

RESULTS OF AURICULAR CONCHAL BOWL RECONSTRUCTIONS FOLLOWING CANCER RESECTIONS WITH POSTAURICULAR ISLAND FLAP

ALEKSANDRA ILJIN¹, EDWARD LEWANDOWICZ¹, BOGUSŁAW ANTOSZEWSKI¹,
MARCIN DURKO², TOMASZ ZIELIŃSKI¹

Department of Plastic, Reconstructive and Aesthetic Surgery, Medical University in Łódź¹
Kierownik: prof. dr hab. *B. Antoszewski*

Department of Otolaryngology and Laryngological Oncology, Medical University in Łódź²
Kierownik: prof. dr hab. *W. Pietruszewska*

The aim of the study was to present our experience with the postauricular island flap (pif) and clinical evaluation of the results following auricular conchal bowl reconstructions with the pif in patients after carcinoma resections.

Material and methods. We analyzed results in 13 patients who underwent auricular conchal bowl reconstructions with pif following malignant tumor resection between 2000-2013. The patients were followed-up. We estimated early and long-term results after surgery including plastic surgeon's and patient's opinion.

Results. The malignancies were completely excised in all patients, and there were no recurrences within 2 years of follow-up. Observed complications of conchal bowl reconstructions were venous congestion in two cases (15.3 %), and pinning of the operated ear in two patients (15.3%). Postoperative result was very good in 11 cases (both in the opinion of plastic surgeon and patients), whereas in two patients with pinning of the operated ear was satisfied.

Conclusions. 1. Postauricular island flap reconstructions after auricular conchal bowl resections allowed for complete removal of malignant tumors with no evidence of recurrence, and also preserved proper conchal shape in the reconstructed ear. 2. Reconstructions of auricular conchal bowl with the postauricular island flap resulted in very good postoperative results, which confirms the efficiency of the applied technique. 3. Reconstructive surgery with postauricular island flap of individuals with partial auricular conchal bowl defects contributed to postoperative satisfaction in both patients and doctors' estimations.

Key words: auricular conchal bowl reconstructions

Reconstructions in patients with auricular-conchal defects are undoubtedly challenging, with regard to surgical performance and outcome, for plastic surgeons. Deformities of this area usually result from skin cancers (mainly BCC – Basal Cell Carcinoma, as well as SCC – Squamous Cell Carcinoma), and rarely from burns (1, 2, 3). Among a number of described local flaps for conchal bowl reconstruction, postauricular or retroauricular (according to Tanzer) myocutaneous island “revolving door” flap, known also as the flip-flop flap (pif), is considered as the best choice for reconstructive

surgery of the anterior auricular conchal bowl (4, 5). Although the concept of transposing the postauricular flap with a buried deepithelialized pedicle through the conchal cartilage was reported by Owens in 1959, retroauricular island flap was introduced by Masson in 1972 (6, 7).

The original technique was modified later by various authors (Talmi, Rodendo, Jackson), and indications for flap's use were extended for larger auricular defects (8, 9, 10). Krespi described the anatomy and vascular supply of the pif (from the auricular branch of the pos-

terior auricular artery and superficial temporal artery), as well as excellent results after surgery with the use of this method. The flap comprises posterior auricular muscle, local fascia, sometimes sternocleidomastoid muscle, and is transferred in a single stage operation (11). Sometimes, if needed, additional cartilage autograft is employed (12). These operations should be properly planned to minimize the risk of complications and auricular-conchal disfigurements.

Currently, there are few literature reviews on the use of pif in auricular-conchal reconstructions, discussing the original technique with modifications, as well as outcomes after surgery (13, 14). However, despite all the interest in this procedure and its proved superiority over other methods of reconstruction, it is not widely practiced. Achieving proper margins in ear cancer resections and preserving aesthetic conchal shape after operation requires surgical expertise, as there is very little excessive tissue in this localization.

Therefore, the aim of the study was to present our experience with pif and evaluate the results in patients after auricular conchal bowl reconstructions following cancers resections.

MATERIAL AND METHODS

We analyzed 13 patients (10 males, 3 females), aged between 48-80 years, with the mean age of 63 years, who underwent partial ear reconstructions with pif following excision of conchal bowl malignant tumors between 2000-2013. Four patients were operated after biopsy taken in other institutions, which revealed BCC infiltrative type – 2, BCC nodular type – 1, or SCC G-2 – 1. The tumor size ranged from 1 to 3 cm, defect size after surgical excision from 1.5x2 to 4x5 cm. All resected tissue material was subjected to histopathologic evaluation. Clinical classification of malignancies advancement in analysed group has been shown in tab. 1.

Other comorbidities were present – diabetes mellitus in 3, cardiovascular diseases in 5, as well as nicotinism in 6 cases. All individuals were operated under local anesthesia (Lidokaine with 1: 100,000 epinephrine). Taking into consideration local severity of cancer and suspected cartilage involvement resection in all cases included whole thickness of the ear concha. Mohs micrographic surgery was not performed. Closure of the defect was achieved by a pif of size according to the size of the defect previously measured. After excision of the lesion the flap was outlined behind the defect. It involved postauricular skin, the subcutaneous tissue, and the muscle layer. Then it was incised around the periphery and attached to its base. The margins of the flap were undercut and mobilized. With the ear pushed back the flap was pulled through the defect (fig. 1). In 2 cases with extension of the lesion into opening of the external auditory meatus, when the flap coverage of the defect was not complete it was left to heal by secondary intention. Antibiotic (aerosol – Neomycinum) was applied to the postoperative wound. The sutures were removed after 7-10 days. All patients were followed up in the

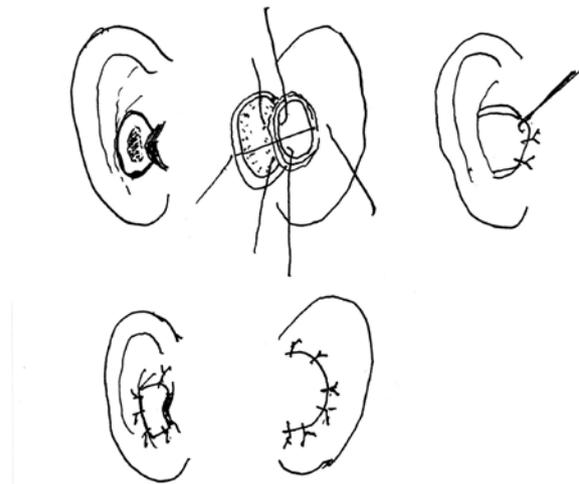


Fig. 1. Scheme of auricular conchal bowl reconstruction following cancer resection with postauricular island flap

Table 1. Clinical classification of malignancies advancement in analysed group

Type of skin cancer	Clinical stage							
	T1	T2	T3	T4	N0	N1	MO	M1
BCC	4	3	–	1	–	–	–	–
SCC	2	2	–	1	–	–	–	–
Ttotal	6	5	–	2	–	–	–	–

Out Patient Clinic in a month after surgery, than after 3 and 6 months, and once a year in consecutive years (fig. 2, 3). We analyzed the early and long-term results of surgery. Postoperative results were subjectively graded by a plastic surgeon on the basis of physical examination (scale of satisfaction), as well as by the patients (scale of satisfaction).

RESULTS

Histopathologic evaluation of postsurgical specimens revealed BCC in 8 cases (5 – infiltrative type, 3 – nodular type) or SCC (G2) in 5 cases. According to histopathologic evaluation (pTNM) change of BCC clinical stage was noted in two cases, which resulted from cartilage infiltration. There were no lymph nodes metastases nor distant metastases. Histopathologic evaluation of margin showed that excision was complete in 5 cases. Width of margin was not evaluated. Minimal excision margin ranged from 1 to 4 mm (an average 3.1 mm) in remaining 8 specimens. None of the patients had a recurrence of cancer at control examinations.

Postoperative outcomes in the examined patients have been shown in tab. 2. Venous congestion had a tendency to resolve in 3-4 consecutive days after surgery. Pinning of the

operated ear towards the scalp in patients with prominent ears improved within a few consecutive months and according to doctor's opinion further revisions were not needed.

In the opinion of the operated patients the defect was insignificant and they did not want to undergo additional corrections. Normal contour of the reconstructed auricular concha was preserved in all individuals. Postoperative estimation by the plastic surgeon and by patients has been shown in tab. 3. Evaluation was based on adopted standards (tab. 4).

DISCUSSION

Carcinoma of the external ear occurs in 5-10 % of all malignant skin neoplasms. Usually, these lesions are more aggressive clinically compared with cutaneous cancers in the other sites and sometimes in spite of surgery, require additional treatments. Malignant tumors of the auricular concha, specially recurrent or long-lasting may spread to cartilage and inner ear. Known as higher-risk subtypes of BCC (infiltrative, metaplastic etc) tend to recur after surgery (2, 15, 16, 17). In turn, SCC observed over the pinna three times more frequent than in different sites, is related to greater recurrence rate, as well as metastatic



Fig. 2. Patient with squamous cell cancer located on the auricular conchal bowl aged 74 years



Fig. 3. Ear of an 74-year-old patient 3 months after reconstruction with postauricular island flap

Table 2. Results of early reconstruction with postauricular island flap in the examined group

Postoperative complications and results of auricular concha reconstructions	Males	Females	Total
Venous congestion	2	0	2
Abnormal wound healing	0	0	0
Infection	0	0	0
Flap necrosis	0	0	0
Secondary flap's shrinkage	0	0	0
Depression in the contour of the flap	0	0	0
Auditory canal constriction	0	0	0
Non-aesthetic appearance of the donor site (wide scar)	0	0	0
Pinning of the operated ear	2	0	2
Linear appearance of auricular concha postoperative scar	10	3	13

Table 3. Postoperative evaluation by plastic surgeon and patient

Postoperative evaluation by	Patients		Plastic surgeon	
	males (n=10)	females (n=3)	males (n=10)	females (n=3)
Scale of satisfaction				
Completely satisfied	8	3	8	3
Satisfied				
Moderately satisfied	2*		2*	
Slightly satisfied				
Not satisfied				

*patients with postoperatively confirmed pinning of the operated ear

Table 4. Postoperative satisfaction survey

Degree of satisfaction Aesthetic status	Estimation standards
Completely satisfied	real contour/shape of the reconstructed auricular concha
Satisfied	almost real contour/shape of the reconstructed auricular concha
Moderately satisfied	imperfections of the reconstructed auricular concha, or pinning of the operated ear are apparent
Slightly satisfied	unreal contour /shape of the reconstructed auricular concha, and pinning of the operated ear are apparent
Not satisfied	additional surgical revision is needed, unreal cochal shape, pinning of the operated ear are apparent

potential, and morbidity (2, 18). Management of BCC, or SCC can be improved by evaluation of phenotypic subtype before the lesion is excised, frozen section, or Mohs micrographic surgery (17). All malignancies of our study were removed with histopathologically free margins at one operation, and recurrences were not detected during subsequent follow-up visits even after resections of invasive forms. Other authors don't excise whole thickness of the ear concha, as we did and perform Mohs micrographic surgery. However, in some reports patients who presented with several recurrences after ear cancer excision and needed further surgery primary Mohs tech-

nique was done. This also proves how difficult is complete extirpation of external ear cancers (1, 15, 18). Although, Mohs surgery allows for complete margin control during removal of a skin cancer, full thickness ear concha resection increases the probability of complete excision of invasive ear malignancies.

A variety of reconstructive techniques (including flaps and skin grafts) following resections of the external ear cancers was widely described (19). Pif allows to reconstruct auricular conchal defects as large as 6.6 cm with minimal risk of necrosis in one stage procedure (12). Resected tumors in our patients were less extensive, and there was no flap's loss, only its

transient venous congestion, observed also in the other studies (19). Rich flap's vascularization minimizes the risk of its necrosis (11, 20). Undoubtedly, this technique has other advantages (flap's color, texture, thickness match, hidden scars) which confirm its superiority over other methods, such as skin grafting procedures, as reported by other authors (16). Skin grafts are easier and more commonly used. However, retraction, poor color match, depressed contour, donor-site morbidity, and difference in pigmentation may impair the results of conchal bowl reconstruction with this method (3). External auditory canal constriction is also more frequently confirmed after skin grafting, as compared with flap reconstruction (16). This complication was not noted in our group. Besides, skin grafting does not guarantee solid structural support as flaps do, which impairs the final appearance of the ear after cartilage excision (3). Reconstruction of large conchal defects may require cartilaginous support to avoid postoperative auricular shape imperfections.

Some authors report on the use of flap and cartilage graft combination concerning improvement ear contour after extensive conchal resections (12). However, these complex procedures may be connected with longer operative time and increased risk of donor site morbidity. Taking into consideration the size of defects in our patients, cartilage graft procedures were not necessary to provide satisfactory conchal shape after surgery. We used radical but not burdensome therapy, which resulted in relatively low early complication rate in spite of senile patient's age and ratio of confirmed systemic diseases – cardiovascular (38.5 %), diabetes mellitus (23 %), as well as nicotinism (46.15 %). Auricle pinning after surgery had a tendency to improve and finally

no further surgical revisions were needed in our patients with prominent ears. These results correspond with the observations from other studies. Postoperative pinning is more visible in persons with protrusive, prominent ears, and the degree of its severity, as well as limitation of flap's mobility, decide upon asymmetry in the reciprocal position of auricles (4, 12). Postoperative results are reflected in the plastic surgeon's, as well as patient's, estimations – moderate satisfaction when pinning of the operated ear was observed, and complete satisfaction in the remaining cases. These opinions are also related to maintaining the normal contour of the reconstructed auricular concha in spite of sufficiently extensive cancer resections, with no signs of recurrence in long follow-up.

Our observations referring to the patient's and doctor's postoperative estimation after reconstructions with the use of the pif correspond with apperceptions presented by other authors (16).

CONCLUSIONS

1. Postauricular island flap reconstructions after auricular conchal bowl resections allowed for complete removal of malignant tumors with no evidence of recurrence, and also preserved proper conchal shape in the reconstructed ear.
2. Reconstructions of auricular conchal bowl with the postauricular island flap resulted in very good postoperative results, which confirms the efficiency of the applied technique.
3. Reconstructive surgery with postauricular island flap of individuals with partial auricular conchal bowl defects contributed to postoperative satisfaction in both patients and doctors' estimations.

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Address correspondence: 90-153 Łódź, ul. Kopcińskiego 22
e-mail: oiljin@poczta.onet.pl