A new technique for the treatment of lumbar far lateral disc herniation: technical note and preliminary results

Abstract A newly designed technique for a minimally invasive approach to the laterally herniated disc is presented. Fifteen patients suffering from far lateral disc herniation (extraforaminal) were operated according to this technique. Through a small skin incision (1.5 cm), the paraspinal muscles are spread by dilators, until a working channel of 9 mm inner diameter and 11 mm outer diameter can be placed. The next steps are done through this channel using the surgical microscope. No bone resections are necessary and the facet joints are left untouched. However, partial resection of the intertransverse ligament may be necessary. The mean follow-up period for these 15 patients was 11.5 months, and they were evaluated by using the visual analogue scale (VAS) and the Oswestry Disability Index (ODI). The average surgical time was 43 min. The ODI improved from 30.6 (preoperative) to 14.3 (postoperative). The VAS of leg pain improved from 7 (preoperative) to 3.6 (postoperative), which represented a statistically significant improvement at the significance level of ($P<0.01$). No intra-operative or early postoperative complications occurred. However, one recurrence did occur, which was treated by the same technique. This technique combines the advantages of three-dimensional visual control (operating microscope) with the minimal surgical trauma of endoscopic techniques, while avoiding some of the shortcomings of both the microsurgical and endoscopic techniques.

Keywords Far lateral disc herniation · Minimally invasive approach

Introduction

Lumbar lateral (extraforaminal) disc herniation constitutes from 2.6% to 11.7% of all lumbar disc herniations [3, 17]. According to Benini [3], any disc herniation lateral to the medial wall of the pedicle is classified as lateral disc herniation. The symptoms of lateral lumbar disc herniation were first well described by Abdullah et al. [1]. They consist of minimal lumbar pain and notable lower limb pain in the area innervated by the compressed root; often there is accompanying sensorial or motor deficit. Symptoms alone do not differentiate this type of hernia from other hernias or compression syndromes. Therefore, instrumental investigation is necessary to achieve diagnostic certainty [9]. Computed tomography (CT) and magnetic resonance imaging (MRI) now allow successful demonstration of lateral disc herniation [18].

Currently, two surgical approaches commonly used for the treatment of this type of disc herniation are (1) a conventional midline approach via large laminotomy and partial facetectomy, and (2) a paramedian approach [23]. Watkins [24] described a paraspinal approach for posterior-lateral fusion, and this approach was modified by Wiltse and Spencer [25] to be used in the treatment of lateral disc herniation. Zindrick et al. [26], Reulen et al. [20] and Maroon et al. [17] modified the paraspinal approach by splitting the paraspinal muscles with preservation of the facet joints. Apart from the minimal soft tissue injury, the paraspinal approach will not damage the lamina or the
facet joints. On the other hand, when treating lateral disc herniation by the standard midline posterior approach, partial laminectomy and sometimes medial facetectomy are mandatory [1, 13, 14, 16], and this may lead to destabilization of the spine.

When a minimally invasive variant of the paraspinal approach is used to introduce a working channel, removal of the laterally herniated disc is possible, with the help of an operating microscope. The aim of this approach is to minimize surgical trauma and to maintain the stability of the spine, as the paraspinal muscles, the bony structures, and the ligaments are left relatively undamaged.

Materials and methods

This study consisted of 15 patients with lateral disc herniations admitted to our centre in the period from February 1999 to December 2001. The mean patient age was 60.3 years, 53% were female, 10 patients complained only of pain (mainly leg and to a lesser extent back pain) and the remaining 5 patients suffered from neurological deficits in addition to pain. The neurological deficits were in the form of paraesthesia at the distribution of the compressed nerve root and weakness of the quadriceps muscle (grade 3–4) [22]. The diagnosis of lateral disc herniation was confirmed by lumbar MRI (Fig. 1). The level mainly affected was L4/5 (six patients) and L3/4 (six patients). The indication for surgery was failure of conservative treatment of pain over a period of 6 weeks and/or neurological deficits. The patients were assessed preoperatively and postoperatively using the Oswestry Disability Index (ODI) [7] and the visual analogue scale (VAS) for back and leg pain [2]. The follow-up period ranged from 2 to 24 months, with a mean of 11.5 months. The results of the scoring systems were analysed statistically using the t-test.

Surgical technique

The operation is done under general anaesthesia, and the position of the upper transverse process at the level of the herniated disc is determined by a spinal needle under image intensifier control (anterior-posterior view) (Fig. 2). A skin incision of 1.5 cm length and about 4–5 cm lateral to the midline is made, and two soft tissue dilators are then applied in sequence (Fig. 3), in order to achieve a gentle spreading of the soft tissues and the fibres of the paraspinal muscles. The working channel is then inserted and its position is checked by the image intensifier (Fig. 4). These working channels are made of titanium with 9 mm inner and 11 mm outer diameter. There are three different lengths (45, 55, 65 mm) (Fig. 5). The han-