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Microsurgical reconstruction of oncological scalp defects in the elderly

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Summary The incidence of scalp tumors requiring radical excision increases with age. Free flap surgery is the standard reconstructive option for large defects; however, there is an ongoing uncertainty about its safety in the elderly. We conducted a review of data and report on 19 patients aged ≥75 years and 13 < 75 years. Data regarding patient demographics, types of tumors, surgery, size of defect, flaps used, and prevalence of complications were analyzed. The patients in the elderly group had more accompanying medical conditions and a higher ASA score. Squamous cell carcinoma was the predominant tumor in the elderly and sarcoma in the younger patients. The defect size was similar in both groups. The latissimus dorsi (LD) and the anterolateral thigh (ALT) flaps were flaps of first choice, with temporal vessels most commonly used for anastomosis. Surgery lasted longer in the younger patients. There was no difference in the duration of hospital stay. No significant correlation was found between age and the flap-related or medical complications. Revision surgery was more often required in the younger patients. We conclude that free flap surgery is safe and reliable in the elderly population. The LD and the ALT are the most commonly used flaps. Advanced age should not be considered a risk factor for free flap surgery in these patients.

Introduction

Scalp defects are frequently encountered in plastic surgery, most commonly occurring after tumor resection but also after trauma, burns, or wound healing problems following intracranial surgery. As actinic damage is an important factor for the development of skin cancers, the scalp is a frequent site of occurrence for these lesions. The incidence

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of skin tumors is higher in the older population and, with the aging of society in industrialized nations, is expected to rise further.

Many lesions are treatable by excision and primary closure or, for larger defects, local scalp flaps. Our group[1] and others[2,3] proposed algorithms for scalp reconstruction, stating that defects >6–8 cm within the hair-bearing scalp and 4–5 cm at the hairline require coverage with free flaps. Complex defects with exposed dura, brain, or calvarial prosthesis also require free flaps. Furthermore, situations primarily treated with local solutions may become complicated due to positive margins, recurrence of disease, or wound healing issues and secondarily lead to the necessity of a microsurgical approach. Several donor sites have been discussed in the literature, with the latissimus dorsi (LD) flap[4–8] and the anterolateral thigh (ALT) flap[9–11] frequently cited as the standard choices. Alternative flaps are the radial forearm,[12–14] rectus abdominis,[15] and vastus lateralis flaps.[16]

An increasing amount of evidence supports the notion that microsurgical procedures are safe in the elderly,[17–20] with some authors reporting an increased prevalence of postoperative complications and advocating careful patient selection based on medical history.[21–24] Recently, it has been reported that advanced age does not lead to increased complications in microsurgical scalp reconstruction.[25] Nonetheless, there is often an increased concern on the part of the surgeon when a complex reconstructive microsurgical procedure is required in an elderly patient. To address this issue, we decided to compare the postoperative course and the outcomes in older and younger patients undergoing microsurgical reconstruction of the scalp.

Patients and methods

We conducted a retrospective study of oncologic cases undergoing free flap surgery on the scalp in the Department for Plastic and Hand Surgery at the Freiburg University Medical Center from 2000 to 2015. Data on comorbidities as reported on admission, and the American Society of Anesthesiology (ASA) Scores, were collected. In order to report the frequency of occurrence of different tumor entities, we recovered data from the pathology reports.

Data on duration of surgery and defect size were examined across the groups and across the flaps used. The defect size was calculated from the size of the pathologic specimen using the formula:

$$A = d_1 \times d_2 \times 0.785$$

Here, A is the defect size and d_1 and d_2 are the width and the length of the resection specimen as measured by the pathologist. The above equation is used to calculate the surface of an ellipse using d_1 and d_2.

The information on flaps used, recipient vessels, and the status of resection margins as well as on the duration of hospital stay and the duration of intensive care treatment were extracted from the charts.

The complications encountered were divided into flap-related and medical complications. Flap-related complications were further divided into major and minor. Complications requiring revision surgery were classified as major, such as large hematoma and problems of arterial or venous flow in the flap. Minor complications could be treated on an outpatient basis in the office and included seroma, minor hematoma, minor wound healing problems, minor wound infection, and spontaneously resolving postoperative facial nerve palsy. Medical problems that involved measures of resuscitation or required referral of the patient to the intensive care unit (ICU) were considered to be major medical complications. Minor medical complications comprised all non-flap-related problems, which were treated at the ward during the postoperative course. The abovementioned data could be collected for all individuals, that is, there were no missing data in any of the variables. The raw data are uploaded as supplementary material (Supplementary Table 2.)

The data in Tables 1–3 are shown as mean values ± standard deviation; unpaired two-tailed t-tests were performed for statistical analysis. The duration of stay and duration of intensive care treatment are reported as medians (interquartile range, IQR), and the significance of the difference in duration of stay between groups was calculated using the Wilcoxon rank-sum test. The ASA

Table 1 Patient demographics.

	≥75	<75	p
N	19	13	
Age (at time of surgery)	80.74 (4.76)	54.77 (14.22)	0.0001
Male/Female	18/1	11/2	
No. of comorbidities	6.18 (3.84)	1.25 (0.96)	0.02
ASA score	3 (3–2)	2 (3–2)	0.02
Follow-up (months)	11.78 (14.63)	12.84 (11.77)	0.83

The data are shown as mean (SD) with the exception of ASA score, which is reported as median (interquartile range). Comorbidity: an accompanying medical condition as documented at the time of admission for surgery.
ASA score: ASA (American Society of Anesthesiologists) physical status classification system.

Table 2 Oncologic entities.

	≥75	<75	p
SCC	11	3	0.07
Sarcoma[a]	3	5	0.21
BCC	1	3	0.27
Merkel cell carcinoma	2	–	0.5
Atypical fibroxanthoma	1	–	1.0
Melanoma	1	–	1.0
Metastasis	1	1	1.0
Eccrine porocarcinoma	–	1	0.4

SCC: squamous cell carcinoma; BCC: basal cell carcinoma.
[a] The population of sarcoma included pleomorphic sarcoma, angiosarcoma, fibrosarcoma, hemangiosarcoma, and malignant mesenchymal tumor.