

Patient Safety Tip of the Week

January 10, 2017

The 26-ml Applicator Strikes Again!

In several of our columns on surgical fires we have issued a warning about use of the 26-ml Chloraprep applicator in head and neck surgery (see, for example, our December 16, 2014 Patient Safety Tip of the Week “[More on Each Element of the Surgical Fire Triad](#)”). We noted a surgical fire in which a hospital had switched from the 10.5 ml Chloraprep applicator, which did not have the warning to avoid use in head and neck surgery, to the 26 ml applicator which did have the warning. It is actually quite predictable that staff would assume the new supplies were the same as the old (because the active ingredients and percent of alcohol are the same) and not “read the fine print”.

So we are not at all surprised to find another incident in which the 26-ml Chloraprep applicator was a factor in a surgical fire. The California Department of Public Health publishes statements of deficiencies/plans of correction several times a year. We find the lessons learned from those to be incredibly useful. The most recent release included two cases of surgical fires and one included the 26-ml applicator issue ([CDPH 2016](#)).

The patient was scheduled to have a temporal artery biopsy. The skin was prepped with a 26-ml Chloraprep applicator and dry towels and sterile tenting drape were placed after a period for drying of the area prepped. The patient was receiving oxygen via face mask at 4L/min, subsequently increased to 8L/min. When a Bovie (electrosurgical unit) was used for a second time a sudden spark occurred and surgical fire ignited. The patient sustained burns on the earlobe, lower neck and chest wall, and contralateral upper extremity. Both second degree and full-thickness burns resulted.

The investigation found that, though there was no formal documentation of drying time after the Chloraprep application, the nurse estimated it was about 10 minutes. The nurse did retrospectively note that the site was close to the patient’s hair and that “just the edge of her hair got wet with Chloraprep”. The nurse was unaware of the warning on the 26-ml Chloraprep applicator that indicated “do not use the 26-ml applicator for head and neck surgery”.

There obviously were multiple factors contributing to this surgical fire. The “open” delivery of oxygen was obviously a major factor and is a significant cause in almost all surgical fires we see now. The lack of communication and coordination between surgeon and anesthesiologist regarding stopping oxygen flow when initiating electrocautery was also a key contributing factor. But we’re just discussing the skin prep issue today. The

26-ml Chloraprep applicator has a specific warning indicating it should not be used in cases of head/neck surgery. In addition, when alcohol-based skin preps touch a patient's hair, the drying time may be as long as an hour or more. In the CDPH case both the amount of alcohol-based skin prep used and getting some on the patient's hair were likely important factors predisposing to surgical fire when the other two elements of the "fire triad" appeared.

The facility's plan of correction focused heavily on policy revision and inservicing regarding alcohol-based skin preps. Plans of care for OR patients were revised to include visualization that flammable prepping solutions are completely dry and fumes have dissipated before applying surgical drapes, and documentation of dry time. It also made available smaller Chloraprep applicators (previously it apparently only had the 26-ml applicators). It also focused on drills for surgical fires. Interestingly, while it did include wording that the surgeon should notify the anesthesiologist prior to Bovie use, it made no mention about the "open" use of oxygen.

We would, of course, encourage the FDA to work with the manufacturer of Chloraprep to make the warning not to use in head/neck surgery even more salient. Do we think that will decrease the likelihood of a surgical fire related to this agent? Probably not. Certain errors are predictable. And it is very predictable that nurses, physicians, or surgical techs who have long used Chloraprep are **not likely to look at the label** when grabbing a 26-ml applicator or a smaller one. Therefore, we need to look at other solutions.

To our thinking, the most logical way is to deliver a **real-time message** to prevent use of the bigger applicator. How would we do this? We'd add it to the checklists used for the pre-op huddle or the surgical timeout or both. We have long advocated that the surgical fire risk be discussed as part of the pre-op huddle (or pre-op briefing) and, if the case is considered high-risk, respective roles of all OR participants are called out during the surgical timeout. In our January 2011 What's New in the Patient Safety World column "[Surgical Fires Not Just in High-Risk Cases](#)" we noted the San Francisco VA checklist "[The Surgical Fire Assessment Protocol](#)" ([Murphy 2010](#)). This checklist/protocol is actually printed on the reverse side of their larger preoperative checklist. This is really a very good tool! The fire risk is assessed by a simple numerical scale. If the score is 3 (high risk) the rest of the form is filled out, which basically delineates the respective roles of all those participants. That's a really good way to remind all about their responsibilities in preventing a fire and what to do if a fire occurred. One of the checkbox items for the circulating nurse on that checklist is "Assess that enough time has been allowed for fumes of alcohol-based skin preps to dissipate (minimum of 3 minutes)". It is there that we would propose adding the warning in bold, colored print that **the 26-ml applicator of Chloraprep should not be used in head/neck surgery**.

Mark Bruley, ECRI Institute's authoritative expert on surgical fires, notes in an AORN article ([AORN 2015](#)) he has seen some surgical fire risk assessments take far too long and recommends teams tailor their fire risk assessment during Time Out to a model created in an algorithm and video from the Anesthesia Patient Safety Foundation ([APSF 2010](#)).

Adding the specific item not to use a 26-ml Chloraprep applicator in head/neck cases to either model could create that “real-time” reminder that can have a much more significant impact than any “education” or “training” or “inservice” interventions that are likely to be forgotten when most needed.

Of course, another solution is simply to use skin preps that are not alcohol-based and not flammable for cases like the one above. See our October 1, 2013 Patient Safety Tip of the Week “[Fuels and Oxygen in OR Fires](#)” and our January 2011 What's New in the Patient Safety World column “[Surgical Fires Not Just in High-Risk Cases](#)” for comments about aqueous-based skin preps.

And just another reminder: the nature of the cases in which surgical fires occur has changed. Now the vast majority of cases occur in patients undergoing what are considered to be relatively minor surgeries. These include cases like temporal artery biopsies, removal of skin lesions on the head or face, plastic procedures, etc. That trend is important for several reasons. First, many of these cases are done under sedation or monitored anesthesia care where there is open delivery of oxygen, which is probably the most important contributing factor to surgical fires. Second, there may be a degree of relative complacency in that our safety “antennas” are lowered when we think we are doing a “minor” case. Third, these cases are often “add-ons” to the surgical schedule (added on when time permits following more major cases in an OR). As such, the OR staff may not be as familiar with the details of the more minor cases. For example, you might have nurses and surgical techs in a room that usually does major abdominal cases (where the 26-ml Chloraprep applicator is commonly used) now prepping for a temporal artery biopsy that they may seldom participate in. Fourth, and it may impact our proposed solution, many facilities lacking a strong safety culture tend to skip the pre-op huddle for these “minor” add-on cases. Maybe that’s a good reason to add it as an item to the surgical “time out” checklist.

We recommend you read about all the other important aspects of surgical fires in our numerous columns listed below, which also have useful links to many valuable resources on the topic.

Our prior columns on surgical fires:

- December 4, 2007 “[Surgical Fires](#)”
- April 29, 2008 “[ASA Practice Advisory on Operating Room Fires](#)”
- November 2009 “[ECRI: Update to Surgical Fire Prevention](#)”
- January 2011 “[Surgical Fires Not Just in High-Risk Cases](#)”
- March 2011 “[APSF Fire Safety Video](#)”
- November 2011 “[FDA Initiative on Preventing Surgical Fires](#)”
- December 13, 2011 “[Surgical Fires Again](#)”
- April 24, 2012 “[Fire Hazard of Skin Preps Oxygen](#)”
- April 2013 “[Reminder: Hand Sanitizers Are Flammable](#)”

- June 25, 2013 “[Update on Surgical Fires](#)”
- October 1, 2013 “[Fuels and Oxygen in OR Fires](#)”
- August 12, 2014 “[Surgical Fires Back in the News](#)”
- December 16, 2014 “[More on Each Element of the Surgical Fire Triad](#)”
- December 2015 “[Unique Ignition Sources in Surgical/OR Fires](#)”

References:

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http://www.cdph.ca.gov/certlic/facilities/Documents/2567_ValleyPresbyterianHospital_IJAP_LA.pdf

Murphy J. A New Effort to Promote Fire Safety in the OR. Topics In Patient Safety (TIPS) 2010; 10(6): 3

http://www.patientsafety.va.gov/docs/TIPS/TIPS_NovDec10.pdf#page=3

SF VAMC Surgical Fire Risk Assessment Protocol

http://www.patientsafety.va.gov/docs/TIPS/TIPS_NovDec10.pdf#page=3

AORN. 4 actions to improve fire safety. Periop Insider 2015

<http://www.informz.net/InformzDataService/OnlineVersion/Pub/bWFpbGluZ0luc3RhbmNISWQ9MTk3NTM4NA==>

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<http://www.apsf.org/resources/fire-safety/>



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