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(Accepted for publication August 14, 1998.)

Anesthesiology
1999; 90:326

Shearing of Plastic Coating of Stylet with Double Lumen Tube: Another Incident

To the Editor:—Shearing of the plastic sheath of the stylet leading to endotracheal tube obstruction has been reported with smaller tubes.[1] It has been suggested that this happens because of the tight-fitting stylet with a pliable coating and a firm grasp of the endotracheal tube over the stylet.[2] Recently, we also experienced a similar incident with a 6.0-mm inner diameter Carlen's double-lumen tube (DLT) (Portex, Kent, England), which has a stylet provided by the manufacturers.

A 38-yr-old man presented for removal of a hydatid cyst of the left lung during general anesthesia. A 6.0-mm Carlen's DLT was passed into the trachea easily with the aid of stylet provided with the tube. At removal of the stylet, it was noticed that the plastic coating over the distal part of the stylet was missing. The DLT was immediately removed. Fortunately the sheared part of the plastic coating was found stuck in the tube. The patient was ventilated with the face mask and was reintubated with the help of another stylet after lubricating it with sterile water-soluble jelly.

Shearing of the plastic coating of a stylet usually occurs at the point where it is angulated to assist in the intubation.[3] This also happened in our patient. Some force is bound to be exerted at this point during removal of stylet because of the contour of the airway and the tube. The more angulation produced, the greater will be this shearing force.

This case shows that shearing can occur even with larger tubes, and one should always inspect the stylet after withdrawal for integrity of the plastic coating.

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(Accepted for publication August 31, 1998.)

Anesthesiology
1999; 90:326–7

In Reply:—The experience of Sinha and Dubey involving Carlen's double-lumen tube and stylet supports our view that shearing of the sheath over the stylet is likely to occur at the point of angulation.[1] The force exerted at the proximal end of endotracheal tube during the withdrawal of the stylet is linear in direction. This linear force, while overcoming the curvature at the point of angulation, causes contact and friction between the endotracheal tube and the plastic sheath of the stylet. If this frictional force is greater than the tensile strength of the sheath, shearing occurs. Thin plastic sheath (smaller endotracheal tubes and stylets with thin sheaths are likely to be used together) and increased angulation create conditions ideal for shearing. If these conditions are reproduced in a relatively larger

inner-diameter tube, as in the case of the double-lumen tube used by Sinha and Dubey, shearing can take place. We agree with the correspondents that the endotracheal tube stylets should be inspected after each use.

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(Accepted for publication August 31, 1998.)

Anesthesiology
1999; 90:327–8

Bottle Contamination

To the Editor:—As the manufacturer of Betadine Solution (10% povidone–iodine; Purdue Frederick Company), we read the article entitled "Povidone-iodine and skin disinfection before initiation of epidural anesthesia"[1] with great interest.

The authors state that their study shows that multiple-use bottles of povidone–iodine (PI) solution "in normal use may become contaminated by bacteria," and secondly, that "PI solution from previously opened bottles was less effective than PI from previously unopened bottles."

Contamination

A great number of variables important to the issue of possible contamination of the bottle caps (*e.g.,* length and number of times a bottle was left open, technique for handling and storing the cap during opening, protection of opened containers from the environment and from contamination by personnel) are not specified. All of these should have been identified and controlled for in this study to arrive at the conclusions noted with a reasonable degree of certainty.

In the results section of the paper, the microorganisms grown from swabs of the caps from the previously opened bottles and from the solution in the previously opened bottles are listed together in the text. The authors do not provide a table to tell us which microorganisms were found in the caps from opened bottles and which microorganisms were found in the PI solutions. Other than *Bacillus*, the organisms listed will not survive in PI for more than 15 s.[2] *Bacillus* (vegetative organisms) have been shown to survive for no more than 30 s in *in vitro* tests with Betadine Solution.[3]

Showing that microorganisms commonly found on the skin[4,5] may be present on some caps of previously opened PI bottles demonstrates that caps may become contaminated if not properly handled during use. The study does not demonstrate that microorganisms on the caps contaminate and multiply in the PI solution itself in previously opened PI bottles.

Support of Microbial Growth

In the article, there appears to be confusion between microbial contamination and support of growth. To demonstrate support of growth, colonies of bacteria should be cultured, then reintroduced into the PI solution in a challenge test to determine organism viability. In the absence of these data one must consider that the study results do not demonstrate the support of growth.

The results of the microbial comparison between the third swab used on the patient's back and the PI bottle used for preparing that surface show that, with one exception, the bacteria isolated from the third swab are not the same as the bacteria isolated from the cap or bottle of povidone–iodine used. This suggests that bacterial contamination of the swab is from environmental sources other than the bottle of povidone–iodine used. The authors apparently did not test the new sponge sticks used to sample patients' backs to see whether they may have already been contaminated with *Bacillus* or *Staphylococcus.* This would have been an important methodological control.

Although these results might be statistically significant, they are not clinically significant, as demonstrated by the authors' clinical experience. In addition, the reported widespread prevalence of *Bacillus* may require explanation. Although it is true that bacteria are commonly found on the some parts of the skin, they are not commonly found in large numbers on the skin of the back.[6] There is no adequate explanation for the presence of *Bacillus* in the setting described in the study.

Loss of Efficacy of PI Solution from Previously Opened Bottles

It is difficult to comment about the reported difference in efficacy between solution from newly opened bottles and solution from previously opened bottles. For opened bottles, the handling technique, the number of openings, and the duration of time of openings should have been recorded and controlled. Also of importance would be the storage conditions of the bottles.

Conclusions

Although the authors raise concerns important to the practice of medicine and to patient health and safety, the results and the