Reliability of Pectoralis Major Myocutaneous Flap in Reconstruction of Cervicofacial Defects Following Ablative Oncological Surgery

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Abstract

The objective of this study was to assess the reliability of pectoralis major myocutaneous (PMMC) in cases ofcervicofacial defects following ablative oncological surgery. We performed aprospective analysis of patients in whom PMMC was used to reconstruct head and neck surgical defects during the period from April 2014 to September 2015. The study was carried outat Sohag University Hospital, plastic surgery department and involved 20 patients. Patients' age ranged from 47 to 78 years, 16 patients were males and 4 patients were females. PMMC was used in 14 cases of defects following cancer larynx surgery and 6 cases of defects following cancer check and mandible surgery. No failures were noted in the study during rthe follow up period, however one case died two month post-operative due to carotid blow out as a result of over dose of radiotherapy. Despite the current emphasis in tissue replacement has shifted to microvascular free-tissue transfer, the pectoralis major myocutaneous flap is still a versatile and reliable flap with an excellent reach to cervicofacial region especially in patient with poor general conditionand with limited expertise and resources required for microvascular free-tissue transfer.

Introduction

Reconstruction with surgical flaps is usually needed forpost-ablative head and neck defects because primary closure or mobilization of neighboring tissues is usually insufficient for repair of these defects (1).Despite the fact that free flapsare now considered the gold standard for head and neck reconstruction, their use may be limited by the need for competentmicrosurgeon, costly materials, generally fit patients who tolerate long surgical procedures. Another limiting factor for the use of microsurgical flaps is the need for good quality of recipient vessels for anastomosis (2).Previously irradiated tissues may have potentially compromised blood vessels that may not be reliable as recipient vessels, so other surgical options may be needed (3). The Pectoralis Major flap (PMF), which was described by Ariyan in 1979, is the most often employed in this situation due to its reliability and versatility, the distinct advantage of PMMC lies in the fact that it is easy to dissect in a short time and has minimal donor site morbidity (4).However some individual complications such as wound dehiscence, infection, partial flap loss, fistula and donor site complications can occur (5). Restricted neck mobility and flap thickness can affect both swallowing and speech functions. Flap bulkiness is sometimes considered a good advantage in cases like coverage of a reconstruction plate or big vessels (6).

In this article, we have described our 2 years' experience using the PMMC flap in soft tissuereconstructionof defects in the head and neck region. We reported the reliability and versatility of this flap showing its high effectiveness in meeting our surgical needs.

Materials and Methods

This study included 20 patients who had ablative oncological surgery in Head and neck region needing for reconstruction and attended to the

plastic surgerydepartment,Sohag University Hospital. The study was approved by Ethical and Research committee in Sohag Faculty of Medicine. An informed written **consent**was obtained from each patient. All operations were performed at our department by the same surgeon from the period from first of April 2014 to September 2015. Follow-up ranged from 6 months to 1.5 years. The site of the defect reconstructed, the size of the flap harvested and outcome were analyzed in detail.

Results

Of the 20 patients, between the age group 47 and 78years, 16 patients were males while 4 patients were females. PMMC was used to reconstruct defect after cancer larynx surgery in 14 patients and defects after cancer mandible and check in 6 patients table (1). Skin paddle size ranged from 8 to 13 cm in length and from 8 to 12 cm in width. The chest was closed primarily in 17 patients and split thickness skin graft needed in 3 cases. The overall flap survival rate was 100 %, one case died by attack of bleeding of carotid blow out due to over dose of radiotherapy. The complications of the procedure included wound dehiscence (seen in 40% of cases), skin necrosis and hypopharyngeal fistula (occurred in 3 cases, 15%) and flap dehiscence with orocutaneous fistula; seen in only 2 cases (10%). No complications at all were found in more than one third of our cases (7 cases, 35%),All the complications were successfully managed conservatively table (2).

Indications for surgery (table 1)

Indication	Frequency	Percent
Defects resulted after Cancer larynx surgery with or without larygeocutaneous fistula	14	70.0
SCC of mandible infiltrates skin and mucosa of the check	4	20.0
SCC infiltrates mucosa of the check	1	5.0
SCC of the check and oral commissure	1	5.0
Total	20	100.0

Complications (table 2)

Complication	Frequency	Percent
Non	7	35.0
Flap dehiscence and orocutaneous fistula	2	10.0
Skin necrosis and hypopharyngeal fistula	3	15.0
Wound dehiscence	8	40.0
Total	20	100.0

Case presentation

A 60 years old man,presented with cancer larynx and laryngocutaneous fistula (Fig. 1a).Total laryngectomy and bilateral selective neck dissection level 1 to 5were done by ENT team (Fig. 1b, c). Pectoralis major myocutaneous flap to provide adequate soft tissue coverage was done at the same setting (Fig. 1d).Accepted wound healing occurred (Fig. 1e, f).

Figure 1a

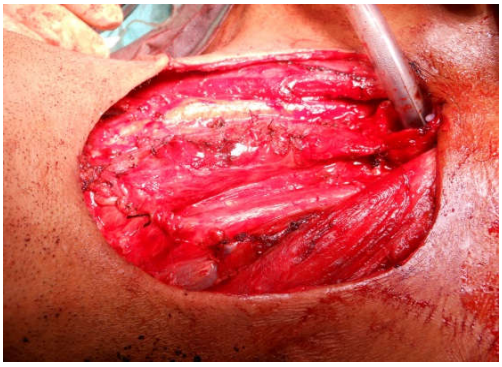

Figure 1b

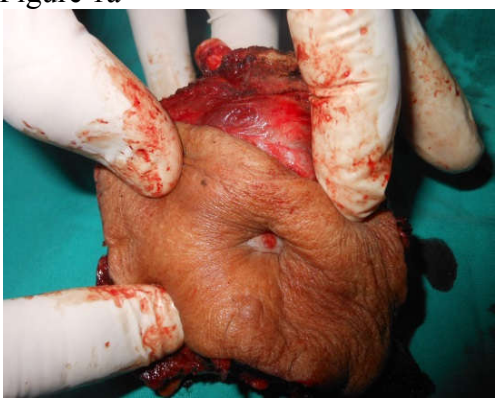

Figure 1c

Figure 1d

Figure 1e

Figure 1f

Discussion

This study included 20 patients with cervicofacial defects following ablative oncological surgery and reconstruction by pectorsalis myocutaneous flap was done for all of them.

The age of our study population ranged from 47-78 years with a mean of 62.15±8.67 years. These were somewhat younger than those seen by Austen (7), whose patients' age had a mean of 71 years and a range from 51-96 years. A study done by Marques (8) showed that the mean age of their 10 patients was 53.7 years with a range from 28 to 72 years. The study of Sharma (9) showed a study group with age ranged from 34 to 74 years. This may indicate that the flap can be used with good reliability in different age groups.

70% of our cases suffered from defects after cancer larynx surgery and 30% suffered from squamous cell

carcinoma of the mandible and cheeks. The study done by Sharma (10) had laryngeal cancer in only 23% of cases, with nearly 44% of cases had an oral cavity tumors and the rest had tumors in the oropharynx, hypopharynx or ear.This was completely different from the cases operated by Bussu in whom mandibular and laryngeal lesions constituted only a minority of total cases (7% and 7.7%; respectively),other cases had primary lesions in the oropharynx (31%) or oral cavity (52.2%), with a very minority had skin lesions (1.8%).One of their cases (0.3%) the primary lesion was occult (11).

The hystotype of our study cases was squamous cell carcinoma (SCC) in all of our 20 cases (100%). This was similar to the study done by Marques (8) whose cases showed also a 100% SCC hystotype. The hystotype of Bussu (11) was mostly also SCC (seen in 93% of their cases). On the other hand, the cases operated by Chenshowed SCC in only 8 cases (66.7%), with the remaining 4 cases had either sarcoma (3 cases) or basal cell carcinoma (BCC) seen in only one case(9).

PMMC was the surgical procedure done for all of our patients, mostly for reconstructing defects after total laryngectomy (55% of cases = 11 cases), total laryngectomy with bilateral selective neck dissection in another 3 cases, hemimandibulectomy in 4 cases (20%) and excision of the check tumour with a safety margin in the remaining 2 cases.

The type of pectoralis muscle flap operated in our study was PMMC in all of our cases. The types of pectoralis major flap used by Bussu were mostly PMMC (86.5%) with only a minority of cases had PMMF operation (11).

The complications of the procedure included wound dehiscence (seen in 40% of cases), skin necrosis and hypopharyngeal fistula (occurred in 3 cases, 15%) and flap dehiscence with orocutaneous fistula; seen in only 2 cases (10%). No complications at all were found in more than one third of our cases (7 cases, 35%).The study done by Marquesfound somewhat similar results as they found that skin necrosis was seen in 30% of cases, oral fistula in 40% of cases and pneumothorax in 20% of cases. However, due to overlap between complications in their cases, the overall complication rate was 70% and none of these complications occurred in the remaining 30% of cases (8).The study done by Sharma showed an overall complication rate of over 60%, with wound dehiscence seen in 27% of their cases, necrosis in only 3% of cases and wound infection in 23% of cases (10).In Kroll report, analyzing complications in 168 pectoralis major osteomyocutaneous flaps used for head and neck reconstruction the overall rate of complications was 63%. Smokers and those with larger tumors increased the risk of complications (5).Nagralstated an overall complication rate of over 78% of their cases, with necrosis seen in 32%, dehescience and/or fistula in 35%, and infection in 21% of their cases (11).Bussufound skin necrosis in only 3.6% of their cases and wound dehiscence in only 0.3% of their cases (11).Accepted wound healing achieved in nearly all cases. This was similar to the results recorded by Austen(7).Favorable prognosis was noticed in 19 cases out of the 20 cases. One case died 2 months postoperatively due to carotid blow out which led to severe bleeding. Only one of the Bussucases (0.3%) died after the operation (11). Chen(9) stated a death rate of 16.7%, mostly due to recurrence of the original tumor after its excision with or without metastasis. On the

other hand, the study of Austen (7) showed a 100% survival rate.

Conclusion

The pectoralis major myocutaneous flap is still a versatile and reliable flap with an excellent reach to cervicofacial region especially in patient with poor general condition.

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الملخص العربي

علاج أورام الوجه والرقبة ينتج عنه غالبا فقد كبير في الأنسجة عادة لايمكن رتقها مباشرة أو باستخدام الأنسجة المجاورة ولذلك نحتاج إلي جراحة تكميلية . استخدام السدائل يضمن نتيجة مرضية من الناحية الجمالية والوظيفية ويساعد المرضي علي العودة للعمل والحياة الاجتماعية،وهناك العديد من السدائل المتاحة منها السدئل الموضعية والمتصلة والحرة.

العلاج الجراحي لأورام الوجه والرقبة عادة ما ينتج عنه ليس فقط إعاقة في وظائف هامة مثل البلع والكلام والتنفس ولكن ينتج أيضا تشوهات تؤثر علي الناحية الجمالية. ولذلك يعتبر التأهيل من الناحية الشكلية والجمالية هدفا لا يقل أهمية من الناحية الوظيفية بعد استأصال الورم.

استخدمت حديثا الجراحة التكميلية بواسطة السدائل الحرة علي نطاق واسع مؤدية إلي نتائج مرضية من الناحية الجمالية والوظيفية عن السدائل المتصلة. ولكن ضرورة وجود خبرات بشرية في الجراحات الميكروسكوبية وكذلك ارتفاع تكاليف هذه الجراحات الميكروسكوبية يجعل استخدامها محدود.

ولذلك يلجأ جراحي الوجه والرقبة لاستخدام السديلة المتصلة في الجراحة التكميلية للعيوب الناتجة عن استئصال الأورام، ومن هذه السدائل سديلة العضلة الصدرية الكبرى التي وصفت عام ١٩٧٩ والتي أثبتت كفائتها في مثل هذه الحالات.

تعتبر سديلة العضلة الصدرية الكبرى من أهم السدائل المتصلة في جراحة الوجه والرقبة التكميلية، وبالرغم من انتشار السدئل الحرة إلا أن هذه السديلة المتصلة ما تزال حجر الزاوية في جراحة الوجه والرقبة التكميلية.

لكن سديلة العضلة الصدرية الكبرى تكون احيانا مصحوبة ببعض المضاعفات ، كما أن هناك عوامل خطورة تؤدي إلي مضاعفات أو فشل السديلة ومنها تعرض المرضي المسبق للعلاج الإشعاعي وبالرغم من هذه المضاعفات إلا أن اغلبها يتم علاجه كما أن فشل السديله كاملة لا يتعدي ٢,٤ %من الحالات.

ومن عيوب سديلة العضلة الصدرية زيادة سمك السديلة والذي قد يؤدي إلي مشاكل في عملية البلع والكلام، ولكن من ناحية أخري يعتبر سمك السديلة ذو فائدة وذلك في عمليات تغطية الشريحة التكميلية أو تغطية الأوعية الدموية الكبرى بالرقبة،وتعتبر سديلة العضلة الصدرية الكبرى من الطرق المفضلة في عمليات إصلاح العيوب الناتجة عن استئصال أورام الوجه والرقبة وذلك لكفاءتها وإمكانية وصولها لتغطية واعادة بناء اماكن مختلفة التي يتم استئصال الأورام منها في الوجه والرقبة، كما أن طريقة رفع سديلة العضلة الصدرية الكبرى من أبسط الطرق ولا تستغرق فترة زمنية طويلة .

يمثل هذا البحث دراسة سريرية لألقاء الضوء علي كفاءة سديلة العضلة الصدرية الكبري في الجراحة التكميلية للأنسجة المفقودة بعد استئصال اورام الوجه والرقبه.

اجريت هذه الدراسةعلي ٢٠ مريض تتراوح اعمارهم من ٤٧ الي ٧٨ عام وكان من بينهم ١٦ رجلا و٤ سيدات حيث كان اكثر من ٧٠% من الحالات يعانون من فقد بالأنسجة بعد استئصال اورام بالرقبه و٣٠% يعانون من اورام بالفك والوجنة ، وقد تم عمل سديله جلدية عضلية باستخدام العضلة الصدرية الكبري لجميع الحالات لاستعاضة الأنسجة المفقودة بعد استئصال الاورام.

وقد كانت النتائج مرضية في ١٩ حالة وتوفيت حالة واحدة نتيجة نزيف شديد من الرقبه بعد جرعة زائدة من العلاج الاشعاعي .