

Does immediate reconstruction increase postmastectomy surgical site infection?

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Immediate reconstruction has become routine surgical practice in most breast cancer patients submitted to mastectomy. The opportunity to start - and sometimes to complete - breast reconstruction at the time of mastectomy represents a definite advance in the treatment of breast cancer.

Furthermore, a growing body of evidence suggests that the preservation of the whole skin envelope including the nipple-areola complex is often possible and oncologically safe both in high-risk individuals and in patients affected by early stage breast cancer (1,2). This is definitively one more reason to opt for immediate reconstruction and has certainly contributed to the steady increase of the number of reconstructive procedures involving breast implants and autologous tissue transfer performed over the last years (3).

In a recent paper published in the *Annals of Surgery*, Nguyen *et al.* looked for an association between immediate reconstruction and surgical site infection (SSI) rates in all mastectomies included in the American College of Surgeons' National Surgical Quality Improvement registry from 2005 to 2009 (4). The data presented are particularly interesting due to the large size and good quality of the database from which were derived and thus may help to shed some light on a debated issue.

The first consideration stems from the fact that Nguyen *et al.* (4) report a SSI rate of 2.5% in mastectomies without reconstruction, consistent with that provided for wounds classified as "clean" by the U.S. National Research Council group (5). In mastectomies followed by immediate reconstruction the SSI rate was significantly higher (3.5%, $P < 0.001$), and close to that of a "clean-contaminated" wound. Previous studies were inconsistent since they

showed either no difference (6), or very large differences (7) in the incidence of SSI when breast reconstruction was added to the oncological procedure.

But what does it cause the increase of SSI? Risk factors are the same for both mastectomy alone and mastectomy with reconstruction, and in particular they are: increased body mass index (BMI), preoperative alcohol use, standard American Society of Anesthesiologists classification of severity of illness (ASA), flap failure, and operative time. The first three factors are independent from the type of surgery performed, while the addition of breast reconstruction may clearly influence the last two. Operative time variably increases when reconstruction is performed, especially for procedures of autologous tissue transfer. As for any type of surgery, prolongation of operative time may favor infection by lowering immune defenses of the patients and increasing chances of microbial contamination.

Flap failure is likely the main factor responsible for the increase of SSI in patients who undergo breast reconstruction. Actually, flap necrosis is a very rare event after total mastectomy without reconstruction. Conversely, the transfer of autologous tissue is definitely linked to the risk of partial or total necrosis of the pedicled or microvascular flap, with possible subsequent bacterial infection. On the other hand, the pathogenesis of SSI after prosthetic reconstruction is less clear. A possible explanation may be that the tension of skin flaps caused by the underlying implant could facilitate the penetration of bacterial agents in the surgical site through microscopic ports of entry or even small diastases of the skin sutures.

With this regard, another consideration is needed. What

is the role of infection in determining the final outcome of breast reconstruction? Surely, a distinction between superficial and deep infection has to be made. Superficial infection usually causes only delayed healing and has a lower cosmetic impact on the final result. This is the case of small and medium-sized diastases without implant exposure, which can be solved by repeated dressings or outpatient surgery. Conversely, deep infections are a major problem, which can result in the complete loss of an autologous tissue flap or require implant removal.

A final comment is that a praise must be done to a system such as the American College of Surgeons' National Surgical Quality Improvement Registry which prospectively incorporates main data from all operations performed on the national territory. Only a systematic analysis of data like these can tell us if we have a problem with the surgery that we perform and if we should change our practice to solve it.

In conclusion, although we must carefully consider all factors that may increase SSI in patients undergoing mastectomy, the additional risk attributable to immediate breast reconstruction appears limited to 1%. We agree with Nguyen *et al.* (4) that, although statistically significant, such a small difference does not mandate any change of the current clinical practice that favors immediate reconstruction whenever suggested by the clinical conditions and personal preferences of the patient.

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