

Original Research Article

Incidence of Preoperative Upper Respiratory Tract Infection and Surgical Outcomes in Patients with Cleft Lip and Cleft Palate

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Abstract: Upper respiratory tract infections (URI or URTI) are illnesses caused by an acute infection which involves the upper respiratory tract including the nose, sinuses, pharynx or larynx. URTI generally includes nasal obstruction, sore throat, tonsillitis, pharyngitis, laryngitis, sinusitis, tonsillitis, Otitis media and the common cold. Most infections are viral in nature and in other instances the cause is bacterial. Upper respiratory tract infections can also be fungal or helminth in origin, but these are far less common. In 2015, 17.2 billion cases of upper respiratory infections occurred. This study was conducted to know the prevalence and incidences of URTI in patients with cleft lip and palate, the association of perioperative and intraoperative respiratory complications in cleft lip and palate patients and to identify the bacterial etiology of URTI in cleft lip and palate. In this study, the patients with pre operative URTI exhibited a greater incidence of peri operative bronchospasm and the patients who had pre operative URTI also had a higher incidence of post operative URTI as well. The incidence of URTI was more in cleft palate patients (63.79%) as against cleft lip patients (3.44%).

Keywords: URTI Cleft Lip, Cleft Palate, Laryngitis, Bronchospasm

INTRODUCTION

Upper respiratory tract infection (URTI) is one of the most common clinical conditions observed in humans especially in pediatric age group [1]. Upper respiratory tract infection (URTI) or "the common cold" is a symptom complex usually caused by several families of the virus; these are the rhinovirus, coronavirus, parainfluenza, respiratory syncytial virus (RSV), adenovirus, human metapneumovirus, and influenza. In industrial United States of America (USA), adults have two to four, and children have between six and eight URTIs a year [2, 3]. In a cross-sectional study from rural Uganda where data was collected from 300 women with children under two

years of age, 37% of children had a current URTI [4]. Recent studies from Kenya in the rural Kilifi district on RSV epidemiology in a birth cohort demonstrated that almost 70% of RSV infections were of the upper respiratory tract only with no seasonality [5]. The majority of infections are spread through contact with infected secretions and can be interrupted through hand hygiene. Rhinoviral infections occur throughout the year, most commonly in spring and autumn. Influenza peaks in winter have been noted universally [6-8]. Several authors suggested that there is increased the risk of peri-operative respiratory complications in patients who have pre operative URTI [9, 10]. Although these complications can cause minimal morbidity and they

are manageable [11]. According to Kotur PF [12] the leading cause of postponement of elective surgeries in pediatric patients is the presence of URTI. Certain risks of anesthesia are keeping in mind to cancel the elective surgery of the child patient presented with URTI. This study was designed to examine the relationship between the presence of URTI symptoms with peri and post operative complications in children undergoing cleft lip and palate surgery, along with to identify the prevalence and incidences of URTI in a cleft lip and palate patients using the “common cold questionnaire” to quantify upper respiratory tract infections. The hypothesis to be tested was that children who present for cleft surgery with URTI have an increased risk of peri and post operative respiratory complications with children with no URTI.

AIM OF THE STUDY

- 1) Prevalence and incidences of URTI in patients with cleft lip and palate
- 2) The association of perioperative and intraoperative respiratory complications in cleft lip and palate patients
- 3) To identify the bacterial etiology of URTI in cleft lip and palate.

MATERIALS AND METHODS

This study was a randomized clinical trial. Approval for the present study was obtained from our institution’s Experimental Medical Research and Practicing Center Ethical committee. Informed consent was obtained from all patients who were enrolled in the study. The study sample was derived from the population of patients (all type of cleft patients) who reported to Department of Oral and Maxillofacial Surgery, Sharad pawar Dental College (Wardha, India) between November 2008 and August 2010. Patients with signs and symptoms of lower respiratory tract infection, proven clinically and radiologically were excluded from the present study. The patients were admitted to the Acharya Vinoba Bhave Rural Hospital, a teaching hospital attached to Department of Oral and Maxillofacial Surgery and Department of Pediatrics were subjected to the following investigations like

routine hemogram, urine analysis, kidney, and Liver function tests, Blood sugar level test, X-ray chest (PA. view), electro cardio gram, specialized investigations such as 2D-echocardiogram, HB electrophoresis, BERA test were done wherever indicated. Preoperative fitness for the administration of the anesthesia and the surgery was obtained from consultant Pediatrician and the Anesthetist. The diagnosis of URTI was based on clinical sign and symptoms as there are no confirmatory laboratory tests and radiographic findings. The common cold questionnaire (CCQ) used in this study was adapted from that used as part of the common cold unit’s standard protocol. It records symptoms across four domains: general symptoms, nasal symptoms, throat symptoms and chest symptoms. The collection of nasal cotton tipped swab were done from the lateral wall of the nose in Oral and Maxillofacial Surgery and pediatrics ward from the patients who had signs of URTI, under aseptic precautions. The specimen was sent for culture and sensitivity test within 4 hours of collection. The specimen was cultured on nutrient blood agar medium at an optimum temperature for growth i.e 37 degrees centigrade, range 22-42 degrees centigrade. The bacterial colonies grow best on nutrient blood agar medium. Colonies were small, 0.5 -1mm in diameter after 24 hours, and were semi transparent, low convex, discrete and with matt or glossy surfaces, when freshly isolated. The matt colonies contained M antigen. Mucoid colonies may occur when the strain is heavily capsulated. Clear and often wide zones of hemolysis surrounding the colonies on sheep blood agar medium were seen. Based on the morphological characteristics, colony characteristics and the biochemical activities exhibited by the cultured microorganisms they were identified as streptococcus species. Those patients found to have URTI pre-operatively; following treatment was given to them various antibiotics, antipyretics and analgesics, and nasal decongestants.

RESULTS

In the present study include total 150 patients youngest patient was 3 months of age and oldest patient was 50 years age. Average age of patients was 12 years (Table 1).

Table 1: Distribution of cases as per age and sex

Age Group	MALE (%)	FEMALE (%)	TOTAL (%)
3 Months – 4 Years	31 (35.23)	18 (29.03)	49 (32.67)
5 to 8 Years	13 (14.77)	10 (16.13)	23 (15.33)
9 to 12 Years	19 (21.59)	12 (19.35)	31 (20.67)
13 to 16 Years	10 (11.36)	13 (20.97)	23 (15.33)
> 16 Years	15 (17.05)	09 (14.52)	24 (16.00)
TOTAL	88 (58.67)	62 (41.33)	150 (100)

The cleft patients according to Karnahan’s classification who are included in the present study were 29 patients of cleft lip, 42 of cleft palate, 33 of

cleft lip + palate +alveolus, 26 of soft palate and uvula with 20 other patients of cleft (Figure 1).

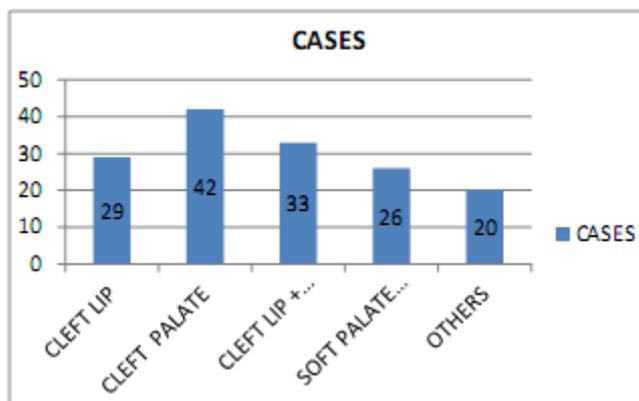


Fig-1: Bar diagram showing distribution of cleft patients according to karnahan's classification

In the present study, total 38.67% had positive sign and symptoms of URTI preoperatively. In which 33 were male and 25 female patients (Figure 2). Out of 58 patients who are positive for URTI preoperatively 37(63.79%) patients were of cleft palate, 2(3.44%) of cleft lip and 19(32.75%) other patients were positive for

URTI preoperatively. The peri-operative assessment of the patients was done for oxygen desaturation, bronchospasm and airway secretions. None of the patients showed any signs of oxygen desaturation intra operatively.

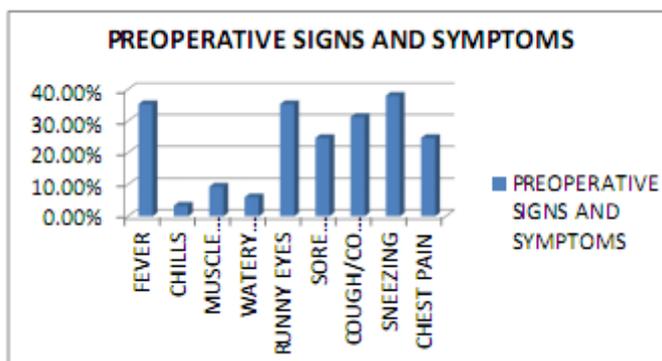


Fig-2: Bar diagram showing incidences according to preoperative signs and symptoms of URTI

Analysis was done between the patients who had URTI pre operatively and showed bronchospasm peri operatively against the patient who did not have URTI preoperatively. Patients were divided into 2 groups. Group A included Patients who had URTI pre operatively and showed bronchospasm peri- operatively and Group B included Patients who did not have URTI pre operatively and had bronchospasm perioperatively. The results were statistically significant for group-A with (p<0.0001).

operative quantitative airway secretions. The results were highly significant for Group –A with patients <0.0001.

Out of 150 patients, 58 patients were positive for URTI preoperatively out of which 36 patients experienced URTI post operatively. 92 patients out of 150 who did not have URTI pre operatively, only 5 patients experienced URTI post operatively.

A comparison was made between patients having URTI preoperatively and who showed peri operative airway secretions against the patients who did not have pre operative URTI. Patients were divided into 2 Groups i.e. Group A and B. Group A: Patients who had URTI preoperatively and showed peri operative quantitative airway secretions. Group B: Patients in whom URTI was absent preoperatively and showed peri

Duration of hospital stay pre operatively in patients with or without URTI was analyzed. Patients were divided into 2 Groups i.e. Group A and B. Group A: Duration of pre operative hospital stay in patients who had URTI Group B: Duration of pre operative hospital stay in patients who did not have URTI. Most of the cases who were positive for URTI pre-operatively had more hospital stay than the other cleft lip and palate patients (Table 2).

Table 2: Table showing duration of hospital stay preoperatively in patients with or without URTI

Pre-Operative Hospital Stay (Days)	Group A	Group B
2	00	80
3	00	12
4	28	00
5	02	00
6	20	00
7	03	00
8	05	00
Total	58	92
Average Hospital Stay	4.34 Days	0.02 Days
K 2- Value	150	P < 0.0001 Significant

Patients were divided into 2 Groups i.e. Group A and B. Group A: Duration of hospital stay of patients with URTI post operatively. Group B: Duration of hospital stays of patients without URTI post operatively. Most of the cases who were positive for

URTI postoperatively had more hospital stay than the other cleft lip and palate patients. Average stay in hospital was 6 days patients had URTI. Patients without URTI duration of hospital stay 4 days (Table 3).

Table 3: Table Showing Duration Of Hospital Stay Post-Operatively In Patients With Or Without URTI

Post-Operative Hospital Stay (Days)	Group A	Group B
2	00	00
3	00	00
4	00	19
5	00	90
6	06	00
7	21	00
8	14	00
Total	41	109
Average Hospital Stay	6.06 Days	4.8 Days
K 2- Value	150	P < 0.0001 Significant

DISCUSSION

The goal of the present study was to examine the relationship between the presence of URTI symptoms with peri and post operative complications in children undergoing cleft lip and palate (CLP) surgery. The hypothesis to be tested was that children who present for cleft surgery with URTI have an increased risk of peri and post operative respiratory complications with children with no URTI. The result of the present study confirmed that patient who had pre operative URTI showed peri operative complications like bronchospasm, more airway secretions with longer pre and post operative hospital stay, which increases the cost as well. The incidence of URTI in the children with CLP is reported to be relatively higher than the normal children, as reported by McCarthy *et al* [13]. In the present study amongst the children who have CLP deformity, the incidence of URTI (n=58) was found to be higher in the children who had the cleft palate (63.79%) as compared to the children with an isolated cleft of the lip (3.44%). The nasal swab cultures showed growth of streptococci, which are normal inhabitants of the oral cavity, nasal cavity, and the nasopharynx, in 67.24% of cases, while in 32.75% of cases no significant growth of any microorganisms was noticed.

This finding suggests that the URTI was probably due to viral infection and there was secondary bacterial infection by the normal nasal flora organisms. The susceptibility to the secondary bacterial infections was increased due to the factors like open air way and nasal regurgitation of food and fluids. These children are often malnourished and that may be an added cause of decreased immunity and increased susceptibility to infections. According to Hers JF & Stuart-Harris CH, URTI is due to viral infection, particularly during the invasive phase and can cause morphological and functional changes of the respiratory epithelium [14, 15]. The common problem with URTI in cleft palate children is the extension of the upper respiratory tract infection to the lower respiratory tract due to abnormal anatomy, difficulty in deglutition and the post nasal drip and micro aspirations in the trachea-bronchial tree. The infections can also extend to lower respiratory tract while intubating the patients for the administration of the general anesthesia. Thus it is imperative to control the URTI prior to the surgery to prevent severe respiratory complications. The incidence of perioperative respiratory complications has been reported to be significantly higher in patients with URTI [16].

During the present study, it was observed that 62% of patients who had pre operative URTI had signs of URTI and mild LRTI post operatively as compared to 5.4% of patients who developed post operative URTI or LRTI, which were negative for URTI preoperatively, which is a significant finding. The probable reason for it being that the URTI signs were suppressed due to medicinal treatment but subclinical infection might have still persisted which got aggravated post operatively due to the stress of anesthesia, surgery, handling of the airway and irritation of the respiratory passage due to inhalant anesthetics. Although none of the patients had life threatening complications and all were effectively managed with medicinal and supportive therapy, it resulted in prolonged post operative hospital stay. The average post operative stay of the patients who did not have pre or post operative URTI was 4 days while as the average post operative hospital stay of the patients who had pre and post operative signs of URTI was 6.6 days. The prolonged post operative hospital stay increases the treatment cost. According to Levy *et al* [17], the reason for delaying the surgery in presence of URTI is the fear of peri-anesthetic complications such as laryngospasm, bronchospasm, aspiration pneumonitis, lobar collapse. It is also felt that until the patients are fully asymptomatic they must be kept in the controlled hospital environments and it is not a good practice to discharge such patients. If a cough gets aggravated the chances of dehiscence of the repaired palate are also increased leading to total failure of the surgical treatment. The anatomical and physiological peculiarities of the respiratory passage make them susceptible for airway complications. As it is known that the airway passage in child patient is narrow as compared to adults, which makes the airway hyper-reactive in children. None of the patients showed any signs of oxygen desaturation intraoperatively. Schreiner MS *et al* [17] experienced the greater decrease in oxygen saturation in patients having URTI taken for surgery as compared to patients who do not have URTI pre operatively. In the present study, the incidence of secretions peri operatively were more in patients (70.6%) who had URTI pre operatively (70.6% vs 5.43%, $p < 0.0001$). Shoba Malviya *et al* [18] also reported the increased secretion peri operatively in their study. The patients who had URTI pre operatively showed bronchospasm in 62.06% of patients peri operatively (62.06% vs 7.60%, $P < 0.0001$). However, the bronchospasm did not persist for a longer period and was managed peri operatively in all the patients successfully. Several authors like Tait *et al* and Olsson *et al* in their studies also demonstrated an increased incidence of peri operative respiratory complications in children with URTIs including the bronchospasm [19, 20].

CONCLUSION

The incidence of URTI was more in cleft palate patients (63.79%) as against cleft lip patients (3.44%). The patients with pre-operative URTI exhibited the greater incidence of peri operative bronchospasm. The patients who had pre operative URTI also had the higher incidence of post operative URTI as well. The URTI associated with cleft lip and palate patients was primarily of viral origin which gets secondarily infected from the normal nasal flora (streptococci) due to irritation from nasal regurgitation of fluids and food.

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