Atypical Facial Access

An Unusually High Prevalence of Use Among Patients With Skull Base Tumors Treated at 2 Centers

Claudio Roberto Cernea, MD; Fernando L. Dias, MD, PhD; Roberto Araujo Lima, MD; Terence Farias, MD; Ullyanov B. T. Mendonça, MD; Eduardo Vellutini, MD; Marcos Q. T. Gomes, MD; Janio Nogueira, MD; Renata R. G. Lorenzetti, MD; Luiz R. M. Dos Santos, MD; Julio Morais-Besteiro, MD; Luiz Carlos Ishida, MD; Mario S. L. Galvão, MD

Objective: To analyze the influence of the unique percentage of skin carcinomas with skull base invasion on the choice of the facial surgical approach.

Design: Multi-institutional retrospective analysis of the medical charts of all patients who had undergone onco logical craniofacial operations from 1981 to 2005. Data were collected on demographic distribution, location of the primary tumor, histologic type, type of operation, reconstruction, complications, and outcome. Special attention was directed toward the choice of facial approach.

Setting: Two major tertiary care centers.

Patients: A total of 484 patients who had undergone major skull base operations.

Intervention: Frequency of atypical facial approaches.

Main Outcome Measures: Impact on the need for more sophisticated reconstructions and on surgical morbidity.

Results: During this 25-year period, 484 patients underwent major skull base operations in the 2 centers; data concerning 467 cases were available for analysis. The median age of the patients was 52.8 years (range, 4-88 years), and the male-female ratio was 1.9:1.0. The initial location of the tumor was the craniofacial skin in 63.5% of cases, ethmoid in 10.8%, orbit in 1.9%, and other origins, including endocranial, in 19.4%. The histologic type of the lesions was basal cell carcinoma in 42.0% of cases, squamous cell carcinoma in 29.5%, esthesioneuroblastoma in 5.3%, adenocarcinoma in 3.9%, adenoid cystic carcinoma in 2.8%, and other types in 16.5%. Owing to this high prevalence of advanced skin carcinomas, the most commonly employed facial approach was atypical, tailored to encompass all compromised skin and underlying tissues, in 55.5% of cases, followed by the Weber-Ferguson approach, with all its variations (eg, nasal swing) in 17.8%, lateral rhinotomy in 12.2%, facial translocation in 3.8%, and other facial techniques in 7.7%. No facial approach was required in 1.5% of cases.

Conclusion: In most situations, head and neck surgeons chose an atypical surgical approach to properly resect all facial structures invaded by very advanced skin cancers.

Arch Otolaryngol Head Neck Surg. 2007;133(8):816-819

The basic technical principles of craniofacial oncological operations were established by Ketcham et al1 and Ketcham and Van Buren2 in their landmark articles. Since the 1980s, some authors3-8 have presented their experience with combined craniofacial procedures for the treatment of skull base tumors. One of the most important advantages of these skull base surgical procedures is the possibility of performing an en bloc resection of the cancer because it results in free margins and better local control. To obtain an adequate visualization, the choices in the facial approach usually include lateral rhinotomy, medial maxillectomy, and/or degloving.9 Some variations of lateral rhinotomy, like the nasal swing and the maxillary swing,10 have been described. More recently, some authors have proposed surgical excision of lesions involving the anterior skull base through a subfrontal approach11-13 or using only endoscopic techniques.14,15

In many series of patients, the most prevalent skull base tumors are sinonasal cancers.16-19 However, in Brazilian series, for several reasons, most craniofacial oncological resections are indicated for very advanced skin carcinomas.20-23 This finding may be related to Brazil’s tropical climate, combined with other factors associated with the aggressive behavior and

Author Affiliations:
Departments of Head and Neck Surgery (Drs Cernea, Lorenzetti, Brandão, and Dos Santos), Neurosurgery (Drs Vellutini and Gomes), and Plastic Surgery (Drs Morais-Besteiro and Ishida), University of São Paulo Medical School, São Paulo, Brazil; and Departments of Head and Neck Surgery (Drs Dias, Lima, Farias, and Mendonça), Neurosurgery (Dr Nogueira), and Plastic Surgery (Dr Galvão), National Cancer Institute, Rio de Janeiro, Brazil.

T


IN MANY SERIES OF PATIENTS, THE MOST PREVALENT SKULL BASE TUMORS ARE SINONASAL CANCERS.16-19 HOWEVER, IN BRAZILIAN SERIES, FOR SEVERAL REASONS, MOST CRANIOFACIAL ONCOLOGICAL RESECTIONS ARE INDICATED FOR VERY ADVANCED SKIN CARCINOMAS.20-23 THIS FINDING MAY BE RELATED TO BRAZIL’S TROPICAL CLIMATE, COMBINED WITH OTHER FACTORS ASSOCIATED WITH THE AGGRESSIVE BEHAVIOR AND
increased recurrence rates of these tumors, such as location in areas of embryological fusion or in the naso-orbital region, or may be related to previous therapeutic attempts. These extremely advanced skin lesions often involve the skull base as well as portions of the bone and soft tissue of the face and thus require more extensive operations. The resulting complex defects usually represent formidable reconstructive challenges, suitable only for microsurgical free-flap reconstruction. These resections have been called extended cranial base resections by some authors creating a subgroup within skull base surgery. In these instances, planning of the facial incisions is often dictated by the invasion of skin, soft tissues, and facial skeleton, precluding any standard, less invasive approach.

The objective of this study was to quantify the percentage of these atypical “customized” facial approaches in 2 Brazilian skull base referral centers.

METHODS

In this retrospective study, the medical charts of 484 patients who underwent craniofacial operations in 2 tertiary care institutions were reviewed. Of these patients, sufficient information regarding the craniofacial surgical approach employed was obtained in 467 cases. The following data were also collected: initial location of the tumor, histologic type, type of facial and cranial approach, reconstruction, and complications. Special attention was directed toward the percentage of atypical facial approaches, which were directly related to the incidence of advanced skin neoplasms, as well as the impact of these approaches on surgical morbidity. Atypical facial access was defined as a nonstandard extended surgical approach, designed to encompass all invaded skin and/or soft tissues. Eyelid resection, in continuity with a maxillectomy, was not considered an atypical facial access.

RESULTS

The male to female ratio of the patients was 1.9:1.0, and the median age was 52.8 years (range, 4-88 years). The initial location of the tumor was the craniofacial skin in 63.5% of cases, ethmoid in 10.8%, maxilla in 2.3%, orbit in 1.9%, and other origins, including endocranial, in 19.4%. The histologic type of the lesion was basal cell carcinoma in 42.0% of cases, squamous cell carcinoma in 29.5%, esthesioneuroblastoma in 5.3%, adenocarcinoma in 3.9%, adenoid cystic carcinoma in 2.8%, and other types in 16.5%. Most of the patients (58.2%) had been previously treated with surgery and/or radiotherapy. Because of this high prevalence of advanced skin carcinoma, the most commonly employed facial approach was atypical, tailored to encompass all compromised skin and underlying tissues, in 55.5% of cases, followed by the Weber-Ferguson approach, with all its variations (eg, nasal swing) in 17.8%, lateral rhinotomy in 12.2%, facial translocation in 3.8%, and other techniques in 7.7%. No facial approach was required in 1.9% of cases. An example of the atypical approach is demonstrated in Figure 1.

Primary reconstruction (including prosthesis) was possible in 33.2% of cases. Most of the surgical defects (37.2%) required microvascular flaps (1.1% required more than 1 free flap), whereas conventional flaps (local or distant) and skin grafts were employed in 21.5% and 2.8% of the situations, respectively. A combination of different reconstructive techniques was used in 18.9% of the patients (Figure 2).

Major complications included bony necrosis (in 10.1% of cases), cerebrospinal (CSF) fistula (in 8.2%), meningitis (in 7.3%), prolonged coma (in 6.4%), microvascular flap necrosis (in 6.4%), local or distant conventional flap necrosis (in 6.4%), brain abscess (in 2.7%), pneumocephalus (in 2.7%), and subdural hematoma (in 2.7%). More than 1 complication occurred in 24.6% of patients. Treatment of bony necrosis, flap necrosis, abscess, and hematoma was always surgical. Prolonged coma was associated with frontal lobe manipulation and was managed conservatively in most cases. Minor CSF fistulas responded to prolonged lumbar drainage, but larger fistulas required a reoperation. The mortality rate was 5.9%, generally related to CSF fistula and meningitis. During a median follow-up period of 39.2 months, the disease-free survival rate for patients with malignant tumors was 48.2%. This survival rate was reduced to 38.2% among those patients who underwent atypical facial access, especially when microvascular reconstruction was required.

COMMENT

Craniofacial oncological operations have been the gold standard for the treatment of skull base tumors since the last decades of the 20th century. Usually, excision of these lesions is accomplished by an association of a neurosurgical access to the skull base, combined with a trans-
facial approach. Several options for this approach have been described in the literature, ranging from variations of paralateronasal incision\textsuperscript{9,10} to complex facial disassembling techniques.\textsuperscript{25} Recently, some authors\textsuperscript{11-15} presented successful resections of skull base lesions without any kind of facial incision. However, when an extensive skin cancer located in the craniofacial area invades the skull base, surgical incisions have to be tailored to include all its boundaries. In this instance, it is virtually impossible to perform a radical operation with no facial incision or even through a conventional facial approach. In contrast with most published series of skull base tumors,\textsuperscript{16-19} skin carcinomas are the most frequent histologic type among Brazilian published series.\textsuperscript{20-23} The reasons for this high prevalence are unclear. Some possible epidemiological and clinical explanations have been considered. Brazil is both a tropical and subtropical country, with most of its territory situated within low-latitude limits wherein the pathological effects of UV-B exposure are more pronounced. Interestingly, findings from a series of skull base tumors that originated from Australia, which is situated in a similar latitude, did not show this increased prevalence of skin carcinomas.\textsuperscript{26} Another reason could be the delay in seeking medical treatment by patients of a low economic class living in rural areas, leading to neglected, extensive skin cancers with deep invasion. Some recent articles\textsuperscript{27-29} have suggested the role of molecular factors in these extremely aggressive tumors.

In articles\textsuperscript{22,23} reporting a previous series, extended procedures, particularly those creating a wide communication between the extracranial and intracranial cavities that required free-tissue transfer for 3-dimensional reconstruction, and dural invasion and resection were the most significant risk factors associated with major postoperative complications. Other authors\textsuperscript{30,31} also have considered the presence of large combined defects, involving both frontal and temporal areas, as the single most important risk factor for the development of postoperative complications. In the present study, the complication rate was comparable with those of other available series in the literature.\textsuperscript{16,22,24,32}

The main objective of this study was to evaluate the prevalence of atypical facial access among patients who underwent major craniofacial oncological operations in 2 tertiary centers in Brazil. Most of these operations were indicated for very advanced skin cancers (63.5%); hence, the most frequent transfacial approaches were atypical (55.5%) to properly encompass all macroscopical tumor boundaries. Two immediate consequences were a high incidence of surgical complications and the need for elaborate reconstructive techniques, such as microvascular flaps, which were employed in more than one-third of the cases in this series. In fact, in a previous publication,\textsuperscript{20} indication of a free flap was a statistically significant prognostic factor. Evidently, an extensive facial defect increases the potential morbidity in skull base operations, especially in the event of a free-flap failure.
leading to life-threatening situations. Similarly, a trend toward reduced survival was noted among patients who underwent atypical facial approaches.

In conclusion, in this retrospective study, which encompasses a 25-year experience with skull base operations in 2 major Brazilian centers, in most situations, head and neck surgeons chose an atypical surgical approach to properly resect all facial structures invaded by very advanced skin cancers.

Submitted for Publication: January 22, 2007; final revision received March 15, 2007; accepted March 25, 2007.

Correspondence: Claudio Roberto Cernea, MD, Alameda Franca, 267, Room 21, CEP 01422-000, São Paulo, Brazil (cerneam@uol.com.br).

Author Contributions: Drs Cernea, Dias, Lima, Farias, Mendonça, Vellutini, Gomes, Nogueira, Lorenzetti, Brandão, Dos Santos, Morais-Besteiro, Ishida, and Galvão had full access to all the data in the study and take responsibility for the integrity of the data and the accuracy of the data analysis. Study concept and design: Cernea, Morais-Besteiro, and Ishida. Acquisition of data: Cernea, Dias, Lima, Farias, Mendonça, Vellutini, Gomes, Nogueira, Lorenzetti, Brandão, Dos Santos, Morais-Besteiro, Ishida, and Galvão. Analysis and interpretation of data: Cernea, Vellutini, and Gomes. Drafting of the manuscript: Cernea, Dias, Farias, Mendonça, Vellutini, Gomes, Nogueira, Lorenzetti, Brandão, Dos Santos, and Galvão. Critical revision of the manuscript for important intellectual content: Cernea, Lima, Vellutini, Gomes, Morais-Besteiro, and Ishida. Administrative, technical, and material support: Vellutini and Gomes. Study supervision: Cernea and Morais-Besteiro.

Financial Disclosure: None reported.

Previous Presentation: This study was presented at the American Head and Neck Society 2006 Annual Meeting and Research Workshop on the Biology, Prevention, and Treatment of Head and Neck Cancer; August 17-20, 2006; Chicago, Illinois.

REFERENCES