under 5 years. The most common cause is foreign body larynx aspiration. The most common presentation is stridor.

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Conflict of Interest:

The authors declare that there are no conflicts of interests.

Ethical approval:

All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards (ethical approval number 201/1).

Data and materials availability:

All data associated with this study are present in the paper.

Peer-review:

External peer-review was done through double-blind method.

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