

Full-endoscopic lumbar disc surgery: the new gold standard? (PhD Academy Award)

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WHAT DID I DO?

The main aim of my PhD research was to provide high-quality evidence regarding the cost-effectiveness of percutaneous transforaminal endoscopic discectomy (PTED) compared with conventional open microdiscectomy in patients with sciatica.

WHY DID I DO IT?

Sciatica is a common healthcare problem and leads to high costs both at the individual and at the societal level. The current standard procedure to treat sciatica caused by lumbar disc herniation is microdiscectomy.¹ Microdiscectomy is a relatively old procedure during which the disc herniation can be removed safely through a dorsal approach. Another relatively new procedure is PTED during which the disc herniation is removed through a smaller incision at the lateral side from the spine (figure 1).² Aside from the difference in incision size, PTED is performed under local anaesthesia, allows outpatient surgery, and does not require detachment of the back muscles or destruction of bony anatomy. PTED, however, seems to be more challenging to be performed and requires patients to be exposed to a higher dose of radiation due to the extensive use of intraoperative fluoroscopy.

Preliminary outcomes of PTED in the literature were promising but the general consensus was that there was moderate quality of evidence suggesting no differences in leg pain reduction or functional status between PTED and microdiscectomy.^{3–4} Furthermore, as the past had shown that innovative, intended less-invasive techniques appeared to have no merits over conventional techniques, PTED was faced by some scepticism from the professional organisations.⁵ Consequently, PTED was not reimbursed in the Netherlands which disappointed both patients and some surgeons. In an attempt to change this, the PTED -study was initiated which was funded by the Netherlands Organization for Health Research and Development.⁶

HOW DID I DO IT?

From 2016 to 2019, a randomised controlled, non-inferiority trial was conducted at four centres in the Netherlands. Patients with at least 6 weeks of radiating leg pain due to an MRI-confirmed lumbar disc herniation were eligible for inclusion.⁶ Patients were randomised between PTED and microdiscectomy and were followed for 12 months after surgery. The primary outcome was leg pain as measured on a visual analogue scale (VAS) ranging from 0 to 100. The non-inferiority margin was set at 5, meaning

that if patients who were randomised to PTED would have a difference in VAS of less than 5 at 12 months, compared with patients randomised to microdiscectomy, PTED would be deemed to be non-inferior. Consequently, it was decided in an agreement between the Dutch Health Care Institute and the research team that PTED would become reimbursed care if it would be non-inferior. Other outcomes measured during the PTED-study were costs, functional status, back pain, quality of life and self-reported recovery.

WHAT DID I FIND?

Eventually, 613 patients were included in the trial of which 304 were randomised to PTED and 309 to microdiscectomy. Twelve months after surgery, patients of the PTED arm had less leg pain (7.1 on the 0–100 VAS), less back pain, a better functional status, a higher quality of life and higher rates of self-perceived recovery.⁷ Furthermore, patients of the PTED arm had less intraoperative blood loss, less complications, a shorter length of hospital stay, used less analgesics and had a similar rate of repeated surgery within 1 year. These differences in patient-reported outcomes, however, were small and may not reach established minimal clinically important difference thresholds. So as the PTED arm had slightly better clinical outcomes, the economic evaluation would determine cost-effectiveness. The economic evaluation showed that aside from the costs for the surgery, all other costs (primary care, medication, informal care, absenteeism and presenteeism) were lower in the PTED arm.⁸ Overall, the probability of PTED being cost-effective compared with microdiscectomy in leg pain reduction was 99.4% regardless of the willingness to pay.

WHAT IS THE MOST IMPORTANT CLINICAL IMPACT?

The most important clinical impact is that patients with sciatica now have a less invasive surgical treatment option to treat their leg pain. As the PTED-study had a high generalisability, I expect full-endoscopic surgery to be a feasible treatment option for many patients with a single-level lumbar disc herniation. Another important impact this thesis had is that PTED is now part of the reimbursed Dutch healthcare and that all patients with an indication for PTED can receive surgery by this technique. I hope that this research will also help solve reimbursement issues with endoscopic procedures abroad. Furthermore, as I showed dominance of PTED in the economic evaluation, I expect that widespread implementation of PTED to treat sciatica will lead to less societal costs. In addition to



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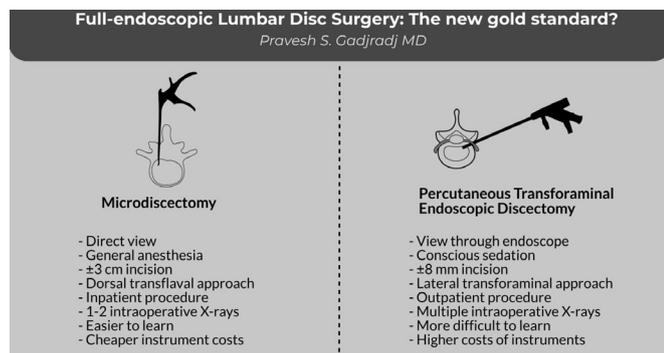


Figure 1 An overview of the surgical approach of microdiscectomy versus percutaneous transforaminal endoscopic discectomy together with differences between the procedures.

this, I hope that indications for endoscopic spine surgery will be expanded to also treat other pathology less invasive.

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