A systematic approach to surgical hemostat use supports standardization and cost efficiencies

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Summary
• A systematic approach to bleeding management, the Hemostasis Optimization Program (HOP), was implemented at a large U.S. teaching hospital.
• Implementation of the HOP framework resulted in an annual cost savings of $168,688.
• This evaluation demonstrated that cost savings, as well as operating room and supply chain efficiencies, were achieved without sacrificing patient outcomes.

Surgical bleeding and variability in hemostat utilization
Disruptive bleeding remains a critical challenge in surgery, as it can lead to suboptimal patient outcomes, introduce procedure complexities for surgeons and surgical staff, and result in higher healthcare costs. For example, uncontrolled bleeding is associated with significantly higher total hospital costs (25-40% higher) versus bleeding controlled with adjunctive hemostats ($24,203 to $61,323 uncontrolled versus $14,420 to $45,593 controlled). Primary methods of hemostasis, such as electrocautery, sutures, and staples, do not always allow achievement of complete hemostasis, or may be impractical. As such, use of adjunctive topical hemostats may be required to help achieve rapid and effective hemostasis.

Adjunctive hemostats manage bleeding by acting as mechanical barriers, providing a matrix for clotting, triggering coagulation, and/or sealing adjacent surfaces. Compared to primary methods alone, adjunctive hemostats have been shown to reduce utilization of hospital resources: up to 40% fewer patients require blood transfusions, up to 4 days shorter length of stay, up to 25 minutes reduced operating time, and significantly decreased likelihood of hospital readmission. A wide array of various types of adjunctive hemostats are available (e.g., absorbable matrices, gelatins, fibrin sealants, and patches) to accommodate various needs. However, selecting the most appropriate hemostat is challenging given ambiguous bleeding classifications, inconsistent clinical guidance on optimal utilization, and limited indications for use appropriate to specific bleeding situations. These ambiguities can create substantial confusion and potentially unnecessary variability for the management of surgical bleeding, as well as significant clinical and economic hospital burden.

A systematic approach to bleeding management
Because there is no existing universal and practical algorithm that provides guidance for surgical bleeding classification or optimal hemostat utilization, Ethicon, Inc. embarked on a large-scale quantitative research study that characterized hemostat usage. This research involved 450 surgeons from 11 surgical specialties, comprising over 7,800 bleeding occasions. Findings of this endeavor revealed that surgeons’ decisions for hemostat selection rely predominantly on the surgical bleeding site (anatomy and critical surrounding anatomic structures) and situation (access, tissue surface, bleeding intensity, and bleeding risk). Specifically, the real-world data categorized five universal bleeding situations and the optimal adjunctive hemostat selection for each situation. For example, continuous oozing bleeding would most optimally be addressed with oxidized regenerated cellulose (ORC) (see table). This guidance on the use of adjunctive hemostats in each bleeding situation is based on their physical and biochemical properties, mode of action, and real-world experience use across a broad range of surgical specialties.

Using the data and recommendations from this research, the Hemostasis Optimization Program (HOP) was developed, which focuses on reducing variation in hemostat use and optimizing performance in surgical bleeding management. The program was designed to provide guidance on adjunctive hemostat use through a systematic, step-wise approach that evaluates product use and performance, educates surgical teams, and provides action plans for the healthcare facility:
1. Collect and analyze hospital-specific data on case observations and product utilization
2. Review data and generate action plan regarding hemostat utilization education and evaluation with multidisciplinary teams
3. Hold education sessions on topics such as the burden of bleeding, hemostat marketplace clarification, science of hemostasis, and the program’s framework and guidance for recommended hemostat use
4. Establish and conduct in-procedure evaluations of the recommended solutions over a set time period
5. Ask surgeons and nursing staff to share experiences and feedback on the program’s effectiveness, as well as hurdles encountered and recommended solutions

As part of the program, several key materials are shared to enhance clinical awareness, including educational modules, procedural bleeding guides, and framework algorithms.

Real-world evidence at a U.S. hospital
The program has been implemented at hospitals across various countries, and the focus of this paper is the program’s impact at a large U.S. teaching hospital. At this hospital, as with most healthcare facilities, optimizing patient outcomes is a top priority. Second to this, cost containment has become essential, with the supply chain team increasingly looking for ways to optimize expenditure without sacrificing patient outcomes.
outcomes. With high volume and variability of hemostat use and product expenditure, implementing the HOP program represented a critical opportunity for the hospital to achieve its goal of continuously improving care based on value and quality. Such goals are aligned with the “Triple Aim,” “Quadruple Aim,” and the increasing push for value-based healthcare. At the hospital, the Supply Chain team, which has the combined role of product value analysis for perioperative products and inventory management, led the implementation of the HOP program and the conversion of the adjunctive hemostat portfolio to the new manufacturer (Ethicon).

A critical first step for the decision to implement the HOP program was to conduct a clinical and cost value analysis on the integration of the new manufacturer’s hemostats. The results of this analysis showed the potential for substantial cost savings, with similar or superior clinical benefits compared with using hemostats from the previous manufacturer. A trial period, then full conversion, of the adjunctive hemostat category was initiated in 2016. Essentially, the process involved switching 95% of the adjunctive hemostat category from prior manufacturers to a full-line supplier. The suite of value-added solutions offered by the HOP program was a key factor in the conversion decision-making process. Consolidating from two manufacturers to one also facilitated more efficient inventory management. Furthermore, converting to a full-line supplier allowed the hospital to have a broader portfolio of products to address their bleeding management needs.

Lessons were learned from this conversion and program implementation. Obtaining surgeon buy-in was critical to the success of this initiative, and the HOP framework facilitated constructive dialogue. Sharing details on the economic evidence was also critical in validating the process, for example, shifting utilization to more cost-effective products. In addition, education on the rationale for conversion, explanation of product differences and advances over time, and product demonstrations were key factors in obtaining buy-in from clinician and non-clinician stakeholders. Importantly, the support and active engagement of the new manufacturer’s representatives, for continual education on the HOP program during procedures and across the surgical community facilitated comprehensive deployment of this initiative.

Once the hospital achieved value analysis and clinician buy-in, the next step was determining how best to customize and integrate the HOP program, which the Supply Chain team felt was the most comprehensive program of its kind seen at their hospital. A hands-on process was required both inside and outside the operating room to bring in training and manage hurdles. The HOP framework was open to all specialties across all operating rooms; the highest level of interest came from cardiothoracic, vascular, spine, and neurosurgery, where multiple hemostats per procedure are sometimes used. Training was provided through various formats to accommodate different needs for the surgeons and staff, including in-services, audiovisual materials, handouts, presentations, and hands-on product training. To help with seamless delivery and minimize interruption, education was offered across shifts and was integrated into the normal workflow; for example, part of the training occurred at weekly staff meetings. Approximately 100 individuals were trained, including surgeons, nurse managers, inventory personnel, and perioperative technicians.

Finally, a system was set up to track hemostat costs as part of the program implementation. The number of hemostat units, by type, was analyzed to determine hemostat expenditure over a one-year observation period. In addition, a team outside of perioperative supply chain services tracked clinical outcomes, which were continuously monitored for changes in the data over time — no differences were detected before versus after conversion and HOP program implementation.

Achieving the goals

The economic analysis of the program’s impact revealed an annual cost savings of $168,688, not including contractual savings from switching to the full-line supplier. These findings aligned with the predicted savings calculated as part of the program’s initiative. To appropriately compare hemostat costs before and after program implementation, it was necessary to control for several factors, including new products introduced that were not part of the initial analysis, contracted price changes, and the case volume increase that occurred over the one-year observation period. Interestingly, the spend per hemostat unit trended downward 15% over the year (see figure). From a higher average to a lower average spend per unit of product, while case volume trended higher. This hemostat spend optimization was enabled by a shift toward the manufacturer’s more cost-effective products appropriate to each bleeding situation, in particular, advanced ORC hemostats (SURGICEL SNOW™ Absorbable Hemostat) and optimal utilization of flowable hemostats (SURGIFLO® Hemostatic Matrix). These findings indicate that the hospital managed the growth of its resource needs well and increasingly optimized its use of adjunctive hemostats over time.

These cost savings and product utilization efficiencies were observed alongside high surgeon and nurse satisfaction. For instance, it was reported that the team of nurses and surgeons were “Very Satisfied” (on a five-point rating scale) with the success of both product conversion and implementation of the HOP program. The hospital also noted improved product education and enhanced communication and support through a solid partnership with the manufacturer, which was integral to the program’s success. Furthermore, operating room efficiencies were observed, which can be partially attributed to having a predominantly single supplier. From a supply chain perspective, inventory monitoring became easier, contracting became more efficient, product waste was reduced, and higher-priced items were eliminated. Periodic evaluation and maintenance strategies were also put in place to ensure continued success.

Final Words

The Hemostasis Optimization Program was effectively implemented, and it represents one of the most comprehensive programs of its kind by this large U.S. teaching hospital. This evaluation demonstrated that cost savings, as well as operating room and supply chain efficiencies, were achieved without sacrificing patient outcomes. In addition, the portfolio conversion and program implementation were met with high staff satisfaction. Manufacturer support and provision of staff resources, through a consultative partnership, were integral to the success of this value-added initiative. The favorable outcomes of this evaluation warrant further partnership with the manufacturer and evaluation of the HOP program, to improve efficiencies in other applicable medical device categories.

References: