

Is Local Bone Viable as a Source of Bone Graft in Posterior Lumbar Interbody Fusion?

Yasushi Miura, MD, PhD, Shiro Imagama, MD, Masaki Yoda, MD, Hideyuki Mitsuguchi, MD, and Hiroaki Kachi, MD

Study Design. Radiographic evaluation of bony union and clinical outcome were investigated after posterior lumbar interbody fusion (PLIF) performed with only local bone.

Objectives. To examine the viability of local bone for bone graft in PLIF.

Summary of Background Data. Different sources of bone graft have been used for PLIF. Autologous iliac bone is most likely suitable for biologic bone healing ability, but there may be some questions such as donor site pain. Allograft and artificial bones are less effective for bone healing. Use of local bone could be a solution. However, the quality of local bone is still being questioned and there is hesitation to use local bone alone.

Materials and Methods. Thirty-two patients underwent PLIF (24 single-level and 8 double-level) using the Brantigan I/F Carbon Cage filled with local bone and segmental pedicle screw fixation. At 3, 6, and 12 months after surgery, "parallel AP view radiograph" was obtained to evaluate bony union status. Average follow-up period was 26 months. Clinical outcome was also evaluated by the Japanese Orthopedic Association clinical score.

Results. The bony union rate was 16.7%, 72.4%, and 100% at 3, 6, and 12 months after surgery, respectively. Clinically, the average of JOA scores was improved significantly ($P < 0.001$). The improvement rate was 72.9% (12 mo) and 76.8% (24 mo) on average.

Conclusions. A 100% bony union rate was obtained 12 months after PLIF with only local bone. The results showed that clinical viability of local bone as a source of bone graft in PLIF. [Key words: PLIF, local bone, bony union rate] *Spine* 2003;28:2386-2389

borne pathogen transmission. Use of local bone could be a solution and several attempts were previously reported.¹⁻⁵ However, the quality of local bone is still questioned and there is hesitation to use local bone alone. To examine the viability of local bone as a source for bone graft, radiographic evaluation of bony union and clinical outcome were investigated after PLIF using Brantigan I/F cages packed with only local bone.

Materials and Methods

Patients. Our criteria for fusion to treat degenerative lumbar disease were: 1) intervertebral instability; 2) deformity; and/or 3) painful disc degeneration. Between October 1999 and July 2001, 89 patients with degenerative lumbar disease underwent surgery, and 38 patients were matched for these criteria. Four patients who had L1/2 level lesion received anterior lumbar interbody fusion or far lateral PLIF procedure with autologous cancellous bone from the iliac crest. In one patient, who had previously received two lumbar surgeries, artificial bone was used along with local bone. Iliac crest was harvested in one patient who was suspected of having a spinal tumor. Therefore, a total of 32 patients underwent PLIF surgery using only local bone with Brantigan I/F cages (DePuy AcroMed, Raynham, MA). All patients had low back pain, leg pain, and/or neurologic deficits and conservative treatment had been unsuccessful. The diagnoses were 14 degenerative spondylolisthesis, five lumbar canal stenosis, four painful degenerative disc, three isthmic spondylolisthesis (including 1 dysplastic spondylolisthesis), three degenerative lumbar kyphoscoliosis, two spondylolysis, and one lumbar disc herniation. Segmental pedicle screw fixations were used in all cases; Liberty system (Medtronic Sofamor Danek, Memphis, TN) in 30 cases, Global Combined System (SEM, Montrouge, France) in one case, and TSRH (Medtronic Sofamor Danek) in one case. There were 12 males and 20 females with an average age of 55.8 years (range, 16-78 y). One patient had previously received an open discectomy, whereas another patient had received a percutaneous laser disc decompression previously. Involved level was L4/5 in 15 cases, L3/4/5 in seven cases, L5/S in five cases, L3/4 in four cases, and L4/5/S in one case. Average follow-up period was 26 months.

Bone Graft Technique. For surgical decompression, inferior one-half to two-thirds lamina of the upper vertebra was resected, so that the supraspinous and interspinous process ligaments were kept intact to maintain stability of the upper adjacent level. In the cases of isthmic spondylolisthesis or spondylolysis, however, total laminectomy was required. The local bone was prepared for graft by cleaning off all attached soft tissue, then milling with Bone Mill (Centerpulse, Baar, Switzerland). Brantigan I/F cages, two cages per fusion level, were filled with the milled local bone. After all nuclear material and endplate removal from intervertebral space, one cage was

Graft bone for posterior lumbar interbody fusion (PLIF) requires biologic bone healing ability and mechanical strength. Several kinds of implants (interbody fusion cages) were developed to facilitate mechanical strength of bone graft combining biologically active bone. Although autologous iliac bone may be the most suitable for biologic bone healing ability, it may cause problems because of donor site pain and increased surgical invasion. Allograft and artificial bones have less ability for bone healing. Allograft may also have a risk for blood-

Department of Orthopaedic Surgery, Toyohashi Municipal Hospital, Aotake-cho, Toyohashi, Aichi, Japan.

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Address correspondence to Yasushi Miura, MD, PhD, Department of Orthopaedic Surgery, Toyohashi Municipal Hospital, 50 Hachiken-nishi, Aotake-cho, Toyohashi, Aichi, 441-8570, Japan; e-mail: ymyhs@aol.com