

Title Autoclaved Reusable Laryngeal Mask Airways Contain Significant Protein Contamination

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INTRODUCTION: Previous studies have documented occult blood and microbial contamination from cleaned reusable anesthesia equipment (1-3). The advent of variant Creutzfeldt-Jakob disease (vCJD) and the isolation of prion proteins from human tonsillar tissues has increased concern for iatrogenic spread of vCJD from reusable anesthesia equipment (4-6). The proximity of LMAs to tonsillar tissues during insertion and removal make their contamination with surface protein deposits more likely and concerning. To our knowledge, the presence of protein deposits on reusable LMAs has not been studied in a U.S. hospital (7).

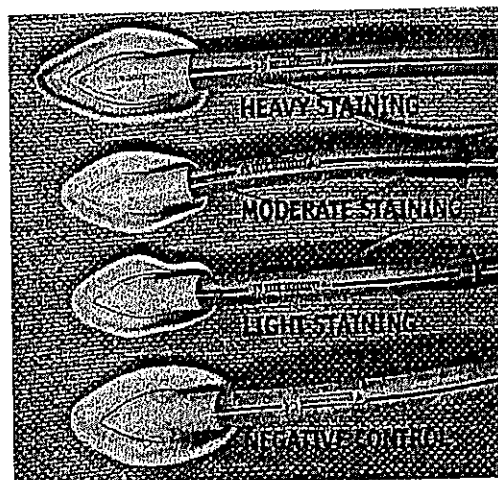
METHODS: Nineteen previously used, cleaned and autoclaved LMAs were randomly collected from operating rooms and stained for 30 minutes at room temperature with erythrosin B dye (1.2% solution, Sigma). Two new and unused LMAs (negative control) and two used and uncleaned LMAs (positive control) were similarly stained. LMAs were rinsed with water and protein staining was evaluated by the investigators using specific criteria. The outer surface of the LMA, inner surface (laryngeal aperture), and edges were examined and staining was subjectively rated as follows: 0 = No appreciable stain, 1 = Light, 2 = Intermediate, 3 = Dark, 4 = Very Dark. Analysis of variance and two-tailed fisher exact test were used to compare the difference in staining between various parts of the LMA.

RESULTS (TABLE) and DISCUSSION: Our data show that 19/19 (100%) of sampled LMAs had some degree of surface protein contamination, ranging from light to heavy staining. Moderate to heavy staining was present in 14/19 (74%) of these LMAs (TABLE 1, FIGURE 1). The location of protein stains on the inner surface, compared to the outer surface ($p>0.2$) or edges ($p>0.3$) was not statistically significant (TABLE 2).

CONCLUSION: Cleaned, autoclaved, reusable LMAs at a U.S.-based university hospital contained significant surface protein contamination. These results demonstrate that current cleaning methods are ineffective at removing LMA surface proteins. Our data show significant contamination of reusable LMAs which is concerning. The clinical importance of protein residues on reusable LMAs in the U.S. remains to be established.

REFERENCES:

- 1) Canadian Anaesthetists' Society Journal 1973; 20:241-244
- 2) Anesthesiology 1994; 80:960
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Summary of LMA Protein Staining

Stain Summary	Total Staining Score*	Number (%)
No Staining	0	0 (0%)
Light Staining	1-3	5/19 (26%)
Moderate Staining	4-6	7/19 (37%)
Heavy Staining	7-9	7/19 (37%)
Very Heavy Staining	10-12	0/19 (0%)

*Total Staining Score is the sum of stain scores in the inner, outer and edges of LMAs.

Location of Protein Staining on LMAs

	Outer Surface	Inner Surface	Edges
Mean Staining Score	2.05	1.42	1.47
Standard Deviation	0.91	0.90	0.84
p-values*	$p>0.2$	n/a	$p>0.3$

*Two-tailed Fisher exact test comparing staining of inner surface to outer surface and edges.