

Efficacy of different wound dressings on artificial plaques of fibrin

Seipp H-M, Hofmann S

Krankenhaus- und Medizintechnik, Umwelt- und Biotechnologie Fachhochschule Giessen-Friedberg, Germany

Introduction:

Beside the bacterial biofilms fibrin and possible artificial plaques of fibrin play an important role in the healing of wounds especially chronic wounds. They can block the cleansing of the wound and the efficacy of local antimicrobial compounds.

Method & Material:

For assessing the effect against fibrin plaques of wound dressings in the clinical practice we used the in vitro Fibrinyl-method as model. Standardized artificial plaques of fibrin (based on fibrin adhesives) were used to quantify the cleansing effect. More than 10 in vitro plaques per test over 1 h in different investigations were incubated with a foam (Suprasorb® P), a biocellulose product without or with polyhexanide (Suprasorb® X, Suprasorb® X+PHMB), an alginate without or with silver (Suprasorb® A, Suprasorb® A+Ag) as well as references two wound cleansing solutions with polyhexanide (Prontosan®, Lavasept®).

Results:

A significant remove of the fibrin could be demonstrated in all cases (fig. 1, 2). The rest of the fibrin plaques for the biocellulose product with polyhexanide (Suprasorb® X+PHMB) 69.2% was significantly different in comparison to the cleansing solutions (Prontosan®, 74.5%, $p < 0.0065$ or Lavasept®, 76.4%, $p < 0.001$), the biocellulose dressing alone (Suprasorb® X, 74.9%, $p < 0.0014$), the alginate (Suprasorb® A, 78.4%, $p < 0.000$), the silver alginate (Suprasorb® A+Ag, 77.8, $p < 0.000$) or the foam (Suprasorb® P) (85.5%, $p < 0,0000$).

The best significant results in comparison to the other products were found with the alginates (54% rest fibrin) in combination with 0.9% NaCl-solution (fig. 3). This property was not found by the other materials.

Conclusion:

The usual foam dressing showed the lowest reduction of fibrin. The best reduction in this test was demonstrated by the water and polyhexanide containing biocellulose dressing as well as significantly better as the cleansing solutions.

After addition of 0.9% NaCl-solution the highest reduction of fibrin was seen with the alginates. The reason may be a better exchange of Ca^{++} -Ions and therefore an increase of the cleansing properties of the alginates. Silver has no positive influence on the fibrin reduction in this model.

Beside the influence on the exudation, granulation and epithelisation as well as its "therapeutical index" the remove of fibrin should be considered into the global assessment of a wound dressing and its correct use depending on the wound situation.

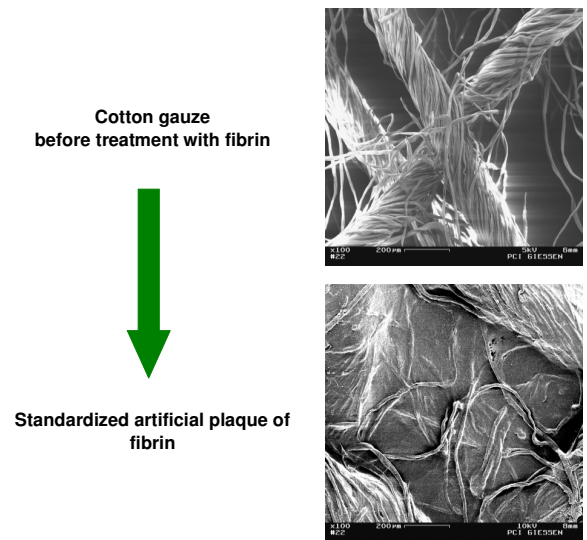


Fig. 1: Gauze with and without standardized fibrin plaque (REM pictures)

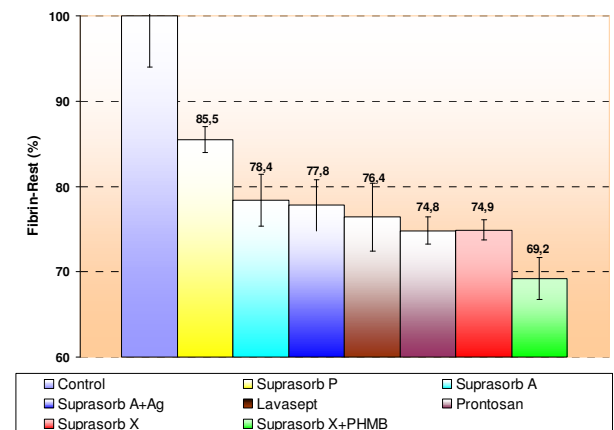


Fig. 2: Reduction of fibrin-rest in comparison with different wound dressings and two wound cleansing solutions

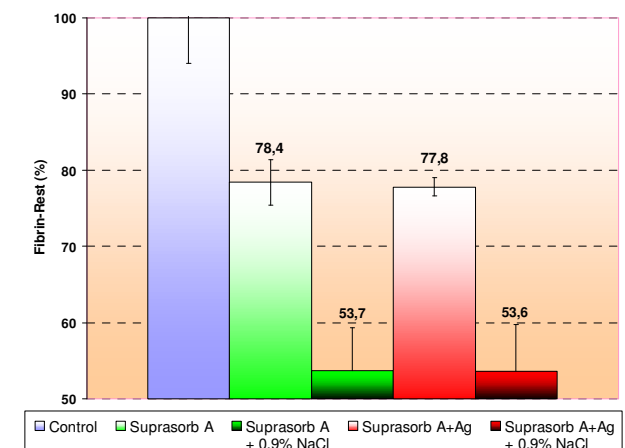


Fig. 3: Additional significant reduction of fibrin-rest by alginate and silver alginate due to the application of 0.9% NaCl-solution ($p < 0.000$)