

Evaluation of Tracheotomies Performed by Percutaneous Dilatation Method in Adult Intensive Care Unit

Mine Altinkaya Çavuş¹, Şerife Gökbulut Bektaş²

¹Department of Intensive Care, University of Health Sciences, Kayseri City Hospital, Kayseri, Turkey

²Department of Intensive Care, University of Health Sciences, Ankara City Hospital, Ankara, Turkey

Abstract

Aim: Percutaneous dilatation tracheotomy in our clinic; It is opened using the advantages and methods of Griggs (GWDR) and Ciaglia Blue Rhino (CBR). We wanted to share our one-year experience with you.

Method: In the study that we retrospectively examined tracheotomies performed in adult intensive care in 2019-2020; Demographic data of patients, SOFA scores, intensive care, tracheotomy, intubation days, complications, mortality and morbidity were recorded.

Results: A total of 50 patients, 33 females, 17 males, were included in the study. The mean age is $65,54 \pm 15,95$. BMI was $26,94 \pm 2,75$. Ciaglia was used in 22 patients and Griggs method was used in 28 patients. Tracheotomy opening day is $10,45 \pm 1,27$. Griggs method; It was found to be significantly higher in terms of complications (6 minor bleeding, 1 emphysema, 1 lack of ventilation) ($p = 0,001$). Mortality (independent of tracheotomy method and complications) was significantly higher in the Griggs method ($p = 0,005$).

Conclusion: Except for minor differences, no significant difference was found between both GDWR method and CBR method in the study.

Keywords: Griggs, Ciaglia Blue Rhino®, percutaneous dilatational tracheotomy, complications

Introduction

Prolonged endotracheal intubation can lead to laryngeal damage, tracheal damage (tracheomalacia, tracheal dilatation and tracheal stenosis), vocal cord paralysis, glottic and subglottic stenosis, and infectious complications¹. With tracheotomy, it is aimed to reduce the complications that may occur due to prolonged endotracheal intubation. Despite these advantages, tracheotomy is an invasive procedure and some complications related to the intervention may develop².

In 1955, Sheldon et al. Applied the first percutaneous dilatation tracheotomy (PDT) technique³. It was developed with the Seldinger method by PDT Toyne and Weinstein in 1969⁴. Sequential dilatation method was used by Ciaglia in 1985 by means of guidewires and dilators⁵. Over time, the Ciaglia Blue Rhino (Single Dilatation, CBR) method, Percutwist (Controlled Dilatation) method, Griggs (Forceps Dilatation, GWDR) method, Fantoni Translaryngeal method have been developed⁶⁻⁹.

Tracheotomies opened by percutaneous dilatation method; It is frequently used in patients receiving prolonged mechanical ventilator support. In this study, we aimed to compile and present the tracheotomies opened with two different dilatation methods (Griggs (GWDR) and Ciaglia Blue Rhino (CBR)) used in our clinic.

Method

In the study that we retrospectively examined tracheotomies performed in adult intensive care in 2019-2020; The demographic data of the patients, SOFA scores, indications for intensive care hospitalization, tracheotomy opening days, complications, and mortality were recorded.

Written informed consent for the tracheotomy procedure was obtained from the first degree relatives of the patients. All of the cases were intubated orotracheally and received mechanical ventilation support. Percutaneous tracheotomy was performed in the intensive care unit by an intensive care specialist. Following fentanyl 1 mcg / kg, propofol 2 mg / kg, and rocuronium 0,6 mg / kg IV in patients undergoing percutaneous tracheostomy, 100% oxygen, PEEP 0 mmHg with pressure control synchronized intermittent mandatory ventilation (P-SIMV) mode mechanical ventilation done. The patients were monitored with electrocardiography, blood pressure and saturation probe. After the patient was placed in a flat supine position, the head was extended with an under-shoulder support. The area to be treated was cleaned with 2% povidone iodine and the patient was covered with a sterile condition. 1.-2 of the tracheal cartilage. or 2.-3. Local anesthesia with 2% prilocaine (4-5 mL) was applied to the area to be treated by palpating the area. After

Corresponding Author: Mine Altinkaya Çavuş

e-mail: minealtinkaya@yahoo.com **Received:** 13.12.2020

Accepted: 05.01.2021 • **Orcid:** <https://orcid.org/0000-0003-2584-0463>

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Mine Altinkaya Çavuş, MD., **e-mail:** minealtinkaya@yahoo.com, **Orcid:** 0000-0003-2584-0463

Şerife Gökbulut Bektaş, MD, **e-mail:** serifegbektas@gmail.com, **Orcid:** 0000-0001-6057-723X

Table 1. Hospitalization indications of patients who underwent tracheostomy

	N	%
Serebrovasculer disease (SVD)	7	14
Respiratory System Pathology	5	10
After Cardiopulmonary Resuscitation	3	6
Sepsis	8	16
Head trauma	27	54

Table 2. Study results

	CBR (n:22)	GWDR (n:28)	P değeri
Age	67,14	64,29	,138
BMI	27,15	26,79	,808
SOFA	8,50	8,29	,601
Platelet	240,77	186,36	,308
INR	1,23	1,52	,009*
aPPT	34,03	35,94	,351
Complication	2	8	,001*
Minör bleeding	2	6	
Emphysema		1	
Lack of ventilation		1	
Mortality	10	24	,005*
Decanulation	8	9	,871

local anesthesia, 3 mL of saline solution was drawn, and the tracheal lumen was entered by aspiration from the designated area with the help of an injector with a 14G needle at the tip. When air was aspirated into the injector, the injector was detached from the needle and the guidewire passed through it was inserted into the tracheal lumen. The area was enlarged with the help of a dilator passed over the guidewire. After removing the dilator and expanding the subcutaneous and trachea with the help of Griggs forceps or Blue Rino, the size 7.5 or 8 tracheotomy cannula was passed over the guide and inserted into the trachea.

Statistical analysis was done with SPSS version 20. Nonparametric tests were applied. Frequency and average values were calculated.

Results

A total of 50 patients, 33 females, 17 males, were included in the study. The patients were admitted to the intensive care unit due to cerebrovasculer disease (SVD) 7 (14%), respiratory system pathology 5 (10%), after cardiopulmonary resuscitation 3 (6%), sepsis 8 (6%), head trauma 27 (54%). (Table 1). In our study, the most common elective percutaneous tracheotomy indication was due to 74% prolonged coma (n: 37) and 26% prolonged mechanical ventilation need (n: 13). The mean age is $65,54 \pm 15,95$. BMI was $26,94 \pm 2,75$. Tracheotomy opening day is $10,45 \pm 1,27$.

CBR method was used in 22 patients and GWDR method was used in 28 patients. In the CBR method, minor bleeding was observed in 2 patients. The GWDR method was found to be significantly higher in terms of complications (6 minor bleeding, 1 emphysema, 1 lack of ventilation) ($p = 0,001$). Comparing the INR values; Values were found to be significantly higher in the GWDR method. In our study, there was no case loss due to complications of the procedure during or after the tracheostomy procedure. There were no late complications. Thirty-four patients (68%) died as a result of the natural course of the pathologies followed in the intensive care unit. Mortality (independent of the tracheotomy method and complications) was found to be significantly higher in the GWDR method ($p = 0,005$) (Table 2). Of the patients using the GWDR method, there were 9 patients who underwent decanulation and 8 patients in the CBR method. Complete closure of the stoma after decanulation occurred within 48-72 hours before any patient developed stenosis.

Discussion

Tracheotomy procedure is a procedure performed in intensive care units to reduce complications of endotracheal intubation and mechanical ventilation and to increase patient comfort, rather than being an emergency airway supply method. With the increase in the number of patients connected to mechanical ventilators, the tracheotomy procedure has also increased¹⁰.

Çiçek et al.¹¹ determined the opening day of tracheotomy as $13,23 \pm 6,29$ days. Kirca et al.¹² It was found to be $8,65 \pm 5,97$ days. Scales et al.¹³, the average time to open tracheotomy by day in the intensive care unit was found to be 34,3% within the first 10 days. In this study, the day of tracheotomy opening; It was found to be $10,45 \pm 1,27$.

Complications can be divided into perop, early and late complications. Perop period complications include apnea, cardiac arrest, air embolism, pneumothorax, pneumomediastinum, adjacent tissue injury, and bleeding. Early complications include cannula obstruction, cannula dislocation, tracheitis, emphysema, aspiration, and hemorrhage. Late complications include tracheoesophageal fistula, tracheoesophageal fistula, tracheomalacia, decannulation difficulty, and laryngotracheal stenosis. Subcutaneous emphysema and pneumothorax are serious complications that may develop during percutaneous tracheotomy. In our study; Subcutaneous emphysema developed in 1 patient after PDT with the GWDR method due to the increase in PEEP value to provide oxygenation. Spontaneous resorption was observed in the patient, pneumothorax did not develop. In 1 patient with low aeration, the problem was resolved with aspiration performed after the procedure. Güçyetmez et al.¹⁴ found the most frequent bleeding (68%, n: 138 patients) as an early complication in their study. In our study, one of the early

complications, minor bleeding, depending on the high INR; It was more common in the GWDR method. Minor bleeding seen in the early period; It was taken under control with a printed dressing made with the help of adrenaline gauze.

Güçyetmez et al. The most common reasons for opening a tracheostomy were prolonged mechanical ventilation need (76,9%) and prolonged coma (14,8%)¹⁴. In our study, the most common indication for opening an elective percutaneous tracheotomy was due to prolonged coma and the need for prolonged mechanical ventilation.

As a result; PDT methods are safe in terms of major complications. Minor bleeding seen more in the GWDR method; depends on the INR height in the group.

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