Complications in Laser Laryngeal Microsurgery

단국대학교 의과대학 이비인후과학교실
정 필 상

Complication

Airway fire
Endolarygeal bleeding
Perichondirits or chondritis
Granuloma
Surgical emphysema
Stenosis and Web formation
Postoperative edema
Swallowing problems : aspiration

Airway Fire

extremely rare
potentially the worst complication
ignition source+fuel+oxidizer → initiation and propagation of fire
Source : electrosurgical unit, laser
Fuel : ETT, pledget

Table 3
Surgical scenario where OR fire took place

Surgical scenario	%	n
Endoscopic airway surgery	27	27
Oropharyngeal surgery	24	24
Cutaneous/Transcutaneous surgery	23	23
Tracheostomy	18	18
Light cord melted drapes	7	7
Anesthesia machine caught fire	1	1
Total	100	100

Table 4
Ignition sources and fuels involved in reported fires separated by surgical scenario during which the fire occurred

Endoscopic laryngeal or airway surgery					
Ignition source		Fuel		Oxygen	
Carbon dioxide laser	22	ETT	15	Yes	25
Potassium-titanyl-phosphate laser	3	Flash	5	No	2
Other laser	1	Suction tubing	3		
Light cord	1	Pledget	2		
		Tracheostomy	1		
		Light cord	1		
Total	27	Total	27	Total	27

Airway fire - prevention

Use of laser-safe tube : checked distal tip of the ETT, methylene blue-stain saline
Airway/ventilation technique : concentration of oxygen ↓ (below 30% FiO_2) intermittent endotracheal intubation
Reduced flammable materials : cottonoid pledgets

Airway fire - management

Extract : immediately remove combustible material (ETT, pledgets)
Eliminate : shut-off oxygen
Extinguish : any fires that may still be present because of residual material in the airway need to be extinguished by saline fiush
Mask ventilate with 100% O_2 → reintubate as soon as possible
Pulmonary care : consider positive end-expiratory pressure (PEEP), continued ventilatory support
High-dose steroid (1mg/kg)
Evaluate : perform bronchoscopy to document the degree and extent of thermal damage as soon as possible → removed debri

Endolarygeal Bleeding (Postoperative Hemorrhage)

Most frequent, dangerous complication after laser surgery
Large tumor, risk of vascular complication, injury of ICA : risk ↑
Most bleeding occurred in the 48 hours after surgery
Prevention : adequate meticulous preparation technique+microscopically controlled intraoperative hemostasis

Preoperative measure

Bleeding tendency : warfarin, aspirin, clotting abnormality
Tumor extension : large vessel
Vascular abnormality

Intraoperative measure

Prophylatic electrocautery of feeding vessels : pharyngoepiglottic fold ligation EAC for OP on hypopharyngeal carcinoma

Watch out for lateral pharyngeal wall:pushed medially from the outside with finger

Intraoperative Hemostasis

Minimizes the risk of secondary hemorrhage

Small vessel in vocal cord : small piece of gauze (epinephrine) monopolar cauterization was avoided

Suction diathermy, coagulation forceps

Vascular clip : bleeding from large vessel or arterial vessels

Postoperative hemorrhage

Location : posterolateral, just anterior to arytenoid cartilage above and lateral to sup. edge of the thyroid cartilage

Pressure from outside or manipulating the tissue from inside → provoke bleeding

Vascular clip, ligation of ECA : if needed

Temporally tracheostomy : high risk of bleeding

Perichondirits or Chondritis

Laser dermal devitalization

Mucosa damage -> cartilage was exposed -> local infection

Treated by laser surgical ablation of necrosis and by antibiotic treatment

Granuloma

Product of trauma of the mucosa

Granulation tissue formation : mechanical trauma (surgical manipulation) +LPR

Self-limited : proton pump inhibitors

If needed, endotracheal laser surgery

Surgical Emphysema

After resection of carcinomas of the ant. commissure and subglottis → penetration of cricothyroid ligaments

Tracheostomy : not necessary

Resorbed spontaneously

Prophylactic method : neck compression bandage

Stenosis and Web Formation

After extensive and repeated surgery for local recurrence

Involved anterior glottic commissure

Prevention : keel insertion, mitomycin C

Treatment : laser microsurgery, mucosal graft

Postoperative Edema

Edema of arytenoid area

− ressection of pyriform sinus+ressection line runs sup. to arytenoid cartilage with preservatioarytenoid, postcricoid area mucosa

− extensive partial resection of larynx including arytenoid+ preservation pyriform sinus mucosa

Iv cortisone ——————→ laser microsurgery

Difficulty : visualize at microlaryngoscopy, risk of removing too little if the mocosa is not held

Swallowing Problems : Aspiration

Extent of the tumor resection : inclusion of arytenoid cartilage and tongue base

Sometimes needed a temporary tracheostomy

Developed pneumonia

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