

Patients with Head and Neck Cancer Undergoing Reconstructive Surgery

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Abstract

In the last two decades, there have been several changes in the field of head and neck surgery. Reconstructions using microvascular free flaps completely replaced earlier methods. More significantly, there has been a paradigm change toward attempting to re-establish normal function and appearance in addition to reliable wound closure to safeguard key structures. Using an evidence-based strategy whenever possible, the current research will propose an algorithmic approach to head and neck reconstruction of diverse subsites.

In contrast to typical cytotoxic therapies, which often cause cell loss, molecular therapeutics are a targeted approach to treating malignancies that express the epidermal growth factor receptor (EGFR). However, the early excitement for this focused treatment has been dampened by the discovery that resistance to such therapy is widespread in clinical studies. However, a deeper knowledge of the molecular mechanisms underlying various receptor tyrosine kinases that are known to be active in cancer has shown a rich network of cross-talk between receptor pathways, with a crucial discovery being shared downstream signalling pathways. Such interactions could be a major factor in the resistance to EGFR-directed treatment. In the context of squamous cell cancer of the head and neck, a tumour that is known to be primarily driven by EGFR-related oncogenic signals, we review the interaction between EGFR and Met and the type 1 insulin-like growth factor receptor (IGF-1R) tyrosine kinases as well as their contribution to anti-EGFR therapeutic resistance in this article.

Keywords: Head and neck cancer surgery; Reconstruction; Therapeutic; Squamous cell cancer; Microsurgery; Neck dissection; Free flap

Introduction

Head and neck reconstruction surgery is a rapidly evolving area. The expanding usage of microvascular free flaps is largely responsible for the advancements made in the last ten years. The anterolateral thigh, fibula osteocutaneous, and supra fascial radial forearm fasciocutaneous free flaps have all become popular flaps for repairing a variety of abnormalities. The reliability and adaptability of these flaps have grown as the anatomy of these flaps has become more familiar [1]. The sole priority is no longer reliable wound closure without exposing essential structures. Every reconstruction aims to preserve function, including speaking and swallowing, and to restore attractiveness. At the majority of centres, free flap success rates now consistently surpass 95% or greater. Additionally, reducing flap donor site morbidity is a crucial factor. The preservation of recipient vessel alternatives and flap donor sites should also be taken into account because to the high rate of recurrence as well as long-term problems following large head and neck resections and reconstructions. The next paper will evaluate and explain projected results of an algorithmic approach to mid-facial, mandibular, oral cavity, and pharyngoesophageal reconstruction [2].

Advanced head and neck cancer cure rates have increased thanks to surgical resections and reconstructions. Due to the exposure of the bacterial flora in the pharyngeal cavity and surgical area, reconstructive surgery for head and neck cancer is linked to a high risk of surgical site infections (SSIs). After head and neck reconstructive surgery, SSIs are said to occur frequently (20–46%). The management of SSIs is further complicated by new developments in salvage surgery for recurrent or persistent malignancies following chemo radiotherapy [3].

In reconstructive surgery for head and neck cancer, infection control is a key concern. The four types of surgical sites established by the WHO are clean, clean-contaminated, contaminated, and dirty. The surgical sites in head and neck cancer surgery are typically divided into clean-contaminated categories due to exposure of the aerodigestive tract (class II). The majority of earlier research has been on the

incidence and risk of SSIs for clean-contaminated operations without reconstruction, and the best antimicrobial prophylactic measures against SSIs following head and neck reconstructive surgery are still being debated [4].

In order to determine the validity of the recommendation for effective preventative tactics against SSIs after head and neck reconstructive surgery, we looked into the incidence of SSIs following these procedures in this study. This is the first study to compare the outcomes of empirical antibiotic prophylaxis with guideline-led therapy of SSIs following head and neck reconstructive surgery [5].

Materials and Methods

The Department of Head and Neck Surgery at the Padre Anchieta Teaching Hospital conducted this cross-sectional study based on an analysis of patient records. The research ethics committee of the institution gave it their blessing. 17 patients who underwent cervicofacial reconstructions utilising the PMMF following salvage surgery for loco regional relapse of head and neck squamous cell carcinomas and/or unsuccessful reconstruction between January 2002 and June 2010 at the ABC Medical School Teaching Hospital were included in the study. In accordance with the 2002 TNM standards published by the Union International Contre le Cancer (UICC), the clinical oncological stage was examined, and the tumours were categorised into stages I through IV [6].

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In specialised literature, the surgical procedure utilised to harvest the PMMF is discussed. The pectoralis major muscle was completely exposed by making an incision from the upper edge of the skin paddle to the midclavicular region, which allowed for direct visibility of the vascular pedicle. The flap was then transposed via the supraclavicular route. In one instance, the deltopectoral flap and PMMF were combined. The three categories of the reconstruction were skin, intraoral (oropharynx and/or oral cavity), and hypopharynx. To make the analysis simpler, reconstructions of the oropharynx and oral cavity were combined into one category. The analysis of the current study did not account for the skin defect that the deltopectoral flap repaired [7].

Discussion

In head and neck reconstruction following cancer excision involving composite tissues, the use of free flaps is thought to be conventional practise. In comparison to alternative flaps, free flaps offer greater cosmetic and functional repair with less donor site morbidity. Forearm and fibular free flaps are the most often used free flaps in head and neck reconstruction. Radial forearm flaps are utilised to repair extensive skin defects on the face as well as the mucous membranes, muscles, and oropharynx, hypopharynx, and oral cavity. Bone and nearby tissues can be rebuilt using fibrous free flaps (i.e., the mandible and maxilla). The need for numerous steps, including the removal of the tumour, collection of the free flap, preparation of the recipient vasculature, microsurgical anastomoses, and rebuilding, lengthens the procedure. As a result, in order to shorten the surgical operation, two teams are typically involved: one team eliminates the tumour, while the second team completes the reconstruction. Because of the precision and efficiency of this tissue dissection technique, which also lessens heat damage to tissues, using ultrasonic dissection is practical for the surgeon [8].

Ultrasonic dissection may affect the quality of reconstruction and healing since it's crucial to maintain the quality of the flap and the tissues at the donor site. Numerous studies have shown that the Harmonic Blade in plastic and reconstructive surgery reduces seroma formation. Ultrasonic dissection causes substantially less lateral tissue loss than traditional electrocautery because the temperature produced by the Harmonic Scalpel is so much lower. In this study, patients treated with the Harmonic Scalpel required significantly less time during surgery (35%) than those treated with electrocautery (55 min vs. 75 min). The length of the pneumatic tourniquet application, which is frequently employed to aid forearm and fibular flap dissection, was cut down significantly as a result of the shorter application duration [9].

Since it's important to preserve the quality of the flap and the tissues at the donor site, ultrasonic dissection may have an impact on the quality of healing and reconstruction. The Harmonic Blade in plastic and reconstructive surgery has been proved in numerous studies to decrease seroma development. Because the Harmonic Scalpel produces much lower temperatures than conventional electrocautery, ultrasonic dissection results in significantly less lateral tissue loss. Compared to patients treated with electrocautery in this trial, patients treated with the Harmonic Scalpel required 35% less time during surgery (55 min vs. 75 min). The shortened application time greatly reduced the length of the pneumatic tourniquet application, which is routinely used to assist forearm and fibular flap dissection [10].

In this study, there was no discernible difference in postoperative discomfort at the flap harvesting site between the Harmonic Scalpel and electrocautery. Due to the possibility that each patient's two surgery sites tainted their perception of pain, it was challenging to

objectively analyse this metric. There is no correlation between the type of scalpel used and the degree of postoperative pain, according to earlier studies. Other research, however, has revealed that Harmonic Scalpel dissection considerably reduces postoperative pain following haemorrhoidectomy surgery when compared to bipolar electrocautery, tonsillectomy as compared to normal dissection and electrocautery, or neck lymphadenectomy. The prevention of severe lateral thermal injury from electrocautery may help to explain these findings. In this study, the incidence of morbidity at the donor site and the reconstruction site (wound infection, hematoma, skin graft diseases, and tissue retraction) was statistically comparable across the two groups and was very rare [11].

The authors reported the use of bipolar cautery alone for perforator hemostasis, but in our experience, surgical clips appear more effective and secure. The pedicle of the free flap requires numerous muscular perforators that must be ligated and divided using conventional surgical clips or bipolar cautery. By employing the anterior or posterior side of the Harmonic Synergy Curved Blade and by cutting the vessel with the lateral side of the blade, the Harmonic Scalpel provides the capacity to accomplish the hemostasis of muscle perforators. The average number of surgical clip users in this study was 7.4 in the EC group and 1.1 in the HS group. As a result, in the EC and HS groups, the mean cost per patient for disposable surgical equipment (clip applicator and/or Harmonic Synergy Curved Blade) was 1,021 and 510 Euros, respectively. If surgical clips were replaced by bipolar cautery, as stated by other surgical teams, the cost in the EC group might be lower than that in the HS group.

However, our findings support earlier research that found the Harmonic Scalpel to be more affordable than traditional surgical dissection [12].

Conclusions

Free flap reconstruction for head and neck deformities proliferated in the 1990s as it became clear that it was more dependable and produced better functional and aesthetically pleasing results than the majority of earlier procedures. In the last ten years, algorithms for flap selection have been established based on data and experience, considerably enhancing results and lowering complications. The anterolateral thigh free flap and other perforator-based flaps are chosen to reduce donor site morbidity. Right now, improvements in head and neck reconstruction are concentrated on refinement, like using computer-assisted design and quick prototype modelling to schedule surgery. Since free flap reconstruction for head and neck abnormalities has been shown to be more dependable and produce better functional and aesthetically pleasing results than the majority of earlier procedures, it has become increasingly popular in the 1990s. Based on data and experience, algorithms for flap selection have been created in the last ten years, considerably enhancing results and lowering complications. Flaps, notably perforator-based flaps like the anterolateral thigh free flap, are chosen to reduce donor site morbidity. The current focus of head and neck reconstruction advancements is on further refinement, such as the use of computer-assisted design and quick prototype modelling to plan surgery.

Conflict of Interest

None

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