

Reconstruction with composite nasal septal cartilage and auricular cartilage in extended partial laryngectomy

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Abstract

Several reconstruction techniques have been employed following partial laryngectomy in order to improve laryngeal function. We report 12 cases in which composite nasal septal cartilage and auricular cartilage were used. We decannulated the patients in an average of 19 days. Following the reconstruction we obtained a satisfactory phonatory function and swallowing. Six patients completed a follow-up period of three years without presenting any recurrences or mortality. Our experience with reconstruction using composite nasal septal and auricular cartilage following partial laryngectomy proved effective.

Key words: Laryngectomy, partial; Cartilage; Ear; Nose

Introduction

Several innovative procedures and techniques have been employed in the past four decades in order to establish the most appropriate reconstruction following partial laryngectomy. Hemilaryngectomy was introduced by Billroth in 1875 (Bailey, 1985) and the first reconstruction following hemilaryngectomy was performed by Glück in 1903 (Burgess, 1993) using cervical skin flaps. Since then reconstruction material varied in an attempt to improve laryngeal function: Som (1951) used pyriform sinus mucosa, Pressman (1954) proposed bipediced sternohyoid-thyrohyoid muscle flap, Setlacek described epiglottis in 1965 (Lawrence and Burgess, 1993), Oglu and Dedo (1965) described thyroid cartilage and Figi (1950) skin grafted stent, Toohill *et al.* (1976), Duncavage (1989), Laurian and Zohar (1981) reported composite nasal septal cartilage, Caputo and Consiglio (1961) described auricular cartilage.

Since maintaining an adequate glottic closure and prevention of aspiration are two major concerns in patients undergoing conservative surgery (Ward *et al.*, 1977), reconstruction for defects involves providing an adequate airway and a framework strong enough to prevent destruction and collapse caused by respiration.

This paper presents our experience with 12 cases in which composite nasal septal cartilage and auricular cartilage were used following partial resection. We evaluated our results in terms of decannulation time, phonatory and sphincter functions.

Materials and methods

We performed partial laryngectomy in 12 patients (three females, nine males; age ranging from 39 to 66 years) diagnosed as having laryngeal carcinoma in the Otolaryngology Department of Cerrahpaşa Faculty of Medicine between 1982 and 1994. The cases were staged according to the criteria of the American Joint Committee for Cancer Staging Classification, 1987. Operation techniques employed were extended frontolateral hemilaryngectomy (n=2), anterior commissure resection (n=4), subglottic resection (n=2), extended partial laryngectomy (n=2), and anterior commissure resection+subglottic resection+prelaryngeal-pretracheal dissection (n=2). Composite nasal septal cartilage and auricular cartilage were used in the reconstruction. All the patients were taken under a follow-up programme of five years. Out of nine cases which were referred for radiotherapy, decannulation, because of the possibility of oedema, was delayed in three patients until after the end of radiotherapy.

The results were evaluated considering the outcome on swallowing, the quality of voice, and the decannulation time. Swallowing and phonatory function were rated as good, moderate, or poor.

Operative technique

Tracheostomy is performed through the second and third tracheal rings under general anaesthesia. The composite nasal graft with mucosa, perichondrium, and cartilage is removed from one side of the nasal septum. Similarly, using a retroauricular incision an auricular cartilage with epithelium and perichondrium is removed. The reconstruction

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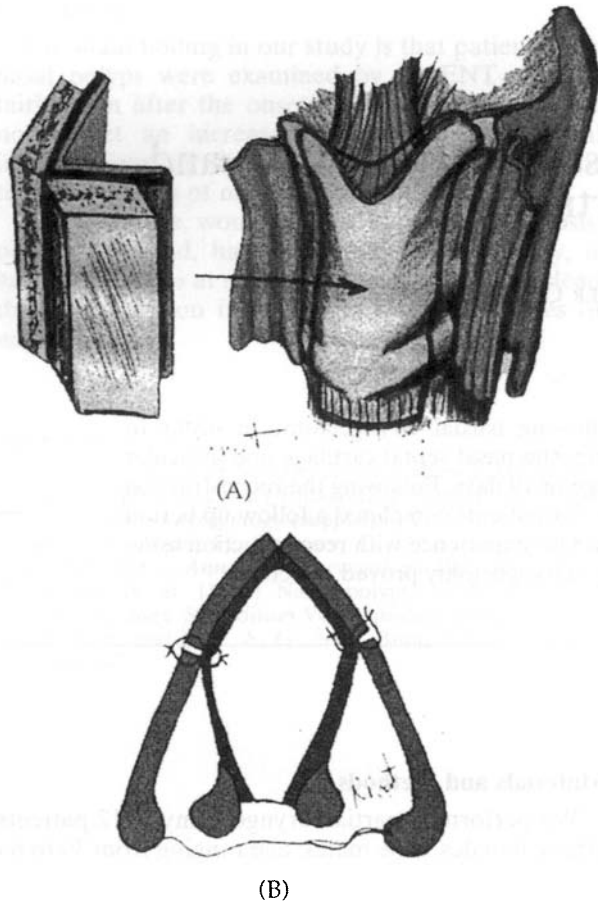


FIG. 1

The most common use of free composite cartilage graft, A) prepared free cartilage and the resection site, B) appearance following the reconstruction.

material is placed in saline. The incision site in the nasal septum is left for primary healing, and the

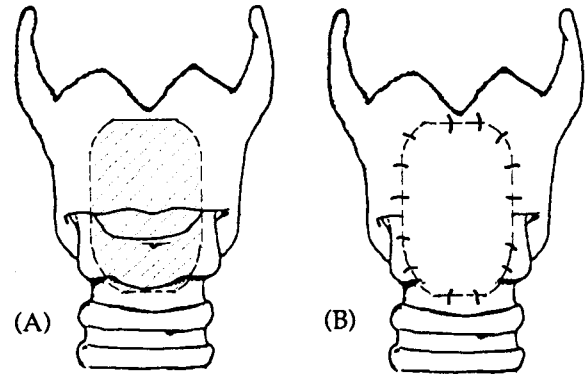


FIG. 2

Reconstruction with composite nasal and auricular cartilage, A) Shaded areas illustrates resection site, B) the composite cartilage in reconstructed glottic, subglottic, and cricoid area (Cases 11, 12).

retroauricular resection site sutured leaving no cosmetic defect. Thereafter, partial or extended partial laryngectomy is performed depending on the size and localization of the lesion (Figure 1). Where necessary – in extensive subglottic invasion – the operation proceeds with a partial resection of the cricoid cartilage (Case 11 and 12) (Figure 2). The reconstruction material is prepared according to the size of the resected specimen and placed and sutured with the mucosal or epithelial surface facing the lumen. Use of a stent is not required.

Results

Table I lists features of our cases including age, sex, localization, stage, operative technique, reconstruction material employed, and follow-up findings. Reconstruction with composite nasal septal and

TABLE I
RECONSTRUCTION WITH COMPOSITE NASAL SEPTAL CARTILAGE AND AURICULAR CARTILAGE IN 12 PATIENTS

No.	Age	Sex	Localization	TNM	Operative technique	Reconstruction material	S	V	D* (Days)	Follow-up (years)
1	53	M	Glottic	T ₂ N ₀ M ₀	Extended fronto-lateral hemilaryngectomy	Septal cartilage + epiglottis	Good	Good	30	5
2	57	M	Glottic	T ₂ N ₀ M ₀	Anterior commissure resection	Auricular cartilage	Good	Good	13	7
3	61	F	Subglottic	Mesenchymal neoplasm	Subglottic resection	Septal cartilage	Good	Good	10	2
4	63	M	Transglottic	T ₂ N ₀ M ₀	Extended partial laryngectomy	Septal cartilage + epiglottis	Moderate	Moderate	40	2
5	39	F	Subglottic	Mesenchymal neoplasm	Subglottic resection	Septal cartilage + auricular cartilage	Good	Poor	72	3
6	64	M	Transglottic	T ₂ N ₀ M ₀	Extended fronto-lateral hemilaryngectomy	Septal cartilage	Good	Good	8	3
7	60	M	Glottic	T ₂ N ₀ M ₀	Extended partial laryngectomy	Septal cartilage	Good	Good	10	1
8	57	M	Glottic	T ₃ N ₀ M ₀	Anterior commissure resection	Auricular cartilage thyroid cartilage	Good	Good	15	10
9	62	F	Glottic	Invasive thyroid Ca	Anterior commissure resection	Auricular cartilage	Good	Good	15	12
10	56	M	Glottic	T ₂ N ₀ M ₀	Anterior commissure resection	Septal cartilage	Moderate	Good	5	1.5
11	66	M	Glottic + subglottic	T ₂ N ₀ M ₀	Anterior commissure + subglottic resection	Septal cartilage	Good	Good	5	1.5
12	44	M	Glottic + subglottic	T ₂ N ₀ M ₀	Anterior commissure + subglottic resection	Septal cartilage	Good	Good	5	1

S-swallowing; V-voice; D-decannulation time
*Mean decannulation period was 19 days.

auricular cartilage resulted in a satisfactory phonatory function and swallowing. The average decannulation time was 19 days. Only one case developed a pseudopolyp in the anterior commissure. Six patients completed a follow-up period of three years without presenting any recurrences or mortality.

Discussion

Reconstructive surgery must provide an adequate glottic closure and prevention of aspiration, which involves establishing an epithelium-covered lumen and a framework strong enough to prevent destruction and collapse caused by respiration. Among reconstruction materials employed, composite septal and auricular cartilages have considerable advantages (Clairmont and Conley, 1978; Laurian and Zohar, 1981; Butcher and Dunham, 1984; Duncavage *et al.*, 1989). They both have epithelium compatible with the laryngeal lumen and a strong, enduring framework, obviating the need to use stents and enabling a one-step operation to be accomplished. In addition, they can readily be removed from the related sites without losing any of their functional properties. Moreover, because of their distance from the tumoral region, they are unlikely to have tumoral risks. These advantages indicate that composite septal and auricular cartilages may be preferably employed in extended partial laryngectomy for T₂ and selected T₃ carcinomas of the true vocal folds.

We employed composite septal and auricular cartilages in 12 cases at varying stages, presenting glottic lesions with anterior commissure involvement (n = 5), transglottic lesions (n = 2), subglottic lesions (n = 2), glottic-subglottic lesions (n = 2), and an invasive thyroid carcinoma. Extended hemilaryngectomy with cricoid resection should be performed if subglottic extension of 5mm or greater is present (Billir and Lawson, 1986). In *Case 11* and *12*, where subglottic extension exceeded 5 mm, we performed pretracheal and prelaryngeal dissection, together with anterior commissure resection+subglottic resection accompanied by cricoid resection.

Our reconstructions resulted in a satisfactory phonatory function and swallowing. The average decannulation time was 19 days. The only complication was pseudopolyp development in the anterior commissure in one case. Similar results have been reported concerning the favourable outcome of reconstruction with composite nasal septal cartilage. Laurian and Zohar (1981) used composite nasal septal cartilage in 11 cases with glottic carcinoma involving the anterior commissure and obtained a satisfactory voice and decannulation time varying from four to six days. Butcher and Dunham (1984), in 12 cases of T₂ and selected T₃ glottic carcinoma, employed composite nasal septal cartilage and decannulated all patients within five days.

Because of the successful use of composite nasal septal and auricular cartilage, reconstruction with these materials can also be extended to other lesions

requiring partial laryngectomy and to laryngotracheal stenosis. Duncavage *et al.* (1989) have described reconstruction with composite nasal septal cartilage in 16 cases with laryngotracheal stenosis, two of which were associated with partial laryngectomy. We also employ composite nasal septal and auricular cartilage for the reconstruction of laryngotracheal stenosis.

Our experience with reconstruction using composite nasal septal and auricular cartilage following conservative surgery has proven to be effective for the rehabilitation of laryngeal function.

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