

Prevention of surgical site infection: still an important challenge in colorectal surgery

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Surgical site infection (SSI) is the most frequent hospital-acquired infection after colorectal surgery. It has an important impact on postoperative hospital stay, mortality, readmission and overall healthcare costs. In the USA, SSI increases the cost of a colectomy by \$17 324, on average [1].

More and more, SSI is related to the quality of care and several health insurances have ceased reimbursements for additional care provided because of SSI. Moreover, hospital administrators, legislators and politicians have also become aware of the adverse impact of SSI and of the fact that, in many cases, SSI are preventable.

Benchmarking results have been shown to have a global improvement effect in specific group outcomes. However, there is still a wide variation in state monitoring and reporting SSI rates [2].

In the literature, SSI rates after elective colorectal surgery range from 5 to 40 % [3]. There seem to be two main reasons for this wide variation. On the one hand, different definitions, which are often very subjective, are used to diagnose infections. On the other hand, cases diagnosed after discharge and within 30 days after surgery are sometimes included, sometimes not.

Most of the published series report SSI rates higher than expected according to the National Nosocomial Infections Surveillance (NNIS) report which raises the question of whether the NNIS reflects the overall reality of infection in colorectal surgery. Collaboration with cancer nurses may

improve a strict follow-up and the increasing home care services may give patients an easier access to their surgical team in order to improve the completeness and reliability of registered data.

Most of the studies on SSI after colorectal surgery analyze together colon and rectal operations as well as benign and malignant diseases. Other studies suggest that SSI rates and risk factors in colon surgery differ from those in rectal surgery. In rectal cancer surgery, there is often need for an ostomy, preoperative chemoradiation, anastomosis close to the anal verge, intersphincteric resections, ultra-low Hartmann procedures or abdominoperineal resections.

Wound infection and organ space infection have been grouped together in the concept of SSI. However, these are two distinct scenarios that arise for different reasons and they should be evaluated separately. It has been observed that while tumor stage and conversion from laparoscopic to open surgery can influence wound infection, type of surgery influences organ space infection [4].

Risk factors for SSI have been identified. Patient-related factors (diabetes mellitus, malignancy, steroid use, anemia, need for perioperative blood transfusion, obesity and immunosuppression) or surgery-related factors (perioperative normothermia, hypoxia, bowel preparation, operative time, antibiotic prophylaxis, types of operation or wound edge protection) could influence the postoperative SSI rate.

Despite the well-established beneficial effect of systemic antibiotic prophylaxis on SSI and the widespread use of prophylactic measures, the appropriateness of those measures is not clearly established.

A recent randomized trial failed to prove that an evidence-based intervention bundle for preventing surgical site infection reduces SSI [5]. Another randomized trial in patients undergoing elective colorectal cancer surgery

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analyzed the impact of a policy of re-scrubbing before laparotomy closure upon wound SSI rates. At 30 days, re-scrubbing did not reduce the SSI rate [6].

Other preventive measures in elective colorectal surgery have been shown to have a beneficial effect on SSI risk. In a randomized clinical trial, antibiotic lavage of the peritoneum with clindamycin-gentamicin was associated with a lower incidence of intra-abdominal abscesses and wound infection [7].

A recent systematic review and meta-analysis investigating the effect of triclosan-coated sutures and conventional uncoated sutures on SSI concludes that use of triclosan-coated sutures may reduce the incidence of SSI and the additional medical costs associated with SSI [8].

Perineal wound infection is a common problem after abdominoperineal resection of the rectum with a high incidence, especially in patients who received preoperative radiation. Moreover, anastomotic dehiscence and local peritonitis after rectal cancer surgery could influence local and distant recurrence.

The impact of local application of a gentamicin-collagen sponge in rectal cancer surgery is controversial. Recently, it has been evaluated in a multicentre randomized controlled trial and no effect on perineal wound complications or cancer recurrence was shown [9].

In this issue, Rutkowski and colleagues publish an interesting randomized clinical trial analyzing the role of gentamicin-collagen implants (GCI) on SSI in patients with rectal cancer treated with neoadjuvant short-term radiotherapy and mesorectal excision [10]. While the main outcomes of the study, evaluation of the rate of local and distant recurrence in patients after R0 resection, will be published after the completion of follow-up, the incidence of SSI is presented.

One hundred and seventy-six patients were randomized to the study group with GCI or to the control group without adjunctive use of GCI. All patients underwent preoperative irradiation with a total dose of 25 Gy in five fractions over 5 days. After rectal resection, two implants were inserted in the space created after mesorectal resection in patients randomized to the study group. All patients had a pelvic drain. The two groups of patients were well balanced and comparable in terms of demographic characteristics, tumor localization, types of rectal resection, surgery duration and pathologic results. The authors clearly differentiate superficial, deep and organ space infection and they perform a follow-up evaluation after discharge at 30 and 90 days after surgery.

Whether a pelvic abscess must be assumed as a consequence of a dehiscence still is a matter of controversy. Rutkowski and colleagues, in this study, clearly define anastomotic dehiscence and considered intra-abdominal pelvic abscess a result of leakage only when a leakage was

confirmed by computed tomography scan, digital rectal examination, fecal material in the drain or laparotomy.

The overall postoperative SSI rate was 22.2 %, while organ space infection was observed in 27 patients (15.8 %). In patients with anastomotic dehiscence, GCI did not influence the risk of organ space infection. However, if there was no leakage, organ space infection was significantly lower in the GCI group. No differences were observed among patients who underwent abdominoperineal resection. The authors conclude that implantation of GCI in the pelvic cavity following short-term preoperative radiotherapy and total mesorectal excision for rectal cancer can reduce organ space infection but only in the absence of anastomotic leakage.

We look forward to reading the important oncological results of this trial that will give us information on the potential effect of SSI prevention on cancer recurrence.

Conflict of interest None.

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