Surgical Site Infections in Gynecologic Oncology: Editorial

Gary Altwerger, Gulden Menderes, Jonathan D Black and Masoud Azodi*

Department of Obstetrics, Gynecology and Reproductive Sciences, Section of Gynecologic Oncology, Yale School of Medicine, New Haven, Connecticut, USA

*Corresponding author: Masoud Azodi, Professor of Obstetrics, Department of Obstetrics, Gynecology and Reproductive Sciences, Section of Gynecologic Oncology, Yale School of Medicine, New Haven, Connecticut, USA, Tel: 203-384-4870; Fax: 203-384-3579; E-mail: masoud.azodi@yale.edu

Rec date: July 21, 2016; Acc date: July 22, 2016; Pub date: July 27, 2016

Copyright: © 2016 Altwerger G et al. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

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/errs 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 ofSSI 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 SSIs 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.

References

1. Swenson CW, Kamdar NS, Harris JA, Uppal S, Campbell DA Jr, et al. (2016) Comparison of Robotic and Other Minimally-Invasive Routes of Hysterectomy for Benign Indications. Am J Obstet Gynecol 50002-9378: 30370-30372.
2. Liu CE, Lu Y, Yao DS (2015) Feasibility and Safety of Video Endoscopic Inguinal Lymphadenectomy in Vulvar Cancer: A Systematic Review. PLoS One 10: e0140873.
3. Walker JL, Piedmonte MR, Spirtos NM, Eisenkop SM, Schlaerth JB, et al. (2012) Recurrence and survival after random assignment to laparoscopy versus laparotomy for comprehensive surgical staging of uterine cancer: Gynecologic Oncology Group LAP2 Study. J Clin Oncol 30: 695-700.
4. Cima R, Dankbar E, Lovely J, Pendlimari R, Aronhalt K, et al. (2013) Colorectal surgery surgical site infection reduction program: a national surgical quality improvement program–driven multidisciplinary single-institution experience. J Am Coll Surg 216: 23-33.
5. de Lissovoy G, Freeman K, Hutchins V, Murphy D, Song D, et al. (2009) Surgical site infection: incidence and impact on hospital utilization and treatment costs. Am J Infect Control 37: 387-397.
6. Tran CW, McGree ME, Weaver AL, Martin JR, Lemens MA, et al. (2015) Surgical site infection after primary surgery for epithelial ovarian cancer: predictors and impact on survival. Gynecol Oncol 136: 278-284.
7. Dimick JB, Ghaferi AA (2015) Hospital readmission as a quality measure in surgery. JAMA 313: 512-513.
8. Merkow RP, Ju MH, Chung JW, Hall BL, Cohen ME, et al. (2015) Underlying reasons associated with hospital readmission following surgery in the United States. JAMA 313: 483-495.
9. Fader AN, Weise RM, Sinno AK, Tanner EL 3rd, Borah BJ, et al. (2016) Utilization of Minimally Invasive Surgery in Endometrial Cancer Care. Obstet Gynecol 127: 91-100.
10. Black JD, de Haydu C, Fan L, Sheth SS (2014) Surgical site infections in gynecology. Obstet Gynecol Surv 69: 501-510.
11. Menderes G, Ali AN, Aagaard K, Sangi-Haghpeykar H (2012) Chlorhexidine-alcohol compared with povidone-iodine for surgical-site antisepsis in cesarean deliveries. Obstet Gynecol 120: 1037-1044.
12. Johnson MP, Kim SJ, Langstraat CL, Jain S, Habermann EB, et al. Using Bundled Interventions to Reduce Surgical Site Infection After Major Gynecologic Cancer Surgery. Obstet Gynecol 127: 1133-1144.
13. Al-Niaimi AN, Ahmed M, Burish N, Chackmakchy SA, Seo S, et al. (2015) Intensive postoperative glucose control reduces the surgical site infection rates in gynecologic oncology patients. Gynecol Oncol 136: 71-76.
14. Chapman JS, Roddy E, Westhoff G, Simons E, Brooks R, et al. (2015) Postoperative enteral immunonutrition for gynecologic oncology patients undergoing laparotomy decreases wound complications. Gynecol Oncol 137: 523-528.
15. Tschernichovsky R, Diver EJ, Schorge JO, Goodman A (2016) The Role of Lymphadenectomy Versus Sentinel Lymph Node Biopsy in Early-stage Endometrial Cancer: A Review of the Literature. Am J Clin Oncol.
16. Boruta DM (2016) Laparoendoscopic single-site surgery in gynecologic oncology: An update. Gynecol Oncol 141: 616-623.
17. Moore RG, Robison K, Brown AK, DiSilvestro P, Steinhoff M, et al. (2008) Isolated sentinel lymph node dissection with conservative management in patients with squamous cell carcinoma of the vulva: a prospective trial. Gynecol Oncol 109: 65-70.
18. Hassanzade M, Attaran M, Treglia G, Yousefi Z, Sadeghi R (2013) Lymphatic mapping and sentinel node biopsy in squamous cell carcinoma of the vulva: systematic review and meta-analysis of the literature. Gynecol Oncol 130: 237-245.
19. Robison K, Roque D, McCourt C, Stuckey A, DiSilvestro PA, et al. (2014) Long-term follow-up of vulvar cancer patients evaluated with sentinel lymph node biopsy alone. Gynecol Oncol 133: 416-420.
20. https://www.nccn.org/store/login/login.aspx?ReturnURL=https://www.nccn.org/professionals/physician_gls/PDF/uterine.pdf
21. https://www.nccn.org/store/login/login.aspx?ReturnURL=https://www.nccn.org/professionals/physician_gls/PDF/cervical.pdf