

Customised Surgical Drapes to Reduce Biomedical Waste

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Abstract

Disposable surgical drapes, as recommended by guidelines in the OR for the health of patients and medical staff, are a regular practice. Despite the implementation of best practices, many healthcare facilities still utilize standard universal drape sets, which cost more and generate more biomedical waste. According to our research at Apollo Hospital in Bangalore, the specialty-specific customized drape set keeps costs down as well as reduces biomedical waste.

Introduction

Biomedical waste is an unavoidable by-product of any hospital setting, but most of the regulated medical waste is generated in the operating room (OR). The first step in waste minimization is to reduce or eliminate it at the source (1,2). Drapes have been used to maintain the sterility of the environment, equipment, and patients during invasive procedures in the OR. In general, surgical drapes are either reusable or disposable. Reusable drapes are comprised of a woven fabric that is washed and sterilized in between procedures. Disposable drapes, on the other hand, are usually made of non-woven material and are burned after each operation. Despite attempts to set recommendations, it remains unclear whether drape type is preferable at preventing an surgical site infections (SSI). As a result, there is a lack of international consensus on which drapes to use (3). Healthcare facilities should be aware of the attributes of the perfect drape and make purchasing selections based on a balance of health and safety concerns, as well as economic, environmental, and comfort concerns. Based on

efficacy in preventing infections, environmental impact, or economics, there is no evident superiority of currently available single-use gowns and drapes over reusable items (4). In orthopedic and spinal surgery studies, there is no evidence to support the use of reusable or disposable drapes to minimize the incidence of SSI (5). Similar studies are necessary to assess incidence of SSI in specialties like ophthalmology, ENT and obstetrician-gynecologist (OBG). The use of drapes, desired drape characteristics, single use versus reusable drapes, and general draping requirements are all covered in the Standards of Practice as per the specialties.

Disposable surgical supplies, personal protection equipment, drapes, and plastic wrappers account for the majority of OR waste irrespective of public or private health care facilities. Global disposable market split by product segment is drapes (42%), Gowns(29%), Sterile Barrier System (21%) and Facemasks (8%). Expected market demand for next 5 years would be an

increase of 10-15% (6). Disposable drapes from the OR are a type of polypropylene fabric also known as spun bond-melt blown-spun bond or SMS PP which composed most of the Municipal Solid Waste (MSW) by weight which is between 22% - 35% of total average material composition of MSW from hospital biomedical waste (7). In many cases, the use of disposable drapes has to do with mandatory rules or guidelines (8).

Inadequate biomedical waste treatment and disposal infrastructure is a serious problem in developing countries like India (9). Kayakalp yojna (Award to public health care facilities), an incentivized approach was launched as a component on Swachh Bharat Abhiyan by the prime minister of India on 2nd October 2014, aimed at improving the Public health care facilities under six thematic areas including Hospital/ Facility Upkeep, Sanitation & hygiene, Waste Management, Infection Control, Supportive services and Hygiene promotion. Kayakalp yojna guidelines consisting of total 500 marks of which 100 marks was for waste management (10).

The choice of disposable standard universal drapes set versus comprehensive range of specialty specific disposable drapes or customized drape set, which are intervention specific is largely at the surgeon's discretion. Therefore, if surgeons choose disposable items or pre-packaged supplies, the OR staff will likely comply with that rather than challenge their request. The standard surgical pre-prepared drapes set was used in all surgical cases across all specialties at Apollo Hospital, Bangalore. We noticed that in many of the cases all the drapes were not being utilized as it was not required. So we performed a Pilot study and specifically looked into specialties like ophthalmology, ENT and OBG where the standard drape set was not required.

Method:

In our pilot project done at Apollo hospital, Bangalore to reduce biomedical waste, we found that its important to reduce the consumables at source. Our study period was from Jan 2014-Dec 2014 at Apollo hospitals, Bangalore. The total number of cases was ophthalmology 457, ENT procedures 535 and 586 minor OBG procedures.

Results:

We observed that the standard prepacked drapes set which included 15 drapes was used (cautery bag-1, medium sheets -2, small sheets -2, long sheets -2, trolley sheets-2, foot sheets-2, wrap sheets-2, drape sheet -2). In all the above cases only 6-7 sheets were used and the rest were disposed of as they were not required. The actual number of sheets required for the above cases was 7 (Medium sheets-2, small sheets-2, long sheets -1, and trolley sheet 2). The costing of standard pre packed drapes set and customized drape set was also evaluated thus; The cost of the standard drape set was Rs 80 and the cost of the customized drape set would be Rs 300 So for the total number 1578 cases the standard drape set cost was Rs 12,62,400 and if we had used a customized drape set it would have cost Rs 4,73,400. That would be a saving of Rs 7,89,000 /year considering 3 specialties only here Weight of the standard surgical drapes was 1200gms and hence 1578 cases generated 1893.6 kgs of surgical waste. The customized surgical drape set would generate 798 kgs of surgical waste. That results in 1104 kgs of extra surgical waste that needs to be disposed annually.

Discussion

Surgical drapes are one of the most common and important consumables in any surgery. They are used to isolate the surgical site from non-sterile areas. It provides a barrier to endogenous and exogenous sources of infection. In our hospital which is a tertiary multi-specialty hospital, pre prepared standard surgical drapes sets are used in all surgical cases. We use disposable drapes in all

cases. We observed that in most of the cases all the drapes in the set were not required. But once the pack is opened the whole set becomes nonsterile and hence would be disposed of as surgical waste even if it's not used. This is surgical overage, that is surgical consumable that is prepared for surgery but not used and hence wasted. Hence surgical overage has an impact not only on the load of disposal of surgical waste but also adds to the financial burden to the Hospital and the Patient. Increase in Surgical waste is known to contribute significantly to overall waste of a hospital and thus have a significant impact on air and water pollution. The above mentioned disadvantages can be overcome by using customized drape sets as required for each procedure/specialty which would help to reduce the environmental pollution to a considerable extent. In our study we found that Rs 7,89,000 could be saved by customizing the surgical drape. We could also reduce the load on surgical waste disposal by 789 kg which would have a significant effect on the environment. This was the cost for 1578 cases we observed. We recommend the same to be applied for all surgical specialties in our setup and then extend it to all the other hospitals in the Apollo group which would have a bigger impact on the cost and waste disposal load and pollution without compromising efficiency and time.

Conclusion

By customizing the surgical drapes as per the surgical procedure, the cost of surgery could be reduced. By reducing the load of surgical waste disposal we would be reducing the impact on pollution and environment. This would have a huge impact on the financial burden for the hospital and patient. Finally, this would help us to achieve a cleaner and safer environment with a huge cost saving impact. By reducing the waste load from the hospital, we could thus reduce the waste on the city corporation and thus contribute to Swach Bharat. So in just 1578 cases we could reduce the waste disposal by 1104 kgs. If we

could implement this project across all specialties and across all hospital, it would have a much bigger impact on reducing environmental pollution

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