The purpose of the study was to examine the effect of steam versus STERRAD® System reprocessing of reusable rigid laryngoscope blades on light output over time. In addition, the study was designed to quantitatively determine if one sterilization modality better preserves the light output of the reprocessed laryngoscope blades.

Data was collected beginning in September 2015 over a period of 5 weeks. A study population of 20 new, reusable rigid laryngoscope blades was reprocessed and then tested for light output as a function of total cycles. 12 blades from two leading manufacturers were processed using steam and the identical 12 blades were processed using STERRAD® System: STANDARD Cycle. Each series of 5 cycles was considered 1 sterilization event and this process was repeated for 20 sterilization cycles. None of the laryngoscope blades reprocessed in this study were in clinical use. In partnership with GMH, it was determined that a 75% reduction in light output would be used as a threshold value to identify GMH, it was determined that a 75% reduction in light output at every 100 cycles. Thus, it was concluded that changing STERRAD® System sterilization over steam sterilization can potentially extend the longevity of reusable laryngoscopes and thereby reduce cost per use. Cost base assumptions used for this study indicate GMH can potentially realize savings of $13,725 per year by reprocessing laryngoscope blades exclusively with STERRAD® Systems.

The results are in and the STERRAD® System is the clear winner. At Greenville Memorial, we’re switching exclusively to STERRAD® Systems.

A Quantitative Case Study Report on the Effect of Terminal Sterilization on Laryngoscope Light Longevity

A STELLAR Study: Steam Reprocessing of Reusable Laryngoscopes and the Potential Extension of Laryngoscope Lifetimes Through a STERRAD® Systems Alternative

INTRODUCTION

Although steam autoclaving has long been the default method for terminal sterilization, the increasing use of high-precision, expensive instrumentation has necessitated that many hospitals shift their focus from standard use of sterilization techniques to that of rising equipment replacement costs associated with steam reprocessing and their wear and tear. Steam sterilization reaches temperatures of 250°–350°F in order to achieve a sterility assurance level of 10^-6 whereas STERRAD® Systems employ low-temperature, hydrogen peroxide gas plasma technology to achieve the same level of sterility. This advanced process means there’s no need for variation orcooling of instruments, which potentially shortens the overall sterilization process for busy hospitals everywhere.

Nearly one hospital and institutions nationwide and replace laryngoscopes in sterilization of the scope light, which relates to a delicate fiber optic bundle in the blade to deliver light and is potentially susceptible to damage. Research is required to make adequate and definitive determination whether the use of alternate, low-temperature terminal sterilization methods would impose less wear and tear on reusable rigid laryngoscope blades, result in extended blade lifetimes and an associated reduction in replacement costs.

The purpose of this nonclinical study was to evaluate the two methods of heat sterilization, to assess how hospitals might reduce the lifespan of laryngoscope light components, and to present cost-benefit implications based on a case study.
After 100 reprocessing cycles, steam-reprocessed laryngoscopes were found to have lost on average 74% of their light output, whereas the STERRAD® System–processed laryngoscopes had lost only 53%, a statistically significant difference of 21% ($P = 0.05$).

This translates to STERRAD® System–reprocessed blades being on average 21% brighter than steam-reprocessed blades at 100 cycles.

The implication of this difference in light output is more substantial when its impact on the effective lifespan of these laryngoscope blades is considered. Since laryngoscope blades were deemed to reach their end of life when their light output has diminished by 75%, estimates for the laryngoscope blade replacement rate for both steam and the STERRAD® System can be calculated for Greenville Memorial Hospital’s 225–laryngoscope blade population.

At 100 cycles, 7 out of 12 (or 58%) on average of steam-reprocessed laryngoscope blades had diminished in light output by 75%, reaching their end-of-life threshold, while only 1 out of 12 (or 8%) on average of STERRAD® System–reprocessed laryngoscope blades had reached this threshold.

When these replacement rates (300 blades reprocessed per cycle and all blades are reprocessed on average 1.5 times per day) are applied to the GMH 225–laryngoscope population over a one-year period, steam reprocessing would require 376 blades to be replaced versus only 193 when the STERRAD® System is used—a 52% decrease in the number of new blades required.

ECONOMIC ANALYSIS

In order to determine which sterilization method is more cost-efficient with regard to light longevity and scope replacement, the cost for STERRAD® System versus steam reprocessing was compared in an ad hoc analysis based on GMH statistics. Assuming that in a 225–laryngoscope facility like GMH, 300 blades can be reprocessed per cycle and all blades are reprocessed on average 1.5 times per day, the average number of STERRAD® System cycles per day is 4.75. Based on these economic assumptions and the data collected for this study, it was determined that exclusive usage of STERRAD® System reprocessing for laryngoscope blades would potentially allow an institution to save an estimated $13,932 annually based on savings related to reduced blade replacement.

FOR EVERY

2 steam–reprocessed BLADES

Only 1 STERRAD® System–reprocessed BLADE REQUIRED REPLACEMENT