Outcome Associated with Closure of Anular Defects Following Lumbar Discectomy
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Introduction: Lumbar discectomy is considered the gold standard for surgical treatment of sciatica. While efforts have been made to evaluate the use of minimally invasive discectomy techniques and less aggressive disc removal, relatively few have studied the effect of closing anular defects left subsequent to lumbar discectomy. Patients indicated for a lumber discectomy at two separate surgical locations were considered for participation in the study. Data from these enrolled patients has been analyzed for outcomes such as re-operation, pain, disability, quality of life and work status.

Methods: The post-market, randomized, single-blind (to patient) study with concurrent control design allowed for appropriate group comparison. Intra-operative randomization post-discectomy was done 2:1 (Treatment:Control) using a suture-based implant to close the remaining anular defect in appropriately randomized patients (Treatment) while anular defects in the Control patients remained patent.

Results: A total of 119 patients were enrolled in the study, with an average post-op time of 26.7 months (range 13.1-39.2 months). Validated patient reported assessments (VAS, SF-12, and ODI) were completed pre-operatively and at each follow-up along with a neurological and adverse event assessment by the physician.

Pre-operative Comparison:
- Control Group; n=39
  - Average Age: 41.6 years
  - Average BMI: 29.4
  - Males: 59.0%
  - Smokers: 48.7%
- Treatment Group; n=76
  - Average Age: 39.1 years
  - Average BMI: 28.3
  - Males: 56.6%
  - Smokers: 42.1%

Additionally, there were 4 patients; in whom defect closure was attempted however a device could not be implanted for the following reasons:
- 2 - Anulus was too calcified
- 1 - Poor anular tissue quality
- 1 - Defect too close to bone spur

Adjunctively closing the anulus resulted in:
- Minimal additional OR time; less than 5 minutes reported in the majority of cases
- No requirement to change surgical access or discectomy technique

Mean follow-up scores as compared to pre-operative values showed;
- Significant (p=< 0.05) improvement within study groups, maintained throughout follow-up
- No difference between study groups

Return to Work status at the time of analysis
- Control Group:
  - Mean time of 80.1 days with 74.4% returning to work
  - 75.9% reported a return to same or heavier work activity levels
- Treatment Group:
  - Mean time of 60.2 days with 77.6% returning to work
  - 88.1% reported a return to same or heavier work activity levels

Re-operations;
- Reoperations were categorized as:
  1. Any subsequent surgery including repair of dural tear, I/D for wound infection, fusion and re-do discectomy;
  2. Those specifically due to re-herniation
• Control group;
  o 12.8% overall re-operation rate
  o 5.1% rate of re-operation due to re-herniation
• Treatment group;
  o 5.3% overall re-operation rate
  o 1.3% rate of re-operation due to re-herniation

**Conclusions:** Adjunctively closing the anular defect post-discectomy is associated with an appreciably lower (though in this analysis not statistically significant) re-operation rate following lumbar discectomy while preserving the positive outcomes of pain and disability improvement. Appropriately powered larger studies may more conclusively demonstrate the effect of closing anular defects on re-operation rates.