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SURGICAL SCIENCES / CERRAHİ TIP BİLİMLERİ

A New Trick for Percutaneous Tracheostomy in Children

Çocuklarda Perkütan Trakeostomi Tekniği için Yeni Püf Nokta

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Abstract

Objectives: Pediatric tracheostomy has undergone notable changes and percutaneous tracheostomy (PT) has taken place of surgical tracheostomy. The aim of this study is to show a facilitation in a previously described technique.
Materials and Methods: A retrospective review of 35 patients who underwent PT was performed. Demographic data of the children and outcomes of the procedures were analyzed.
Results: Among total of 35 children, there were 14 girls and 21 boys. Mean age was 54.8 months (2-207) and mean weight was 15.8 kg (3-42). The mean follow up time was 11.4 (1-22 months). There were no complications intraoperatively or in early postoperative period (1 week).
Conclusion: Cannula placement through a frozen feeding tube is a new and facilitating method in rigid bronchoscopy guided tracheostomy cannula placement in children.
Key Words: Bronchoscopy, Children, Feeding, Minimal Invasive, Tracheostomy

Öz

Amaç: Pediyatrik trakeostomi geçmişten günümüze göze çarpar değişikliklere uğramıştır ve perkütan trakeostomi (PT), cerrahi trakeostominin yerini almıştır. Bu çalışmanın amacı daha önce tarif edilen teknikte kolaylaştırma göstermektir.
Gereç ve Yöntem: PT kanülü takılan 35 hasta retrospektif olarak tarandı. Hastaların dermografik bilgileri ve prosedürün sonuçları analiz edildi.
Bulgular: Toplam 35 çocuk arasında 14 kız 21 erkek çocuk vardı. Ortalama yaş 54,8 ay (2-207) ve ortalama ağırlık 15,8 kg (3-42) idi. Ortalama takip süresi 11,4 (1-22 ay) idi. Ameliyat sırasında veya ameliyat sonrası erken dönemde (1 hafta) komplikasyon görülmedi.
Sonuç: Dondurulmuş feeding üzerinden kanül yerleştirme, çocuklarda rijit bronkoskopi ile guide üzerinden trakeostomi kanülü takılmasında yeni ve kolaylaştırıcı bir yöntemdir.
Anahtar Kelimeler: Bronkoskopi, Beslenme Tüpü, Çocuk, Minimal İnvaziv, Trakeostomi

Introduction

Tracheostomy is a common procedure among intensive care unit patients (1). Even though it is more common in adult population, children also need tracheostomy due to reasons as; neurological issues, acute or chronic airway obstructions, to avoid airway stenosis in long term intubations, infectious reasons etc. (2-4). Percutaneous tracheostomy (PT) has taken place of surgical tracheostomy and we have published our results of PT under rigid bronchoscopy recently (2). The challenge we encountered in this procedure was that the guide was not strong enough to carry the cannula and even though the space you created in the trachea was large enough, it was difficult to place the cannula. To make this step easier; we inserted a sterilized feeding tube over the guide and place the cannula through

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that. The aim of this study is to present our development in the step which we struggled most of this technique.

Materials and Methods

Ethics Committee Approval was not obtained because the study is retrospective. Children who underwent PT under rigid bronchoscopy between 2017-2019 were included to study. Demographic data of the children and outcomes of the procedures were recorded.

Technique

A night before the procedure, feeding tubes of each size (8-10 and 12 Fr) are put into the freezer in their sterile coverage and let the tubes stay for at least 6 hours. They are removed from the freezer just before the procedure in order not to lose their hardness.

All procedures were under rigid bronchoscopy guidance. After puncturing, insertion of introducer needle and guide wire and separation of the tissue with the special separating forceps, 8,10 or 12 Fr feeding tube was inserted through the guide wire as the changed step and the cannula was placed through this tube. (Figure 1) After ensuring proper ventilation, the procedure was completed.

Results

Among total of 35 children, there were 14 girls and 21 boys. Mean age was 54.8 months (2-207) and mean weight was 15.8 kg (3-42). The indications of tracheostomy were presented in Table 1. There were no complications intraoperatively or in early postoperative period (1 week). The mean follow-up time was 11.4 (1-22 months).

Discussion

PT techniques have been evolved and become a more common procedure in pediatric age group recently (1,5). Since its first introduction to medical history in 100 BC by Asclepiades and the first known successful tracheotomy in 16th century by Pauld'Egine, tracheostomy procedure had been thought to be the last choice for desperate cases (6). But nowadays, tracheostomy may be performed to improve life quality of children and the parents. Among the indications as neurological disorders, infectious diseases, muscle diseases, etc. the most common indication in our study was necessity of long-term intubation (2,4).

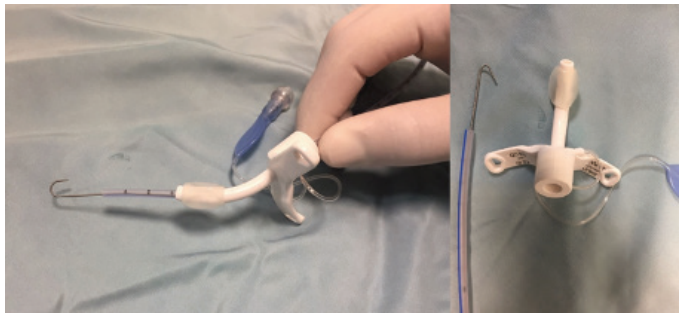

Figure 1: Feeding tube was inserted through the guide wire as the changed step and the cannula was placed through this tube

PT under rigid bronchoscopy is a safe method in especially infants because of the esophageal injury and dislocation risks and that is the reason the authors prefer this method. The authors have published a case series with big number of patients in the past (2). In these procedures, one of the biggest struggle authors encountered was placing the cannula over through the guide wire. Even though the opening of trachea was adequate, the guide was sometimes not sufficient to carry the cannula. Thinking about this difficulty led us to place frozen feeding tubes through the guide wires before placing the cannulas. Under tracheostomy guidance, the risk of perforation of the posterior tracheal wall is low. Since the opening is dilated enough with the special separating forceps, the feeding is not used for dilatation but only for guidance. Afterwards placing the cannula is much easier because of having a stronger guide.

The complication rate of the procedure in the literature is 10-58% (4). The complications may be classified as major and minor and also intraoperative-early postoperative (first seven days) and late postoperative. As intraoperative complications, bleeding, tracheal or esophageal perforation may be counted (4,6). Among 16 cases in this study the authors did not encounter any intraoperative major or minor complications or

Table 1: Indications of tracheostomy

Indications	n
Chronic lung disease	13
Spinal muscular atrophy	3
Medullablastoma	3
Krabbe disease	1
Neuroenteric cysts	1
Congenital myasthenic syndrome	1
Fallot tetralogy	1
Posterior fossa tumors	4
Spina bifida	1
Hypertrophic cardiomyopathy	1
Pulmoner hypertension	1
Mitocondiral myopathy	1
Walker walburg	1
Epilepsy	2
Congenital myopahty	1
Asphyxiation	1

n: Number of the patients

early postoperative complications. Since the follow up period of the study is only 11.4 months (1-22 months) it is too early to comment on postoperative late complications even though there were not any for now. One of the mostly encountered postoperative complications of percutaneous tracheostomy method is accidental decannulation (7). The difficulty of placing the cannula may push the surgeon to perform unnecessary dilatation of tracheostomy site. Placing a more appropriate guide as feeding tube may also decrease this risk and the risk of accidental decannulation postoperatively.

Study Limitations

The study has some limitations. It is a retrospective study with small number of patients.

Conclusion

PT under rigid bronchoscopy is safe and feasible under experienced hands. Cannula placement through a frozen feeding tube is a new and facilitating method.

Ethics

Ethics Committee Approval: Ethics Committee Approval was not obtained due to the study is retrospective.

Informed Consent: Informed consent was obtained from the patients with regards they could be used in the scientific study before the operation.

Peer-review: Externally peer-reviewed.

Authorship Contributions

Surgical and Medical Practices: E.E., U.A., K.B., G.G., F.S., A.Y., A.M.Ç., H.D., Concept: Ö.S.C., M.B.K., Design: A.Y., A.M.Ç., H.D., Data Collection or Processing: K.B., F.S., Analysis or Interpretation: Ö.S.C., Literature Search: E.E., U.A., G.G., Writing: E.E., U.A., K.B., M.B.K.

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