Does Combined Spinal Epidural Anesthesia Decrease the Morbidity of Iliac Block Bone Grafting for Deficient Alveolar Ridges Compared With General Anesthesia?

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Purpose: To evaluate the morbidity of iliac block bone grafting performed under general anesthesia (GA) or combined spinal epidural anesthesia (CSEA).

Materials and Methods: We implemented a retrospective study including patients who underwent anterior iliac block bone grafting for deficient maxillary alveolar ridges. The anesthetic technique (GA or CSEA) was the primary predictor variable. The outcome variables were pain, gait disturbance, neurosensory disturbance (0 to 5 weeks), vomiting tendency (0 to 7 days), and postoperative hospitalization period (0 to 2 days).

Results: The sample comprised 22 patients, with 10 in the GA group and 12 in the CSEA group. No surgical complications except sensory disturbance in 2 patients were observed during the study period. Pain during initial healing ($P < .001$), the gait disturbance rate at 3 weeks after surgery ($P = .003$), and the vomiting tendency on the day of surgery ($P < .001$) were significantly higher in the GA group than in the CSEA group; all variables showed significant improvement with time in both groups. The postoperative hospitalization period was also significantly longer for the GA group than for the CSEA group ($P < .001$). No significant difference was observed between groups with regard to neurosensory disturbance.

Conclusions: Iliac block bone grafting for deficient maxillary ridges can be successful under both GA and CSEA, although CSEA results in less pain and vomiting and early recovery, thus increasing patient comfort.

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Alveolar bone loss can be attributed to a variety of causes such as trauma, oncologic diseases, oral infections, and bone atrophy after dental extractions.[1,2] Before prosthodontic rehabilitation with dental implants, patients with alveolar bone loss may require multidimensional bone augmentation procedures.

Although the application of bone substitutes such as allografts, xenografts, and alloplasts remains popular, the autologous bone graft is the gold standard for alveolar bone augmentation because of its osteogenic potential.[3] Extraoral donor sites are essential to reconstruct severely atrophic jaws for a structurally and functionally sufficient bone volume.[4] Anterior iliac crest bone harvesting provides sufficient alveolar bone volume for the reconstruction of severely deficient alveolar ridges before dental implant therapy.[5,6]

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However, numerous studies have reported low to moderate morbidity because of many factors such as gait disturbance, infection, donor-site pain, vomiting, and sensory changes after grafting procedures,[6,7] and preventing these morbidity factors will improve patient comfort.

The anesthesia technique used for iliac bone harvesting may directly affect the donor-site morbidity and general patient well-being. Neuroaxial blockade (NAB) techniques allow for very efficient pain control and are associated with a wide diversity of indications.[8,9] NAB techniques may eliminate anesthesia-related morbidity and serve as an alternative to conventional general anesthesia (GA) techniques. Meanwhile, a treatment protocol with a lower incidence of morbidity will increase patient acceptance of extraoral grafting procedures.

The primary aim of this study was to address whether the use of combined spinal epidural anesthesia (CSEA) decreases the morbidity of iliac block bone grafting for deficient maxillary alveolar ridges compared with the use of GA. To our knowledge, this is the first clinical study to compare the morbidity of alveolar onlay bone grafts harvested from the anterior iliac crest with regard to these 2 anesthetic techniques. The null hypothesis was that iliac crest bone grafting under GA and iliac crest bone grafting under CSEA have similar morbidity rates with statistically insignificant differences. Specifically, this study aimed to compare different morbidity parameters for iliac bone grafting under CSEA versus GA.

Materials and Methods

STUDY DESIGN AND SAMPLE SELECTION

To address the research aims, we designed and implemented a retrospective study including patients who underwent onlay block bone grafting with harvested tricortical anterior iliac crest bone for deficient alveolar ridges from December 2011 through January 2014. The sample was derived from a population of patients requiring implant placement in maxillary alveolar ridges with severe bone resorption who were treated by clinicians at the Department of Oral and Maxillofacial Surgery and Department of Oral Implantology, Faculty of Dentistry, Istanbul University, Istanbul, Turkey. The anesthesiologist (T.S.) at the Department of Oral and Maxillofacial Surgery offers CSEA as an alternative to GA to patients who fear GA or do not want to lose consciousness during surgery. A retrospective chart review of data was used for sample selection. The inclusion criteria for the study were as follows: procedure performed under GA or CSEA, age 18 years or older, follow-up for more than 6 months after surgery, presence of a residual alveolar ridge with a remaining bone width of less than 4 mm and/or height of less than 7 mm that was augmented with tricortical anterior iliac crest bone grafting, and availability of data on morbidity variables during the follow-up period. The exclusion criteria were as follows: missing medical records on morbidity, previous surgery at the donor or recipient site, systemic diseases contraindicating oral surgery, chronic periodontitis in the remaining teeth, and a history of smoking. The presence of these conditions was ascertained by retrospective chart review. Thus, the final patient sample was selected after application of all inclusion and exclusion criteria.

This study followed the Declaration of Helsinki on medical protocol and ethics, and the regional Ethical Review Board of Istanbul University approved the study (protocol No. 2015/61). All patients signed an informed consent agreement.

SURGICAL METHODS

After clinical and radiologic examinations, the anterior iliac crest was chosen as the preferred donor site for autogenous block bone grafting under GA or CSEA. CSEA, which is an NAB technique, was administered at the L3-L4 intervertebral disc level, and intravenous sedation was induced during surgery. We used 0.15 mg/kg of midazolam (Demizolam; Dem Ilac, Istanbul, Turkey) for intravenous sedation and 10 mg of bupivacaine hydrochloride (Marcaine; AstraZeneca Ilac, Istanbul, Turkey) for CSEA. Nasotracheal intubation was performed for all patients treated under GA, which was induced with 1% minimum alveolar concentration isoflurane (Adeka, Samsun, Turkey) in a 50% oxygen and 50% nitrous oxide mixture, 3 mg/kg of propofol (Fresenius Kabi, Istanbul, Turkey), and 0.5 mg/kg of rocuronium bromide (Esmeron; Organon Ilaclari, Istanbul, Turkey).

After the placement of a sulcular incision at the deepest level of the maxillary vestibular sulcus and blunt dissection, a full-thickness flap was raised at the recipient site to the top of the alveolar ridge. The dimensions of the bone graft required for reconstruction of the alveolar ridge were measured, and the standard surgical protocol for anterior iliac crest bone harvesting was followed. A skin incision was placed approximately 2 cm above the anterosuperior iliac spine along the anterosuperior margin of the anterior iliac crest. The medial and lateral cortical surfaces of the iliac crest were directly exposed after subperiosteal dissection, and a tricortical (corticocancellous) autogenous bone block from the anterior iliac crest was harvested using a microsaw and chisel. Block bone grafts were recontoured with diamond burs under copious sterile saline solution irrigation for optimum onlay adaptation to the recipient site and fixed to the residual ridge with multiple screws to inhibit