OBG MANAGEMENT

SPECIAL SECTION

THE 2019 SCIENTIFIC MEETING OF THE SOCIETY OF GYNECOLOGIC SURGEONS

HIGHLIGHTS ISSUE, PART 1

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B. Star Hampton, MD
Professor
Department of Obstetrics and Gynecology
Division of Urogynecology and Reconstructive Pelvic Surgery
The Warren Albert Medical School of Brown University
Women & Infants Hospital
Providence, Rhode Island

Peter C. Jeppson, MD
Assistant Professor
Division of Urogynecology
Department of Obstetrics and Gynecology
University of New Mexico School of Medicine
Albuquerque, New Mexico

Audra Jolyn Hill, MD
Assistant Professor
Division of Urogynecology
Department of Obstetrics and Gynecology
University of Utah School of Medicine
Salt Lake City, Utah

Sunil Balgobin, MD
Assistant Professor
Department of Obstetrics and Gynecology
Division of Female Pelvic Medicine and Reconstructive Surgery
University of Texas Southwestern Medical Center
Dallas, Texas

Sean C. Dowdy, MD
Professor and Chair
Division of Gynecologic Oncology
Mayo Clinic
Rochester, Minnesota

Rising to the challenges in gynecologic surgical care

Derived from presentations at this year's Society of Gynecologic Surgeons (SGS) meeting, this special section kicks off with features on enhanced recovery after surgery protocols and efforts to standardize pelvic anatomy terminology

B. Star Hampton, MD

As the face of health care changes and physicians are presented with new challenges, we need to keep focused on our priorities: maintain outstanding patient care, continue to grow ourselves as physicians, and train the next generation of women's health care providers. The theme of the SGS 2019 annual scientific meeting in Tucson, Arizona, "Looking Forward: Achieving Excellence in Gynecologic Surgery for Ourselves, Our Learners, and Our Patients," focused on these very concepts. This 2-part special section of OBG MANAGEMENT highlights some of the meeting's outstanding presentations.

The excellent postgraduate workshops included courses on simulation of laparoscopic suturing, surgical strategies for fibroid management, and a quality improvement boot camp. In addition, Rebecca Rogers, MD, Cassandra Carberry, MD, and Danielle Antosh, MD, along with physical therapist Uchenna Ossai, PT, DPT, WCS, ran a course on pelvic surgery and its impact on sexual function, tackling an important, often difficult topic for gynecologic surgeons. In part 2 of this special section, these authors highlight current knowledge on sexual function related to surgery and offer an initial evaluation and treatment approach for women with sexual dysfunction after surgery.

Peter Jeppson, MD, Audra Jolyn Hill, MD, and Sunil Balgobin, MD, have been integral leaders of the SGS Pelvic Anatomy Group, which has a mission to educate physicians about pelvic anatomy. Early discussions made it clear that standardized terms needed to be established and used for pelvic structures. On page SS4, these authors illustrate the importance of standard terminology to optimize patient care, and they review pertinent vaginal compartment structures for the gynecologist.

Along with outstanding plenary talks focusing on surgical education research by Gary Dunnington, MD, and health disparities in gynecologic surgery by Marcela del Carmen, MD, MPH, 2 special focus speakers were featured. Sean Dowdy, MD, highlighted advances in the perioperative care of gynecologic surgery patients. On page SS8, he reviews best practices for enhanced recovery after surgery (ERAS) and describes his experience with implementing a successful ERAS program.

Cheryl Iglesia, MD, covered energy-based therapies in female genital cosmetic surgery. In part 2 of this special section, she highlights, with Sarah Ward, MD, the salient points from her presentation, including the mechanism of action of laser therapy on tissue remodeling as well as some therapeutic uses for and outcomes of laser therapy in gynecologic care.

I hope you enjoy the content of this special section (part 2 will follow in the May issue) and find that it helps you achieve excellence in gynecologic surgery for yourself, your learners, and your patients! ■

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Anterior, apical, posterior: Vaginal anatomy for the gynecologic surgeon

The SGS Pelvic Anatomy Group is working to establish standard pelvic anatomic terminology for surgeons, with the ultimate goal of improving clinician communication and enhancing patient care

Peter C. Jeppson, MD; Audra Jolyn Hill, MD; and Sunil Balgobin, MD

CASE 1 **Defining anatomic structures to assure surgical precision**

A 44-year-old woman is scheduled for a vaginal hysterectomy and bilateral salpingectomy for abnormal uterine bleeding. In your academic practice, a resident routinely operates with you and is accompanied by a medical student. As this is your first case with each learner, you review the steps of the procedure along with pertinent anatomy. During this discussion, numerous anatomic terms are used to describe anterior cul-de-sac entry, including pubocervical fascia, vesicouterine fold, and vesicovaginal space. Which of these terms, if any, are correct? Is there a preferred term that should be used to teach future learners so we can all "speak" the same language?

What's in a name?

ObGyns must thoroughly understand pelvic anatomy, since much of our patient care relates to structures in that region. We also must understand the terminology that most appropriately describes each pelvic structure so that we can communicate effectively with colleagues and other providers. The case described above lists several terms that are commonly found in gynecologic textbooks and surgical atlases to describe dissection for vaginal hysterectomy. Lack of a standardized vocabulary, however, often confuses teachers and learners alike, and it highlights the importance of having a universal language to ensure the safe, effective performance of surgical procedures.[1]

At first glance, it may seem that anatomic terms are inherently descriptive of the structure they represent; for example, the terms uterus and vagina seem rather obvious. However, many anatomic terms convey ambiguity. Which muscles, for example, constitute the levator ani: pubococcygeus, pubovisceral, pubovisceralis, puboperinealis, puboanalis, pubovaginalis, puborectalis, puborectal, iliococcygeus, ischiococcygeus? Do any of these terms redundantly describe the same structure, or does each term refer to an independent structure?

Standard terminology is essential

Anatomists long have recognized the need for standardized terminology to facilitate clear communication. To provide historical background, the term anatomy is derived from the Greek word for "dissection" or "to cut open."[2] Records on the scientific study of human anatomy date back thousands of years.

A brief review of current standardized terminology can be traced back to 1895, with the publication of *Basle Terminologia Anatomica*.[3] That work was intended to provide a consolidated reference with clear direction regarding which anatomic terms should be used. It was updated several times during the ensuing century and was later published as *Nomina Anatomica*.

In 1990, an international committee was formed with representatives from many anatomical organizations, again with the intention of providing standardized anatomic terminology. Those efforts resulted in the publication of *Terminologia Anatomica: International Anatomical Terminology*, commonly referred to as TA, in 1998. TA continues to be the referent standard for

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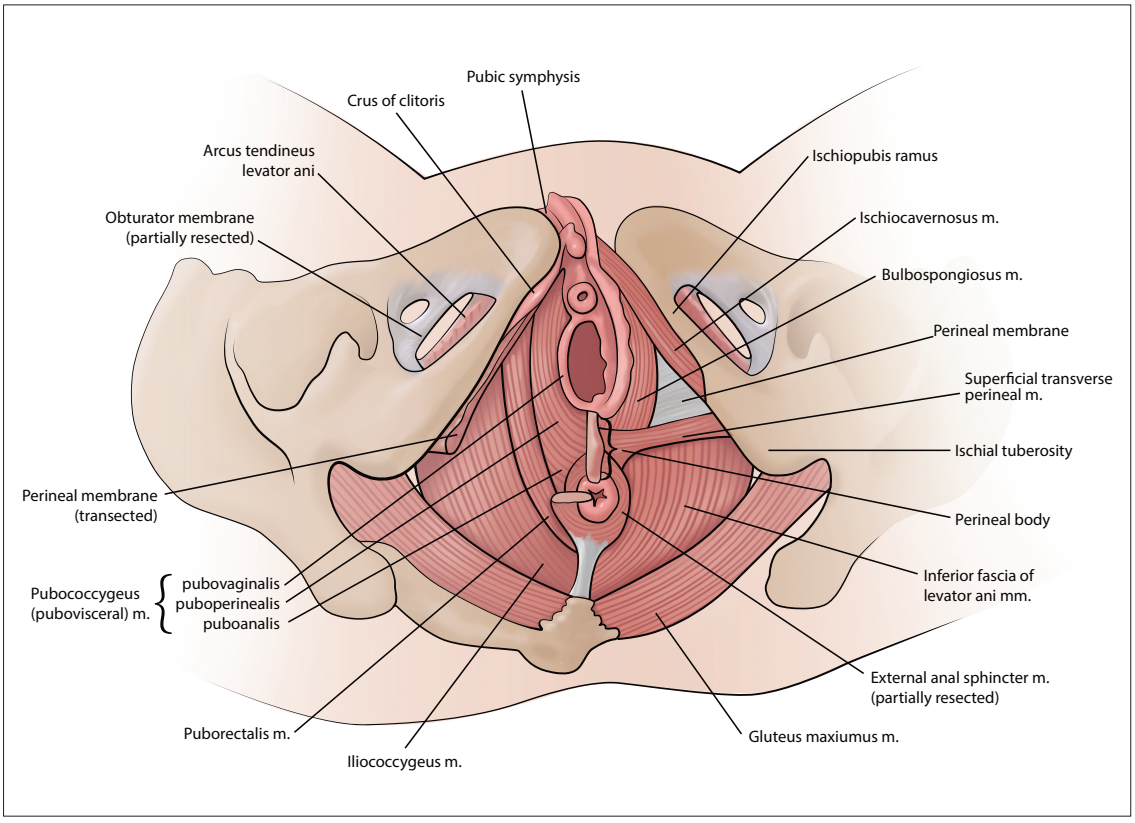
FIGURE 1 Muscle components of the levator ani



human anatomic terminology; it was most recently updated in 2011.[4]

CASE 2 Conveying details of mesh erosion

A 52-year-old woman presents to the general gynecology clinic with a 10-year history of pelvic pain and dyspareunia after undergoing vaginal mesh surgery for prolapse and urinary incontinence. On examination, there is a visible ridge of mesh extending from the left side of the midurethra along the anterior and lateral vagina for a length of 1.5 cm. There also is a palpable tight band on the right vaginal wall near the ischial spine that reproduces her pain and causes spasm of the levator ani. You believe the patient needs a urogynecology referral for complications of vaginal mesh. How do you best describe your findings to your urogynecology colleague?

Pelvic anatomy from the SGS perspective

The Society of Gynecologic Surgeons (SGS) recognized the importance of standardizing terminology specific to the pelvis. The SGS Pelvic Anatomy Group thus was organized in 2016. The Pelvic Anatomy Group's purpose is to help educate physicians about pelvic anatomy, with the overarching goal of compiling instructional materials, primarily from dissections (surgical or cadaveric), and radiologic imaging for all pelvic structures. Throughout the discussions on this initiative, it became clear that standardized terms needed to be established and used for pelvic structures.

While TA is an excellent reference work, it does not include all of the clinically relevant structures for gynecologic surgeons. As physicians, surgeons, and women's health care providers, we read about and discuss pelvic anatomy structures in medical textbooks, medical literature, and clinical settings that are not necessarily included in TA. In addition, advances in information technology have facilitated the creation of clinically oriented computer-based anatomy programs and expanded the number and availability of electronic publications on surgical and clinical anatomy.[5] As a result, there is a need not only to standardize nomenclature but

ILLUSTRATION: JOE GORMAN FOR OBG MANAGEMENT

also to continually revise and update terminology and integrate new terms, both from an anatomic and a clinical perspective.

The Pelvic Anatomy Group developed a novel approach to anatomic terminology. We decided to review the medical literature, identify the terms used, adjudicate the terms with current TA terms, and provide consensus for the terms and structures in the pelvis. Because of the volume of literature available and the existing number of terms, we divided the pelvis into 4 regions—anterior, apical, posterior, and vulvar—to improve the feasibility of reviewing the medical literature for the entire female pelvis.

Our process for tackling terminology

Our literature review started with the anterior compartment. (For complete details, see our prior publication.[3]) Modeled on a systematic review, we searched the MEDLINE database for terms related to the anterior pelvis, screened all associated abstracts, and then extracted terms from appropriate papers. We also identified several book chapters from various disciplines (anatomy, gynecology, urology, and radiology) to ensure wide representation of disciplines. We then extracted all terms pertinent to the anterior pelvis.

We organized the terms, with terms that referred to the same anatomic structure grouped together. Whenever possible, we used TA terms as the preferred terms. In this process, however, we identified several clinically relevant terms that were not included in TA: pelvic sidewall, pelvic bones, anterior compartment, pubourethral ligament, vaginal sulcus, and levator hiatus, among others. The new terms were then proposed and agreed on by members of the SGS Pelvic Anatomy Group and accepted by SGS members. We currently are completing a similar process for the apical pelvis, posterior pelvis, and vulvar regions.

TA code numbers pinpoint the nomenclature

As we move forward, we suggest that physicians use TA or other approved terms for patient and research communication. Such use will help standardize anatomic terms and also will improve communication between providers and education for learners.

TA includes approved options in English and Latin and lists a unique identification number for each term (shown in parentheses in the examples that follow). For instance, to answer the question posed earlier, the levator ani (A04.5.04.002) is comprised of the pubococcygeus (A04.5.04.003), puborectalis (A04.5.04.007), and iliococcygeus (A04.5.04.008) muscles (**FIGURE 1**, page SS5). The terms pubovisceral and pubovisceralis are used synonymously in the literature with pubococcygeus (A04.5.04.003).[3] The additional terms puboperinealis (A04.5.04.004), pubovaginalis (A04.5.04.005), and puboanalis (A04.5.04.006) are subcomponents of the pubococcygeus (A04.5.04.003), and this relationship is indicated in TA by indentation formatting.[4] Finally, the ischiococcygeus (A04.5.04.011) muscle is not considered part of the levator ani (A04.5.04.002).

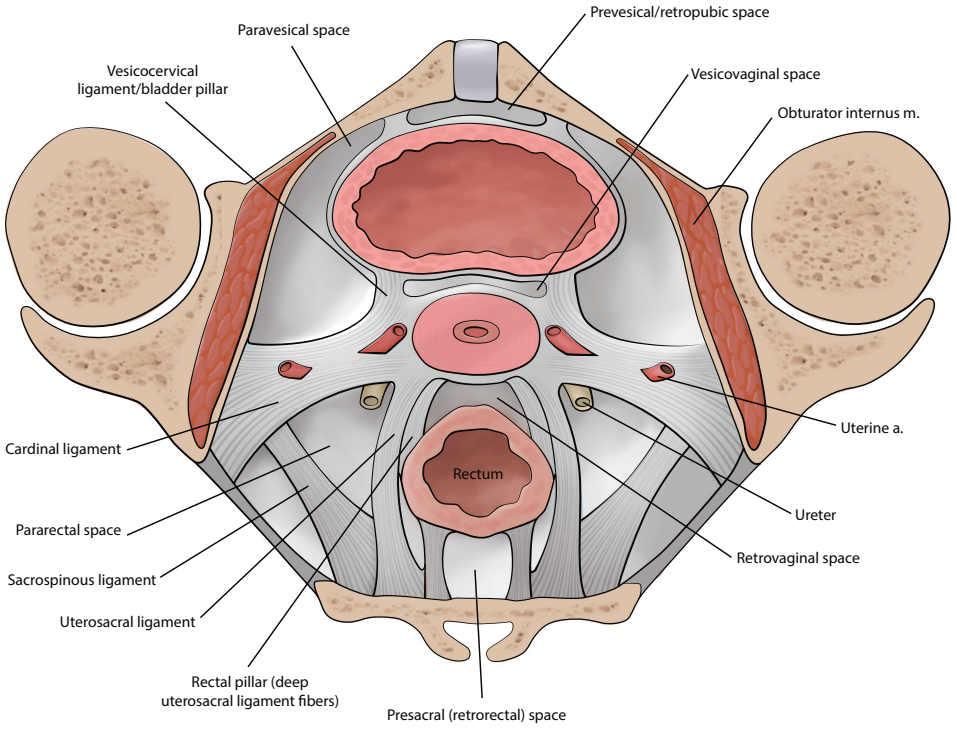
Revisiting the mesh erosion case: Reporting your findings

After reviewing the recommended terminology for the anterior pelvis,[3,4] you might draft a report as follows: "A mesh erosion was visualized in anterior vaginal wall (A09.1.04.006) at the level of the midurethra extending into 'anterior and lateral vaginal sulci' (proposed term). In addition, there is a painful tight band in the 'lateral vaginal wall' (proposed term) near the ischial spine (A02.5.01.205). Palpation of this band reproduces the patient's pain and causes secondary spasm of the levator ani (A04.5.04.002)." Certainly, TA identification numbers would not be expected to be included in medical communication; they are included here for reference.

From your description, your urogynecology colleague has a better understanding of the location of your patient's vaginal mesh and requests her operative report from an outside facility. In the operative report, the surgeon described "placement of mesh into the vagina, dissection through the rectal spaces, and anchoring of the mesh into the levator/pelvic muscles, the cervix, and lastly to the paraurethral ligaments," and "passage of trocars through the cave of Retzius at the level of the midurethra" (**FIGURE 2**).

Based on this description, the urogynecologist ascertains that the mesh is located in the anterior vaginal wall (A09.1.04.006), with passage of anchoring arms through the bilateral sacro-

FIGURE 2 Spaces and ligaments in the anterior pelvis pertinent to determining the location of vaginal mesh



spinous ligaments (A03.6.03.007) and retropubic space (A10.1.01.003). Exposed mesh is visible, extending from the midurethra to the "anterior and lateral vaginal sulci" (proposed term).

This case clearly demonstrates the importance of communication between providers for patient care, since understanding the patient's anatomy and the location of the vaginal mesh is important for planning surgical excision of the exposed mesh.

Additional initiatives

Outlining standardized terminology is just the first step toward improving the anatomic "language" used among providers. Ongoing efforts from the SGS Pelvic Anatomy Group include a special imaging group's review of imaging modalities (ultrasonography, magnetic resonance imaging, computerized tomography) to improve standardization on reporting clinical anatomy. In addition, SGS has developed a group to create educational content related to the structures identified by the terminology group from cadaveric or surgical dissections. Educational materials will be compiled to help physicians and learners expand their anatomic understanding and improve their communication.

Further details of the Pelvic Anatomy Group's efforts can be found on the SGS website at https://www.sgsonline.org. ■

ILLUSTRATION: JOE GORMAN FOR OBG MANAGEMENT

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Beyond enhanced recovery after surgery

An expert explains the key elements required to develop an effective ERAS program and strategies to facilitate change in the face of resistance

Sean C. Dowdy, MD

Our specialty is focusing now more intently on perioperative optimization, commonly referred to as *enhanced recovery after surgery (ERAS)*, a concept championed first and most visibly by colorectal surgeons in the 1990s.[1] Both academic and nonacademic practices are challenging long-held beliefs about perioperative management.

The 3 tenets of ERAS

In multiple surgical specialties, proper implementation of 3 tenets—early feeding, perioperative euvolemia, and multimodal pain control—reduces the length of hospital stay, improves patient satisfaction, reduces complications, lowers health care costs, and most importantly hastens patient recovery.

1 Early feeding

Just as athletes hydrate and carbohydrate load prior to a competition, patients benefit if fluids and calories are not withheld in anticipation of a physiologically stressful surgical procedure. Similarly, modest benefit is associated with carbohydrate loading as a liquid supplement 2 hours before surgery.[2] The American Society of Anesthesiologists guidelines state that while solid foods should not be consumed after midnight before surgery, clear liquids safely may be withheld for only 2 hours prior to anesthesia induction, and systematic reviews have failed to show harm.[3,4] All patients, including those undergoing colonic resections, are allowed to eat a general diet as tolerated the evening before surgery, supplemented with caloric-dense nutritional supplements.

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2 Multimodal pain control

Postsurgical pain is a top patient concern. Pain control is critical for rapid recovery; it helps avoid upregulation of the sympathetic axis and permits ambulation and resumption of normal activities. Although opioids relieve pain, they should not be considered a primary pain control approach.

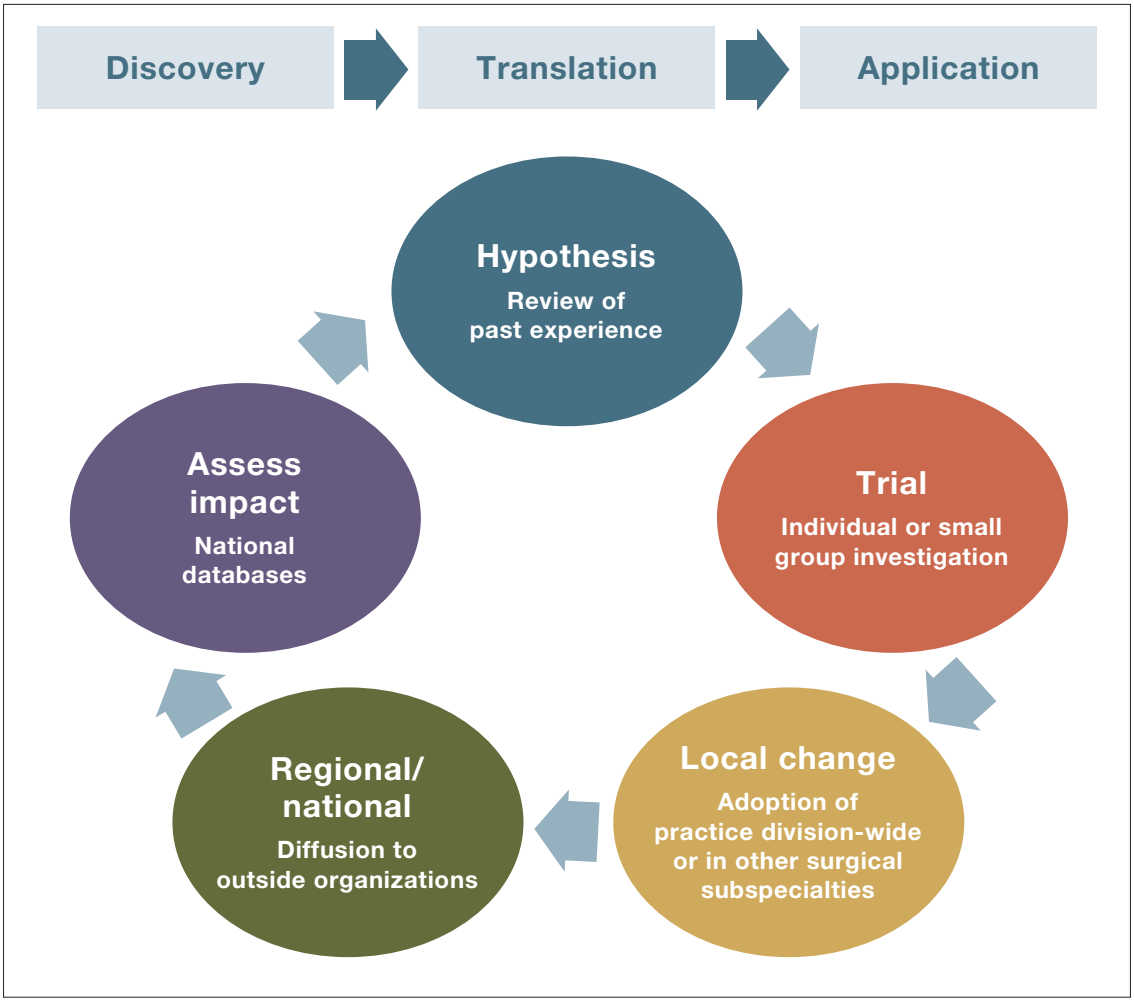
Responding to the opioid epidemic, in 2015 the Centers for Disease Control and Prevention identified opioid overdose prevention as one of the top 5 public health challenges; notably, approximately 6% of patients will experience new, persistent opioid use following surgery.[5] Optimal pain management therefore should provide effective pain relief while minimizing opioid use.

Preemptive oral acetaminophen, gabapentin, and celecoxib should be used routinely prior to incision; nonsteroidal anti-inflammatory drugs should be scheduled postoperatively. Even after a complex cytoreductive laparotomy, pain may be controlled with oral rather than intravenous (IV) medications in most patients, with opioid requirements averaging just 2 to 4 tablets of oxycodone in the first 48 hours after surgery, in our experience. The most critical need for pain medications occurs in the first 48 hours after surgery, which highlights the importance of local or regional analgesia. In one investigation, implementation of multimodal pain management that included incisional injection of liposomal bupivacaine reduced patient-controlled analgesia use to less than 5% after laparotomy.[6] The need for opioids more than a week postoperatively is uncommon even after a laparotomy.

3 Perioperative euvolemia

Maintaining euvolemia is a central and underrecognized tenet of enhanced recovery pathways,

FIGURE 1 ERAS cycle of diffusion and continuous improvement



Tailored solutions are required to overcome obstacles at each transition.
Abbreviation: ERAS, enhanced recovery after surgery.

and it facilitates the other 2 tenets of early feeding and optimal pain control. Overhydrated patients have more pain and prolonged recovery of bowel function. Unfortunately, euvolemia is the most difficult ERAS component to implement, requiring seamless communication between all members of the surgical team.

Fluid therapy should be respected as a pharmacologic agent with both benefits and risks. Recognizing that a single liter of lactated Ringer's solution contains the sodium load of more than 30 bags of potato chips (and normal saline contains far more), one can imagine the impact of 10 L of solution on peripheral and bowel edema and on overall recovery. Importantly, euvolemia must be initiated during surgery. A meta-analysis of nearly 1,000 randomly assigned patients showed that benefits were limited when euvolemia was initiated in the postoperative period.[7]

When it comes to maintaining euvolemia, particular care must be taken to avoid erring toward hyperadherence. No difference in hospital length of stay, complications, or ileus was observed when patients were randomly assigned to goal-directed fluid therapy or standard practice.[8] However, differences in the volume of fluid administered were relatively small, and while there was evidence of underhydration (likely responsible for acute kidney injury), there was no evidence of overhydration. For example, 4 L of fluid

is likely superior to 15 L, but it may not be clinically different from 4.5 L. A threshold of fluid restriction is likely to be reached; that is, additional benefit is not achieved and, instead, detrimental effects may occur.

Rather than a specific directive, a more clinically relevant goal may be to replace insensible fluid losses and to maintain perfusion and blood pressure with the lowest volume possible. Note that estimation of fluid requirements is vastly simplified by omitting mechanical bowel preparation. Postoperatively, permissive oliguria (20 mL/h) is allowed since reduced urine output is a normal response to surgery (as a result of inappropriate secretion of antidiuretic hormone) and does not necessitate administration of a fluid bolus. Above all, anesthesiologists should acknowledge that fluid administration's effects on a patient extend past the postanesthesia care unit, and the entire surgical team should be invested in the patient's long-term recovery.

Our experience with ERAS

In 2011, Mayo Clinic was the first institution to implement enhanced recovery on a large scale in gynecologic surgery. We have subsequently made multiple pathway modifications in the spirit of continuous improvement (**FIGURE 1,** page SS9).

For patients with ovarian cancer requiring extended procedures for cytoreduction via laparotomy (such as colon resection, splenectomy, diaphragm resection), enhanced recovery reduced the median hospital stay by 3 days, patient-controlled IV analgesia use by 88%, and postoperative opioid requirements by 90%.[9,10]

At 48 hours after surgery, 40% of our patients require no opioids or tramadol, and epidurals are not utilized because of their effects on ambulation and the potential for hypotension. These reductions were met with stable to improved pain scores, a 60% decrease in nausea, and a 50% reduction in adynamic ileus.[9,10]

Our initial efforts reduced 30-day costs of care by more than $850,000 in just 6 months, with savings of more than $7,600 for each patient undergoing a complex cytoreduction. Furthermore, these improvements allowed consolidation of our inpatient unit with those of other surgical specialties, serving higher volumes of patients within a smaller inpatient footprint. This contraction of inpatient services has accounted for an additional $1.1 million in savings every year since implementation (**FIGURE 2**).[9,10]

Our group is not alone in realizing these benefits, and interest has intensified as demonstrated by the fact that the ERAS Society guidelines are among the all-time most downloaded articles in *Gynecologic Oncology*.[11,12] Although our research to demonstrate safety has focused on women undergoing complex oncologic operations, ERAS nevertheless hastens recovery, improves patient satisfaction, and adds value for all patients undergoing gynecologic surgery.

Collateral improvements to practice

Clinical optimization using evidence-based practices such as enhanced recovery pathways can result in immediate patient benefit. Affecting such profound clinical improvements is energizing and creates a unique opportunity to transform the culture of the entire health care team. Irrespective of our provider roles (surgeon, anesthesiologist, nurse) or areas of interest (practice, research, education, leadership), we are united by a common purpose: to improve the human condition.[13] Reaffirming this common purpose, through the collective effort involved in establishing a standardized enhanced recovery pathway, has allowed our practice and those of others to move beyond enhanced recovery and improve other areas of practice.

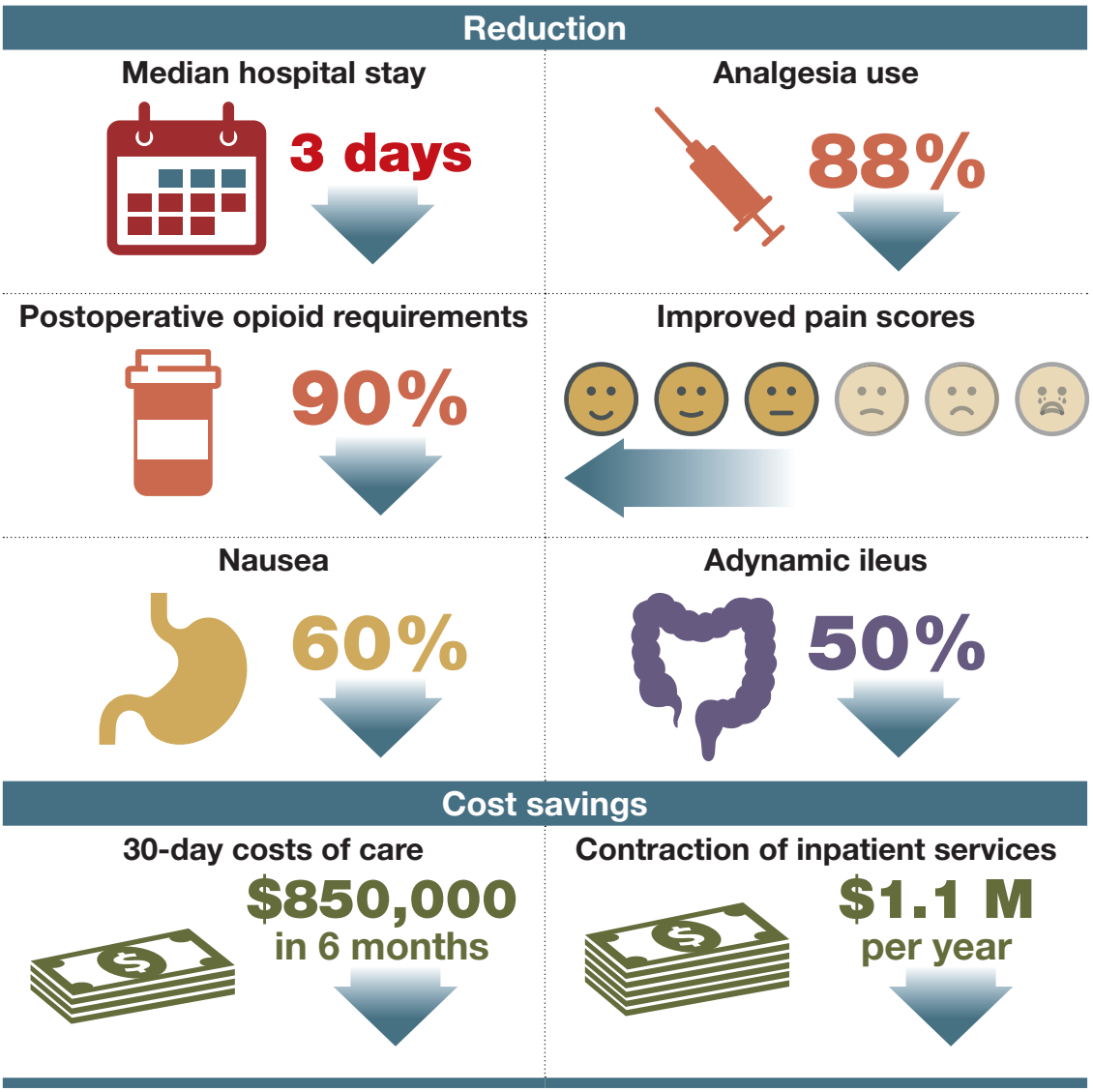
Other positive effects. The long-term collateral impact of this culture change at our institution is arguably more important than enhanced recovery itself. Examples of downstream impact include[14,15]:

- 80% reduction in surgical site infection
- 50% reduction in anastomotic leaks
- 60% reduction in blood utilization for patients undergoing surgery for ovarian cancer.

Team-based pragmatic strategies. Additionally, our willingness to make decisions as a division rather than as individuals facilitated universal implementation of sentinel lymph node biopsy for patients with endometrial cancer and standardized imaging, testing, and surgical decision making for patients with ovarian and endometrial cancer.

The interventions associated with these im-

FIGURE 2 Beyond ERAS: Clinical improvements and cost savings



provements were not tested in a randomized fashion; however, rather than await perfect data, we made informed decisions based on imperfect data together with a commitment to continuous data review. We find this to be an effective strategy if our goal is to ensure that tomorrow's outcomes will be better than yesterday's. In this way, pragmatic trials can be extremely effective in rural settings and tertiary centers.

Barriers to innovation

The widely reported benefits of enhanced recovery beg the question, Why has enhanced recovery not been adopted universally as standard of care? The answer is multifaceted and highlights long-standing shortcomings in our health care system.

Most importantly, our health care system lacks a robust interface to link discovery of new techniques, treatments, and workflows to clinical practice. Perhaps the best example of this is the adoption of minimally invasive surgery (MIS) for endometrial cancer. Ten years have passed since randomized trials showed MIS has equivalent oncologic outcomes and superior recovery compared to laparotomy, yet in the United States less than 50% of women with endometrial cancer benefit.[16,17]

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ERAS resource: The Improving Surgical Care and Recovery program

The national Improving Surgical Care and Recovery program is available to specifically aid with ERAS implementation. A collaboration between the Agency for Healthcare Research and Quality (AHRQ) and the American College of Surgeons, the program aims to diffuse enhanced recovery to 750 service lines in 4 surgical subspecialties, including gynecologic surgery, over the next 5 years. (Note: The author is the content expert for the gynecology portion of this program.) The program's larger aim is to measurably improve patient outcomes, reduce health care utilization, and improve patient experience through the use of an adaptation to AHRQ's Comprehensive Unit-based Safety Program (CUSP).

The backbone for this program is the recent systematic review to establish best practices for gynecologic surgery.[1] Free to all participants, the program includes resources such as webinars and coaching calls to assist with the inevitable barriers to ERAS implementation. For more information and to enroll, visit https://www.ahrq.gov/professionals/quality-patient-safety/hais/tools/enhanced-recovery/index.html.

An important aspect of the program is a registry for tracking outcomes and identifying areas for improvement. For members who currently participate in the National Surgical Quality Improvement Program, clinical data are automatically uploaded into the database.

Programs such as Improving Surgical Care and Recovery may be the most reliable way to facilitate diffusion of best practices and take collective responsibility for not only "my outcomes" but also for "our outcomes" as a national community of gynecologic surgeons.

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However, even surgeons who are knowledgeable about recent innovations and genuinely wish to promote improvements may face near-insurmountable skepticism. Blind faith in our abilities and outcomes, overprotection of autonomy, close-mindedness, and satisfaction with the status quo are common responses to innovation and are the enemies of change. Resistance often comes from good intentions, but our desire to avoid complications may result in actions that could just as accurately be labeled superstitious as conservative. These observations suggest that developing methods to incorporate evidence-based practice into routine clinical use is the rate-limiting step in improving surgical quality.

Principles essential to change

Various methodologies have been described to manage change and facilitate implementation of new workflows and practices. Irrespective of the method used, including the more formal discipline of implementation science, at least 4 principles must be followed:

1. Teamwork. Mutual trust, mutual respect, and a sense of common purpose are minimum requirements for any successful initiative. Standardization is difficult or impossible without these elements. Thus, establishing a healthy team is the first step in implementing change.

2. Stakeholder analysis. Feedback from surgeons, nurses, residents, fellows, anesthesiologists, pharmacists, nurse anesthetists, and administrators is necessary to obtain diverse perspectives, facilitate engagement, and promote collaborative management. Negativity and resistance are common reactions to change, and it is particularly important to include those who are most skeptical in the stakeholder analysis to mitigate sabotage.

3. Concrete metrics. Success is possible only if defined a priori by specific and achievable goals. Counterbalances also are important to ensure that interventions do not have unintended consequences. Once a goal is met (for example, reduced hospital length of stay or costs), relevant metrics should be monitored after project completion for a minimum of 3 years to avoid regression to the pre-project state.

4. Leadership. The project champion responsible for the initiative must objectively facilitate all of the above and ensure excellent communication between stakeholders to nurture long-term

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engagement. Despite best efforts, if a minority of the group rejects compromise, this creates an opportunity to compare outcomes between those who do and do not accept the proposed change. Progress realized by early adopters may convince resistors to conform at a later time. Alternatively, the project champion also must have the insight to recognize when a proposed change is impossible at that point in time with that particular group. For example, our own initial attempts to implement enhanced recovery stalled in 2008, but they were successful 3 years later in a different environment.

Although a discussion of leadership styles is beyond the scope of this article, in our experience, the most successful model is one of servant leadership that is team oriented rather than star dominated. Rather than being led by a single surgeon, each of the 4 quality improvement projects reviewed above (ERAS, and reductions in anastomotic leak, surgical site infection, and blood transfusion) that grew from enhanced recovery included trainees and was led by a different champion, encouraging teamwork and promoting career development. Such a model also supports the Accreditation Council for Graduate Medical Education's emphasis on quality improvement education. ■

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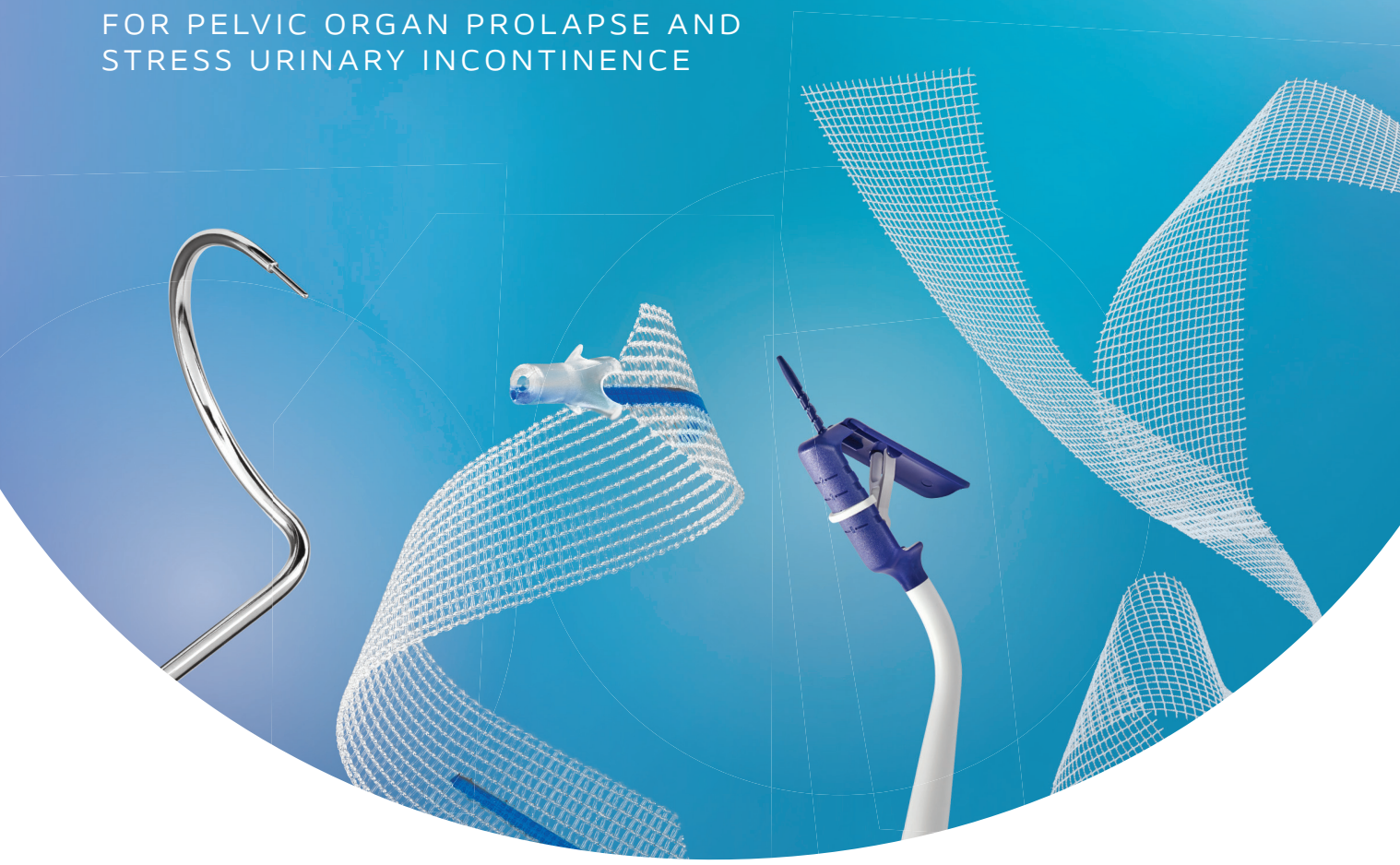

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