TRACHEOSTOMY IN SHORT NECK PATIENT: A CASE REPORT

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ABSTRACT

Background: Procedure tracheostomy may be performed quickly, but it can also be challenging in patients with burns, acute sickness, post-head traumas, juvenile patients, obesity, short necks, and masses in the neck that impede access to the trachea. The potential of difficulties after a tracheostomy is increased by the short neck condition. The effectiveness of the tracheostomy is directly connected to the surgeon's willingness to address the patient's complicating issues. **Objective:** Understanding how to evaluate a short neck, the potential for difficulties, and preventative measures that may be performed to avoid issues caused by a short neck. **Case:** According to the report, a 49-year-old male with a short neck—defined as thyromental distance less than 6 cm, sternomental distance less than 12 cm, and neck extension distance less than 5 cm—was suggested for a tracheostomy. When the patient is in the extended neck posture, the laryngeal cartilage may be felt. The tracheal cannula is securely fastened. **Methode:** A review of references was conducted using PubMed databases, the Web of Science, and Google Scholar. The references were found in books, journals, and guidelines. **Result:** The trachea was difficult to expose and identify, the trachea canulla was difficult to place, there were no difficulties, the procedure went smoothly, and there was only minor bleeding. **Conclusion:** Short-neck patients' tracheostomies provide a challenge for ENT departments, and the outcome of the treatment relies on the surgeons' talent.

Keywords: tracheostomy in patient with short neck, tracheostomy complications, upperairway obstruction

INTRODUCTION

Procedural tracheostomy is simple to conduct, but it may be challenging for patients who have burns, severe diseases, post-head injuries, short necks, obesity, pediatric patients, and individuals with these risk factors for difficulties. A short neck condition increases the likelihood of tracheostomy-related problems.[1,2]

The mediastinal hollow of the short neck makes it challenging to expose and distinguish the trachea due of its location below and behind the sternum. The risks of having a tracheostomy in a short neck include major or minor hemorrhage, false passage or additional tracheal insertion, desaturation, mucosal plugs, and unintentional decannulation.[3-6]

A short neck is described as having a sternomental distance of 12 cm, a neck extension distance of 5 cm, and a thyromental distance of 6 cm. The sternomental distance in neutral and maximum extension was used to gauge neck extension. The distance between the thyroid prominence and the mental apex in the maximum extended neck posture was used to calculate the thyromental distance. The direct distance from the manubrium sterni to the top of the mental point in the maximum extended head posture serves as the basis for measuring the sternomental distance.[4-7]

The difficulty of tracheostomy in adult patients with short neck issues will rise due to the increase in neck fat storage after puberty. The operator should take the patient's neck fat thickness into account, particularly if he is a man.[8]

The 49-year-old man patient described below will have an urgent tracheostomy because to an upper airway blockage (Jackson II) and short neck ec nasopharingeal cancer. It is simpler for the operator to plan measures that can be done to avoid tracheostomy difficulties caused by a short neck when the challenging patient variables are appropriately assessed before a tracheostomy is performed.

CASE REPORT

A 49-year-old male patient presents with the primary complaint of dyspneu since two weeks ago, when it was at its worst. His nasopharyngeal cancer diagnosis included enlarged lymph nodes.

A physical examination of the subject (height: 139 cm, weight: 38.8 kg) indicated a normal body mass index. sternomental length: 10.6 cm, neck extension: 5, and thyromental length: 6. Examination of vital signs when the patient is generally experiencing breathlessness (respiratory rate: 28 breaths per minute). A neck exam showed right-side enlarged lymph nodes at level IIb that were 6 x 5 x 1 cm in size, well-defined, motionless, and free of pain and inflammation. Additionally, there were left-side level IIb enlarged lymph nodes measuring 5.9 x 5 x 1 cm that were firm, well-defined, immobile, and showed no symptoms of inflammation or pain.

The chest X-ray revealed several coin lesions dispersed across the basal extra. Squamous cell carcinoma that has spread to the lymph nodes is seen as a neck lump on the right. A mass in the right nasopharynx that spreads to the right and intra-cranial superior nasal cavities may be seen during a CT scan of the nasopharynx with contrast. Cerebral edema and mass infiltration into the cranial base were seen on a head CT scan. The tracea appears after the curvement of the spina

Y. A. Dewi et al. (eds.), *Proceedings of the 19th Otorhinolaryngology Head and Neck Surgery National Congress (PERHATIKL 2022)*,
Advances in Health Sciences Research 68,
https://doi.org/10.2991/978-94-6463-280-4_24

on the ct scan image of the nasopharynx in a sagittal segment.
Adipose tissue is not excessively thick between the epidermis and the trachea. On the right and left sides of the submandibular, cervical soft tissue, the findings of the soft tissue Colli ultrasonography were SOL. His short neck ec nasopharingeal cancer was identified as upper airway obstruction (Jackson II), and an urgent tracheostomy would be scheduled.

Figure 1. Patient's clinical findings

Tracheostomy Procedure

On April 23, 2021, the surgery was completed with • To palpate the thyroid cartilage, cricoid cartilage, and supra sternal fossa protrusions, the patient is positioned supine with the shoulders raised with pads and the head hyperextended. acting aseptically and antiseptically in the operation room before being confined to a sterile doek. The thyroid cartilage, cricoid cartilage, and suprasternal fossa are marked on the front of the neck using a povidone-iodine solution. continuation of anesthetic infiltration in the operative space using a lidocaine compositum solution as a vasoconstrictor. Using the no. 15, a 4-5 cm long horizontal incision is made in the midst of the cricoid cartilage, suprasternal fossa, and medial m. sternocleidomastoideus (Jackson's triangle). Electrocautery and deep cautery may both stop bleeding. visible, but not too dense, fatty tissue on the surface. The incision wound was then gradually deepened with clamps until the platysma fascia could be seen, and then separated using a vertical cautery. To separate the strap muscles (m.sternohyoid and m.sternothyroid) using blunt clamps, the incision is enlarged vertically. The thyroid isthmus is visible, and it is then pushed upward with the right hand until two to three tracheal rings are discernible. Using a syringe with liquid lidocaine inside of it, aspirate the patient's trachea until water bubbles start to emerge. The nail, which serves as a marker and is kept in the trachea, is released along with the syringe. Remove the ETT tube by making a circular incision in the tracheal rings 2-3. The maindrain was withdrawn from tracheal cannula number 6, and an air passage test was carried out using a thread to make sure the cannula had entered the airway (result +). Examining emphysema symptoms by palpating the neck region. No evidence of emphysema was discovered. By extending the cuff, introducing an inner cannula, and stitching the margins of the incision with surgipro 3.0, fixation was accomplished. Betadine gauze was then wrapped over the stoma and the procedure was finished with strings.

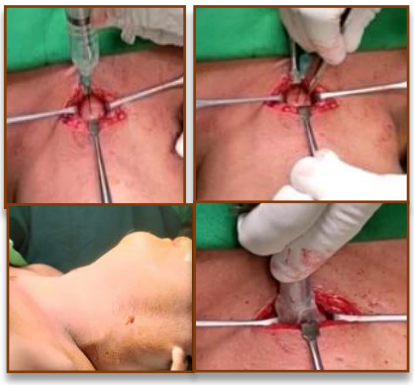

Figure 2. Tracheostomy procedure

METHOD

The keywords "tracheostomy in patient with short neck", "tracheostomy complications", and "upper airway obstruction" were used to search the PubMed, Web of Science, and Google Scholar databases to gather the literature review from books, research journals, and recommendations.

RESULTS

The trachea was difficult to expose and identify, the trachea canulla was difficult to place, there were no difficulties, the procedure went smoothly, and there was only minor bleeding.

DISCUSSION

The patient was 139 cm tall and weighed 38.8 kg when they first saw him. BMI = 20.08 after using the BB/TB2 formula to calculate it. The patient is categorized as normoweight according to the categorization. If a person is considered obese, their body weight may cause tracheostomy difficulties (BMI 25). Thus, the patient did not have tracheostomy difficulties brought on by obesity. However, Ni Nyoman, et al.'s study on the "correlation of neck circumference with presentation of body fat in obesity" discovered that during puberty, males store more fat in the upper body, namely the shoulders, the belly, and the neck. All adult people, both normoweight and more so overweight

persons, have fat deposition in this region. Men have more fat and soft tissue in the neck's anterior mandibular region and palatal segment than women, according to research from China. The difficulty of administering a tracheostomy on a short neck will increase if the patient has fat on the front of the neck. Before beginning a tracheostomy procedure, the operator should take into account how thick the neck fat is.8

Patients with short necks are those whose necks have a sternomental distance of at least 12 cm, a thyromental distance of less than 6 cm, and a neck extension distance of less than 5 cm. Sternomental distance was used to calculate the neck's neutral and maximum extension. The thyromental distance was calculated as the separation between the thyroid prominence and the mental apex at the point of maximum neck extension. The direct distance from the sternal manubrium to the mental top of the head in the most stretched head posture is used to calculate the sternal distance. The patient's neck extension was 5 cm, the sternomental distance was 10.8 cm, and the thyromental distance was 6 cm. The patient meets the short neck requirement according to the aforementioned parameters. According to a study by Indian researchers Vaibhav and Shaila, neck size is one of the evaluation criteria for the degree of difficulty in maintaining an airway, and among the three predictors, restrictions on neck extension have the most bearing. According to Sung Mi Hwang et al., a short neck is a predictor of tracheostomy difficulties. According to Tirbod Fattahi, et al. and Haesti Palupi in Semarang, the same viewpoint was also mentioned by various study publications in America.[4-5,11]

After a horizontal incision was created during the procedure, it seemed that the neck fat was not too thick. Therefore, a lipectomy is not required prior to tracheostomy. Since the distance between the skin and the trachea is not great, the no. 6 tracheal cannula with standard curvature is nevertheless thought to be acceptable for the tracheal anatomy and curvature of this patient. Lipectomy before tracheostomy would substantially assist the operator, according to Sung Mi Hwa in a case study titled "difficult tracheostomy tube placement in an obese patient with short neck."[5]

Jackson's triangle landmarks were used to conduct a horizontal skin type incision on the patient. In non-emergency situations, horizontal incisions are often used. They are more visually pleasing because they follow the lines of the skin folds, allow for greater exploration to locate the trachea, and prevent stress to the inferior thyroid v. According to Michael Friedman et al., diagnosis and management of inferior v. thyroid, which is often located in the middle of the tracheal surface, may avoid difficulties with bleeding.[12]

Up till the thyroid isthmus is seen covering the second and third tracheal rings, the incision is continued bluntly and vertically against the strap muscle and fascia. The second and third tracheal rings get a circular tracheal incision once the superior isthmus is opened. Circular incisions are appropriate and may be decannulated reasonably easily if necessary. It is possible to prevent spontaneous unintentional decanulation and the side effects of post-decannulation stenosis. As a case series journal by Hesti citing Prize D's statement in the "technique of tracheostomy for intensive care units" states, the use of a Bjork flap can prevent accidental decannulation and false route, which occur in many patients with short necks and obesity. However, some argue against this technique because it can increase the incidence of post-decannulation tracheal stenosis.[5]

In this patient, neither the procedure itself nor the post-tracheostomy consequences were complicated. According to Hesti, intraoperative and early postoperative problems are likely in individuals with short necks. Major and minor hemorrhage, mucosal plugs, unintentional decannulation, granulation tissue, subglottic stenosis, desaturation, and false passage are a few of the potential problems. Following a tracheostomy surgery, minor bleeding is the most frequent complication that might lead to clots in the tracheal cannula, necessitating surveillance for at least one full day. Accidental decannulation and false passage are the following difficulties that often happen. Due to the frequent intraoperative occurrence of these issues, extra care must be taken to prevent difficulties. These issues, nevertheless, did not exist in this patient.[5]

As a result of the trachea pars cervicalis' shorter location and tendency to be inferior and substernal, small necks are thought to be challenging to tracheostomy. This is in line with what Michael Friedman stated in the article "The Difficult Tracheostomy Simplified," which stated that the difficulty of performing a tracheotomy on a patient who has a substernal (below the sternum) tracheal ring has a significant impact on the success of the procedure. due to the constrained space between the sternal notch and the cricoid cartilage. In reality, in individuals with short necks, the upper tracheal ring on the substernal plane prevents direct access.[12]

The patient is positioned with the shoulder cushioned by approximately 10 cm so that the head may be hyperextended in order to get a suitable landmark. The thyroid cartilage will also grow more pronounced and the larynx and trachea will be in the right positions to be pushed up, positioning the landmarks for tracheostomy operation to be both visible and palpable. This is done in accordance with Susan R. Code, et al.'s assertion that distinct markers would make it easier for the operator to perform a successful tracheostomy and prevent any potential difficulties. Following the advice of Michael Friedman, Vaibhav, and Esra Ozayar, this method involves raising the shoulders while hyperextending the head, which causes the larynx and trachea to be superficially pulled up and pushed. However, if anomalies are discovered in the cervical spine, neck extension cannot be done.[7,10,13]

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