THE ASSOCIATION BETWEEN PEDIATRIC SUBGLOTTIC STENOSIS AND ENDOTRACHEAL INTUBATION: A 9 YEAR RETROSPECTIVE STUDY

Nader Abdelmoneim Faseeh, Mohamed Saeed Abougabal, Mostafa Samir Mohamed Abdelmonem Abu ollo
Department of Pediatrics, Faculty of Medicine, Alexandria University

Introduction

Subglottic stenosis (SGS), is a narrowing of the airway below the vocal cords within the cricoid cartilage. SGS affects the pediatric population predominantly, with acquired forms (95% of cases) primarily caused by endotracheal intubation complications, while congenital forms (5%) result from embryologic malformations.

The pediatric airway's unique anatomy makes children particularly vulnerable to obstruction, as the cricoid cartilage represents the narrowest airway point.

SGS severity is classified using the Myer-Cotton grading system (Grades I-IV), with symptoms ranging from exercise-induced stridor in mild cases to life-threatening airway compromise in complete obstruction.

Diagnosis relies on comprehensive history-taking, physical examination, imaging studies, and flexible bronchoscopy as the gold standard.

Management approaches include endoscopic techniques (balloon dilation, laser treatment) for milder cases and open surgical procedures (laryngotracheoplasty, cricotracheal resection) for severe stenosis, with success rates exceeding 90% in specialized centers.

Aim of the Work

General objective:

To evaluate the association between subglottic stenosis and endotracheal intubation among pediatric age groups diagnosed in the period from 2016 to 2024.

Patients and Methods

This retrospective observational study examined pediatric patients with subglottic stenosis at Smouha Pediatric Hospital's bronchoscopic unit from 2016-2024. Using convenience sampling, all pediatric patients diagnosed with subglottic stenosis (congenital or acquired) by flexible bronchoscopy were included, while those with other airway obstructions or unconfirmed diagnoses were excluded.

Data collected encompassed sociodemographic characteristics (age, sex, residency), anthropometric measurements, natal history including gestational age and NICU admission, hospital admission history, presenting symptoms (stridor, hoarseness, respiratory distress), associated comorbidities, NICU/PICU admissions, intubation history, and bronchoscopy results. Stenosis severity was graded using Cotton-Myer classification (Grade I: 0-50%, II: 51-70%, III: 71-99%, IV: no detectable lumen).

Management approaches including medical and surgical treatments were documented.

Statistical analysis utilized IBM SPSS version 20.0, employing Shapiro-Wilk tests for normality, chi-square tests for categorical variables, and Monte Carlo correction when appropriate, with significance set at 5%. Retry Claude can make mistakes. Please double-check responses. Sonnet 4.

Results

Table 1: Relation between endoscopic finding and ventilation (n = 50)

	Broncoschopic finding								χ^2	MCp
	Grade I (0%–50 %) (n = 26)		Grade II (51 %-70%) (n = 10)		Grade III (71 %- 99%) (n = 13)		Grade IV (100%) (n = 1)			
	No.	%	No.	%	No.	%	No.	%		
Mechanical ventilation										
No	12	46.2	2	20.0	4	30.8	0	0.0	2.801	0.434
Yes	14	53.8	8	80.0	9	69.2	1	100.0		
Type of mechanical ventilation										
None	12	46.2	2	20.0	4	30.8	0	0.0	5.900	0.504
Conventional	13	50.0	7	70.0	9	69.2	1	100.0		
Other	1	3.8	1	10.0	0	0.0	0	0.0		
Duration of mechanical ventilation (days)										
No mechanical ventilation	12	46.2	2	20.0	4	30.8	0	0.0	13.159	0.096
≤10	7	26.9	2	20.0	1	7.7	0	0.0		
>10 - 20	2	7.7	5	50.0	4	30.8	1	100.0		
>21	5	19.2	1	10.0	4	30.8	0	0.0		

χ^2: Chi square test
MC: Monte Carlo test
p: p value for comparing between the four studied grades

Table 2: Distribution of the studied cases according to mechanical ventilation parameters (n = 50)

	No.	%
Mechanical ventilation		
No	18	36.0
Yes	32	64.0
Duration of mechanical ventilation (days)		
No mechanical ventilation	18	36.0
≤ 10	10	20.0
>10 – 20	12	24.0
≥21	10	20.0
Type of mechanical ventilation		
None	18	36.0
Conventional	30	60.0
Other	2	4.0

Conclusion

This study examined pediatric subglottic stenosis (SGS) at Smouha Children's University Hospital from 2016-2024, revealing important patterns in this critical airway condition. SGS showed a male predominance (60%) with prematurity affecting half of patients and mechanical ventilation being a major risk factor (64% of cases). The condition demonstrated high rates of associated congenital anomalies (48%), particularly gastrointestinal (32%) and cardiac (14%) abnormalities, along with a notable consanguinity rate of 42% suggesting genetic factors.

The clinical presentation was dominated by stridor (72% of cases), with most symptoms appearing during infancy (58%). The healthcare burden proved substantial, with 84% of patients requiring hospitalization and 38% needing multiple admissions. While most cases were Grade I stenosis (0-50% obstruction), 28% presented with severe stenosis requiring comprehensive multidisciplinary management. The study emphasizes that flexible bronchoscopy remains the gold standard for diagnosis and that treatment approaches must be individualized based on severity, ranging from conservative management to surgical intervention.