

## Prevalence of Laryngospasm in Children Undergoing Elective ENT Surgery At Lady Reading Hospital Peshawar

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### ABSTRACT

**Background:** Laryngospasm occurs frequently during the administration of anesthesia to pediatric patient. The pathophysiological mechanism of laryngospasm during anesthesia is unclear. The aim of this study was to determine the prevalence, of laryngospasm postoperative in children undergoing elective ENT surgery.

**Methods:** This cross-sectional study was conducted in ENT Operation Theater at Lady Reading Hospital Peshawar from October 6, 2020 to Feb 01, 2021 where Elective ENT surgeries are performed. Those included in the study whose age were between 11-15 years are most prominent laryngospasm and those who undergoing tonsillectomy. The exclusion criteria was the patients of ASA class IV and V Respiratory disease.

**Results:** A total of 169 patients were recruited in the study done in lady reading hospital Peshawar. In this males were 107 (67%) and females were 64 (37%). in which laryngospasm were found. in age wise the rate of laryngospasm is high in 11 to 15 years.

**Conclusion:** The risk factors that have shown increased incidence of laryngospasm in ENT surgery with statistical significance. The risk factors that showed positive correlation with outcome of Laryngospasm without statistical significance. There was no major adverse effect of laryngospasm encountered in this study.

**Keywords:** Tonsillectomy, laryngospasm, ENT Surgery, Anesthesia

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### INTRODUCTION

Laryngospasm is most common in children during general anesthesia. It is the involuntary closure of glottis muscle. It protect us from foreign material entering the trachea. By producing these effect the glottis close the trachea and block the respiration.<sup>1</sup> This cause to hypoxia and hypercapnia. But, in some cases, the spasm remain present as long as the stimulus present it lead to morbidity and mortality e.g. cardiac arrest and morbidity such as cardiac arrest, arrhythmia.<sup>2</sup>

Laryngospasm occurs frequently during the administration of anesthesia to pediatric patient. The pathophysiological mechanism of laryngospasm during anesthesia is unclear.<sup>3</sup> The incidence of laryngospasm after tonsillectomy and adenoidectomy to be as frequent as 21%–26% this has not been experienced in our institution.<sup>4</sup> Although if laryngospasm is early diagnosed and treated so it protects us from morbidity and mortality. In some time the laryngospasm is not properly diagnosed so it harm the patient foreexample cardiac arrest, pulmonary edema, and left ventricular hypertrophy.<sup>5</sup> In general anesthesia, laryngospasm is most common in which airway obstruction occurs and anesthetist considers it different thing. If laryngospasm is not recognized early and if not treated then it lead to severe complication. The complication includes the

respiratory depression and cardiac arrest and patient should be intubated ventilated and oxygenated.<sup>6</sup>

Laryngospasm is the involuntary contraction of upper airway muscle it protect us from any martial entering to the trachea but it cause apnea respiration cessation and cardiac abnormality.<sup>7</sup>

In complete laryngospasm the vocal cord complete closed and partial little bit space available. In complete laryngospasm the chest movement is absent and the bag is not inflate and deflate so it need artificial ventilation and respiration. But in partial laryngospasm the chest movement is slightly present and stridor sound is listen.<sup>8</sup> Mostly laryngospasm occur in children during general anesthesia in ketamine anesthesia by the procedure of anal dilation.<sup>9</sup>

The important causative factors which are responsible by causing laryngospasm are respiratory tract infection presence of nasogastric tube oral endoscopy and post extubation. Surgical procedure e.g. adenoidectomy and tonsillectomy.<sup>10</sup> In general anesthesia laryngospasm occur due to two reason: firstly, the central nervous system is not depress the glotic reflexes is present and second the presence of stimuli. There are a lot of causes in anesthesia e.g light anesthesia and extubation in light anesthesia, secretion and blood on vocal cord, an artificial airway laryngoscope and suction.<sup>11</sup> Laryngospasm occurrence is more common in child age after general anesthesia mean they are inversely related

with age. Children with asthma and upper airway infection are more prone to develop laryngospasm.<sup>12</sup> The principal mechanism of pulmonary edema is the forced inspiration on closed glottis and trans pulmonary pressure gradient difference lead to leakage of fluid in interstitial spaces.<sup>13</sup> From the last 40 years there is improvement in surgical procedure anesthetic and postoperative in these type of patient as a result the chances of morbidity and mortality increase.<sup>14</sup> The management of laryngospasm discuss by many authors some soya it is relieved by positive pressure ventilation or by given intravenous small dose lidocaine and succinylcholine increasing the depth of anesthesia 100% oxygen reintubation, before extubation suction proper done and extubate the patient by full awaking.<sup>15</sup> In partial laryngospasm the air slightly inspire and we cannot differentiate it with upper respiratory obstruction. In complete laryngospasm the air not inspired by the patient as a result negative pressure develop in lungs which lead to pulmonary edema.<sup>16</sup> The aim of this study was to prevalence of postoperative Laryngospasm in children undergoing Ear, Nose and Throat surgery at Lady Reading Hospital Peshawar.

#### MATERIALS AND METHODS

This descriptive study was conducted at Lady Reading Hospital Peshawar. A total of 169 patients were recruited in duration of 4 month October 6, 2020 to Feb 01, 2021. Patients reserved for elective tasks are owned up to one of two wards following a medical procedure. Patients are confessed to similar wards for no less than three days after medical procedure prior to being delivered. This study utilized a comfort test methodology in which ASA I and ASA II elective medical procedure patients who had general sedation were remembered for the preliminary on the off chance that verbal informed understanding was gained. All patients had equivalent possibilities taking part in the preliminary. ASA I and ASA II patients planned for elective methods had general sedation and consented to take part in the review following verbal informed assent. Patients with ASA classes III, IV, and V.

The study was approved from the Ethical Review Committee of Institute of Paramedical Sciences, Khyber Medical University and then approval was also obtained from Lady Reading Hospital Peshawar Research and Ethics Committee. The lead investigator visited elective surgical patients scheduled for general anesthesia in their individual admitting wards the evening before the day of surgery. They were informed about the study's objectives and were invited to participate. All individuals who consented were easily recruited in the research. After being recruited into the research, the patient's file contained a data collecting sheet for recording the needed information.

All collected data were entered in Microsoft Excel 2016 and then further analyzed through SPSS-20. Data presented in tables for better presentation.

#### RESULTS

A total of 169 patients were recruited in the study in which males were 107 (67%) and females were 64 (37%). Patients were categorized according to gender-wise also, in which highest number of patients identified in age group 11-15 years with 52.7%, followed by age group 6-10 years with 29.3%, and then 1-5 years age group with 17% (Table 1 & 2).

Table 1: Frequency of laryngospasm in both gender.

Gender	Frequency	Percent
Male	105	61.5
Female	64	37.5
Total	169	100

Table 2: Age interval of patient face laryngospasm.

Age	Frequency	Percent
1-5 years	29	17.0
6-10 years	50	29.3
11-15 years	90	52.7
Total	169	100

Table 3: Frequency of different ENT Procedure.

Procedure	Frequency	Percent
Tonsillectomy	115	67.3
Adenotonsillectomy	34	19.9
Adenoidectomy	4	2.4
Septoplasty	16	9.5
Total	169	100

Table 4: Frequency of different types of disease in which laryngospasm observe

Disease	Frequency	Percent
Chronic Tonsillitis	29	17.0
Tonsillitis	86	50.3
Enlarged Adenoids	3	1.8
Adenotonsillitis	36	21.1
Deviated Nasal Septum	15	8.8

#### DISCUSSION

Postoperative laryngospasm remains a major factor in patient care after surgery. Interventions to prevent laryngospasm are not educated in the majority of the general population who may suffer symptoms even without prophylaxis.<sup>12</sup> Interventions to prevent laryngospasm may become cumbersome and expensive. It is necessary to direct these interventions to those at high risk of laryngospasm and it is thus important to know the predisposing factors.<sup>3</sup>

Different risk scoring systems have been developed based on consistent risk factors that have been studied in different surgical populations. Some risk factors have not been shown to be significant contributors to

laryngospasm and this is due to the different patient populations that have been studied.<sup>17</sup> No scoring system has been studied in Lady Reading Hospital Peshawar and describing possible risk factors is the first step in trying to develop one. From this study, the incidence of Laryngospasm in ENT surgical patients within 24 hours after anesthesia was different in different age e.g. age 1-5 years is 17% and 6-10 years 29% and age 11-15 years is 53%. The pediatric age group (less than 11yrs) who formed 48% of the total patients had a statistically significant decrease in outcome of laryngospasm as compared to increase in age till to 15 years. This is consistent with other studies. Inhalational induction was used in majority of the pediatric age group (72.7%) and inhalational induction was found to be a predisposing factor for laryngospasm in this study. In this study, males had a higher percent of laryngospasm than the females in the overall surgery (63% versus 37%). Other studies have shown that males have a higher risk of laryngospasm and this is thought to be due to the high sensitivity of male to inhalational anesthetic to female.

Some studies have showed a positive correlation of amount of body fat and laryngospasm while other studies have not identified BMI as a significant risk factor.<sup>18</sup> The overweight and the obese patients in this study had a higher percent of outcome in the laryngospasm. The underweight patients consistently showed a lower percent of outcome in all the time groups.<sup>19</sup> The patients with history of upper respiratory disease had higher outcomes of laryngospasm than those without this prior history statistically significant. This correlate with other studies where history of upper respiratory disease and laryngospasm have been shown to be significant contributors to occurrence of laryngospasm.<sup>20</sup> Surgery tonsillectomy (68%) adenotonsillectomy (20%) septoplasty (10%) adenoductomy (2%). had the highest risk for causing laryngospasm followed by throat and oral cavity surgery (60.8% of -the surgeries). This could be explained by the fact that presence of blood and debris in the pharynx is higher in nasal surgeries since there is a poor visual field for controlling hemostasis well. As well as anesthesia tool in the presence of recovery which activate the nerve response. Most studies have consistently reported an increase in outcome of laryngospasm with longer durations of surgical stimulation and anesthesia. This was not so in this study which found a higher incidence of laryngospasm in surgeries different surgical procedure.

#### CONCLUSION

The overall incidence of laryngospasm in ENT surgical patients at Lady Reading Hospital Peshawar in different in different age group but in elder children it is 50%. The risk factors that showed positive

correlation with outcome of Laryngospasm without statistical significance included: male gender, the overweight and obese, prior history of smoking and upper respiratory tract infection and, surgery in the nose and throat cavity, use of spontaneous ventilation, and absence of use of prophylactic proper sedation. There was no major adverse effect of laryngospasm encountered in this study.

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