OUR EXPERIENCE WITH PECTORALIS MAJOR MYOCUTANEOUS FLAP AND ITS COMPLICATIONS IN HEAD AND NECK RECONSTRUCTION*

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ABSTRACT

Objective: To investigate the results and complications of pectoralis major myocutaneous flap (PMMF) reconstruction in our department.

Methods: Twenty-three patients who underwent head and neck cancer resection and reconstruction with PMMF in our department between 1988 and February 1998 were reviewed retrospectively. Results were assessed according to complications and risk factors.

Results: Flap-related complications developed in 9 patients (39%); these were intraoperative vascular injury, total/partial flap necrosis, fistula formation and flap/suture line dehiscence. Blood albumin level was the most important risk factor for the development of complications. The median length of hospitalization for patients developing complications was 59 days compared with 18 days for those who did not develop complications.

Conclusion: Although variable new techniques for head and neck reconstruction are described, the PMMF still remains an excellent tool for single-stage reconstruction in the head and neck region. Unfortunately, the true complication rate after reconstruction with PMMF is not low. Many complications are undoubtedly related to risk factors and prolong hospitalization. These risk factors should be carefully considered and, if possible, treated preoperatively. Alternative reconstruction techniques should also be considered, and following general guidelines the best technique should be selected for each individual case.

Key Words: Head and neck, Reconstruction, Pectoralis major myocutaneous flap, complications

INTRODUCTION

Although pectoralis major myocutaneous flap (PMMF) is first described by Hueston and McConchie in 1968 (1), it is first used by Ariyan in 1979 (2,3). Since then, it remains the most common method used for reconstruction in head and neck surgery. The flap has proven to be versatile, reliable and easily applicable and sufficient experience has now been obtained about its limitations and complications (4). Overall complication rates of 35% to 68% have been reported with PMMF (5).

MATERIAL AND METHOD

In a 10-year period from 1988 to 1998 (February) 25 PMMF reconstructions were performed on 23 patients undergoing major head and neck surgery in our department. The case records were reviewed retrospectively and details of clinical information, operative procedure, immediate and delayed postoperative complications were retrieved. Tumour stages, laboratory profiles, associated conditions and hospitalization lengths, as well as the reasons for reconstruction, were all carefully reviewed. The causes and risk factors leading to complications were investigated but not analyzed statistically due to the limited number of patients.

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RESULTS

PMMF reconstruction was performed on 20 (87%) male and 3 (13%) female patients. Their ages ranged from 22 to 80, with the majority in the 6th and 7th decades, the average age was 55,5. The sites of the primary tumours are shown in Table I.

Twenty-one of the 23 patients had squamous carcinoma of the upper aerodigestive tract, one patient had high-grade mucoepidermoid carcinoma and the other one had synovial sarcoma. Twenty-one patients were operated for primary tumours, the remaining two for recurrent disease. Tumour stages for the primary squamous carcinoma according to AJCC were as follows: 16 patients (76,2%) had Stage IV disease, 4 patients (20%) Stage III and only 1 patient (4,8%) had Stage II disease. Two patients treated for recurrent disease had Stage III and Stage IV disease. Eight PMMFs (32%) were used to close mucosal opening in the oral cavity and oropharynx, 11 PMMFs (44%) for pharyngoesophageal reconstruction and 6 PMMFs (24%) to close skin defects or to preserve the carotid artery.

All complications occurring between the time of surgery and discharge from the hospital were listed regardless of their relative importance. Fourteen patients (61%) had a completely uneventful recovery. Nine patients (39%) developed flap complications which are listed in Table II.

Flap necrosis: Out of the 25 PMMFs, 6 (26%) were exposed to various degrees of flap necrosis. One patient had total flap necrosis, the other 5 partial flap necrosis. The patient developing total flap necrosis had most of the risk factors: was female and overweight, had Stage IV carcinoma of the oral tongue and an albumin level of less than 4 g/dl. Total flap necrosis and fistula formation were developed during radiotherapy in the first postoperative month. Conservative debridement was not effective and the biopsy taken from the fistula revealed a residual tumour. Therefore, the residual tongue was excised and reconstructed with the free forearm flap. Unfortunately, the residual tumour invaded the carotid artery, thus carotid ligation had to be done and the patient died on the 2nd postoperative day. In one patient the PMMF was injured intraoperatively and excised. Five patients developing partial flap necrosis were treated with conservative surgical debridement.

Fistula formation: Six patients (26%) developed fistulas. However, 3 of these fistulas (50%) closed spontaneously with conservative management. In three patients (50%), a second surgical procedure was necessary to close the fistula. Two of these patients underwent reconstruction with a PMMF from the contralateral side, one patient with an advancement flap.

Nine patients who developed complications were assessed regarding the various risk factors. The results are shown in Table III. As mentioned above, these results were not analyzed statistically due to the limited number of patients.

Table I. Primary tumour sites

Primary tumour sites	No.of cases	(%)
Larynx	9	39,1
Hypopharynx	5	21,75
Auricula	2	8,7
Oral tongue	2	8,7
Tonsil	1	4,35
Parotis	1	4,35
Retromolar trigone	1	4,35
Alveolar ridge+Tongue base	1	4,35
Floor of the mouth	1	4,35
Total	23	100

Table II. Complications

Complications	No. of cases	(%)
Total flap necrosis	1	4,35
Partial flap necrosis	5	21,75
Fistula development	6	26,1
Flap opening	1	4,35
Intraoperative vascular injury	1	4,35

Table III. Comparison according to risk factors

Factor	Complications (+)	No compliactions	Total
Gender			
Male	7	13	20
Female	2	1	3
Average age	60,7	52,2	55,5 (22-80)
Primary tumour site			
Larynx	4	6	10
Tongue	1	1	2
Retromolar trigone	1	–	1
Floor of the mouth	1	–	1
Hypopharynx	2	2	4
Auricula	–	2	2
Parotis	–	1	1
Tongue base	–	1	1
Tonsil	–	1	1
Primary tumour stage			
Stage III - IV	9	13	22
Stage I - II	–	1	1
Patient weigth			
Normal	3	7	10
Overweight	2	3	5
Underweight	4	4	8
Blood albumin level			
<4 g/dl	6	4	10
4-5 g/dl	3	9	12
>5 g/dl	–	1	1
Previous therapy			
Tracheotomy	1	3	4
Radiotherapy	–	–	–
Hospitalization length (days)	59,7	18	34,7 (12-91)

DISCUSSION

In the management of head and neck cancer, reconstruction is an absolute necessity rather than an option. The chosen method for reconstruction must be consistent with the hierarchy of treatment priorities: survival, followed by function, freedom from pain and cosmetic (6).

Since its introduction in 1979 by Ariyan (2,3), the PMMF has become the most commonly used pedicled muscle flap for head and neck reconstruction. It provides a great amount of tissue, has a reliable vascular supply, is easy to harvest and appropriate for single-stage reconstruction (7). But it also has limitations and complications and one should bear in mind that it is not ideal for every head and neck defect. The disadvantages of the PMMF are its bulkiness, wound problems, swallowing dysfunction, deformity on the chest wall and hair growth interfering with hygiene (5,7). Moreover, serious complications can develop. Overall complication rates of 35% to 68% have been reported (5). This difference depends on the number of cases in these reports and on the experience of each

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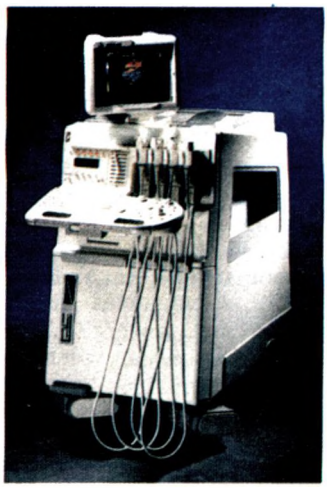

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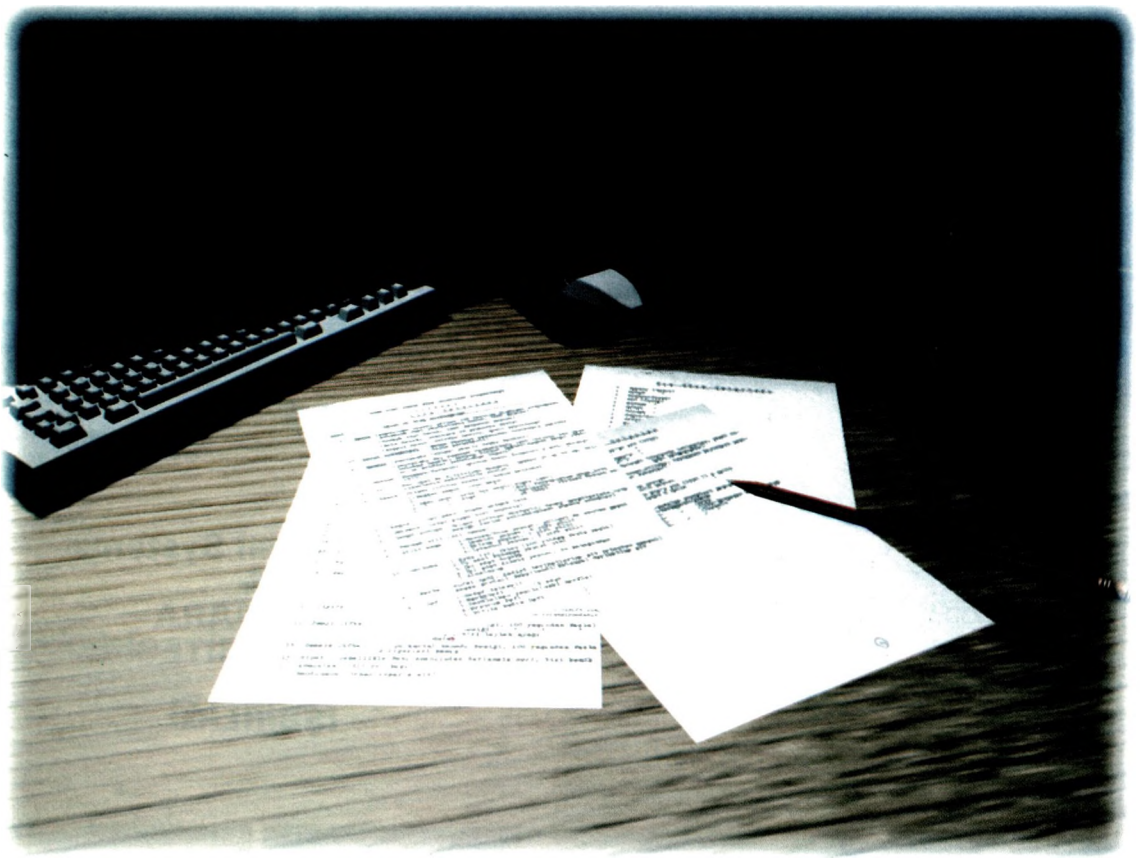

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department and moreover on the definition of complication. The definition of complication differs in the literature (4). Some authors reported a low rate of complications, but significance and complication have obviously been interpreted differently in most instances and the definition of complication is not clear (4). Furthermore, the underlying causes and the impact of complications are seldom reported (4). Mehrhoff et al (8) reported a complication rate of 68% in 73 flaps, similarly Kroll et al (9) reported 63% complications in 168 flaps. In their review of 211 patients in 1990, Shah et al found a complication rate of 63% (4). Our complication rate of 39% is consistent with the literature. Although these rates seem to be very high, many of the complications are easily treated with conservative management. The incidence of partial or total flap necrosis ranges from 2 to 33% in the literature (5). Shindo et al reported a total flap necrosis rate of 4% and a partial flap necrosis rate of 5-17% (7). These rates are 4,5% and 22% in our patients. The fistula rate in our cases is 26%, similarly to that of 29% reported by Shah et al (4). One of 6 patients (17%) developing flap necrosis and 3 of 6 patients (50%) developing fistula required a second surgical intervention, these rates are higher than in the literature. We observed no donor site complication which is reported as being up to 19% in the literature (10).

In their review of 211 cases in 1990 (4), Shah et al described some risk factors: age greater than 70 years, female sex, primary tumour in the oral cavity, tumour stage III or IV, overweight and a blood albumin level less than 4 g/dl. Table V shows the comparison of our cases according to these risk factors. Seven of 20 male patients (35%) and 2 of 3 female patients (67%) developed complications, but the number of our cases is not enough to accept the female sex as a risk factor. No correlation between body weight and complication rate could be found. Blood albumin level was the most important risk factor for developing complications. Resection for Stage III or IV tumours of the oral cavity or laryngopharynx is undoubtedly a risk factor for PMMF complications. These findings are similar to those of Shah et al, with the exception of sex and body weight. The only patient developing total flap necrosis is female, overweight, and also has low albumin level and Stage IV tongue carcinoma. None of our patients had received radiotherapy prior to surgery, therefore we were not able to evaluate the impact of radiotherapy on flap survival. Some authors suggest that radiotherapy prior to surgery increases the risk of fistula formation and, if a fistula occurres, prolongs the closure time with conservative management (11), whereas some authors propose that it has either no effect or only a minimal effect on major or minor morbidity (4,11). Complications in our patients resulted in prolongation of their hospital stay, as also reported by Shah et al (4).

In conclusion, PMMF still remains an excellent tool for routine immediate reconstruction in head and neck surgery despite a variety of new techniques described. Unfortunately, the true complication rate following PMMF reconstruction is not low and undoubtedly related to risk factors. Thus, its limitations should be carefully considered and if possible, risk factors should be eliminated before surgery.

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