

Complications of Formaldehyde Injection for a Cystic Mass of the Neck

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Case Report

Abstract

Formaldehyde is a colorless reactive chemical with suffocating and pungent odor. It is irritant to mucous membranes and can enter the body by either oral ingestion or inhalation. Formaldehyde is toxic to living tissue. In this

report, we present the case of a 22-year-old woman who was treated with formaldehyde injection for a cystic mass of the neck with developing complications.

Keywords: Formaldehyde, neck, cyst, complication

Introduction

Formaldehyde is a colorless, pungent reactive chemical with a heavy and unpleasant odor. The substance occurs naturally in the environment, and most living organisms, including humans, make small amounts as part of their normal metabolic processes. It is also used in many areas from industrial to household goods to dental veneer applications to preserving cadavers in laboratories (1-3).

Exposure to formaldehyde may occur by oral intake or inhalation, and the substance has toxic effects on the digestive system, the respiratory system, the skin and the mucosa. Intense exposure to formaldehyde can cause irritation in the airway, cough, itching and watering in the eyes, nasal itching, drainage, congestion, and sore throat as well as headache (4). While the words formaldehyde and formalin are often used interchangeably, formalin is an aqueous solution containing 37-40% formaldehyde (1-4).

In this article we discuss the case of a patient who presented with complications following a formaldehyde injection for the treatment of a cystic tissue on the neck, and the method used for remedying the complications.

Case Report

The 22-year-old female patient presented with vomiting and a swelling to the right side of the neck. One month earlier she had been preliminary diagnosed with and treated for a cystic mass in an external center, where the cyst was drained with a syringe and then injected with 3 cc of 10% formaldehyde.

The patient had severe vomiting at the time she presented to our clinic. Her physical examination showed a stiff mass involving the mid- and upper section of the right neck. Her tongue was deviated to the right side and her right vocal cord was paralyzed. Magnetic resonance imaging (MRI) of the neck revealed the presence of a mass adjacent to the carotid artery, pushing the submandibular gland forward. The central section of the mass displayed a dense cystic structure with air-fluid level, and there was a mass lesion of 5x4 cm compatible with the dense inflammatory soft tissue around the cystic structure (Figure 1). Wall thickening was observed around the carotid artery. No flow was observed in the jugular vein. Inflammation and enhanced contrast was observed in the adjacent sternocleidomastoid muscle. Soft tissue planes were edematous. There were multiple lymph nodes in the cervical chain. The patient was hospitalized



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Cite this article as: Çaylaklı F, Yılmaz İ, Alkan Ö. Complications of Formaldehyde Injection for a Cystic Mass of the Neck. Turk Arch Otorhinolaryngol 2018; 56(2): 122-5.

This study was presented at the 38th Turkish National Congress of Otorhinolaryngology Head and Neck Surgery, October 26-30 2016, Antalya, Turkey.

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Received Date: 03.01.2018

Accepted Date: 29.03.2018

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DOI: 10.5152/tao.2018.3168

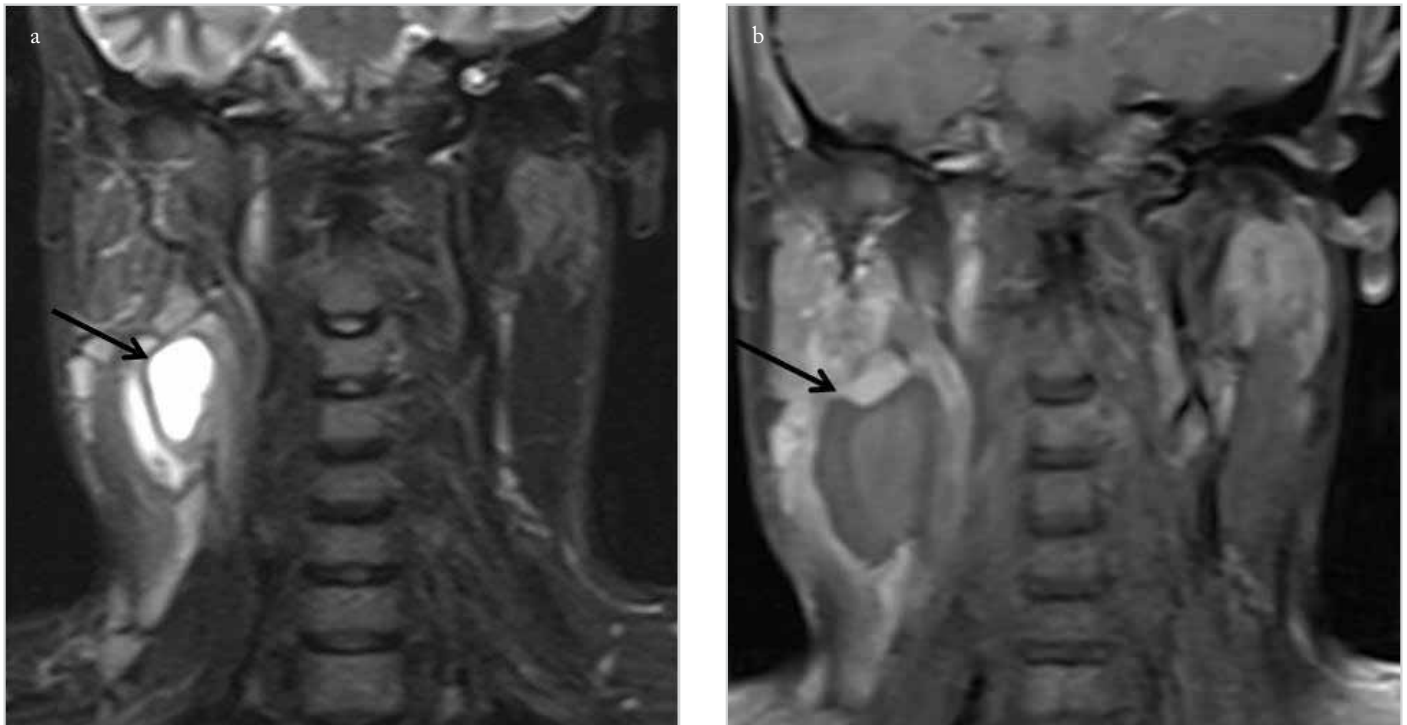


Figure 1. a, b. Preoperative fat-suppressed T2-weighted (a) and contrast-enhanced fat-suppressed T1-weighted (b) coronal MRI sections of neck show necrotic tissue and fluid collection in the right carotid space, and inflammation of the adjacent soft tissues



Figure 2. a, b. Excision of necrotic tissue (a), excised necrotic tissue (b)

and started on medical treatment with antibiotics, anti-inflammatory, antiemetic and anti-reflux medication.

Presence of a densely inflamed cystic structure in radiological findings suggested that the formaldehyde solution had penetrated the interstitial space during injection and caused disseminated inflammation. Total excision of the inflamed tissue was deemed suitable and decision was made for surgery. After the vomiting stopped and her overall condition improved, a wide excision including the mass was performed on the right neck (Figure 2). Following an uneventful surgery, histopathological examination reported infective cystic lesion and necrotic tissue. In the follow-up examination two months after discharge the patient's overall condition was good and her tongue movements were natural and symmetrical, both vocal cords were mobile.

Follow-up MRI of the neck demonstrated that the necrotic cystic mass was totally excised and the inflammation in the adjacent tissue had significantly diminished (Figure 3).

Discussion

Formaldehyde is often used in histopathology laboratories to perform a fixative function in non-viable tissues. The substance can enter the body by oral intake or by breathing and has a highly irritant effect on mucous membranes. When taken orally it is rapidly metabolized to formic acid and leads to metabolic acidosis. Exposure to formaldehyde can lead to cardiovascular shock, unconsciousness, gastrointestinal hemorrhage, dyspnea, cyanosis, and cardiac arrhythmia (4). Studies demonstrate that oral intake of 50 to 100 mL formaldehyde will lead to fatal consequences (3, 4).

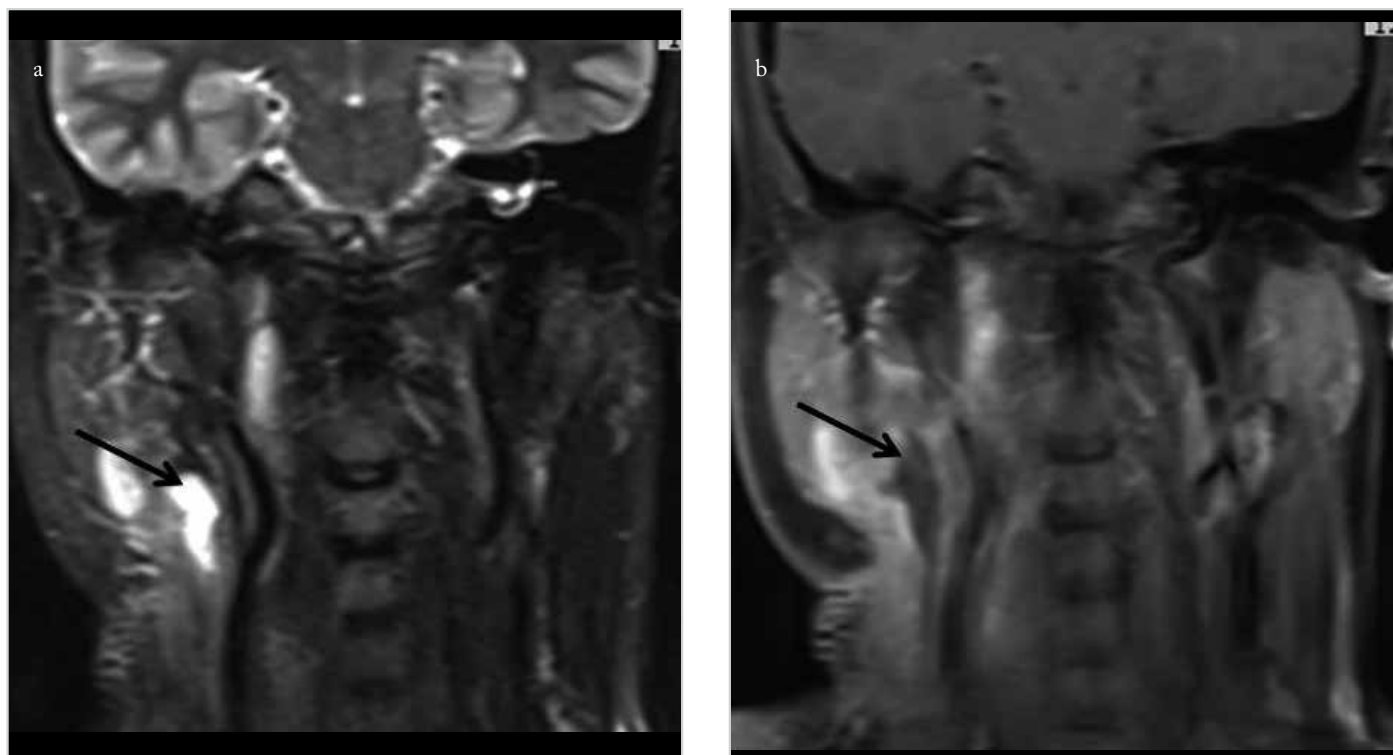


Figure 3. a, b. Postoperative fat-suppressed T2-weighted (a) and contrast-enhanced fat-suppressed T1-weighted (b) coronal MRI sections of neck reveal reduction in necrosed and inflamed areas

In an event of toxicity, there is no antidote for formaldehyde and the main treatment includes supportive therapies. Hemodialysis is recommended to remove formic acid from the bloodstream. Also N-acetylcysteine can be used to prevent formaldehyde from converting to formic acid (3, 4). In the literature, there are reports of accidental intraoral formalin injection during dental procedures (5-7). In their respective publications Swami et al. (5), and Arakeri and Brennan (6) report about the procedures they performed following accidental intraoral injection, and describe the measures to be taken to avoid such unwanted incidents. The authors, in their respective reports, recommend labeling the bottles with their content to avoid confusing local anesthetics with formaldehyde, and educating the clinical staff about the medication and the chemicals used in the clinic.

Bector et al. (8) report a case of facial cellulitis that occurred after the inadvertent use of intraoral formalin. Whilst most of the reports in the literature describe cases associated with dentistry, there are rare reports of cases associated with inadvertent injection of formalin instead of local anesthetic to the eyelid (9).

Whereas formaldehyde injection to the neck for suicidal purposes are reported in the literature, there are no reports of using the chemical for therapeutic purposes (10). In their case report, Yeh and Lee (10) report to have used prophylactic antibiotics, intense intravenous hydration, N-acetylcysteine (nasogastric tube, 2x600 mg/day), and performed tracheotomy upon the development of airway obstruction. Tracheotomy was not deemed necessary in our case since the patient

did not demonstrate any urgent findings of airway obstruction.

Conclusion

Exposure to formaldehyde has toxic effects on living tissue. Its injection into the tissue can lead to edema and necrosis. In our case, we observed and successfully managed the complications that arose after formaldehyde injection for the treatment of a cystic mass on the neck. To conclude, our experience, as well as the reports in the literature, suggest that formaldehyde should not be used for treatment purposes on living tissues.

Informed Consent: Written informed consent was obtained from patient who participated in this study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept - F.Ç., İ.Y., Ö.A.; Design - F.Ç., İ.Y., Ö.A.; Supervision - F.Ç., İ.Y., Ö.A.; Resource - F.Ç., İ.Y., Ö.A.; Materials - F.Ç., İ.Y., Ö.A.; Data Collection and/or Processing - F.Ç., İ.Y., Ö.A.; Analysis and/or Interpretation - F.Ç., İ.Y., Ö.A.; Literature Search - F.Ç., İ.Y., Ö.A.; Writing - F.Ç., İ.Y., Ö.A.; Critical Reviews - F.Ç., İ.Y., Ö.A.

Conflict of Interest: The authors have no conflicts of interest to declare.

Financial Disclosure: The authors declared that this study has received no financial support.

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