

## Case Report

# Airway management in a case of expanding neck hematoma after carotid endarterectomy

Masih Ebrahimi Dehkordy<sup>1</sup>, Faranak Behnaz<sup>1\*</sup>, Shayesteh Khorasanizadeh<sup>1</sup>, Homeyra kouzekanani<sup>1</sup>, Naeimeh Gholizadeh<sup>1</sup>

<sup>1</sup>Department of anesthesiology, Shohada Tajrish hospital, Shahid Beheshti University of Medical Sciences, Tehran, Iran

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## Abstract

**Background:** Respiratory obstruction is a fatal complication following carotid endarterectomy, which caused direct compression of trachea secondary to venous and lymphatic congestion.

**Cases Report:** In this study, we report a complicated case of carotid endarterectomy that required emergency intubation in difficult circumstance due to progressing hematoma and soft tissue edema.

**Conclusion:** we report a case of hematoma and edema causing compromised airway following carotid endarterectomy (CEA), in which quick action to decompress the hematoma and prepare a secure airway lead to successful outcome.

**Keywords:** Difficult airway, Neck hematoma, Difficult intubation

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\*Corresponding Author: Faranak Behnaz. Email: faranak.behnaz@gmail.com

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## Introduction

One of the most important frequent complications after carotid endarterectomy (CEA) is respiratory obstruction, which may happen due to expanding hematoma or soft tissue edema or a combination of both in neck<sup>1-3</sup>. We present an expanding hematoma associated with soft tissue hematoma after carotid endarterectomy in a case who had taken anticoagulant agents due to recent transient ischemic attack (TIA).

## Case Report

A 68 year old male with a past medical history of hypertension and ischemic heart disease who was being treated by Clopidogrel 75 mg, Losartan 25 mg

twice a day and 80 mg Aspirin daily. Recently he experienced from a TIA.

He was admitted for right CEA, having suffered from 2 times of TIA during last 3 months, while carotid angioplasty with stent placement was carried out unsuccessfully. His head and neck CT angiography revealed a severe proximal right internal carotid artery (ICA) stenosis of greater than 80% and a proximal left ICA stenosis of 70%.

His preoperative blood pressure measured by noninvasive method was 170/105 mmHg and intra-operative invasive measurement of blood pressure was about 140/90 mmHg. He was hemodynamically stable during surgery.

Right carotid artery endarterectomy was done uneventfully. After surgery, he transferred directly to

the intensive care unit (ICU). Seven hours after surgery in ICU, patient complained from dyspnea and tachypnea. Tracheal intubation was planned due to severe respiratory distress and tachypnea. Intubation was tried under direct Laryngoscopy, which was unsuccessful due to massive hematoma and edema, but fortunately, patient was ventilated by mask. After second unsuccessful try for intubation, patient was ventilated by mask. At this time, a number 4 laryngeal mask was inserted successfully and his O<sub>2</sub> saturation increased again. Simultaneously, a general surgeon removed sutures and 80-100 cc of clots and hematoma was decompressed. Patient transferred to the operation room urgently. Then the site of incision was explored and evaluated. Residual clots and hematoma was removed. Suddenly, something happened in the patient's airway, which caused insufficient ventilation, and the airway resistance increased dramatically, then O<sub>2</sub> saturation started to decrease again. Now, endotracheal tube passed by force through an edematous airway under direct Laryngoscopy. We heard a pop sound, which shows there was trapped air inferior to the larynx. Operation finished uneventfully and patient transferred to ICU. Two days later he was discharged from hospital with good general condition.

## Discussion

Airway obstruction due to cervical expanding edema and hematoma following carotid endarterectomy is not common, but when it happened, it may be a life-threatening event and it would be difficult to manage<sup>4,5</sup>. In our patient urgent evacuation was needed to decompress the hematoma. According to the literature, evacuation of hematoma did not immediately relieve airway obstruction. Therefore, at least 10 hours of mechanical ventilation is recommended in these patients after drainage<sup>6</sup>.

Our patient has been taking anticoagulant agent until the day (Plavix) before surgery. Many studies showed that patients who continued Clopidogrel until the day before CEA are at increased risk of expanding hematoma after surgery. Therefore, some surgeons prefer to discontinue antithrombotic medications (AM) before surgical procedure, fearing the risk of preoperative bleeding whereas others

prefer that patients take these agents to prevent thromboembolic and neurologic events preoperatively, despite the higher risk of bleeding after surgery<sup>7-9</sup>. In a 2007 audit on the United Kingdom community of vascular surgeons' evaluated Clopidogrel use at the time of CEA procedure, It showed that 52% of surgeons discontinued Am before surgery and 51% administered no alternative drug, but rest of them replaced it with Aspirin<sup>8</sup>. Risk factors associated with hematoma formation after CEA include no reversal of Heparin, intra-operative hypertension, postoperative hypertension, a preoperative Aspirin consumption, general anesthesia and the use of a shunt<sup>11</sup>.

Intra-operative blood pressure in our patient was about 140/90 mmHg, he had no history of Heparin no reversal, but positive history of preoperative Aspirin use. Operation and shunting were done under general anesthesia.

One of the agents that have been recommended prophylactically after prolonged neck surgery in order to decrease soft tissue edema is Dexamethasone<sup>10</sup>. In our patient, it was administered after decompressing hematoma. One of the most important factors that might cause formation of hematoma or soft tissue edema is post-operative hypertension, which might be caused by carotid body stimulation, pain or neurological insult. Prevention and rapid management of severe hypertension is necessary to avoid subsequent complications. In our case, postoperative blood pressure was kept in normal limitations.

In emergency, evaluation of airway may be difficult and life-threatening deterioration is frequently sudden with least warning signs. Our patient started mild dyspnea 7 hours after surgery and soon it progressed to airway obstruction and subsequently compromised airway.

In order to avoid catastrophic result of respiratory obstruction due to completely compressed airway, aggressive and immediate management of neck swelling with early surgical intervention is recommended. Although airway management is the main study of cervical expanding hematomas, there is a risk of hemodynamic deterioration due to baroreceptors reflex, which should be considered<sup>12</sup>. Sethi et al., in their study showed that severe hematoma after anterior cervical spine surgery caused severe hypotension and bradycardic after intubation

and sufficient ventilation. It was suggested that this situation was due to mass effect of hematoma on the carotid sinus, which caused baroreflex and hemodynamic instability and solved by evacuation of hematoma<sup>13</sup>.

In another study, Yu et al, reported partial hematoma decompression under local anesthesia in order to ease intubation in their patient, successfully<sup>14</sup>. In our case, early hematoma decompression was done in ICU.

Evaluation of such hematoma under local anesthesia reported successfully. In cases of airway obstruction, documented management strategies include, inhalational induction, awake fiber optic intubation, although these methods require a skilled hand. Anatomical distortion, venous congestion and secretions may impair operator's vision.

Both retrograde intubation method and making a surgical airway in the swollen neck may be so dangerous and difficult. During rapid sequence, induction may result in unexpected difficult airway and it may be hard to pass the tube through the larynx. In a study which reports 6 similar cases, in 4 patients' inability to ventilate the lungs happened, all suffered severe hypoxia and cardiac arrhythmias<sup>15</sup>. In our patient, we had to insert a laryngeal mask after second unsuccessful try for tracheal intubation but at last, tracheal intubation was done by force in operating room when laryngeal mask became insufficient for ventilation.

## Conclusion

Airway obstruction due to expanding hematoma and soft tissue edema is a lethal complication of CEA. This is a challenging airway emergency which needs well-prepared approach. Here we report a case of hematoma and edema causing compromised airway following CEA, in which quick action to decompress the hematoma and prepare a secure airway lead to successful outcome. In these circumstances specialized management and careful approach is necessary. All medical staff should be aware of this potential complication to respond quickly and

effectively as it occurs.

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