

Use of A Novel Sterilization Process for Surgical Instruments

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Preparation and Planning

The Kaleida Health Hospital System was expanding the number of operating rooms from 20 to 40. The expansion included ORs for different procedures including vascular and pediatric. The sterile processing department (SPD) management was requested to evaluate a sterilized pod system that was a new and more efficient sterile processing method (**Figure 1**). An eighteen month trial was set up to evaluate the sterile pod system for orthopedic joint procedures.

The evaluation would include sterile processing instruments in the standard method versus the new pod system.

The standard methods decontamination, cleaning, inspection, high level disinfection/sterilization. **1.** The instruments are then systematically placed into custom metal sterilization trays wrapped in blue paper secured with autoclave indicator tape, placed in the autoclave for 60 min then properly cooled (**Figure 2**).



Figure 1 Pod System



Figure 2 Blue paper wrap versus the pod

Preparation and Planning (cont.)

2. Instruments are placed in custom metal containers and secured with a lock which has an indicator to verify the sterilization process. Once cooled placed on case charts for use in the operating room.

The **sterile pod method**, method **3**. The first steps of cleaning are the same. Instruments are placed in there custom trays but there is no wrapping in blue paper. The trays are put directly into the sterile pod which has filter that changes color after sterilization. There is no additional lifting of individual trays once they are in the pod. The autoclave time is only 30 minutes and you don’t have to wait for cooling. The pod is brought to the OR when the instruments are needed. The sterile seal is released in the OR and the instruments trays are placed onto the OR tables. There are not 10 + pans to individuality open.

Implementation

In the first 6 month evaluation period we introduced 4 sterile pods into the sterilization process. The sterile pod is a five-sided steel box with a front dual aluminum removable vented inner and out door. A single-use double layer paper filter is placed between the 2 vented doors. Six spring loaded latches allow the inner and outer doors to be removed for loading and unloading. The entire assembly is on a 4 wheeled cart. The sterile pod can hold up to 12 instrument trays (370 lbs. max). There is no need for sterile wrapping or rigid containers (**Figure 1**). The transition to the use of the sterile pods was seamless. Throughout the 18 month evaluation period an additional 12 sterile pods were introduced.



Figure 3a: 30 containers of instruments to lift if not using the pod system



Figure 3b: Sterile pod system, 10 instrument trays, no containers



Figure 4a Loading unsterile instruments into the pod



Figure 4b Unloading sterile instruments in the OR.

Outcome

During the 18 month period the sterile pods were used for 2100 orthopaedic joint replacement procedures. Processing time (time form decontamination to OR availability), costs, # of lifts, processing time, sterilization “incidents”, and durability were evaluated (**Table 1**).

- Processing time 45 min less for sterile pod
 - 20% time saving prior to autoclaving
 - 70% time savings dry time
 - 10% time savings no transfer needed to case cart
- No difference in cost of disposable materials
- 300 less pounds lifted per case set up (**Figure 3a,b**)
- 0.1 % sterilization issues pods, 0.5% for standard method
- Sterile pod 1 latch failure, 1 outer door repair
- Standard method multiple rigid containers needed refurbishing to manufacturers specifications

Implications for Perioperative Nursing

The Sterile Pod System improved the processing of surgical instruments for our joint replacement cases. Our meticulous evaluation of time savings, cost reduction, safety and ease of use were carefully considered in this trial (**Figure 4a,b**). We had a time savings of 45 minutes which over the course of a standard shift can allow enough time to add an additional surgical procedure. Sterile incidences were <5% in all groups. The most common breach was with large irregular instruments in the blue paper wraps. The sterile pod system eliminated this issue.

There was a 300 lbs. reduction in the amount of weight SPD staff lift per joint replacement case since the instruments are only lifted once into the pod and the pod is on a wheeled cart. We believe this reduction in strain to the staff will result in fewer injuries and a decrease in lost work. Our next study will track and report additional experience for other types of cases as well as look at loss work due to job injury.

Evaluation Period	# of Procedures	# of S pods	Ratio of S pods/std sterilization	Tray prep time std min	Tray prep S pod min	Clave time std min	Clave time S pod min	Transfer trays to case cart std min	Transfer trays to case cart S pod min	Time savings per procedure min	Total time savings Minutes, Hours
First 6 months	670	4	20%/80%	15	3	60	30	3	0	45	6030, 110.5
Second 6 months	712	10	50%/50%	15	3	60	30	3	0	45	16020, 267
Third 6 months	718	16	80%/20%	15	3	60	30	3	0	45	25848, 430.8