Sublabial rhinoseptoplastic technique for transsphenoidal pituitary surgery by a hinged-septum method

Technical note

TAKANORI FUKUSHIMA, M.D., AND KEIJI SANO, M.D., D.M.Sc.

Department of Neurosurgery, University of Tokyo Hospital, Tokyo, Japan

A new modification of the transseptal, transsphenoidal approach to the sella turcica is described. The procedure consists of unilateral dissection of the septal mucosa through a sublabial route, and retraction of the entire nasal septum with its upper attachment as a hinge. For mobilization of the septum, an L-shaped osteotomy is made along the base of the septum and along the anterior wall of the sphenoid sinus. It provides adequate exposure of the sphenoid sinus while preserving the septal structures. The anterior nasal spine and the edges of the nares are also left intact. The anterior wall of the sphenoid sinus is resected en bloc and is used as a bone splint for the reconstruction of the sellar floor. This approach has been performed in 45 cases of pituitary adenoma, one of craniopharyngioma, and one with sphenoid mucocele. There was no instance of complications such as mucosal perforation, septal deformity, or infection. Modifications of the surgical instruments used are described.

KEY WORDS • pituitary adenoma • sella turcica • hypophysectomy • transsphenoidal surgery • operative approach

Since classical transsphenoidal surgery was revived with technical innovations by Guiot and Thibault and Hardy and Wiger, this approach to the sellar region has become a routine surgical procedure in most neurosurgical centers. With the use of an operating microscope and televised x-ray monitoring, it provides an easy, accurate midline access to the sella turcica with negligible risks. In recent years, several newer modifications of the transnasal technique have been reported. Drawing from the experience with the transeptal technique described by Laws, we have developed a new rhinoseptoplastic operation in which the bone edges of the nares and the nasal septum are entirely preserved.

This report presents the details of our operative technique and describes some modifications in the surgical instrumentation.

Operative Procedure

The operation is performed under general endotracheal anesthesia in every case. The patient is placed supine in a semirecumbent position, with the top of the operating table elevated about 30°. The patient’s head is held loosely on a horseshoe headrest to enable intraoperative adjustment of its position. Usually, the head is tilted 20° toward the left shoulder and rotated 20° to the right, while keeping the axis of the face horizontal. This position provides the easiest access to the nose. An x-ray image intensifier is positioned with its C-arm under the head holder to allow space for the participation of the assistant during the operation. The spiral endotracheal tube is secured by tape at the left corner of the mouth. The right hip is prepared for removal of muscle graft. The operative arrangement is illustrated in Fig. 1.

The nose, mouth, and the mucosa are prepared with aqueous chlorhexidine and hydrogen peroxide. The oropharynx is completely packed with moist gauze. The mucosa is infiltrated with normal saline containing epinephrine in a concentration of 1:200,000. The upper lip is retracted by an assistant, and a sublabial concave incision is made through the midpoint of the frenulum and up toward the nares (Fig. 2 upper left). This inverted
T. Fukushima and K. Sano

FIG. 1. Operative arrangement and position of the patient. The top of the operating table is elevated 30°. The patient's head rests loosely on a horseshoe head holder to allow intraoperative rotation. The endotracheal tube is firmly taped at the left corner of the mouth. An image intensifier is positioned with its C-arm under the head support to allow effective participation of the assistant during operation. A piece of muscle is taken from the right hip to avoid a visible scar.

curvilinear incision facilitates the rapid exposure of the nares and prevents mucosal laceration even by the extreme upward retraction of the lip. The submucosal soft tissue is dissected to expose the pyriform nasal aperture. The edges of the nares and the anterior nasal spine are preserved intact. The nasal mucosa is first elevated from the floor and then from the septal cartilage. The mucoperiosteum is incised in the midline with a scalpel, and the mucosa is carefully separated from the septum on its left side. The fibrous attachments of the mucoperiosteum to the maxillary crest are coagulated and gently dissected off (Fig. 2 upper center). The right side of the septal mucosa is left attached to the septum. The mucosa is further elevated posteriorly from the septum of bone with the aid of a pair of long flat-blade retractors. The appropriate direction toward the sphenoid sinus is confirmed by x-ray television, after which a horizontal osteotomy is performed along the base of the septum (Fig. 2 upper right), using a specially designed U-shaped knife (Fig. 3a). At this point, a surgical microscope is positioned, and a vertical osteotomy is made with a curved chisel along the anterior wall of the sphenoid sinus (Fig. 2 upper right). This completes the L-shaped osteotomy of the nasal septum as illustrated diagrammatically in Fig. 2 lower left, and now the whole septum can be swung toward the right nasal chamber with its upper attachment as a hinge ("hinged septum").

Next, our modification of a slim nasal speculum is introduced and fixed in the appropriate direction under fluoroscopic control. A lip guard is inserted beneath the upper lip which serves to retract the upper lip out of the operative area. Thus, without removing any part of the nasal septum, the anterior wall of the sphenoid sinus is widely exposed (Fig. 2 lower center). The attachment of the bone septum on the sphenoid sinus is usually located exactly in the midline, forming the appearance of a keel. Near the upper end of this keel, natural ostia of the sphenoid sinus are situated, indicating the direction toward the anterior border of the sellar floor. The anterior wall of the sphenoid sinus is further opened with a Kerrison punch, and the mucosa is removed. The anteroposterior limits of the sella are identified with fluoroscopy, and then the sellar floor is removed with a bayonet chisel and a micro-Kerrison punch. The dura is cauterized and incised with a bayonet knife and microscissors. The tumor is identified and removed totally.

After adequate hemostasis is achieved, the sellar cavity is packed with a piece of crushed muscle. The sellar floor is reconstructed, securing the muscle graft in place. The bivalve nasal speculum is withdrawn, and the nasal septum is brought back to its original position. A small hole is made across the anterior nasal spine to fix the septal cartilage. A sliver of bone, 2-mm thick, is inserted at the base of the cartilage to maintain the height of the septum (Fig. 2 lower right). The sublabial incision is closed. A couple of plastic splints are applied to the nasal septum from the nostrils to maintain its normal configuration as advocated by Laws. The nasal cavity is packed with Vaseline gauze impregnated with antibiotics.

Postoperatively, the patient is kept in a recumbent position with the face straight up for 7 to 10 days. The nasal packs are removed on the 6th postoperative day. The nasal plastic splints are removed on the 10th day. Antibiotics in relatively high dosage are administered systemically for a week. Postoperative diabetes insipidus, usually transient if present, is managed by keeping the patient in relative dehydration. Persistent diabetes insipidus, which occurred in 10% of our patients with radical excision, is treated with synthetic vasopressin nasal drops.

Discussion

Several modifications of Hardy's original subnasal operation have recently been reported. Laws described a unilateral transseptal approach; however, in his procedure, the bone septum and a part of the cartilage are removed and an additional nasal incision
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Fig. 2. Illustration of the rhinoseptoplastic procedure. Upper Left: Sublabial concave incision. This inverted curvilinear incision facilitates rapid exposure of the nares and prevents mucosal laceration by extreme retraction of the upper lip. Upper Center: Unilateral separation of the mucoperichondrium and the mucoperiosteum. Upper Right: An L-shaped osteotomy of the nasal septum is made to produce a “hinged septum.” A U-shaped septum knife is used for the horizontal osteotomy and a curved chisel for the vertical one. The upper attachment of the septum to the alar cartilage and to the ethmoid sinus operates like a hinge. Lower Left: Midline sagittal section of the nose illustrating schematically the L-shaped osteotomy. Lower Center: Insertion of a slim nasal speculum to expose the anterior wall of the sphenoid sinus. Note the position of the lip guard and the retracted septum. Lower Right: Repositioning of the nasal septum. The anterior septal cartilage is anchored to the nasal spine with a “bone tip” in place.

is required. Tindall, et al., described another unilateral procedure consisting of the removal of one side of the bone edge of the nares and the bone septum. Freidberg, et al., reported a modification of Hirsch’s endonasal approach, with an incision across the base of the nasal columella and the removal of a part of the septum. Our experience showed that the endonasal or the unilateral insertion of the nasal speculum was difficult to accomplish in the small nostril of the Japanese. In our method, no part of the nasal septum, bone edge of the nares, or nasal spine is removed. The whole procedure can be done through a sublabial incision by the neurosurgeon. The operative field is as wide as in the conventional method. With the proper adjustment of the position of the microscope and with the rotation of the patient’s head, the anterior nasal spine does not obstruct the surgeon’s view.

So far, we have performed this rhinoseptoplastic operation in 45 cases of pituitary adenoma, one case of craniopharyngioma, and one with a sphenoid mucocele. There was no mortality nor any instance of complications such as cerebrospinal fluid rhinorrhea, infection, or delayed bleeding. There has been no

Fig. 3. Photograph of the specially designed rhinological instruments. a: U-shaped septum knife used for horizontal osteotomy along the base of the septum. b: Curved chisel used for the vertical osteotomy along the anterior wall of the sphenoid sinus. c: A pair of long flat-blade retractors for the unilateral separation of the septal mucosa. d: A slim nasal speculum with tapered tips. The reinforced thick joint is designed to enable wider opening at the tip. e: A lip guard which serves to retain the upper lip out of the operative field.
deformity of the nasal septum, mucosal perforation, nasal discharge, or atrophic rhinitis. The procedure is simple and logical, and a good cosmetic result is achieved. In particular, any subsequent reoperation is as easy as the initial procedure, since the whole nasal septum is preserved.

References


Address reprint requests to: Keiji Sano, M.D., D.M.Sc., Department of Neurosurgery, University of Tokyo, 7-3-1 Hongo, Bunkyo-ku, Tokyo 113, Japan.