The Activated Platelet-rich Plasma-Fibrin Hydrogel Attenuates Uterine Endometrial Fibrogenesis after Acute Injury via Modulation of Senescence, Inflammation, and Epithelial-Mesenchymal Transition

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In fibrotic diseases, cellular senescence plays a major part by exhibiting healthy or pathologic features, and these characteristics determine whether an organ will maintain its health or progress to disease. Although several studies on fibrotic senescence-related mechanisms have been conducted in organs such as the lungs and liver, research on endometrial fibrotic diseases remains poorly understood. We identified senescence in intrauterine adhesion, a typical fibrotic disease of the uterine endometrium, as fibrosis progressed. Additionally, we applied platelet-rich plasma-fibrin hydrogel (PFH), which demonstrated beneficial effects in our previous study, to prevent fibrosis formation. After inducing endometrial fibrosis through acute exposure to hydrochloric acid, senescence in the endometrium showed a tendency to increase over time along with fibrosis formation. In the experimental group, PFH was infused into the emdometrial cavity immediately after damage, and it was confirmed that senescent cells and fibrotic tissues were significantly reduced. These results indicate that when PFH is administered promptly after endometrial damage, pathologic fibrosis is delayed by preventing senescent cell fate, leading to proper wound healing.