

Laryngoscopy in Neonates and Infants presenting with stridor in tertiary care hospital.

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ABSTRACT

INTRODUCTION

Neonatal life involves the readaptation of gas exchange from the intrauterine to extrauterine environment. Stridor in this period reflects a critical airway obstruction which may have been anticipated or wholly unexpected. Many congenital and acquired diseases may cause airway obstruction and respiratory distress in infants.

AIMS AND OBJECTIVES

1. To study the causes of stridor in neonates and infants.
2. Early diagnosis and treatment of the stridor to prevent morbidity and mortality.

METHODS

The study was observational study. In this study both qualitative and quantitative approaches were used to collect, analyse and interpret the data. Patients with stridor under age of 1 year who were referred to our department were taken in this study BY DIRECT LARYNGOSCOPY

Direct laryngoscopy with macintosh laryngoscope or miller's blade was done.

Results: In our study the most common symptom at presentation was stridor which was present in all 25 cases we have taken.

13 cases were presented with difficulty in feeding along with the stridor. This was 2nd most common symptom of presentation.

Stridor was associated with fever and cough cold in 13 cases. Change of cry along with stridor observed in 6 cases

Result and CONCLUSION

FNPL is gold standard for diagnosis and very useful and safe procedure. Use of better technology and continuous monitoring in NICU/PICU in tertiary care hospital and observation by team of doctors (Pediatrician, ENT Specialist, intensivist etc.) have definitely reduced the rate of morbidity and mortality.

Keyword: Laryngoscopy, Neonates, Infants presenting, stridor, tertiary, tertiary care hospital

INTRODUCTION

Neonatal life involves the readaptation of gas exchange from the intrauterine to extrauterine environment. Stridor in this period reflects a critical airway obstruction which may have been anticipated or wholly unexpected⁽¹⁾. Many congenital and acquired diseases may cause airway obstruction and respiratory distress in infants.

The word stridor is derived from the Latin word "Stridulus", which means creaking, whistling or grating. Stridor can be defined as a harsh; grating sound as a result of partial obstruction of the laryngotracheal airway⁽²⁾. Stridor in a neonate potentially implies an impending disaster with a much-compromised airway.

Mild circumferential oedema in the infraglottic region of a child drastically reduces the airway lumen due to the small diameter of the larynx in children, which results in stridor.⁽³⁾ If seen with significant suprasternal and intercostal recession, stridor indicates an airway that may be less than a millimeter away from complete obstruction.

Stridor is, however, a symptom that has to be considered with the rest of the history and examination findings, and appropriate investigations should then be undertaken to confirm the source of the noise. Its severity, as well

as the severity of accompanying respiratory distress, determines the urgency with which investigations are required to proceed, ranging from the well neonate with mild stridor, no respiratory distress, and good feeding, to the one with severe airway compromise requiring immediate intervention.

This study on infantile stridor is to suggest an approach to evaluate and manage the underlying cause.

In newborn and lactating children, congenital airway anomalies are the most frequent cause of stridor, of which laryngomalacia is the main cause^(3,4,5,6)

Other congenital malformations of the larynx that cause stridor include atresia, vocal cord palsy, laryngeal membrane, cysts, subglottic stenosis, laryngotracheal fissure, hemangiomas, laryngocele and Prompt medical attention is essential to establish the severity of cases with stridor and define the degree of respiratory distress.

In most cases detailed airway endoscopy will be required not only for the diagnosis but also to treat the condition. A flexible nasopharyngolaryngoscopy (FNPL) or direct laryngoscopy and tracheobronchoscopy may be chosen⁽⁷⁾

AIMS AND OBJECTIVES

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MATERIALS AND METHODS

The study was observational study. In this study both qualitative and quantitative approaches were used to collect, analyses and interpret the data. Patients with stridor under age of 1 year who were referred to our department were taken in this study.

- **DIRECT LARYNGOSCOPY**

Direct laryngoscopy with Macintosh laryngoscope or miller's blade was done.

The Macintosh blade⁽⁸⁾ is the most widely used of the curved laryngoscope blades, while the Miller blade⁽⁹⁾ is the most popular style of straight blade.

Both Miller and Macintosh laryngoscope blades are available in sizes 0 (neonatal) through 4 (large adult).

The Macintosh blade is positioned in the vallecula, anterior to the epiglottis, lifting it out of the visual pathway, while the Miller blade is positioned posterior to the epiglottis, trapping it while exposing the glottis and vocal folds. Incorrect usage can cause trauma to the front incisors.

All the DL scopes were performed in NICU Or PICU at bed side with keeping all resuscitation equipment's available.

- **FLEXIBLE NASOPHARYNGOLARYNGOSCOPY**

Flexible nasopharyngolaryngoscopy was performed in children by senior consultants. The patients were examined by the senior consultants, in accessibility of resuscitation facilities.

With the child lying down and comfortably restrained with a blanket, a 2.7 mm FNPL scope was passed into the anaesthetized nostril (with 4% lignocaine) up to the level of the oropharynx. The findings were recorded. Patients were observed for 30 mins after completing the procedure.

No fasting or sedation was required and the scope was not passed into the larynx to minimize the possibility of laryngospasm. Children were kept in regular follow-up in the outpatient's department.

During these visits the severity of stridor and feeding difficulties were recorded⁽¹⁰⁾

Supraglottic larynx, vocal cord movements, visible area of subglottic were examined. Flexible laryngoscopy gives good view of the supraglottic and vocal cords, allowing one to make an assessment of the dynamic airway in an awake child along with suction facility. However, flexible laryngoscopy does not allow visualization of the subglottic and trachea.

The examination is considered normal if airways are unobstructed, vocal cords are mobile, and there is no inflammation, no organic lesions, and no structural laryngeal or tracheal collapse during breathing.^(1,11)

Potential complications include epistaxis, aspiration and laryngospasm.⁽¹²⁾

Besides routine blood investigations chest x-ray was done. When there was suspicion of laryngeal web/cleft/stenosis/hemangioma, CT scan of larynx with thorax was advised.

OBSERVATION AND DISCUSSION

- **TABLE NO 1 - AGE DISTRIBUTION**

AGE	No of patients	Percentage	Regina H.G. Martins study	Percentage
0-28 DAYS (neonates)	7	28%	15	39.47%
29 DAYS TO 1 YEAR (infants)	18	72%	23	60.52%

In our study 25 children were clinically assessed for stridor amongst them 7(28%) were in the age group of 0 to 28 days and 18(72%) were from 29 days to 1 year.

It is in concordance with Regina H.G. Martins study⁽¹³⁾. In their study 38 children were between the age group of 0 to 1 year and 15(39.47%) were in age group of 0 to 28 days and 23(60.52%) were of 28 days to 1 year.

- **TABLE NO 2-SEX DISTRIBUTION**

SEX	No of patients	Percentage	Marissa Botma study	Percentage
Male	18	72%	26	60%
Female	7	28%	17	39.53%

In our study amongst 25 infants **18(72%)** were male and **7(28%)** were female. This is in concordance with **Marissa Botma**⁽¹⁰⁾ study in which **26(60%)** were male and **17(39.53%)** were female.

Male predominance can be explained on the basis of cultural and socioeconomic beliefs and sex ratio.

• **TABLE NO 3-SYMPTOMS**

SYMPTOMS	PATIENTS	PERCENTAGE
Noisy breathing	25	100%
Difficulty in feeding	13	52%
Change of cry	6	24%
Cough and cold	13	52%
Fever	13	52%

In our study the most common symptom at presentation was stridor which was present in all 25 cases we have taken.

13 cases were presented with difficulty in feeding along with the stridor. This was 2nd most common symptom of presentation.

Stridor was associated with fever and cough cold in 13 cases. Change of cry along with stridor observed in 6 cases In infant larynx the high position allows the epiglottis to meet soft palate and make a nasopharyngeal channel for nasal breathing during suckling allows breathing and feeding to go on simultaneously.

In laryngomalacia epiglottis is curled up, so proper approximation of soft palate does not occur, leads to difficulty in feeding, which is 2nd most common symptom along with stridor.

After laryngomalacia 2nd most common cause of stridor in neonates and infants was ALTB (Acute laryngotracheobronchitis), which was presented with fever and cough along with stridor, causes congestion of laryngeal and tracheal mucosa resulting in narrowing of lumen, that causes stridor.

• **TABLE NO 4(A) – FNPL EXAMINATION**

FNPL findings	Patients (current series)	Percentage	Marissa Botma STUDY	Percentage	Regina H.G. Martins study	Percentage
Curled or omega shaped epiglottis	11/20	55%	35	81%	6	15.79%
Congestion over arytenoids and vocal cords	3/20	15%	-	-	-	-
B/L Vocal cords in paramedian position (abductor palsy)	2/20	10%	6	13.95	6	15.79%
Nasopharyngeal mass	1/20	5%	-	-	-	-
Inflammatory process in the larynx or trachea	-	-	-	-	10	26.32%
Normal larynx	2/20	10%	2	4.65	7	18.42%

Flexible nasopharyngolaryngoscopy was done in 20 infants amongst 25 which were presented with stridor. 11(55%) of them were having curled or omega shaped epiglottis. It was the most common finding. In 3 infants' congestion over arytenoids and vocal cords was present. 2 infants were presented with B/L vocal cords in paramedian position. (Bilateral abductor palsy). Nasopharyngeal mass was found in 1 infant which was obstructing nasopharynx partially. 2 infants were found with normal larynx.

Our study is in concordance with **Marissa Botma**⁽¹⁰⁾ study in which the most common cause of stridor amongst infants was laryngomalacia followed by bilateral vocal cord paralysis. Our study is in discordance with **Regina H.G. Martins** study⁽¹³⁾ in which most common endoscopic finding was inflammatory process in the larynx and trachea followed by laryngomalacia and bilateral vocal cord paralysis followed by subglottic stenosis

• **TABLE NO 4(B)-DIRECT LARYNGOSCOPIC EXAMINATION**

FINDINGS	NO OF PATIENTS
Oropharyngeal and supraglottic mucosal ulceration and edema	2/5
laryngeal congestion	2/5
Only epiglottis could be seen	1/5

- In 5 patients direct laryngoscope examination was done, as they presented with respiratory distress.
- 2 of them were having accidental corrosive ingestion and on direct laryngoscopy there was oropharyngeal and supraglottic mucosal ulceration and oedema.
- In 2 patients' laryngeal congestion was found.
- In one patient direct laryngoscope examination, epiglottis was normal but other details could not be assessed.
- Examination with direct laryngoscopy is difficult because during examination insufficient illumination, cry of child and secretions obscure the vision, and making judgement difficult.
- Fnpl is a better tool with excellent illumination and suction facilities makes the vision clear.

• **TABLE NO 5-ASSOCIATED COMORBIDITY**

Laryngeal pathology	No of patients	Other associated comorbidities
ALTB	5	Pulmonary (4) Cardiac (1)
Laryngomalacia	2	Cardiac
B/L abductor paralysis	1	Cardiac & Neurological

- In this study 8 out of 25 patients had other comorbidities then laryngeal pathology.
- In 5 ALTB patients, 4 of them were having associated lung diseases, of which pneumonia was most frequent. One ALTB patient was having atrial septal defect.
- In 2 laryngomalacia patients one was having atrial septa defect and other one had patent ductus arteriosus.
- One patient of bilateral abductor paralysis was having patent ductus arteriosus and hypoxic ischemic encephalopathy.

CONCLUSION

- FNPL is gold standard for diagnosis and very useful and safe procedure.
- Use of better technology and continuous monitoring in NICU/PICU in tertiary care hospital and observation by team of doctors (Pediatrician, ENT Specialist, intensivist etc.) have definitely reduced the rate of morbidity and mortality.

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