



TRANSFORAMINAL ENDOSCOPIC FORAMINOTOMY FOR ACUTE NEURALGIA

JN Alastair Gibson and Menno Ipreburg†

The Royal Infirmary and University of Edinburgh, Scotland

† Herniäkliniek, Veenhuizen, Netherlands



INTRODUCTION

In the last ten years there have been significant improvements in:

- ◆ HD Camera technology
- ◆ Endoscopic bone reamers
- ◆ Diamond cutting drills
- ◆ Radiofrequency and Laser probes

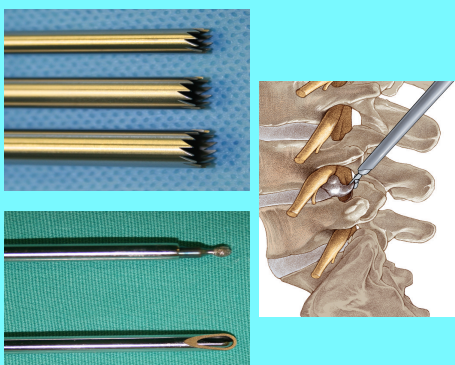
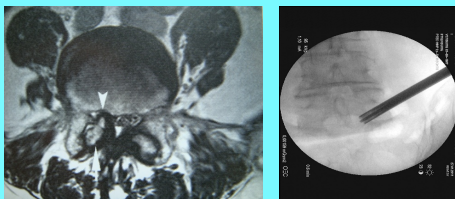
AIMS AND OBJECTIVES

To determine the safety and effectiveness of transforaminal endoscopic foraminotomy (TEF) as an alternative to open laminotomy

PATIENTS AND METHODS

- ◆ 34 patients (22m,12 f) mean age 56±12 yrs all with MR foraminal compression
- ◆ Comparison with 25 patients (11m,13f) mean age 57±13 yrs with respect to hospital stay and secondary surgery
- ◆ VAS, ODI and EQ5-D logged on British Spine or Jointell QMS registries

SURGERY



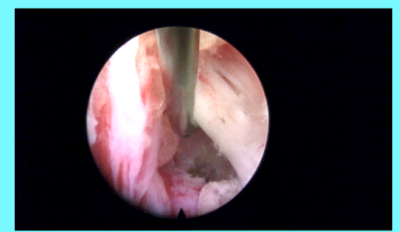
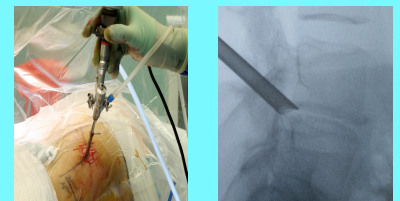
RESULTS

TEF

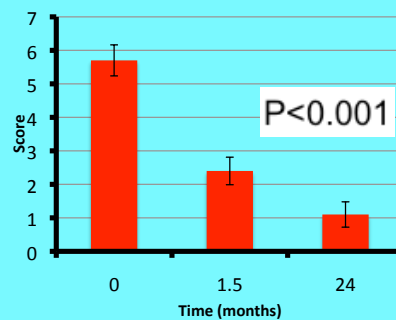
- ◆ 36 foramina widened: 5 L3/4, 17 L4/5, 14 L5/S1
- ◆ 26 disc margins trimmed
- ◆ Surgery 60 min (range 33-140)
- ◆ Radiation 43±16s
- ◆ 28/34 patients Day Case
- ◆ All 23 workers returned to work at a median time of 28 days

Laminotomies

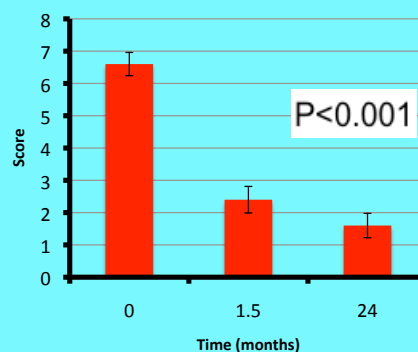
- ◆ 25 foramina widened
- ◆ Mean stay 2.3±1.2 nights



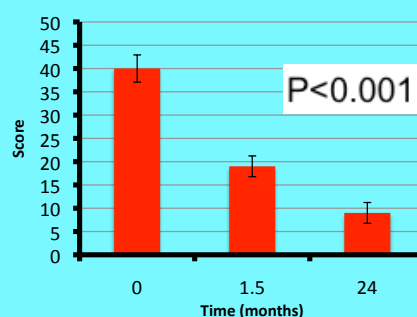
Back pain VAS



Worst leg VAS



ODI



(Means ± SEM)

COMPLICATIONS

- ◆ No direct complications
- ◆ TEF – 4/34 secondary surgery – 2 Repeat TEF, 2 Axialif
- ◆ Laminotomy – 3/25 secondary surgery – pedicle fusion

CONCLUSIONS

- ◆ TEF was performed safely
- ◆ Visualisation allowed safe widening of foramen and resection of disc material if necessary
- ◆ Immediate recovery more rapid than laminotomy
- ◆ Low rate of repeat surgery
- ◆ Early return to work

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DISCLOSURES

JNAG and MI have received payments for teaching from joimax GmbH

Nakagawa*, Hideto Nishi*, Hiroshi Iwasaki*, Shunji Tsutsui*, Sae Okada*, Hiroki Iwahashi*, Hiroyuki Oka**;

*Department of Orthopaedic Surgery, Wakayama Medical University, Wakayama, Japan **22nd Century Medical and Research Center, The University of Tokyo Hospital, Tokyo, Japan

INTRODUCTION: We have developed a minimally invasive laminotomy using endoscope to lumbar spinal disorders since 1998. The novel microendoscopic laminotomy (MEL) technique helps to preserve the facet joints, posterior ligament complex and soft tissues as much as possible. The purpose of this study was to investigate the clinical outcomes of MEL for degenerative lumbar spondylolisthesis, and to clarify which factors influenced the poor clinical outcomes.

METHODS: From 2008 to 2012, all patients, who developed a surgical treatment for LSS including DS on L3/4 or L4/5 single level, underwent MEL surgery at authors' institute. A total of 196 patients (87 males, 109 females; age: 69.8 years) were reviewed prospectively. The Japanese Orthopaedic Association scoring system (JOA score) was evaluated preoperatively and more than 2-years postoperatively. A poor improvement was defined as less than 50% recovery rate. Multivariate logistic regression analysis was accomplished for the preoperative factor which influenced poor improvement. The factors were selected as follows: age, sex, JOA, slippage, spinal instability, disc height, osteoarthritis of facet joint, endplate signal change, disc degeneration and sagittal alignment. All parameter were analyzed statistically ($p < 0.05$).

RESULTS: Finally, 153 patients were reviewed. The final followed period was 30.5 months. The JOA recovery rate was $64.8 \pm 24.7\%$. The overall result was the defined poor improvement in 30.7% of patients. As the results of multivariate

logistic regression analysis, the factor related to the poor improvement was endplate changes, and the odds ratio was 2.6. The endplate changes were also significantly related to slippage.

CONCLUSION: This observation suggests that the long-term results after MEL were well. The endplate signal changes were associated with postoperative clinical outcomes and slippage.

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J.N.Alastair Gibson, Menno Ipreburg*;

The Royal Infirmary and University of Edinburgh, Edinburgh, Scotland; *Ipreburg Herniakliniek, 9341 AH Veenhuizen, Drenthe, Netherlands

INTRODUCTION: Improvements in HD camera technology, purpose designed reamers and endoscopic powered diamond cutting drills now potentially allow adequate foraminotomy through a transforaminal endoscopic approach. We aimed to determine the safety and effectiveness of transforaminal endoscopic foraminotomy (TEF) as an alternative to open decompression by laminotomy.

METHODS: 34 patients (mean age 56 ± 12 yrs, 22m, 12f) with MR proven foraminal neural compression were admitted for TEF. All patients were treated under analgo-sedation in a lateral position with bi-planar imaging. Cannulated or olive-tipped reamers were used for access and a diamond burr for marginal resection of the facets. Outcome scores were collected preoperatively at 3 months and 2 years. A historical group of 25 patients treated with open laminotomy (age 57 ± 13 , 11m 13f) was used for comparison of in-patient stay and rate of revision surgery within 2 years.

RESULTS: 36 foramina were widened by TEF (5 L3/4, 17 L4/5, 14 L5/S1) with trimming of the disc margin performed in

26. Median surgical time was 60min (range 33-140) and radiation time 43 ± 16 s (mean \pm SD). Pain in the most affected leg decreased from 6.6 ± 2.1 pre-operatively to 2.4 ± 2.4 at 6 weeks and 1.6 ± 2.2 at 2 years. Back pain decreased from 5.7 ± 2.7 to 2.4 ± 2.4 and 1.1 ± 2.2 with ODI falling from 40 ± 17 to 19 ± 13 and 9 ± 13 (all $p < 0.001$). No operative complications occurred; 4 required repeat surgery (2 repeat TEF and 2 Axialif fusion). Only 6 patients required overnight admission. All 23 working pre-surgery returned to work at a median time of 28 days. These figures compared to a 12% revision and a mean in-patient stay of 2.3 ± 1.2 nights after open laminotomy.

DISCUSSION: Our results suggest that transforaminal endoscopic foraminotomy is a safe and cost-effective alternative to open laminotomy and foraminotomy with a low rate of early revision surgery. Rapid recovery and an early return to work are expected.

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MMP-12 EXPRESSION UNDER NEUROPATHIC PAIN: A RODENT L5 SPINAL NERVE LIGATION MODEL

1Wing Moon Raymond Lam PhD, 1Tao Hu PhD, 2Nurul Dinah Bte Kadir BSc, 2Roger Chun Man Ho MBBS, MRCPsych, FRCPC, 3Sanjay Khanna PhD, 4Kishore Bhakoo PhD, 5Yulin Lam PhD, 1Hee-Kit Wong MBBS, MMed, FRCS, MChOrth, FAMS;

1Department of Orthopaedic Surgery, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 2Department of Psychological Medicine, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 3Department of Physiology, Yong Loo Lin School of Medicine, National University of Singapore, Singapore 4Director, Translational Imaging Industrial Laboratory, Singapore Bioimaging Consortium, A*STAR 5Department of Chemistry, Faculty of Science, National University of Singapore, Singapore

INTRODUCTION: Matrix metalloproteinases degrade extracellular matrix to

facilitate immune cell infiltration. It plays an important role in neuropathic pain development and maintenance. Recent research evidences showed high MMP-12 expression in neuroinflammation condition. Hence, we hypothesised that MMP-12 is up-regulated in neuropathic pain patients. This study aims to verify and localise MMP-12 up-regulation in the dorsal root ganglion (DRG) of spinal nerve ligation (SNL) model.

METHODS: Twelve male adult Sprague Dawley rats were divided into 2 groups: 1) Sham-operated ($n=6$); 2) SNL ($n=6$). On day 1, the left lumbar 5 (L5) nerve root was ligated in SNL but it was only exposed in Sham-operated by removing the transverse process. Von Frey tactile stimulation and thermal sensory tests were conducted on Day 0, 5, 7 and 13. On Day 14, rats were sacrificed and DRG of L5 were harvested for immunohistochemical staining (IHC) (anti-CD 68, anti-GFAP, and anti-MMP-12). MMP-12, GFAP and CD-68 labelled cells were then localized and quantitatively measured. **RESULTS:** SNL rats showed a significant lower mechanical threshold and thermal withdrawal latency of paw ipsilateral to ligated L5 in SNL than Sham-operated on Day 5, 7 and 13. Marker labelled/tissue area of ligated DRG (MMP-12: $0.895 \pm 0.156\%$, $p=0.01$; CD-68: $3.023 \pm 1.598\%$, $p=0.04$) is significantly higher than non-ligated DRG (MMP-12: $0.157 \pm 0.045\%$; CD-68: $0.049 \pm 0.001\%$) and Sham-operated (MMP-12: $0.351 \pm 0.159\%$; CD-68: $0.007 \pm 0.008\%$). GFAP encircled neuron in ligated DRG ($83.83 \pm 18.16\%$, $p=0.02$) is significantly higher than non-ligated L5 DRG ($20.53 \pm 9.02\%$) and Sham-operated ($30.41 \pm 15.32\%$).

DISCUSSION: This study demonstrates that MMP-12 is up-regulated in SNL model. MMP-12 degrades the matrix to promote infiltration of macrophages and cause indirect activation of satellite cells, indicat-