Results of resection of infantile nasal hemangiomas in the proliferative phase: a safe approach for central face tumors

Resultados da ressecção de hemangiomas infantis nasais em fase proliferativa: abordagem segura para os tumores centrais da face

ABSTRACT

Background: Infantile hemangioma is the most common benign tumor in infancy and occurs most often in the cervicofacial region. Its course can be divided into 3 phases with frequent spontaneous regression. However, residual sequelae or anatomical structure deformities can occur. An early and definitive surgical approach aiming at good aesthetic results and anatomical preservation is indicated in such cases because of the localization of the nasal hemangiomas and their capacity to disfigure. This study analyzed the results of the definitive surgical approach for proliferative nasal hemangiomas according to an objective evaluation. Methods: From 1997 to 2009, 20 patients suffering from nasal hemangiomas in the proliferative phase were treated surgically. The lesions were analysed according to the area affected and type of treatment. Complication rates and the need for additional procedures were analyzed. The aesthetic results were evaluated by independent evaluators. Results: The lesions were localized in the tip of the nose in 50% of patients, dorsal area in 20%, all subunits in 15%, paranasal areas in 10%, and alar area in 5%. Resection was total and subtotal in 60% and 40% of the patients, respectively. The mean follow-up period was 42.6 months. The mean number of surgical procedures per patient was 1.3 ± 0.7. No significant complications were observed. The results were positively evaluated with respect to the reduction of lesion volume and improved face shape, corroborating the proposed approach. Conclusions: Definitive surgical treatment is a safe and effective alternative for the management of nasal hemangiomas and has low complication rates.


RESUMO

Introdução: O hemangioma infantil é o tumor benigno mais comum da infância, predominando na região cervicofacial. É caracterizado por apresentar 3 fases distintas, observando-se frequentemente regressão espontânea dessas lesões. No entanto, sequelas residuais ou deformidades das estruturas anatômicas em crescimento podem ocorrer. A abordagem cirúrgica precoce e definitiva é indicada, em decorrência da localização dos...
INTRODUCTION

Infantile hemangioma is the most common vascular tumor in childhood. It is a true neoplastic disorder composed of endothelial cells: it proliferates after birth, growing via hyperplasia and cellular hypertrophy, with microscopic characteristics of neoplastic tissues and it is easily cultured in vitro cultures. Infantile hemangioma is characterized by rapid proliferation in the first months of life, followed by spontaneous involution.

The natural history of hemangioma is divided into 3 well-characterized phases: initial growth (proliferative), spontaneous regression (involution), and the final involuted phase. The clinical presentation varies depending on the evolution phase. Infantile hemangioma typically appears between birth and the 8th week of life. Precursor marks such as spots or telangiectasias are frequent. The proliferative phase is more pronounced during the first 3 to 6 months of life, peaking around 12 months. After that, the hemangioma begins a phase of spontaneous regression or involution characterized by increased cell apoptosis and progressive replacement of neoplastic tissue with stromal fibroadipose tissue.

The incidence of hemangiomas in Caucasians ranges from 4% to 12%; it is 3 times more frequent in female than male patients and is more common in premature and low-weighted newborns. Anatomical distribution is variable, but hemangiomas occur in the head and neck region in approximately 60% of cases. Patients with infantile hemangioma in the cervicofacial region frequently have psychosocial disturbances due to associated aesthetic and functional deformities.

Approximately 50% of infantile hemangiomas are completely involuted by 5 years of age. The potential for spontaneous involution makes active treatment of non life threatening lesions controversial. The side effects of current medical therapy and definitive deformities caused by surgical treatment must be critically considered before indicating active treatment.

Treatment options for infantile hemangiomas include conservative (expectant) treatment, pharmacological or surgical treatment.

Active treatment during the proliferative phase is indicated more often for hemangiomas in the center of the face, particularly nasal hemangiomas, due to the localization and potential for disfiguration. The particular complications of such locations, includes risks of airway obstruction, bleeding, ulceration, pain, and potential deformity of the nasal cartilages as well as psychological problems both for the child and family members, prompting an early and definitive surgical approach.

Several studies also indicate that the rate of spontaneous resolution of nasal hemangiomas is relatively lower even after the end of proliferative phase. This is because of the presence of fibro-adipose tissue deposition and remaining excess skin, which may deform facial shape, contributing to unsatisfactory results frequently produced by these lesions.

In this sense, proliferative nasal hemangiomas are particularly challenging because of need for short-term resolution, counteracting with the risk of adverse effects caused by early treatment. In this context, surgical treatment for nasal proliferative hemangiomas must be indicated and...
evaluated through objective criteria aiming at satisfactory outcomes, including the removal of affected tissues and preservation of anatomy.

Therefore, in the present study, we analyzed the results of the definitive surgical approach for nasal proliferative hemangiomas according to an objective evaluation.

METHOD

From 1997 to 2009, 20 patients being 16 females with nasal infantile hemangiomas were treated during the proliferative phase by the same surgeon. The mean age of the patients at the time of surgery was 41 months. The present study was approved by the ethics committee of our institution.

The lesions were evaluated according to anatomical localization (according to the aesthetic subunits of the nose). Infantile hemangioma was classified as superficial (only the skin was affected), deep (only affected subcutaneously), or mixed, depending on depth (Figures 1 to 4).

From a technical perspective, surgical planning aimed at definitive treatment. The surgical access were transcutaneous direct approach (Figures 1 and 4), with incisions on the hemangioma or its limits, or a transcolumellar approach, similar to that used in open rhinoplasty (Figures 2, 3, and 5). In deep hemangiomas, the approach was always transcolumellar, but it varied in superficial and mixed cases.

Non affected skin was not removed in any case, even when there was excess after resection of the hemangioma. Resection was classified as partial (up to 50% of the lesion), subtotal (50-90% of the lesion), or total (91-100% of the lesion).

To evaluate the results and validate the indications, we considered the complication rates, need for additional procedures, and aesthetic evaluation.

To evaluate the aesthetic results, pre- and postoperative photos were analyzed by 3 plastic surgeons not involved in the treatment of the patients. Shape, lesion volume, scar quality, general appearance of the face, and functional involvement were scored from 1 to 4 as follows: 1, worsening; 2, small improvement; 3, improvement; 4, large improvement.

The statistical package STATA (Stata Statistical Software: version 10.0, StataCorp LP, College Station, TX, USA) was used for statistical analysis.

To evaluate the distribution of frequencies was used to describe categorical variables (i.e., gender, ethnicity, localization, treatment categories, and evaluations), and the measures of central tendency (mean and median) and variability (minimum and maximum values, and standard deviations) were used for numerical variables (i.e., age and follow-up). The $\chi^2$ frequency test was used to verify independence between scores from different evaluators concerning each item, and the kappa concordance index was used to verify the degree of concordance between evaluators. The level of significance was set at 5% for all statistical tests.

RESULTS

The lesions were located in the nose tip in 10 (50%) cases, in the dorsum in 4 (20%), paranasal areas in 2 (10%),
Results of nasal infantile hemangioma resection in the proliferative phase

and ala in 1 (5%). In 3 (15%) patients, the entire nose was affected (Figure 6). Nine (45%) hemangiomas were deep, 8 (40%) were mixed, and 3 (15%) were superficial (Figure 7).

The transcolumellar and direct approaches were used in 9 (45%) and 11 (55%) cases, respectively. Total and subtotal resection were performed in 12 (60%) and 8 (40%) patients, respectively.

The mean follow-up period was 42.6 months (median 41 months, ranging from 3 months to 8 years).

The mean number of surgical procedures per patient was 1.3 ± 0.7. No postoperative complications compromising the final result were observed.

The 3 evaluators considered the results adequate with respect to the reduction of volume of the lesion and improvement of facial shape; the mean aesthetic score was 3.3. Large improvements were observed in 12 (60%) patients, and moderate improvements were observed in 4 (20%) cases. The results were considered insufficient in 4 (20%), patients for whom additional surgical procedures were indicated (Figure 8).

DISCUSSION

Volumetric reduction of facial hemangiomas through surgery can be effective, avoiding several complications...
including visual and airway obstruction, bleeding ulcerations, and anatomical distortion. Treating infantile nasal hemangiomas early is advantageous because it prevents sequelae resulting from the lesion enlargement, which can compromise growing structures. In contrast with the classical treatment philosophy, which recommends late approach, we indicate the treatment of patients with hemangiomas still in the proliferative phase in order to achieve the proposed aims.

However, the long-term predictability of the results is very limited since the patient is still developing and growing during treatment. It is important to consider surgical planning and measures aiming to reduce the potential for negative side effects.

Resection of healthy skin is formally contraindicated. In extensive lesions with superficial involvement, partial resections may be indicated, which can also avoid growth restrictions due to a lack of tissue malleability. Conservative planning in skin resection helps maintain enough tissue for nasal growth and simultaneously prevents the hemangioma from compressing growing structures. The fast skin adaptation characteristic of infancy allows the maintenance of excessive normal tissue as evidenced by the favorable results obtained in the present study, validating the criteria of surgical indication. The findings of the long-term evaluation also corroborate this, showing such results with only 1 or 2 surgical procedures.

Evaluation by independent examiners appears to be the best way to objectively analyze the sample. Some questions such as the difficulty of the case and need for reoperation must be answered by independent plastic surgeons with evaluation philosophies and sufficiently high standards who lack the bias of the primary surgeon on the case. Nevertheless, it is important that there is a consensus among the evaluators so that the results will be relevant from a statistical perspective. In other words, when the precise indications and criteria are followed, surgical removal of hemangiomas provides favorable results for both simple and complicated cases.

When weighing the risks and benefits of surgical treatment and considering the scar at the location of the hemangioma, the present study support the current treatment philosophy. The proportion of cases evaluated and considered as not requiring new procedures or requiring small simple procedures indicates that the treatment aims were achieved. Early surgery has established itself as a treatment option and is being performed more often.

CONCLUSIONS

For the management of nasal hemangiomas, definitive surgical treatment is a safe and effective option with low complication rates.

REFERENCES

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