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Repair of Large Dural Defects Utilizing Non-Biologic Resorbable Dura Substitute

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Introduction

Resorbable, non-biologic dura substitutes offer the ability to immediately seal dural defects and progressively resorb following effective neoduralization and defect repair. Yet, few studies have demonstrated whether fully-resorbable dura substitutes are optimally suited for repair of large dural defects. The present study was conducted to evaluate the comparative efficacy of resorbable, non-biologic dura substitutes in the repair of dural defects of varying size in a canine duraplasty model.

Methods

Small (1.6cm2) and large (4.0cm2) dural defects were created bilaterally and repaired with a fully-resorbable, non-biologic dura substitute (Cerafix® Dura Substitute). Animals were observed for signs of CSF leakage or neurological abnormalities and repair sites were excised either 4 or 13 weeks after surgery to evaluation local tissue reaction and neoduralization.

Results

Both small and large defects were effectively repaired with no evidence of CSF leakage or neurological sequalae in either group. Histological analysis of repair sites revealed comparable rates of tissue healing and vascularization in small and large defects at both 4 and 13 weeks, and that gradual resorption of the graft was balanced by progressive neoduralization over time. Upon conclusion of the study at 13 weeks, all dural defects were fully healed with complete neoduralization of the repair site.

Conclusions

Efficacy of fully-resorbable, non-biologic dural substitute appears to be independent of the size of induced dural defects. Furthermore, timed resorbtion of non-biologic grafts was effectively balanced by increasing neoduralization to achieve successful defect closure in all repair sites.

Learning Objectives

By the conclusion of this session, participants should be able to: 1) Describe the intra-operative and post-operative impact of dura substitute graft composition (biologic, non-biologic, etc.), 2) Discuss the importance of matching dura substitue materials to the properties of target defects, and 3) Understand the limitations and benefits of emerging resorbable, non-biologic graft materials

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