

# Dental Negligence: Accidental Administration of Formalin Instead of Local Anesthetic

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## INTRODUCTION

Local anesthetic injection is delivered with standard protocols the world over to perform various dental procedures.<sup>1,2</sup> Many local anesthetic agents are available that provide fast onset and long duration of surgical anesthesia to perform the dental/surgical procedure.<sup>3</sup>

Dental literature is replete with articles where various solutions used in dentistry have been used accidentally instead of local anesthetic agent; formalin being one of them.

Formalin is a colorless pungent reagent used as a disinfectant, antiseptic and tissue preservative in dentistry; is a 35-40% aqueous solution of formaldehyde. Its toxicity includes the effects on GIT, respiratory tract and skin. Conjunctival redness, irritation and watering of eyes, palpitation, bronchospasm, dyspnea, laryngeal and pulmonary edema are the symptoms of exposure to formalin vapors.<sup>4</sup>

## ABSTRACT

A solution like formalin used as a fixative has to be handled with lot of care and needs to be stored with utmost care. Negligence on part of the dental professional by accidentally injecting formalin instead of the local anesthetic can lead to permanent tissue damage and also may induce a life threatening situation. The operating dentist injected formalin accidentally instead of the local anesthetic and the patient experienced severe pain and burning sensation. The general practice of formalin being stored in the local anesthetic bottles and being assisted by untrained assistant is the most common reason for mishaps to happen. The dentist operating should be careful and aware of the drugs and chemicals being available in the operatory and re-check the solution being injected in the patient as to not land up in complications because of the negligence.

## KEY WORDS

*Formalin, Dental negligence, Local anesthetic*

A case is presented here where formalin was accidentally injected instead of local anesthesia prior to performing a periodontal flap surgery.

## CASE REPORT

A 38 year old female patient prepared for the periodontal surgical procedure reported to the department of periodontics for periodontal flap surgery. Surgery was to be performed in the mandibular right quadrant under local anesthesia. The informed consent regarding the procedure was obtained from the patient. The case was assigned to a post graduate student. Inferior alveolar nerve block was given by the post graduate student and immediately after the block, the patient complained of severe burning sensation and pain in the pterygomandibular region on the right side of the face. Patient was reassured by the

postgraduate, but within minutes, it resulted in a significant swelling and intolerable pain and burning sensation. The procedure was aborted and was reported to the faculty members. On investigation, it was discovered that the bottle thought to contain the local anesthetic agent actually contained a clear liquid with an offensive odor - formalin.

A quick clinical examination including monitoring of the vital signs was performed. The patient was shifted to the department of Oral and maxillofacial surgery. Aspiration and surgical exploration of the site was planned under local anesthesia in order to limit the effect of the formalin and to prevent necrotic tissue damage as much as possible.

The pterygomandibular space was approached intraorally and explored using a sinus forceps. Copious saline irrigation and meticulous debridement was carried out along the space. A corrugated rubber drain was placed and secured using 3-0 silk suture at the site. The patient was consoled and reassured after the culmination of treatment and was shifted to the ward. Medications were prescribed and she was monitored for 3 days. An intravenous injection of 8mg dexamethasone was administered twice daily for 3 days with a tapering dose, an intramuscular injection of 100mg dclonofac sodium was given twice daily for 3 days for pain relief. An intravenous combination drug injection of 1000 mg amoxicillin and 200 mg clavulanic acid also was administered twice daily for 3 days along with 500 mg metronidazole thrice daily for 3 days. This was followed by 5 day oral dosage 625 mg tablet of amoxicillin and clavulanic acid twice daily and 400 mg metronidazole thrice daily.

Over the first 24 hours the face on the affected side demonstrated increased edema and erythema giving signs of chemical cellulitis. The region was irrigated thoroughly with normal saline frequently.

By the 3<sup>rd</sup> post-operative day, the progression of the cellulitis had ceased. Patient showed signs of paresthesia on right side of face for which vitamin B complex with B12 was prescribed once a day for 30 days.

Patient was discharged on the 3<sup>rd</sup> postoperative day on her request and was scheduled for follow-up visits daily. At the end of 1 week the patient was completely normal except for mild paresthesia on the right lower lip region which continued even at the end of 1 month, but, over the period of 3 months it decreased.

## DISCUSSION

Dental literature search shows articles on accidental injection of solutions like xylene, chlorohexidine, benzalkonium chloride, EDTA, sodium hypochlorite, formocresol, adrenalin, chloroform and even lighter fuel instead of local anesthetic agent.<sup>5-16</sup> The search also shows up to 9 articles on the accidental injection of formalin as an anesthetic agent during dental treatment procedures.<sup>17-25</sup> Formalin accidentally being used as an irrigant for rotary

bur during bilateral surgical removal of 3<sup>rd</sup> molar has also been documented.<sup>26</sup>

All the articles show that once there is an inadvertent injection of formalin, incision at the site with saline lavage is performed followed by placement of a drain at the site. Systemic antibiotics, steroids and analgesics are administered and is followed up as the treatment protocol.<sup>17-25</sup> The same protocol was followed in the case presented here.

A big question arises on the reason why such chemical solutions are injected instead of the local anesthetic agent. A study conducted to evaluate the knowledge and behavior of the Indian dentist towards handling the local anesthetic solutions included 1484 dentists as respondents (graduate and post graduate).<sup>27</sup> The results of the study showed 97% of the dentists used local anesthetic from bottle (3% used cartridge), about 45% stored local anesthetic bottle under lock and key and just 13.4% of the respondents knew about safe disposal rules and methods of local anesthesia bottles. It was observed that approximately 37% of the dentist, irrespective of them being clinician or academicians used empty local anesthetic bottle for storing biopsy specimen.

In the case presented here, the local anesthesia was administered by the postgraduate for the periodontal surgical procedure. However; the surgical trolley was prepared by the untrained assistant, who had placed the bottle containing formalin considering it to be local anesthetic. The postgraduate did not verify the bottle to be local anesthetic and administered the same resulting in the much avoidable clinical situation. Moreover; local anesthetic bottle should be stored away from sunlight in the temperature range of 15-25°C. It should never be placed in the surgical trolley where there are chances of cross contamination. The dearth of qualified dental assistant has also been reported. Around 40% of the dentists still are assisted by unqualified assistants which is a cause of concern. The following conclusions can be drawn from this report.

-The preservative agent like formalin should never be allowed in the operatory. The specimen for biopsy should be sent out of the operatory to be placed in the formalin.

-Separate wide mouth bottles/containers should be used for placing and transporting the biopsy specimen.

-Use of cartridge to deliver local anesthetic should be advocated.

-Even if local anesthesia is dispensed from bottles, once empty, the bottle should not be used to store the agents like formalin, sodium hypochlorite, xylene etc.

-Local anesthetic drug should be loaded only by the operator after verifying the drug.

-A test dose of the local anesthetic solution should always be given to elicit the allergy and adverse reaction to local anesthetic components and also to prevent injection of

noxious agents in larger amount into the body.

-Other chemicals should be stored in well labeled bottles away from the operatory. In case of doubt regarding the content of the bottle, it should be discarded.

-Dental assistant should be trained in handling dental drugs and chemicals.

-Dental students should be educated on drug safety and toxicity of chemicals used in dental operatory.

-Continuing dental education programs should be conducted for awareness amongst dentists regarding such mishaps and ways of avoiding the same.

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