

PREVENTIVE BOUGIE PLACEMENT IN TREATING ASPHYXIA CAUSED BY HEMATOMA AFTER THYROIDECTOMY: A CASE REPORT AND LITERATURE REVIEW

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ABSTRACT

Introduction: *Dyspnea and asphyxia caused by incision hemorrhage after thyroid surgery is the most serious complication of thyroidectomy. It can be fatal if no proper measure is taken in time.*

Case presentation: *A 76-year-old woman was admitted to our hospital due to anterior cervical swelling. The disease has lasted for more than 40 years and swelling has been progressive enlargement in the past three months. Preoperative evaluation of airway showed that the anterior cervical swelling was of significant size and located in the center of the trachea. After thyroidectomy, we found that airway was partly blocked and jaw was clenched. Therefore, PFTT was directly re-intubated over the elastic bougie and mechanical ventilation was performed. After complete hemostatic treatment, the patient was kept intubated till the next day. No oozing of blood was observed. Both withdraw from the breathing machine and endotracheal extubation went well.*

Results: *The patient achieved stability, and she was discharged from the hospital upon recovery after 7 days.*

Conclusion: *In conclusion, the anesthetist should be fully skillful to amicably address relevant postoperative complications during thyroidectomy. The key factors for the management of hemorrhage after thyroidectomy include close observation, early detection and airway management.*

Keywords: *Bougie placement, asphyxia, hematoma, thyroidectomy, case report.*

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Introduction

Dyspnea and asphyxia are the most serious complications after thyroidectomy⁽¹⁾. If the rescue is not timely or the treatment is not appropriate, it can often endanger the life of patients⁽²⁾. Postoperative hemorrhage is the most common cause of dyspnea and asphyxia, which usually occurs within 24 h after surgery⁽³⁾. Patients often have neck swelling, progressive dyspnea, asphyxia and cyanosis⁽⁴⁾. Moreover, unskilled tracheal intubation,

tracheomalacia, tracheal spasm, bilateral recurrent laryngeal nerve injury, side effects of drugs and postoperative pulmonary infection are also possible causes⁽⁵⁾. While dealing with patients who have an anticipated difficult endotracheal intubation or the same past medical record, it is advisable to insert a gum elastic bougie prior to extubation⁽⁶⁾. In this report, we described a case of a patient with asphyxia caused by massive hematoma after thyroidectomy. The patient was successfully treated with preventive bougie placement.

Case report

A 76-year-old woman, 145 cm in height and 36 kg in weight, was admitted to our hospital due to anterior cervical swelling. The disease has lasted for more than 40 years and swelling has been progressive enlargement in the past three months. There were several palpable lumps in size ranging from about 2×2 cm to 10×4 cm on both lobes of thyroid. There were comparatively typical pathological features characterized by smooth, clearly defined surfaces and no infiltration into nearby tissues. The lumps had vertical movements during deglutition without pressure symptom. DR chest X-ray showed emphysema and right thoracic scoliosis in the elderly. Doppler ultrasound demonstrated multiple thyroid nodules, so the patient may have the possibility of nodular goiter. Computed tomography (CT) scan showed multiple space-occupying lesions and diffused goiter. Therefore, we decided to perform thyroidectomy on this patient. Based on these findings, the possibility of thyroid adenoma combined with retrosternal extension was considered for the patient. As the patient was in good condition, total thyroidectomy and bilateral recurrent laryngeal nerve exploration were performed after General anesthesia. Preoperative evaluation of airway showed that the anterior cervical swelling was of significant size and located in the center of the trachea. When the opening diameter of the mouth was 3 cm, deformities were found, including maxillary protrusion (commonly known as “bucktooth”) and one missing tooth in the lower jaw. Moreover, her Mallampati Grading was III, which showed that her airway was an intricate one.

Before operation, equipment, including anesthesia machine, suction device, laryngeal mask, glide scope video laryngoscope (GSVL), lightwand and tracheostomy suite, were prepared. Induction of anesthesia was achieved with 0.15 mg of fentanyl, 60 mg of Propofol and 4 mg of vecuronium by intravenous injection. 7.0# Parker Flex-Tip Tube (PFTT) was intubated orally with the help of light wand, and the process went well. Anesthesia was maintained concurrently with 4-6 mg/kg/h of Propofol, 0.1-0.2 µg/kg/min of Remifentanyl by intravenous injection and 1.0 MAC of sevoflurane. The surgery lasted for 2 h. After operation, the patient was shifted to postanesthesia care unit (PACU) with endotracheal tube. After 1 h, the patient's spontaneous breathing and consciousness recovered, and the chest movement was completely

normal. In view of the long-term recurrent laryngeal neuropathy during the operation, including complex recurrent laryngeal neuropathy, 2% lidocaine was used for tracheal surface anesthesia through tracheal intubation, and elastic probe was inserted at a depth of 30 cm. Once extubation, the patient immediately becomes restless and dyspnea. Suction drainage was performed around the incision, and 100 ml dark red liquid was discharged.

The patient's underjaw was lifted up and oxygen was pressurized with mask. We found that airway was partly blocked and jaw was clenched. The possibility of laryngotracheal oedema caused by surgical manipulation was considered, 8 mg of dexamethasone and 60 mg of Propofol were given intravenously, then oropharyngeal airway was placed. At the same time, facial cyanosis occurred. Haematoma was considered, and compression bandage was removed and the anterior cervical swelling extended to the lower jaw (Figure 1).



Figure 1: The anterior cervical swelling extended to the lower jaw.

PFTT was directly re-intubated over the elastic bougie and mechanical ventilation was performed. When vital signs were stable, the surgeon immediately cleared out the incision suture (Figure 2), and the blood ejected from the incision was over 1 m in height. After 30 s, the patient's facial color turned normal. The patient was shifted to the operation room to perform bleeding within a few minutes, and it showed that the bleeding site was thyroid arteriole. After complete hemostatic treatment, the patient was kept intubated till the next day.

No oozing of blood was observed. Both withdraw from the breathing machine and endotracheal extubation went well. The patient achieved stability, and she was discharged from the hospital upon recovery after 7 days (Figure 3).



Figure 2: Surgeon immediately cleared out the incision suture.



Figure 3: State of the patient at discharge.

Discussion

Postoperative hemorrhage is one of the most serious complications of thyroidectomy, which is fatal. It has been reported that the incidence rate was between 0.1% and 6.5%. However, it is commonly reported to be approximately 1%, and it happens between 6 to 24 h after operation⁽⁷⁻¹⁰⁾. The damage degree depends on the size, speed and volume of hemorrhage. Hemorrhage after thyroidectomy within the closed gaps of deep cervical fascia will lead to hematoma characterized by cervical swelling and ecchymosis. Subcutaneously, the bleeding could spread upwards into the lower jaw and downwards into the upper chest. The former might hinder the facial blood circumference and the latter might oppress the trachea, so that symptoms, including symmetrical cervical swelling, facial cyanosis, airway obstruction, progressive dyspnea and severe life-threatening hypoxia, would occur. In our case report, when the tracheal tube was removed, the

patient instantly became restless and presented similar symptoms. The elastic bougie (Figure 4), such as laryngeal mask and Broncho fiberscope, is a convenient and effective method that greatly reduces risks of difficult tracheal intubation⁽¹¹⁻¹³⁾.



Figure 4: The elastic bougie used in treating complication after thyroidectomy.

Elastic bougie is made of polyethylene with the diameter of 5 mm and a length of 60 cm. The 2.5 cm section at the front end is molded into a 35-degree angle like the letter J, and the tip head end is a smooth. Since polyethylene has a certain level of suppleness, this endotracheal tube bougie is quite flexible. Currently, if an elastic tracheal tube bougie with proper size is placed before the tracheal tube is removed with difficult airway, an airway passage could be secured. In the future, when another tracheal intubation is necessary, this elastic bougie could be used as an introduction tube.

The elastic bougie should be fully lubricated with sterile paraffin before use. The insertion depth of the tracheal tube (the corresponding scale of a tracheal tube where a patient's incisor is placed) was observed and the total useful length of tracheal tube was measured. The total effective length of the endotracheal tube is exactly the expected depth of the elastic bougie, which should be marked on the exterior of the tracheal bougie. Generally, we don't recommend an insertion depth of over 30 cm. In order to prevent irritant swelling and reduce irritant coughing and chokes, 3~5 ml of 2% Lidocaine should be administrated through the trachea to perform surface anesthesia, which improves the patient's tolerance towards the bougie placement. After removal of tracheal tube, the patient was kept under observation to assess whether there are signs

of hypoxia or airway obstruction. If there is such a situation, measures should be taken accordingly, including clearing out oropharyngeal secretions, placing in oropharyngeal airway and lifting aloft the lower jaw. After 10 min, the patient is fully conscious and responsive to verbal commands without discomfort, and the bougie can be safely removed. In this particular case, the postoperative asphyxia was successfully managed by placing an elastic probe before extubation. It is timely to judge that there was postoperative hemorrhage, which oppressed blood vessels and caused hypoxia and breathing difficulty. There were also significantly compromised in both facial and thoracic blood circumfluence. PFTT was immediately reinserted into the patient through the elastic bougie to facilitate mechanical ventilation, and at the same time, the hemorrhage zone was decompressed by surgery to remove accumulative blood and thrombus.

Another important factor for the success of the second intubation is the optimal choice of endotracheal intubation. PDF, as shown in Figure 4, is the soft-tip micro-invasive tracheal tube, which is commonly known as "Eagle moon" tube (Figure 3). The head end of an ordinary tracheal tube is a slope that inclines to one side, and the head end of the "eagle mouth" tube is a J-shaped curve. The frontal surface is convex, and the curve starts with a narrow tip and gradually widens. There are small holes on both sides of the front end of the trachea, which reduce the gap between the elastic probe and the inside of the tube, theoretically improves the success rate of intubation, and plays a leading role in the whole tracheal intubation⁽¹⁴⁾.

Conclusion

In conclusion, the anesthetist should be fully skillful to amicably address relevant postoperative complications during thyroidectomy. When operating on patients with a long medical history of thyroid nodules, the anesthesiologist should be alert and be prepared for any possible consequences.

When nursing after anesthesia, it is recommended to place a preventive elastic probe or switch the tracheal tube in advance. Pay attention to observe the volume, color and drainage speed of blood in the suction bottle, and observe whether there is bleeding or swelling of neck incision. After tracheal extubation, the vital signs of the patient must be closely observed to judge if there is any discomfort such as dyspnea. The elastic probe

should be removed or the endotracheal tube should be changed only when the patient has no discomfort. The key factors for the management of hemorrhage after thyroidectomy include close observation, early detection and airway management.

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QC and GZ designed the case report study. WM and FL performed the case report. CW participated in the case analysis. QC wrote the manuscript.

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