Circumspinal Decompression with Dekyphosis Stabilization for Thoracic Myelopathy due to Ossification of the Posterior Longitudinal Ligament

Norio Kawahara, Katsuro Tomita, Hideki Murakami, Satoru Demura, Yoichi Sekino, Wataru Nasu, and Yoshiyasu Fujimaki

Introduction

Ossification of the posterior longitudinal ligament (OPLL) in the thoracic spine is likely to be multiple or extensive. In patients with thoracic myelopathy resulting from OPLL, removing the OPLL is the most effective method for relieving pressure on the spinal cord [1–6], but the anterior approach for removing OPLL plaque is technically demanding. Postoperative neurological degradation has been reported in several articles [1,7]. Especially when the OPLL plaque is large and the spinal cord is pinched between the plaque and the inner cortex of the posterior arch or there is ossification of the ligamentum flavum (OLF), anterior removal of the OPLL plaque is extremely dangerous for the already debilitated spinal cord [3,8].

Many authors have reported that extensive posterior decompression provided posterior shift of the spinal cord, which was indirect decompression of the spinal cord [9–12]. Some authors have tried to prevent postoperative kyphosis by laminoplasty or fusion with bone grafting supported by instrumentation [9,11,12]. These procedures have not always provided satisfactory results, however, because the OPLL plaque is left in place and may still compress the spinal cord owing to the posterior shift of the spinal cord [3–5].

Thus, anterior decompression is the best approach for spinal cord recovery when treating thoracic myelopathy caused by OPLL [1–6]. We reported our original technique of circumspinal decompression for thoracic OPLL and OLF, including safe removal of the OPLL plaque, in 1990 [3,4]. We have since improved this surgical procedure by introducing the concept of dekyphosis stabilization [8].

Materials and Methods

Patients

Circumspinal decompression with dekyphosis stabilization was performed on 10 patients with thoracic OPLL at Kanazawa University Hospital from 1995 to 2002. There were seven women and three men with ages ranging from 40 to 70 years (average 56.6 years). Patients were followed up for an average of 59.2 months (24–120 months).

Evaluation System for Thoracic Myelopathy

The evaluation system for cervical myelopathy, established by the Japanese Orthopaedic Association (JOA in 1975), was used. To evaluate thoracic myelopathy, we utilized the JOA evaluation system for cervical myelopathy but modified it by excluding the category “upper extremity.” Thus, 11 points became the highest score possible for patients who have no thoracic myelopathy, meaning no neurological defects.

Surgical Technique for Circumspinal Decompression

The surgical procedure consists of two steps.

Step 1: Posterior decompression, gutter creation, and dekyphosis stabilization

Step 2: Anterior decompression

Step 1: Posterior Decompression, Gutter Creation, and Dekyphosis Stabilization

With the patient in a prone position, the posterior elements are exposed through a midline incision. The extent of the laminectomy includes at least one vertebra above and below the area affected by OPLL so the spinal cord cannot be pinched by the laminar edge as the
spinal cord, which is still compressed by OPLL, shifts backward after posterior decompression. The laminectomy also includes all levels at which the laminae are causing symptoms or signs of OLF. A diamond burr is used to thin the deep cortex of the laminae and the OLF plaque, so they can be grasped and put aside. This decompression should be done not only on the posterior side of the dura but also on the lateral side (Fig. 1A).

The next procedure is undertaken as a pretreatment for safe removal of the OPLL anteriorly. Corresponding to the area of OPLL to be removed, the inner portions of the facets and pedicles (the lateral sides of the dural tube) are drilled using a 3 mm diameter diamond burr, reaching approximately 1 cm into the vertebral body. Parallel deep gutters are then made on both sides of the dura. The lateral edge of the OPLL should be meticulously separated from the dura (Figs. 1A, 2B). Careful