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Pectoralis major flaps for reconstruction of the head and neck defects

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Between 1991 and 1995, the pectoralis major myocutaneous flap used for the reconstruction of defects in the head and neck region in 26 and the pectoralis major osteomyocutaneous flap in one patient were treated at Ankara Oncology Hospital. The mandible was resected in 13 patients who suffered from the destruction of the bone. Among these patients segmental mandibulectomy was performed in nine patients, marginal mandibulectomy in seven patients and hemimandibulectomy in one patient. Peroperative mortality was 3.7%. A recurrence at flap region was seen in six patients and a mandibular deformity occurred in six cases. In conclusion the pectoralis major osteomyocutaneous flap is a reliable flap that can be used for the immediate reconstruction in the head and neck region.

Key words: head and neck neoplasms surgery; surgical flaps; mandible-surgery; pectoralis muscles

Introduction

The reconstruction of large soft tissue defects after the ablative cancer surgery, especially in the head and neck region, is a significant problem which turns out to be even more serious when the mandible is resected. The goals of the reconstruction in the head and neck region should be directed: (1) to achieve a healed wound and not to delay the adjuvant therapy; (2) to maximize the tongue function and consequently the deglutition and the speech; and (3) to restore cosmesis.[1]

In the retrospective chart review, the authors present their experience in the treatment of 27 patients in whom large defects after the ablative cancer surgery in the head and neck region were primarily reconstructed with pectoralis major flaps.

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Material and methods

Medical records of all patients who underwent a PMMC or PMOMC flap reconstruction for soft tissue defects after the ablative cancer surgery in the head and neck region between 1991-1995 at Ankara Oncology Hospital were reviewed. The data were analyzed with respect to the demography, the type of operation, complications, and results.

The operative technique for PMMC or PMOMC flap was similar to those for the standard technique that had been reported previously.[2,3]

Results

Between 1991 and 1995, 26 PMMC flaps and 1 PMOMC flap were used for the reconstruction of post-ablative defects in the head and neck region. Among the treated patients there were 20 males and 7 females. The mean age was 53 (range 35-70). The distribution of the primary tumor sites of the 27 patients is presented in Table 1. The histopathologic types of the tumors were squamous cell carcinoma in 21 patients, malignant melanoma in three patients, ameloblastoma in one patient, thyroid papiller carcinoma in one patient and malignant epithelial tumor in one patient. Eight patients in the present series received a previous radiotherapy.

Table 1. Distribution according to the type of primary tumors

Lower lip	12
Metastatic mass in neck	4
Carcinoma of skin	4
Carcinoma of larynx	2
Carcinoma of tonsil	1
Ameloblastoma	1
Carcinoma of tongue	1
Carcinoma of floor of mouth	1
Carcinoma of ear and temporal bone	1

The mandible was resected in 13 patients who suffered from the destruction of the bone. Among them nine patients suffered from the segmental mandibulectomy, three from marginal mandibulectomy and one from the hemimandibulectomy. For the mandibular Kirschner wires were used in seven cases, rib in one and titanium replacement plates in two cases. The fracture of the mandible occurred in one of the patients who suffered from the marginal mandibulectomy.

The treatment modalities are shown in Table 2. In two cases an early flap necrosis occurred. One of these cases was lost with respiratory distress and the other one underwent trapezius myocutaneous flap reconstruction after this complication. The average follow up period was three years.

The peroperative mortality was 3.7% (1/27 patients). In the follow up period, mortalities occurred one month after the operation in one patient and 6 months after the operation in two patients due to the neutropenic sepsis.

A recurrence at the flap region was seen in six of 27 patients. A mandibular deformity occurred in six patients who had undergone the mandibular reconstruction with a stainless steel wire.

Discussion

The reconstruction of large defects after the resection of tumors in the head and neck

Table 2. Treatment Modalities in patients

RND + Wide excision + PMMC	8
RND + Mandibulectomy + PMMC	8
RND + Mastoidectomy + PMMC	1
RND + Mandibulectomy + par. glossectomy + PMOMC	1
RND + Mandibulectomy + excision of floor of mouth	1
RND + Laryngectomy + Oesephagectomy + PMMC	2
Wide excision + Mandibulectomy + PMMC	2
Wide excision + PMMC	3
Composite resection (Jaw-Neck) + PMMC	1

RND: radical neck dissection , PMMC: pectoralis major myocutaneous flap , PMMOC: pectoralis major osteomyocutaneous flap

area has been facilitated by the development of myocutaneous flaps.[2] The use of myocutaneous flaps, which provide both the muscle bulk and the skin coverage, represents a significant advancement in the reconstructive surgery.[3] Traditionally, the reconstruction in the head and neck region after extensive resections for malignancy had been accomplished by the use of forehead flaps, deltopectoral flaps, and shoulder flaps.[4]

The forehead flap described by McGregor has been used previously, but the donor site is cosmetically unappealing, and the flap insertion can be difficult because of the pedicle bulk.[1,5] The deltopectoral flap described by Bakamjian has also been used, but the precarious axial blood flow and the necessity of multiple procedures limit its availability.[1,4,5] The trapezius myocutaneous flap often requires two stages and also leaves a significant donor defect, which needs a skin graft.[5] Microsurgery was performed widely in the mid 1970s, however, the success of free flaps was rapidly overrun by the implementation of musculocutaneous flaps.[1,6] In the musculocutaneous flaps the dissection is easy and the surgeon does not need microsurgical experience.[1,2]

Although Hueston and McConchie described the use of the pectoralis major myocutaneous flap in the reconstructive surgery in 1968, its use in the head and neck region has not been reported until 1979.[3,4,5,7,8] The anatomical basis and operative techniques of the PMMC and PM-OMC flaps have been well described in the literature.[7,8,9] The pectoralis major muscle has been shown to be useful as a muscle and myocutaneous flap unit for defects of the head and neck.[10] Its dual blood supply from the thoracoacromial artery and from the perforating intercostal branches of the internal thoracic artery provides a considerable versatility in orientation and configuration.[7,10,11] The thoracoacromial vessels have a consistent origin in the axillary vessels and are rarely included in the radiation field in head and neck malignancies.[8] This flap procedure has also been performed without any technical problems in eight cases who had radiotherapy to the neck, similar to those previously reported.[3] The blood supplies of the skin paddle of the flap and the rib in PMMC and PM-OMC flaps are provided by the muscle perforators and the periosteal blood vessels, retrospectively.[8,12] "Andy Gump" deformity due to a progressive resorption of the rib was reported as a long term complication of the patients with PMOMC flap.[13] We have not noticed this complication in our series. This may be due to the short duration of the follow up period of only one patient with PMOMC flap. A mandibular deformity occurred in many of our patients in whom their mandibles were reconstructed with a steel-wire, so in our opinion it will be more appropriate to use a mandible prosthesis in the mandibular reconstruction.

A series of patients with cancer in the head and neck region have undergone the immediate reconstruction with the PMMC flap.[4,14,15] But it has been reported that PMMC flap is not an ideal reconstruction for intraoral tumors because of several complications such as a stricture and an orocutaneous fistula formation.[3,15] However, patients suffering form the advanced stage cancers require a wide resection with the reconstruction which may be achieved with PMMC flap. Our patients suffering from the oral cavity cancers underwent no such complications. This may be related to the attention that has been paid to the tension of the suture line.

The PMMC flap is a method that has several advantages:[2] 1-It is an axial flap, with an excellent blood supply to the muscle and overlying skin. 2-It can be used to transport a large amount of muscles for bulk, and an attached rib for bone graft. 3-The muscle portion not only covers the carotid artery but also provides bulk to fill the hollow and restore the contour after a neck dissection.

4-The flap has enough length to provide a coverage to distant sites such as the fronto-orbital and temporo-parietal areas. 5-The donor site can be closed by expanding the chest skin locally. Furthermore, this flap may be performed with minor morbidity and without any sever long term complications. In our series we have seen two flap necrosis due to ischemia in patients who previously underwent the operation.

In conclusion, the PMMC flap is a reliable, versatile flap that can be used for the immediate reconstruction of a variety of defects at different locations in the head and neck region. Our experience suggests its use in restoration of soft tissue defects after the intraoral cancer ablation.

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