

The Use of Seprafilm as a Biological Barrier in Flap Delay

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Abstract

Purpose: Seprafilm is a bioresorbable hyaluronate-carboxymethylcellulose membrane used to prevent adhesion formation in abdominal and pelvic surgery¹⁻³. The clinical efficacy of Seprafilm has been attributed to its properties as a non-immunologic barrier. We experimentally investigated the role of Seprafilm in preventing reactive fibrosis around a rat implant and in delayed flaps.

Methods: Two implants were placed in each of eight Sprague-Dawley rats, one of these wrapped with Seprafilm. Animals were sacrificed at 3 weeks. The periprosthetic capsules were sent for microscopic analysis including capsular thickness and extent of inflammatory infiltrate. Clinically, Seprafilm was utilized as a barrier to adhesion formation in two patients undergoing surgical delay of reverse sural (Figure 1) and trapezius myocutaneous flaps.



Figure 1: Seprafilm placed in reverse sural flap wound bed after delay harvest.

Results: Seprafilm wrapping of implants resulted in decrease in minimum ($46 \pm 47 \mu\text{m}$ vs $189 \pm 121 \mu\text{m}$; $p = 0.01$) and maximum ($241 \pm 173 \mu\text{m}$ vs $461 \pm 207 \mu\text{m}$; $p = 0.03$) thickness of periprosthetic capsules, with areas of non-detectable cellular capsule observed in 3 animals. Four animals (50%) developed distinctly loose periprosthetic capsules with Seprafilm, which was never observed on the control side. Seprafilm did not affect the degree of inflammation. Clinically, no signs of excessive inflammation or infection were observed in either of the patients. The undersurface of each flap displayed no signs of healing and thus no redissection was required (Figure 2).



Figure 2: Reverse sural flap after elevation for definitive transposition.

Conclusion: Seprafilm decreased periprosthetic capsular thickness in the rat model without undue inflammation. Clinically, the application of Seprafilm resulted in no adhesion formation between the delayed flap and surrounding tissues, which facilitated reoperation. We speculate that Seprafilm serves as a barrier to fibrotic healing, and thereby may enhance the development of preferential blood supply of a delayed flap.

References:

¹Kawamura H, Yokota R, Yokota K, et al. A sodium hyaluronate carboxymethylcellulose bioresorbable membrane prevents postoperative small-bowel adhesive obstruction after distal gastrectomy. *Surgery Today*. 2010; 40:223-227.

²Park C, Lee WY, Cho YB, et al. Sodium hyaluronate-based bioresorbable membrane (Seprafilm) reduced early postoperative intestinal obstruction after lower abdominal surgery for colorectal cancer: the preliminary report. *Int J Colorectal Disease*. 2009; 24:305-310.

³Darmas B. Use of barrier products in the prevention of adhesion formation following surgery. *J Wound Care*. 2008; 17:405-8, 411.