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Commentary: Local Spinal Cord Decompression through a Full-Endoscopic Percutaneous Transcorporeal Approach for the Ossification of the Posterior Longitudinal Ligament at the T1-T2 Level

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Abbreviation

OPLL: ossification of the posterior longitudinal ligament

PFETP: percutaneous full-endoscopic transcorporeal procedure

CTJ: cervicothoracic junction

CSF:cerebrospinal fluid

Cervical or thoracic OPLL results from the common pathological factors of cervical or thoracic spinal stenosis, which often cause the compression of the ventral portion of the spinal cord. Patients exhibited progressive deterioration of sensory and motor function in the double upper and (or) lower limbs accompanied with excretion dysfunction[1,2]. Conservative treatment is often ineffective, and surgical procedures for OPLL represent the only effective methods[3]. The purpose of surgical treatment is to achieve decompression of the affected spinal cord, rescue spinal cord function and promote limb function recovery. Various surgical options for cervical or thoracic OPLL are available and can be divided into direct decompression and indirect decompression based on the different surgical approaches. The CTJ exhibits anatomical peculiarities given that the reversal of lordosis to kyphosis occurs at this location. Direct decompression is achieved by removal of OPLL bone blocks in the ventral spinal cord, which was considered to be difficult given the complex anatomical structure. This procedure includes separation of the sternoclavicular joint or manubrium splitting and sternotomy. The operation time is longer, and extensive trauma and massive hemorrhage often occur. The proportion of patients experiencing postoperative neurological deterioration reached 7%-33%, and the cerebrospinal fluid leakage rate was 31.6%-58.3%[4,5]. Indirect decompression is only resected the posterior wall of the CTJ spinal canal and does not address the OPLL in the ventral region of the spinal cord. This procedure leads to a poor decompression effect due to physiological kyphosis of the thoracic spine and traction of the spinal cord by the dentate ligament and nerve root. Yamazaki et al. reported that the symptom remission rate of posterior decompression with instrumented fusion for thoracic myelopathy caused by OPLL was only 58.1%[6]. Thus, the anterior approach is the optimal selection from the perspective of effective decompression of the spinal cord, in which the OPLL could be fully resected. However, the procedures of anterior or posterior approaches for CTJ OPLL exhibit high risks of neurological deterioration postoperatively, and CSF leakage is noted in up to 50% of cases[6-7].

OPLL can be divided into beak type, continuous type, zigzag type, etc. The use of open surgery to address beak-type disease is associated with significant trauma, more complications and internal plant fixation, long recovery time, and expensive medical treatments[3,4,6,7]. To avoid or reduce the potential iatrogenic complications of anterior approach techniques, the microinvasive endoscopic technique has made great progress. George was the first to describe the transcorporeal approach with routine anterior cervical incision and exposure of the segment[8]. Since then, this technique and percutaneous channel microscope-assisted procedures have been performed by other surgeons[9,10]. however, widespread separation of the anterior cervical soft tissue is inevitable. Full-endoscopic technology has been applied to spine degenerative diseases, such as lumbar disc herniation, lumbar spinal stenosis, and cervical myelopathy[11,12]. Choi et al first described the removal of foraminal disc herniation or decompression of the unilateral foraminal stenosis of the cervical spine through a transcorporeal approach[13]. We routinely used an anterior percutaneous full-endoscopic transcorporeal approach for cervical intervetebral disc herniation[14]. We accomplished local spinal cord decompression by removing the localized OPLL at the T1\2 level through anterior percutaneous full-endoscopic transcorporeal approach. No intraoperative iatrogenic complications occurred. In addition, there was no need to stabilize the spinal segment. The technique of spinal endoscopy is used to achieved targeted resection of lesion, decompression of spinal cord, and maintain the biomechanical stability of the spine.

Given the patient's poor physical condition, lack of insurance, and poor financial situation, the OPLL of the T1-2 level was the beak type. The patient and her family refused open surgery and the attendant costs. Consistent with the humanitarian principle of saving lives, we performed local spinal cord decompression through a PFETP for removal of the local lesion. We could touch the anterior cortical portion of the targeted vertebral body through the loose tissue gap using two-finger separation technology and creating a safe zone of percutaneous puncture. Gradual expansion of tube and protection of the casing can prevent the damage to nerves, blood vessels and the esophagus[15,16]. We created a tunnel trajectory in the craniocaudal oblique to address the local lesion of OPLL at the T1-2 level. The lesion was isolated and excised from the surface of the spinal cord in a step-by-step fashion from the outside to the inside.

The observation dural sac reexpansion indicated that satisfactory decompression was achieved. Based on clinical follow-up and radiographic evaluation, the results were satisfactory, and no surgery-related complications were noted. Our procedure provides an alternative approach to reduce trauma, bleeding, pain, expenses, and hospitalization time.

The anterior approach for OPLL in the upper thoracic region is challenging, but we achieved favorable clinical outcomes of local spinal cord decompression using PFETP. The patient recovered without any related complications. Our study presents a case report where PFETP is demonstrated to be safe, effective and feasible for localized lesions in the spinal canal. Our study underscores the benefits of clear visualization, thus reducing intraoperative iatrogenic injury. We provide a new treatment option or reference for localized lesions in the spinal canal. Cases with more strict indications are needed to verify the efficacy and reliability of the technique in the further comparative cohort studies.

Disclosure

The authors have no personal, financial, or institutional interest in any of the drugs, materials, or devices described in this article.

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