

AIRWAY MANAGEMENT IN HEAD AND NECK CANCER SURGERY

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ABSTRACT

The anesthetic plan must be discussed and personalized for each patient. The anesthesiologist must identify and find solutions for the main perioperative issues which may occur due to this type of surgery. One of the most important issues is the permeability and securing the airways, followed by establishing the right time after the surgery for a safe intubation removal. The interventions are prolonged with complex techniques and an important risk of bleeding.

Keywords: Difficult intubation, difficult ventilation, head and neck cancers

Malignant or benign tumors of the cervico-maxillo-facial region have a high level of difficulty for the anesthesiologist due to the high density of structures in a relative restricted area and due to the operating room being shared with the surgical team. Among all the types of surgical interventions, those related to the oro-maxillo-facial area have the highest incidence of possibly difficult intubation (1). This is the reason why it is extremely important to have a thorough preoperative, clinical and imagistic assessment in order to set out the instrumentation strategy of the airways. (2). The anatomical and physiological changes of patients with head and neck cancer make difficult the management of airway during the perioperative period (3).

The patients with neoplasms located at head and neck level are subject to some very complex surgical procedures carried out

under general anesthesia (hemi-mandibulectomy, parotidectomy, maxillectomy, glosso-pelvi-mandibulectomy, radical dissections of the cervical regions, reconstructive surgery with muscular or tegument flaps), interventions with long operating times and high risk of bleeding.

Neck and head neoplasms are the sixth most frequent cause of death due to cancer worldwide. There is a geographical variety of incidence given by tobacco and alcohol consumption or by local nutritional habits. At global level, over 600.000 new cases are diagnosed each year, 66% of the cases being in stage III or IV with about 300.000 death per year. (4,5) The incidence is increasing at global level with a mortality estimated at 595.000 death per year until 2030. (6) The prognosis is given by the stage and the

location of the neoplasm but also by the presence of associated comorbidities. (7).

The patient typical for the oncological head and neck surgery is elderly, chronic consumer of ethanol and/or a smoker. (8) The assessment of the associated pathology may highlight the following comorbidities: obstructive chronic broncho-pneumopathy, pulmonary emphysema, ischemic coronary disease, high blood pressure, chronic hepatopathy with toxic etiology, coagulopathies associated with the oncological status. The locations of tumors leading to discomfort or the impossibility for deglutition lead to important nutritional disorders with weight loss, anemia, dyselectrolytemia. All these changes of the paraclinical picture must be corrected as much as possible in the preoperative stage.

A difficult airway is due to the tumor itself which may occupy partially the lumen or may determine extrinsic compression by volume. Preoperative radiotherapy, meant to decrease the size of the cancer, has adverse effects such as the onset of a degree of local fibrosis but also an increase of vascular fragility.

The potency of the airway is assessed during the pre-anesthetic consultation. It is mandatory to identify a possible dysphonia, dyspnea, inspiratory stridor, sibilant rales, wheezing, limited degree of neck movement and mouth opening as well as by directly viewing the tumor in the mouth, on the tongue or in the throat. The information is corroborated with the information obtained by the surgeon by specific examinations completed with fiberoptic and imagistic assessment.

A neoplastic perioral or peri-glottic development may render impossible ventilation with facial mask. The exophytic tumors are friable with a risk of breaking, dislocation or fracture during laryngoscopy, with a predisposition for bleeding due to the phenomena of angiogenesis. It is absolutely necessary to assess the extension of the neoplasm in order to identify the possible difficulties in carrying out the laryngoscopy and the intubation. (9).

The following options may be applied in the management of a possible case with a potential of supraglottic airway obstruction: orotracheal or nasotracheal intubation in a conscious patient by using various devices (laryngoscope, bougie, fiberoptic, video laryngoscope, bronchoscope), antero- or retrograde intubation, inhalational agent and rapid sequence induction, cricothyroidotomy – elective tracheotomy with local anesthesia of a conscious patient in spontaneous respiration. The low tolerance to hypoxia of such patients given by the pathology with respiratory predominance, associated with a high probability of dislocation of some tumor fragments during the intubation maneuver, with consecutive bleeding and with possible pulmonary aspiration compels the anesthesiologist to a high degree of carefulness.

The anesthetic technique must be individualized depending on the particularities of the patient but also depending on the communication with the team of surgeons as the intubation is made in the most adequate way depending on the type of the surgery. The nasotracheal intubation is elective in the interventions of the oral cavity or in those where a

postoperative inter-maxillary immobilization is absolutely necessary(2). If the surgical intervention involves important muscle resections in order to support the airways, tracheostomy becomes mandatory.

Awake Airway Management

The safest plan for a patient needing a possibly difficult endotracheal intubation is that the patient should be intubated before the induction of the general anesthesia.

Awake intubation requires good analgesia of the airway and this can be achieved with a nerve block and/or topical anaesthesia. Nerve blocks are frequently contraindicated by the presence of tumour in oral cancer patient(10).

The intubation with optical fiberscope in a conscious patient is the elective technique for the cases of difficult airways (11,12) which can be made both via the nose and via the mouth. For the elective approach of a difficult airway, we use intubation as a first choice before the visibility of the airway to be compromised due to the blood, secretions or edema. It is necessary to be aware of the following case: decreasing the posterior pharyngeal space may make the passing of the fiberscope difficult (12). Coughing and straining during awake intubation may cause trauma and bleeding from a tumour further worsening the condition.

A few practical steps must be observed in fiber-optical intubation via the nose in a conscious patient. A great importance must be given to the psychological preparation accompanied by informing the patient in connection with the adopted technique and how it is done, especially as the success of the maneuver depends on the immediate

cooperation of the patient. The administration of the pre-medication must be adapted to the conditions and the state of the patient. The administration of medication with analgesic-sedative effects leads to the increase of comfort and tolerance of the patient and it is advised to avoid medication that induce apnea until securing the airways (13). The mandatory condition is for the patient to maintain spontaneous ventilation during the entire maneuver and the oxygenation of the patient must be improved before and during the maneuver.

A tracheostomy is the most secure method to prevent an airway obstruction after the surgical treatment of head and neck cancer. The elective tracheostomy in a conscious patient is an option when oro- or nasotracheal intubation is not possible or advised as it is the standard approach in a major surgical intervention for oral cancer with reconstructive tissue transfer (14).

The tumors located in the larynx or below the glottis with obstructive effect, laryngeal stenosis or significant supraglottic edema are cases mandating tracheostomy as an approach method of the airways.

Tracheostomy should not be taken into account or made in pediatric patients due to the following reasons: the trachea is small with a soft cartilage and difficult to palpate. Moreover, cooperation with the patient is almost impossible in many cases. Obesity with the increase of the neck's circumference determines a more difficult identification of the anatomical landmarks.

The radiotherapy of the tumor formations at neck and head level results in distortions of the local anatomy with some difficulty in

identifying the anatomical landmarks, which increases the incidence of elective tracheostomy. (9)

The benefits of tracheostomy need to be balanced against its risks. We also have to take into account the high rate of complications associated with tracheostomy, as the reported complications are from 8% to 45%. (15-17). Such complications include bleedings, lesions near the structures, surgical emphysema, pneumothorax or pneumomediastinum, blocking of the tracheostomy cannula, cannula displacement, tracheitis, cellulitis, atelectasis, fistulas (tracheo-esophageal, trachea-cutaneous), tracheomalacia, granulations, excessive scars, decannulation (18).

Tracheostomy was a method used more in the past in order to maintain the airways of patients with a radical surgical attitude; however, its necessity becomes debatable given the increased morbidity associated with the procedure and the negative impact on the deglutition function, speaking and the life quality of the patient (19).

A viable alternative for tracheostomy is maintaining the patient with a nasotracheal intubation for 24-48 h after the surgery (20). Maintaining intubation for 24-48 h postoperatively has been adopted for less extensive head and cancer surgeries to avoid a tracheostomy. If there is a possibility of having to maintain the endotracheal tube for more than 2 days, elective tracheostomy is recommended. However, it is difficult to decide which management is best for specific situations. The experience of the operator is still the most important factor in making the

decision whether to perform a tracheostomy or not (21,22).

The complications of the tracheal intubation using the new materials and techniques are less likely if the intubation period is less than 48 h after the surgery. (23) Another advantage of the nasotracheal intubation is resuming the communication with the patient considerably improving his/her quality of life. The prolonged surgical intervention near the airways with reconstruction by flaps may trigger an edema around the airways making even more difficult to detubate the patient. (10,24).

It is very difficult to manage a postoperative compromised airway. If there are some emergency situations, emergency intubation is difficult due to edema and bleeding in the oral cavity and neck. Usually in that situation, the patient is not under sedation or there is not enough time for sedation or to bring the patient to an operation room. Even a tracheostomy is difficult in these emergency situations. It is generally known that complications are more frequent in tracheostomies performed under emergency conditions (17). If a patient has a possibility of compromised airway postoperatively, elective tracheostomy can be considered as a secure choice of treatment (25).

Tumor location and extent of tumor resection are crucial factors in determining the extubation timing. This maneuver must be used at the right time after the patient is fully awake, when there is not risk of obstruction by bleeding, hematomas or edemas (26).

Conclusions

The patients with neoplasms located at head or neck level have airways which are potentially difficult to intubate but they also

associate important pathologies with an impact on the perioperative management.

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