

Evaluations of procedures for reprocessing flexible endoscopes by log-stages of germs don't guarantee a successfully reprocessing of FE

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Background

Iatrogenic transmission of infections via flexible endoscopes (FE) is of general concern. Effect of FE disinfection in a Washer-disinfector (WD) is described by log-stages reduction of the germs. Follows a successful reprocessing of FE a log-linear kinetic?

Table 1: Automatic reprocessing of a flexible gastroscope using 2% glutaraldehyde at 20 °C. Sampling from the water channel.

Sampling after	Proliferation (of an <i>Acinetobacter</i> sp. in FE channels)	Clean FE (0-4 CFU per 0.2 mL)	Critical FE (5-50 CFU per 0.2 mL)	High-risk FE (>50 CFU per 0.2 mL)
Manual cleaning	-	40 (95%)	2 (5%)*	0
Disinfection	-	38	4	0
Manual cleaning	+	8	1	9
Disinfection	+	10	4	4

*) Microorganisms from handling of the gastroscope

Objectives

The results in table 1 provide the background for two questions:

- Is reprocessing of FE a log-stages reduction?
- What is the influence of manual cleaning and proliferation of microorganisms in FE channels on a successful reprocessing?

The goal is $\geq 95\%$ clean FE

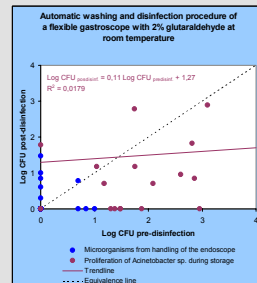


Figure 1: Relation between log CFU before and after 60 automatic washing and disinfection procedure of a flexible gastroscope (from table 1)

After proliferation of a *Acinetobacter* sp. over night in the channels of gastroscope, their was no correlation between log CFU before and after reprocessing in the WD.

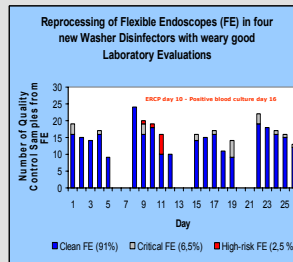


Figure 2: 322 quality control samples from 16 FE obtained before all endoscopes through four weeks.

A cluster of three high-risk FE with *Klebsiella oxytoca* was detected day 9-11. An identical strain was isolated from a duodenoscope before an ERCP and in a blood culture from the patient

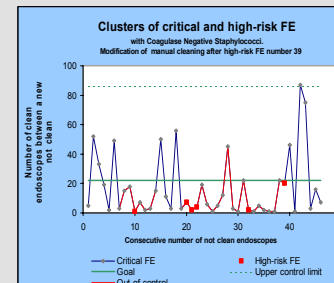


Figure 3: g-Type control chart.

Automatic reprocessing with 2% glutaraldehyde at 20 °C.

Presence of High-risk endoscopes is overall in the QC program correlated to out of control periods with 8 or 12 of 14 consecutive control values below the goal line

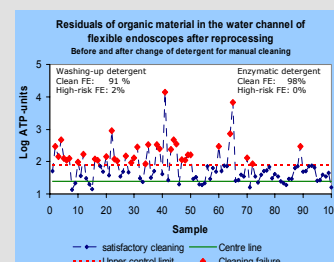


Figure 4: Results of ATP measuring before and after modification of the manual cleaning (figure 3)

The manual cleaning was performed with a washing-up detergent (s. 1-50) and an enzymatic detergent (s. 51-100)

Results

Table 1-4 exemplify the evaluation procedure and the table below summaries the evaluation of reprocessing procedures for FE.

Washer disinfector (disinfection)	Log stages-reduction	Prevent proliferation of microorganisms	Residuals of organic materials
2% glutaraldehyde at 20 °C	No	+ Residuals in channels	++
Heat and detergent at 59 °C	Yes	++	+
detergent + modified ammonium chloride at 59 °C	Yes	+++	0

911/912 flexible endoscopes were clean (one limit value)

www.clean-endoscope.com

Methods

- 10722 Quality Control (QC) samples from 8 hospitals obtained from the water channel of FE immediately before an endoscopy (flush water) are divided up into clean, critical or high-risk results (definitions in table 1).
- ATP was measured in QC samples as cleanness indicator.
- The results are evaluated in control charts.

Conclusion

A reprocessing of FE is only successfully if

- The total cleaning procedures removes organic materials and micro organisms and
- The disinfectant prevents proliferation of micro organisms on the surfaces of FE during storage.

Only thermal disinfection with heat + detergent was a log stages-reduction