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Original article:

Study of tracheostomy in Pediatric Intensive Care Unit at tertiary care hospital

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Abstract:

Introduction: Tracheostomy is one of a safe procedure, improving prognosis of paediatric patients. However we found very limited research work on this speciality area. Hence this research work was conducted mainly to highlight the outcome of the tracheostomy at a tertiary care paediatric intensive care unit at tertiary care hospital.

Material and methods: Present retrospective study was conducted at our department for one year duration. Sample size was estimated with the help of statistician. In our study, a total of 20 tracheostomies were performed during said period. We collected data from patient records, clinical examination and interview. We also included patient follow up data. All the tracheostomies were performed by otolaryngologists in the presence of an anesthetist and a pediatric intensivist either in the pediatric intensive care unit (PICU) or in the operation theatre.

Results: In our study, out of 20 patients undergo tracheostomy, of them 60 % were with indication prolonged mechanical ventilation secondary to neuromuscular problems, 15 % with Upper airway obstruction, 10 % with neurological cause and neuromuscular cause while 5 % were with other indications. 70 % patients were with average duration of tracheostomy in range 5 to 15 days duration with mean duration 13.5 days. Maximum patients (35%) were with Pneumothorax complication followed by 25% were with bleeding and 10 % with tissue granulation on long term follow up.

Conclusion: From present study, we conclude that, nowadays the indication for tracheostomy has changed from emergency towards more of the elective one. The most common indication for tracheostomy in present study was prolonged mechanical ventilation. The present study also highlighted safety factor of tracheostomy procedure.

Keywords: Tracheostomy, the pediatric intensive care unit

Introduction:

Tracheostomy is one of a safe procedure, improving prognosis of paediatric patients. However we found very limited research work on this speciality area. [1]Hence this research work was conducted mainly to highlight outcome of tracheostomy at a tertiary care pediatric intensive care unit at tertiary care hospital. The ideal timing (early VS late) and techniques (percutaneous dilatational, other new percutaneous techniques, open surgical) for tracheostomy have been topics of considerable debate. [2]

Placement of a tracheostomy has become a viable alternative to prolonged endotracheal intubation, with the benefits of improving

patient comfort, reducing need for sedation, lowering airway resistance, and allowing for easier airway care.[3,4,5] Complications related to tracheostomies include pneumothorax, bleeding, subglottic stenosis, tracheoesophageal fistula, vocal cord dysfunction, stomal granulation, persistent tracheal fistula, and scarring.[6]

There is an increased prevalence of children undergoing tracheostomy, but deaths directly attributable to tracheostomy complications are very rare .[7]

Material and methods:

Present retrospective study was conducted at our department for one year duration. Sample size was estimated with the help of statistician. In our study, a total of 20 tracheostomies were performed during said period.

We collected data from patient records, clinical examination and interview. We also included patient follow up data.

We included all patients irrespectively admitted in PICU and undergone for tracheostomy. Written informed consent was obtained from parents with proper counselling.

We excluded patients not willing to participate in study.

All the tracheostomies were performed by otolaryngologists in the presence of an anesthetist and a pediatric intensivist either in the pediatric intensive care unit (PICU) or in the operation theatre.

A standard procedure for tracheostomy was used. The indication and timing of tracheostomy were decided by the pediatric intensivist.

Data was filled in excel sheet and was further analysed.

Results:

In our study period, 140 children were ventilated, out of them only 20 required a tracheostomy. Mean age of children were 2.3 years with 14 male and 6 female with gender wise distribution.

Table 1) Distribution of cases on the basis of indications

S.NO.	Indication	Number of cases	Percentage
1	Prolonged mechanical ventilation secondary to neuromuscular problems	12	60
2	Upper airway obstruction	3	15
3	Neurological cause	2	10
4	Neuromuscular cause	2	10
5	Others	1	5

In our study, out of 20 patients undergo tracheostomy , of them 60 % were with indication prolonged mechanical ventilation secondary to neuromuscular problems , 15 % with Upper airway obstruction , 10 % with neurological cause and neuromuscular cause while 5 % were with other indications.

Table 2) Distribution of cases on the basis of average time duration.

S.NO.	Time duration	Number of cases	Percentage
1	< 5 days	4	20
2	5- 15 days	14	70
3	> 15 days	2	10

In our study , 70 % patients were with average duration of tracheostomy in range 5 to 15 days duration with mean duration 13.5 days.

Table 3) Distribution of cases on the basis of complications

S.NO.	Complications	Number of cases	Percentage
1	Pneumothorax	7	35
2	Bleeding	5	25
3	Occlusion of the tube	1	5
4	Subglottic stenosis	1	5
5	Granulation tissue	2	10

In our present study, maximum patients (35%) were with Pneumothorax complication followed by 25% were with bleeding and 10 % with tissue granulation on long term follow up. In our study, no any single case was with death showing safety of tracheostomy.

Discussion:

Acute respiratory failure requiring mechanical ventilation is common in critical illness, and progressive advancements in the understanding of and technologies for the care of the critically ill have resulted in an increase in the number of patients who remain dependent on mechanical ventilation for prolonged periods of time.[8]

Tracheostomy is a common procedure performed in critically ill patients requiring prolonged mechanical ventilation for acute respiratory failure and for airway issues.[9] In our study , out of 20 patients undergo tracheostomy , of them 60 % were with indication prolonged mechanical ventilation secondary to neuromuscular problems , 15 % with Upper airway obstruction , 10 % with neurological cause and neuromuscular cause while 5 % were with other indications. In our study , 70 % patients were with average duration of tracheostomy in range 5 to 15 days duration with mean duration 13.5 days. In our present study , maximum patients (35%) were with Pneumothorax complication followed by 25% were with bleeding and 10 % with tissue granulation on long term follow up. In our study , no any single case was with death showing safety of tracheostomy .

While comparing other studies, Jain MK et al , in his study , 283 children were ventilated, out of which 26 (9.1%) required a tracheostomy. Among this 73% were boys. The median age of the children who underwent tracheostomy was 6.32 y. The youngest child was 4-mo-old and the eldest was 16 y. Seven children were ≤ 1 y. In 19 (73%) patients tracheostomy was performed at the bedside in the pediatric intensive care unit. Complications from tracheostomy were seen in 14 patients (55%). Out of 14, 2 patients had accidental decannulation, 2 had tube occlusion, 1 patient had a cardiac arrest, 2 patients developed pneumothorax, 3 developed granulation tissue, 1 patient had maggots and infection at home, another patient died at home due to occlusion and 1 patient each developed stromal site infection and subglottic stenosis.[10]

Can FK et al concluded that , tracheostomy seems safe and improves pediatric patients' outcomes. The most important factor that affects the prognosis of children who underwent tracheostomy is the indication for tracheostomy. The outcomes are always better if the tracheostomy has been performed because of upper airway obstruction. Performing tracheostomy helps weaning from and off ventilator support and finally the discharge of patients with prolonged mechanical ventilation from the pediatric intensive care unit setting.[11]

Yukkaldıran et al concluded , most of the children who underwent tracheostomy were males and older than 1 year of age. The most common indication for tracheostomy in children was long-term intubation, bleeding was the most common complication, and cardiac arrest was the most common cause of death. The median age of children who underwent tracheostomy due to trauma was higher than other indications. Further studies are needed to reveal the features of pediatric tracheostomy with stronger evidence.[12]

Though with small sample size this study highlights the importance of tracheostomy in Pediatric Intensive Care Unit at tertiary care hospital as elective as well as emergency tool.

Conclusion:

From present study, we may conclude that, nowadays the indication for tracheostomy has changed from emergency to more of elective one. The most common indication for tracheostomy in present study was prolonged mechanical ventilation. The present study also highlighted safety factors of it.

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