Laundry’s Impact On Surgical Instrument Damage
By Douglas Story
VP Innovation
Swisher Hygiene

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A call comes in from the Operating Room. A panicked voice tells you that the surgery instruments taken from the surgical pack that your laundry prepared are stained, discolored, or rusted and they want to know what you are doing in the laundry to cause this.

Your first response is to tell the caller -- nicely -- that all the laundry does is process the surgical wraps that are used to make the surgical packs and that you have no idea what caused or could cause this kind of damage to very expensive surgical instruments. You speculate, “Has the hospital purchased a poor quality brand of surgical instruments?”

If the surgical instruments are same brand and quality, what could cause perfectly good instruments to suddenly be damaged while wrapped in the surgical pack and autoclaved?

Actually there are several procedures and conditions that may cause this type of damage as the instruments are moved from soiled to clean to the sterilized condition.

Since this is an article for healthcare laundry let’s discuss the “what and where” this problem could occur in the laundry process. Yes, I know we don’t wash the instruments in the laundry; someone else does that, but we do process the textile products in our washers.

How could a wrap be involved in damaging surgical instruments?

In a word - residuals. It is imperative that you and your operation keep track of the type of water, chemicals, and procedures your operation is using when processing surgical wraps. Let’s take each of these one at a time.

Water
This is one of the greatest solvents on earth and from the time it falls from the air, soaks through the ground, is treated by the cities, and then delivered to your facility. It will contain a multitude of natural and man-made minerals that will end up as residuals on all the fabrics that you process. Calcium carbonates, sodium chloride, potassium chloride, copper, iron, are just a few of the residual minerals that occur naturally or are added to water as it makes its way from the ocean, to the clouds, to the ground and to your laundry.

- Instruments that come into contact with high concentrations of sodium chloride, iron, chlorine, or copper while being autoclaved can be discolored.

So if you have water conditions in your facility that contain high concentrations of these minerals it will be important that you make sure your pre-treatment or in-washer treatment for these minerals is effective enough to eliminate or minimize these residuals in the surgical packet wraps.

- Antichlor used for chlorine and laundry products with very effective chelating capabilities are chemical “in washer” procedures to minimize source water residuals in the surgical warps during processing.

Chemicals
The primary chemicals that a laundry manager is generally concerned with are those chemicals that are being used during the processing of the linens.

- Alkalis, chlorine bleaches, oxidizers, and sours are all products that must not be left as residuals in the surgical wraps that are being processed.

- Extra rinses and “end of process” Quality Control procedures (such a pH testing, iron testing, and residual chlorine testing) on surgical wraps will add an extra layer of protection to the whole process.

In most cases, we can let “out of spec” Q.C. numbers pass through the operation but in the case of surgical wraps you are playing Russian Roulette with a very expensive issue. If the pH is too low or too high, do you let this load go through or do you rinse it one or two more times? In this case, when in doubt rinse it out!

Procedures
The wash formula and chemical procedures developed for processing the surgical pack wraps should be consistent and be set to yield the following Quality Control specification on the wrap:
Chlorine residual: zero  
Iron residual: zero  
Alkaline or pH: 6.5 - 7.5

pH is a very key measure on this fabric. Many of the metals used to make surgical instruments can be pitted if the pH drops to extremely low levels. The autoclave used to sterilize the majority of surgical packs and instruments today will drive a pH down as the temperature and pressure increases (>200°F) inside the unit. For example: a pH of 6.5 can drop to 5.0 which will not cause damage, but if your pH is too low on the fabric the high temperature and pressure environment inside the autoclave could push the pH down to levels that will damage the instruments.

A key indicator that this (extremely low pH) may have occurred or is occurring in an autoclaved fabric (100% cotton or cotton blends) would be pin holes being formed in the fabric.

pH too high >7.5 is indicative of a high level of chemical residuals that may become extremely reactive within the environment of the autoclave. Residuals such as sodium, chlorine, etc. can become reactive and initiate damage to the surgical instruments (not to mention dulling the quality of the look of the linen).

Other Issues
When this problem does come to your attention don’t forget that there are other steps in the preparation, cleaning, and sanitizing of surgical packs. Don’t forget to remind whomever is researching the issue to look at the following:

Pre-cleaning the instruments  Chemicals must be completely rinsed from the surface of the instruments. De-ionized/distilled water should be used in the rinse down of the instruments.

Boiler compounds Boilers treatment chemicals can be injected into the autoclaves and cause damage to the instruments if the boilers and chemical treatments have not been properly operating or applied.

In today’s business environment there are many issues that take our time and effort. Hopefully this information can be used in speeding up the time it takes to go from “issue to solution.”

1) George Tiemann & Company, “Instrument Care and Instruction Handbook”.

2) International Fabric Care, “Autoclave damage to fabric and surgical instruments”.

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