IN VITRO ASSESSMENT OF THE COMPATIBILITY OF APPLICATION OF PU FOAM AND DRAINAGE FOIL DURING NPWT USING DIFFERENT PUMPS

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Introduction

NPWT has been advocated for virtually all kinds of acute and chronic wounds. Treatment is based on local negative pressure applied to the wound surface. It is thought that the decrease of the local and interstitial tissue edema, increased perfusion of the (peri-)wound area, reduction of bacteria, and mechanical stimulation of the wound bed account for the beneficial effects [1,2]. NPWT is mainly carried out using open-cell polyurethane foams. It could be shown that cells especially show a significant tendency to grow into these foams which can be inhibited by application of a drainage foil without interfering with induction of cell migration [3]. Hence, it is of interest to investigate if this combination is robust and workable with different vacuum pumps.

Material & Methods

The drainage foil** was placed on fibroblast 3D-cultures in combination with large-pored PU foam dressing***. Assemblies were positioned in Petri dishes and sealed with air-tight film after medium supply and vacuum pumps* were connected. Experiments were carried out at -80 mmHg and -120 mmHg for 48h. Histology specimens were stained with haematoxylin/eosin and fibroblasts were detected using anti-vimentin-antibodies. Cell viability and ingrowths of cells into samples was determined.

Results

Using the combination of drainage foil and PU foam samples during NPWT at -80 mmHg with different vacuum pumps led to the same cellular responses in vitro (figure 2). With the PU foam dressing alone, cells did not stop at the pellicle edge but continued to migrate into the PU foam (figures 3 and 4). In contrast, placement of a drainage foil between collagen pellicle and PU foam inhibited ingrowths of cells into the PU foam.

Conclusion

It could be shown that the combination of a drainage foil with a PU foam dressing for NPWT is workable with pumps from different manufacturers. The ingrowths of cells into large-pored foams can be inhibited in vitro by application of a drainage foil. In vivo this may prevent the disruption of newly formed tissue during dressing changes.

References