

CASE STUDY : Blood absorption on an post-OP wound (hip revision)

Introduction: Superabsorbent wound dressings are an emerging and fast growing product group in modern wound management. The high absorbency of these dressings is due to sodium polyacrylate polymers, which are known to absorb up to 1,000 times their own dry weight in fluids^[1]. The downside of the chemistry of the binding process, sodium polyacrylate polymers can absorb only polar fluids, is that superabsorbent dressings have been regarded as failing to absorb blood^[2]. However, the ability to absorb whole blood is a crucial property of wound dressings because the enrichment of blood in wounds can lead to various complications like inflammation or aggravated infection.

To determine the facts, we examined the blood absorption of one specific superabsorbent dressing *in vitro* and *in vivo*. The outcome is that the absorption of blood works via the separation of its components: the water fraction is absorbed and bound by the sodium polyacrylate polymers (SAP), while the proteins and non-polar components are filtered by the cellulose and bonded there by superficial adsorption.

The result of bench tests and clinical applications indicate that curea P1 dressings are very suitable as dressings for acute wounds. The absorption of whole blood was measured with > 100 g per 100 cm² while no significant separation of different components of the blood was observed^[3].

Case description: A patient (f, 72 yrs) had undergone a revision of the hip joint at the Kantonsspital Laufen (Switzerland). The surgery was complicated by a persistent dermal infection with a multi resistant *Staph. epidermidis* (MRSE). The removed prosthesis also showed a MRSE infection which was confirmed by intraoperative biopsy of the surrounding tissue. The infection related strong exudation and the bleeding caused by the massive surgical intervention would have required a wound therapy with a drainage tube, opening the gates for further infections. The initially applied simple compresses had to be changed almost hourly, causing pain to the patient and endangering the healing process.

Therapeutic approach: To reduce the pain and to avoid the danger of maceration of the periwound area, we chose as an alternative therapy to apply a superabsorbent dressing in the dimensions of 10x30 cm on the incision. The first dressing change was necessary after 24 hours. Fig. 1 shows the suture with obvious after-bleeding in the area of staples, but no residual coagulated blood. Fig. 2 shows the good absorption of blood in the dressing. Subsequently the change interval of the dressing could be increased to up to once a week. After five weeks the incision had completely healed (c.f. Fig. 3).



Fig. 1: Suture of the hip revision. Left and right ends were clipped, while the middle part was sutured with a double suture. Note the obvious discharge of posttraumatic sanguineous lymph in the right end of the suture.



Fig. 2: Superabsorbent dressing after 24 hours application on the fresh suture mirroring Fig. 1. Obvious discharge of sanguineous lymph on the left and right end of the suture has been absorbed by the dressing.

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Fig. 3: The suture five weeks after the surgical intervention.

Summary: The current state of practice is to use simple cellulose dressings which usually have to be changed several times per day. The numerous dressing changes cause significant pain to patients and endanger the adhesion of the wound edges. In case of hip revisions the current state of nursing is to use catheters to drain the incision. This implies a significant risk of infection due to the open channel into the incision.

By using curea P1 super absorbent dressings, the dressing changes can be significantly reduced to once every day or even less. This results in an improved comfort for the patient in the form of reduced pain and assures a better wound healing.

References

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- [2] Heuck CC. Polyacrylate adsorbents for the selective adsorption of cholesterol-rich lipoproteins from plasma or blood, GMS Ger Med Sci, 2011; 9:Doc 2, DOI: 10.3205/000125.
- [3] Expert Report from „Universitätsmedizin Göttingen“ (University Medical Centre Göttingen), Department of Medical Microbiology, Accredited Analytical Laboratory and Consultation Center, Humboldtallee 34A, DE 37073 Göttingen, Germany | Dr. med. U. Schmelz: Determination of the resorptive potential of the wound dressings „curea P1“ and „curea P2“ with respect to whole blood, plasma, serum and physiological saline from 30th March, 2012. [<http://www.curea-medical.de/en/literature/laboratory-reports/>]