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Surgical Site Infections in Gynecologic Oncology: Editorial

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Site Infections in Gynecologic Oncology

Surgery is the cornerstone of treatment for gynecologic malignancies; therefore a gynecologic oncologist may encounter a number of postoperative surgical site infections (SSIs) throughout his or her career [1-3]. The importance of reducing these SSIs cannot be overstated in modern day healthcare. The goal to reduce SSIs is twofold: one, to limit the patient's morbidity and two, reduce the costs of healthcare by decreasing readmission rates and limiting prolonged hospital stays. In the former, SSIs can result in significant morbidity and mortality for the gynecologic oncology patient, imposing additional suffering to an individual who already carries a morbid diagnosis [4]. SSIs in these patients may prolong hospital stays, introduce antimicrobial resistant bacteria, expose patients to medication reactions/errors and more importantly, may even lead to decreased overall survival [5,6]. This is evidenced in a retrospective review of 888 gynecologic oncology patients who underwent primary surgery for ovarian cancer. In the study, increasing BMI, operative time and advanced stage disease were independently associated with SSIs, which in turn led to a decrease in OS. The investigators reported an increased risk of death with a HR of 1.69 [1.12,2.57] for superficial SSIs and a HR of 1.46 [1.07,2.00] for organ/space infections [6]. With these findings, the authors identified an ongoing need for alternative measures to lower SSI rates.

Although readmission rates might not be an ideal means of ranking and/ or penalizing hospitals, the availability of readmission rates in administrative claims-based datasets makes it an easily available metric to profile hospital quality [7]. Merkow et al. pointed out that hospitals could suffer substantial financial losses because of postoperative complications [7,8]. Specifically, they could be penalized twice: once for a higher SSI rate, and then again for a higher readmission rate resulting from the higher SSI rate. Therefore, efforts to curb rates of readmission should focus on reducing surgical time and increasing the use of minimally invasive surgery, both of which have been firmly established to decrease SSI [7-11].

With the goal of reducing SSIs in mind, there has been an interest in implementing new strategies for the elimination of SSIs. One such strategy has been the introduction of "bundled interventions" in the perioperative time frame. Johnson et al. proposed the use of "bundled interventions" in gynecologic oncology patients undergoing laparotomies for surgical staging. In the study, Using Bundled Interventions to Reduce Surgical Site Infection After Major Gynecologic Cancer Surgery, the investigators paired commonly used pre-interventions (patient education regarding infections, use of a chlorhexidine gluconate shower prior to surgery, chlorhexidine gluconate, and isopropyl alcohol skin preparation in the operating room, prophylactic use of cefazolin) with newly proposed intraoperative and postoperative interventions (sterile closing trays, and a shower with 4% chlorhexidine gluconate following dressing removal 24 hours post operatively). The authors showed a statistically significant decrease of overall SSI from 5.9% to 1.5% in patients with the newly proposed intraoperative and postoperative interventions [12]. In continuing with the bundled care for reduction of SSIs in gynecologic oncologic patients, Al-Niaimi et al. and Chapman et al. have identified perioperative glycemic control as an important aspect of the "bundle intervention". Al- Niaimi et al. initiated intensive glycemic control for 24 hours after surgery in 372 patients with diabetes mellitus and postoperative hyperglycemia. The study found that intensive glycemic control significantly lowers rates of SSI [13]. Similarly, Chapman et al. used perioperative immune modulating diets (IMDs) in patients undergoing laparotomies to control blood glucose levels [14]. Consumption of IMDs remained protective against wound complications with an OR of 0.45 [CI 0.25-0.84] [13,14]. Although helpful and important in reducing SSI, these "bundled interventions" are not likely to be the silver bullet in SSI prevention. Gynecologic oncologists therefore need to consider how improving and advancing current surgical techniques could reduce SSI.

In the current era of medicine where preventing perioperative adverse events like SSIs has become the focus of quality improvement efforts, gynecologic oncologists are in search of less morbid procedures to achieve superior surgical and oncological outcomes for their patients. Efforts should focus on reducing surgical time and increasing the use of minimally invasive surgery (MIS), both of which decrease SSI [9-11]. Currently, MIS includes and is not restricted to standard laparoscopy, robotic surgery, mini-laparoscopy, single-port laparoscopy and sentinel lymph node mapping (SLN). MIS remains an important tool in gynecologic oncology since standard laparoscopy has been established as the preferred surgical technique over the last decade, particularly for endometrial and ovarian cancer staging as a staging and interval cytoreductive procedure [3].

In addition to standard MIS techniques there are newly developed technologies that have not yet undergone randomized controlled trials (RCT), but may be beneficial in reducing the above mentioned surgical complications. Two examples are Laparoendoscopic single-site surgery (LESS) and SLN. LESS exploits one single incision for completion of surgical procedures, this decreases the introduction of incisions and multiple laparoscopic port sites [15,16]. With the LESS technique there have been small positive trials in endometrial and ovarian cancer staging, risk reducing hysterectomies and bilateral salpingo-oophorectomy. The benefits of this new technique remain to be seen without RCTs and certainly merit further investigation for determination of SSI rates, postoperative hospital stay and overall survival. The second minimally invasive technique that may help to reduce SSI is SLN mapping. SLN mapping has the potential to reduce surgical trauma to the lymphatic channels, reduce the number of lymph nodes removed, and decrease postoperative lymphatic stasis,

likely reducing lymphocele formation and importantly, superinfection of the same. This technique could therefore help reduce SSI in patients requiring lymph node assessment. In addition, there may be benefits in limiting the removal of lymph nodes as they are an integral aspect of the immune system. There have been encouraging results in a number of small studies in vulvar, endometrial, ovarian and cervical cancer with SLN mapping [17-19]. Currently, the National Comprehensive Cancer Network (NCCN) has stated that SLN can be considered for surgical staging of malignancy confined to uterus, but the role of SLN is currently being evaluated with ongoing randomized control trials. Additionally, cervical and ovarian cancer both have rudimentary data showing SLN mapping may be helpful to decrease the need for pelvic lymphadenectomy in early-stage cervical cancer [20,21]. Gynecologic oncologists may have the ability to greatly reduce SSIs with the utilization of SLN mapping through minimizing tissue manipulation, limiting surgical complexity and shortening overall surgical time.

While the benefits of "bundled interventions" on the rate of SSI are evident, the utilization of MIS also plays a large role in decreasing SSIs. Moving ahead, we need to validate LESS and SLN via randomized controlled trials and continue to advance new surgical approaches in MIS, for example, video endoscopic inguinal lymphadenectomy in vulvar cancer. By following this path, gynecologic oncologists will gain the necessary tools to reduce SSIs and improve patient outcomes.

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