INFECTIVE COMPLICATIONS IN PATIENTS UNDERGOING SURGICAL RECONSTRUCTION WITH DERMAL MATRIX: THE MODENA EXPERIENCE

Bedini A[1], Fiorentini C[2], Mandel VD[2], Menozzi M[1], Bacca E[1], Ferrari F[2], De Pace B[2], Meschiari M[1], Santoro A[1], Orlando G[1], Franceschini E[1], Puzzolante C[1], Mussini C[1], Magnoni C[2]

Azienda Ospedaliero-Universitaria "Policlinico di Modena", Modena, Italy: [1]Infectious Diseases Unit; [2]Department of Dermatology.

Background: Bioengineered skin dermal substitutes (SDS) represent a novel therapeutic opportunity for restoring damaged tissue[1,2,3]. Antimicrobial prophylaxis duration in such procedures has not been well established yet. The aim of the study was to evaluate the changing of infective complications following shortening of perioperative prophylaxis in patients undergoing surgical reconstruction with SDS.

Material & Methods: Infective complications at the site of SDS were compared in 2 groups: subjects undergoing surgical reconstruction between September 2014 and January 2016 (PERIOD A) who received a >24H-antibiotic-prophylaxis, and between May 2016 and June 2017 (PERIOD B) who received a ≤24H-antibiotic-prophylaxis. Differences in the incidence of infection and pathogen prevalence were explored.

Results: Between September 2014 and June 2017, 116 patients underwent a surgical reconstruction with a SDS. The mean age was 73-years, 77 were male (66.4%), 78 (67.2%) were positive for hypertension, 20 (17.2%) for diabetes mellitus, 16 (13.8%) for chronic renal impairment, 22 (19%) were smokers, and 45 (38.8%) had an ASA score ≥3. In the 94.8% (n=110) the reason of surgical intervention was a skin cancer. Surgical SDS reconstruction involved the scalp in 44 cases (37.9%), the face in 28 (24.1%), the chest in 11 (9.5%), the limbs in 33 (28.5%). Among 116 patients, 62 (53.4%) received >24H-antibiotic and 54 (46.6%) ≤24H-antibiotic-prophylaxis. The average duration of prophylaxis in the 2 groups of patients was 6.6 days and 0.5 day, respectively. Overall incidence rate of infection was 20.7% (24/116). The most frequently isolated pathogen was S. aureus (41.6%), followed by P. aeruginosa (29.1%), P. mirabilis (8.3%), and E. faecalis (4.1%). Patients undergoing SDS reconstruction in limbs had higher infection rate in comparison with chest/head (33.3% and 15.6%, respectively; p=0.034). No differences in the infection rate were observed between the patients who received >24H or ≤24H-antibiotic-prophylaxis (22.5% and 18.5%, respectively; p=0.590). The two groups resulted similar for gender, age, comorbidities, ASA score, and type of skin cancer.

Discussion: As far as we know, this is the first study that compared two perioperative antibiotic prophylaxis regimes in patients undergoing SDS reconstruction. Comparing the two patient groups (≤24-hour and >24-hour prophylaxis), no differences in the rate of infection were found. The result is very important: it shows that prolongation of prophylaxis in this type of surgical patients does not reduce the rate of infection. Shortening of antibiotic prophylaxis allowed to reduce of 6 days-per-patient the antibiotic exposure. It was surprising that only the reconstruction of the limbs, in comparison with other sites, was associated with a higher risk of infection (33.3 and 15.7 respectively). Nor the most critical patients (with an ASA score ≥3), nor patients undergoing major surgical reconstructions (surgical area >60 cm^2) resulted associated with a higher risk.

Conclusion: Antibiotic prophylaxis reduction to 24 hours or less demonstrated to be beneficial to patients undergoing surgical reconstruction with SDS. Shortening of antibiotic prophylaxis did not increase infection rate, and it allowed a reduction of 6 days-per-patient the antibiotic exposure. Randomized and controlled trials, with greater population, could give a more accurate response on the duration of antibiotic prophylaxis in patients undergoing surgical SDS reconstruction.

References

1. Capo, J. T. *et al.* The use of skin substitutes in the treatment of the hand and upper extremity. *Hand (N Y)* **9,** 156–165 (2014).
2. Richardson, M. A., Lange, J. P. & Jordan, J. R. Reconstruction of Full-Thickness Scalp Defects Using a Dermal Regeneration Template. *JAMA Facial Plast Surg* **18,** 62–67 (2016).
3. Khan, M. A. A. *et al.* Use of dermal regeneration template (Integra) for reconstruction of full-thickness complex oncologic scalp defects. *J Craniofac Surg* **21,** 905–909 (2010).