Disc Fragment Herniectomy Through a Facet Joint Quadrantectomy for Extraforaminal Lumbar Herniation: Technique and Results

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BACKGROUND: **Extraforaminal lumbar disc herniation (EFLDH) accounts for 7%–12% of all lumbar disc herniations. We report on a surgical technique for EFLDH, which requires only minimal resection of the facet joint and also allows access to the preforaminal space, if necessary.**

METHODS: **The medical records of 61 consecutive patients treated with disc fragment herniectomy through a facet joint quadrantectomy for EFLDH at the Universitair Ziekenhuis Brussel were critically evaluated with respect to preoperative clinical signs and symptoms, surgery-related complications and outcome at 6 weeks after intervention. Patient satisfaction after the surgery was evaluated using the MacNab classification.**

RESULTS: **The prevalence of leg pain decreased from 100% before the intervention to 19.7% at follow-up. Only 9 patients (14.8%) suffered from residual motor deficit at follow-up, compared with 37 patients (60.7%) in the preoperative situation. The postoperative improvement was highly significant for all parameters ($P < 0.0001$) and this evolution is also reflected in the MacNab classification showing 62.3% excellent, 23.0% good, 13.1% fair, and only 1.6% poor satisfaction. Using logistic regression analysis, only the presence of a preoperative sensory deficit was found to be an independent predictor for excellent patient satisfaction on the MacNab classification.**

CONCLUSIONS: **Disc fragment herniectomy through a facet joint quadrantectomy for EFLDH is a safe and minimal invasive technique resulting in very satisfactory results. Preservation of facet joint stability and the possibility to convert to a classic approach to reach for preforaminal components, if necessary, are major advantages of this technique.**

INTRODUCTION

Extraforaminal lumbar disc herniation (EFLDH), defined as a herniated disc outside the confines of the spinal canal, accounts for 7%–12% of all lumbar disc herniations.[1,2] However, in a significant number of patients the lumbar disc herniation simultaneously occurs in foraminal and extraforaminal locations, especially at level L5-S1.[3] This combination of location is one of the causes of persistent or recurrent leg pain after microdecompression for EFLDH.[3]

The literature is amply documented with descriptions of various surgical techniques that can be divided into 2 main operative approaches: the lateral or the medial procedures. The medial or midline approaches consist of techniques such as laminectomy, laminotomy, hemilaminectomy, and subtotal or full facetectomy. These procedures require almost always resection of bone or parts of the facet joint to reach the extraforaminal space, which may lead to instability and persistent back pain. The lateral paraspinal muscle-splitting and endoscopic approaches require no bone resection and are considered superior to the medial approaches.[4-6] However, to reach a target at the L5-S1 level—with its narrow oblique passage descending toward the outer L5 neural foramen—this technique takes longer.[7] Another drawback of the lateral approaches is the difficulty to reach the foraminal component or even the preforaminal disc bulging, which may induce persistent irritation of the radix if not treated. In these cases, a supplementary medial approach is necessary.

Key words
- Extraforaminal
- Facet joint quadrantectomy
- Lumbar disc herniation

Abbreviations and Acronyms
EFLDH: Extraforaminal lumbar disc herniation

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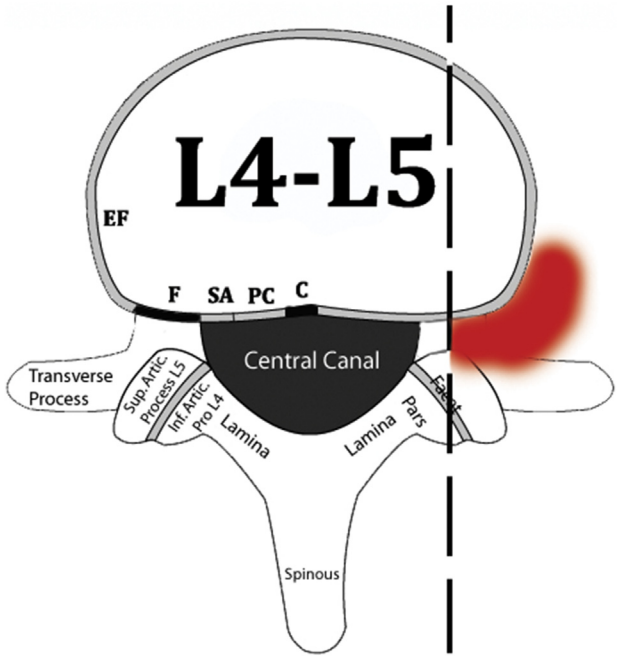

Figure 1. Axial view at disc level L4-L5. The *red zone* lateral to the midforaminal line indicates the region where the lumbar disc herniations are eligible to the technique of quadrantectomy. C, central; PC, paracentral; SA, subarticular; F, foraminal; EF, extraforaminal.

We developed a novel medial technique for EFLDH, which allows conversion to the preforaminal space, if necessary, and which implies only minimal resection of the facet joint.

We present our experience, detailed technique, and long-term follow-up for patients with EFLDH.

PATIENTS AND METHODS

Inclusion Criteria and Outcome Evaluation

Clinical data of 61 consecutive patients who underwent disc fragment herniectomy through a facet joint quadrantectomy for EFLDH at University Hospital Brussels between 1999 and 2015 were retrospectively obtained by reviewing medical reports and outpatient charts. Patients in whom the major component of the lumbar disc herniation was situated lateral from the midforaminal line (red zone) were eligible for this technique (Figure 1). The reports of each patient were critically evaluated with respect to preoperative clinical signs and symptoms, classification of EFLDH,[8] operative findings, surgery-related complications, and 6-week clinical outcome. For this purpose, a structured questionnaire and physical examination was performed to attain precise indications about each patient's status and residual complaints. All patients were queried about persisting back pain and/or sciatica, sensory, and/or motor disturbances and information with respect to physical capacity and potential restrictions in daily activities was obtained. A full neurological examination was also performed. Subjective satisfaction with the result of surgery was classified as excellent (no pain), good (some pain),

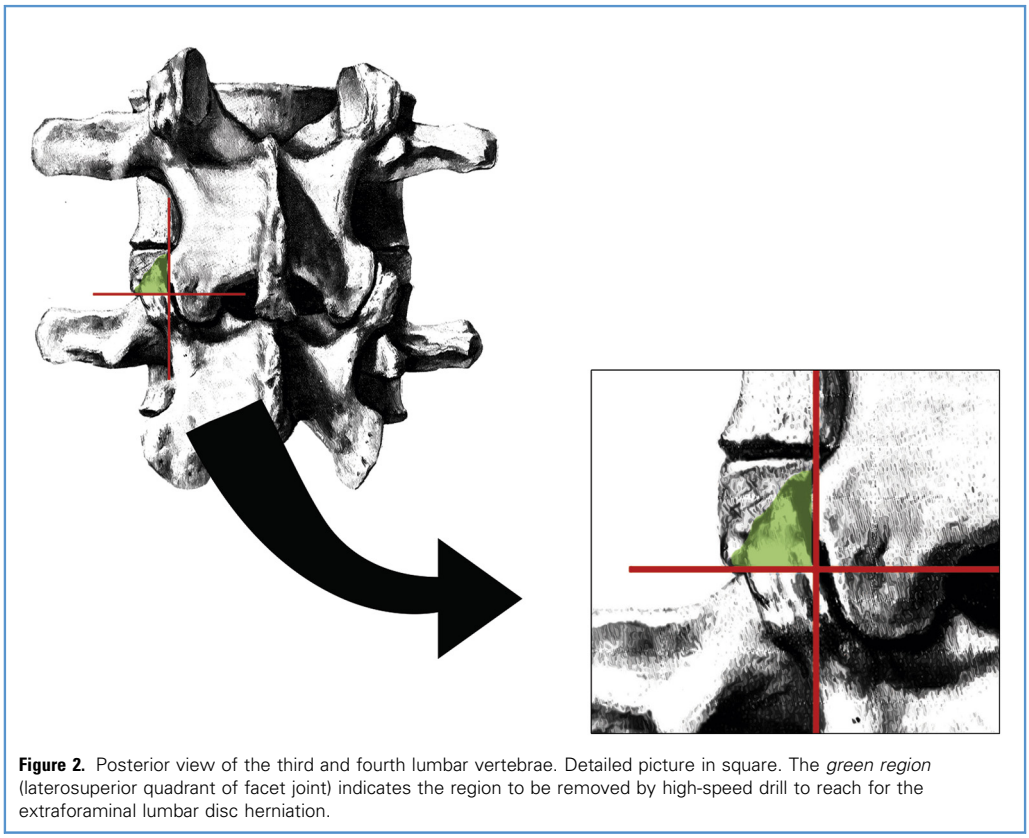

Figure 2. Posterior view of the third and fourth lumbar vertebrae. Detailed picture in square. The *green region* (laterosuperior quadrant of facet joint) indicates the region to be removed by high-speed drill to reach for the extraforaminal lumbar disc herniation.