Orbitofacial Masses in Children

An Endoscopic Approach

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Objective: To describe an endoscopic approach for pediatric orbitofacial masses.

Design: A retrospective medical chart review.

Setting: Tertiary-care children's hospital.

Participants: Patients (4 boys, 7 girls) ranged in age from 6 months to 11 years. All children underwent endoscopic excision of an orbitofacial mass.

Intervention: A single port approach was used in all but the initial case. The scalp incision was placed approximately 2.0 cm behind the frontal hairline. A subgaleal dissection was performed to minimize risk of nerve injury. Under endoscopic visualization, the mass was resected.

Main Outcome Measures: Ability to successfully excise the mass endoscopically, and the incidence of complication.

Results: All lesions were successfully resected endoscopically. The surgical time varied from 30 to 105 minutes (mean, 50.5 minutes). Pathologic examination revealed 10 dermoid cysts and 1 neurofibroma. Two children had transient frontalis branch palsies that resolved spontaneously. There was 1 unilateral frontal hypoesthesia in the patient with the neurofibroma (an expected result). There were no other complications.

Conclusions: An endoscopic approach to pediatric orbitofacial tumors is safe and effective. Although the risk of nerve injury may be higher, a thorough knowledge of frontotemporal anatomy and careful dissection will minimize this risk. The distinct advantage of an endoscopic approach is the absence of any facial scar in these young patients.


Pediatric orbitofacial masses represent a diverse group of lesions, ranging from the uncommon nasal glioma and encephalocele to the relatively more common periorbital dermoid. These lesions typically present early in life as a slowly enlarging solitary mass but in some cases may only manifest themselves after episodes of infection. After a thorough clinical examination, most masses are found to be superficial and readily amenable to surgical excision. Midline nasoglabellar masses and some orbital masses, however, require further radiological examination to exclude intracranial extension. The typical surgical approach for most orbitofacial masses involves an incision in the eyelid or eyebrow in a relaxed skin tension line of the forehead or an incision directly over the mass. While the results are typically described as cosmetically acceptable, a scar is still created.

Since the introduction of the endoscopic forehead lift in the early 1990s, surgical endoscopic procedures have expanded to encompass many applications within the specialty of plastic surgery. The primary advantage of surgical endoscopic procedures is their minimally invasive nature, allowing for equivalent surgical manipulation but without the need for a long incision. With the recent application of these techniques to the pediatric population, the advantages of endoscopic plastic surgery are even more appealing. To further promote the safety and efficacy of endoscopic surgical techniques in the pediatric population, we present our experience in the endoscopic approach to the removal of pediatric orbitofacial masses.

RESULTS

All patients underwent successful endoscopic resection of orbitofacial masses. The average surgical time was 50.5 minutes (range, 30-105 minutes). A trend toward decreased operative time was noted as the number of prior endoscopic proce-
dures performed by the surgeon increased. Pathologic examination revealed 10 dermoid cysts and 1 neurofibroma. The neurofibroma was removed from the left superior medial brow of an 11-year-old girl. Further workup for von Recklinghausen disease was negative. The remaining patients ranged in age from 6 to 30 months (average, 13.1 months) with the eyebrow dermoid being the most common presentation. While some pathologists have classified epidermoid and dermoid cysts together, we considered only those lesions that contained skin appendages in addition to cutaneous epithelium as true dermoids.2 All patients healed well with an aesthetically pleasing, hidden scar (Figure 4).

After discussing the risks of the endoscopic approach vs the traditional open approach, informed consent was obtained from the parent or guardian and the patient was taken to the operating theatre. Depending on the location of the lesion, a 1.5- to 2.0-cm incision was created cephalad to the mass, at least 2 cm behind the hairline (Figure 1). A single port approach was used in all cases but the first one, in which both midline and temporal incisions were used to remove a mass from the left superior lateral brow. The scalp incision was carried down to the subgaleal plane. Spreading dissection in the subgaleal plane continued to cephalad to the mass, at which time the endoscope was inserted (Figure 2). Care was taken to stay directly on the periosteum or deep temporalis fascia to minimize the risk of injury to the supratrochlear and supraorbital nerves medially and the frontal branch of the facial nerve laterally. The endoscopic setup included a 6-mm 30° endoscope, a xenon light source, and video camera with monitor. Under endoscopic visualization, the dissection was completed until the dermoid was well circumscribed. A combination of sharp and blunt dissection with the microscissors and periosteal elevators was used to free the periosteum overlying the mass and to remove the intact lesion. In most cases, there was a scalloped depression in the underlying bone (Figure 3). After copious irrigation, the wound was closed primarily, and all patients were discharged on the day of surgery.

**COMMENT**

Dermoid cysts in children are commonly found in the head and neck region, accounting for up to 84% of the total body dermoids in 1 study. The orbital and periorbital location is the most frequent site of involvement, with the neck, scalp,
and ear being the next most frequent locations. Nasolabial cysts are much less common, accounting for 1.1% to 2.6% of all dermoid cysts throughout the body. We found a similar pattern of distribution with 8 of 10 dermoids located in the orbital-periorbital region.

Complete surgical excision is necessary to avoid recurrence of the cyst or mass. Various surgical approaches have been advocated to excise these lesions, depending on the location. Examples include a direct incision over the mass; an incision above, below, or in the eyebrow; an incision in an adjacent relaxed skin tension line; and an incision through the natural crease of the upper eyelid. Most brow and orbital dermoids can be approached through the upper eyelid crease incision with reportedly good exposure and aesthetic results. Possible complications of this approach include damage to the levator aponeurosis, lacrimal gland, and reflected tendon of the superior oblique muscle. If a lesion in the forehead cannot be reached by an incision near the eyebrow, a camouflaged mid forehead or coronal incision is indicated. The former, while providing adequate exposure, will leave a conspicuous scar; the latter approach requires a long scar in the scalp with frequent scar line alopecia and paresthesias. Various approaches to midline nasal dermoids have been described, usually resulting in a midline nasal scar. Midline lesions with intracranial extension do not obviate the use of endoscopic techniques and have been described using an endoscopic transnasal approach.

Since the introduction of the endoscopic forehead lift in 1991, this technology has expanded to involve many areas of aesthetic surgery, including brow and facelifts, breast augmentation, abdominoplasty, and pediatric plastic surgery. Endoscopic forehead-brow lifts are performed routinely with excellent results, while minimizing operating and recovery time, blood loss, alopecia, paresthesias, and scar length compared with the traditional coronal approach. The minimally invasive nature of endoscopic surgery makes it an excellent choice for use in pediatric patients. Several reports have been published in the past few years documenting the use of endoscopic surgery for a variety of pediatric procedures, including tissue expander placement, torticollis release, excision of cranial suture release, and excision of facial dermoids. To further stimulate and encourage interest in this area, we present our experience with the endoscopic excision of pediatric orbitofacial masses.

The primary advantage of an endoscopic approach to orbitofacial mass excision is the avoidance of a conspicuous facial scar. The greater tendency toward hypertrophic scarring in the pediatric population provides further incentive to use a minimally invasive approach. In addition, this technique is advantageous in ethnic populations prone to keloid formation. The upper eyelid crease incision typically results in an aesthetically pleasing result, the absence of any facial scar is a cosmetic advantage. This cosmetic advantage is especially evident when a forehead or midline nasal incision can be avoided by the use of endoscopic surgical techniques. The minimally invasive nature of the endoscopic approach results in less tissue trauma with potentially less postoperative edema, blood loss, and recovery time. This is particularly evident when compared with the coronal approach for a forehead lesion. In their original description of endoscopically assisted dermoid excision, Huang et al used a 2-port approach, with 1 temporal incision and 1 incision cephalad to the lesion behind the hairline. We used a single-port approach in all cases but the first one to minimize the number of scars.

The primary disadvantage of an endoscopically assisted surgical approach is the increased risk of sensory and facial nerve injury. When the lesion is located laterally, the temporalis branch of the facial nerve is at increased risk for injury. In our series, 2 of 7 patients with laterally based lesions had a transient postoperative temporalis branch paresis. This was most likely secondary to stretching of the nerve by the endoscope, while elevating the overlying flap. Another disadvantage is the potentially higher cost of the procedure secondary to use of the endoscopic equipment and longer operative times early in the learning process. However, we noted a trend toward decreased operative time as the number of procedures performed increased. Some authors may argue that the use of this procedure is not necessary for small lesions around the eyebrow or orbit, but we believe that the absence of an appreciable facial scar is a significant advantage and outweighs the risks of nerve injury.

A thorough knowledge of the anatomy of this region is necessary to minimize the risk of nerve damage. The frontalis branch of the facial nerve courses diagonally upward across the zygomatic arch in the temporal region to enter the frontalis muscle above the superior orbital rim. It courses within the superficial temporal fascia, which is continuous with the superficial musculoaponeurotic system inferiorly, the galea superiorly, and the frontalis muscle anteriorly. Dissection directly on top of the deep temporal fascia laterally, and the periosseum medially will avoid injury to the frontalis branch. The supratrochlear nerve and superficial branch of the supraorbital nerve can be avoided with safe subgaleal dissection to within 2 cm of the supraorbital rim. The location of the supraorbital foramen is variable and may occur up to 1.9 cm above the supraorbital rim. Therefore any dissection within 2 cm of the supraorbital rim...
Figure 4. Before (A and B) and after (C and D) photographs of child with lateral brow dermoid.
should be done carefully under direct visualization. The deep branch of the supraorbital nerve, however, is prone to injury with subgaleal dissection. Damage to this nerve accounts for the paresthesias noted in the frontoparietal scalp after traditional coronal forehead-brow lift. This branch runs in the subgaleal plane parallel and medial to the superior temporal line. To avoid damaging this branch, dissection in the subperiosteal plane is advised during forehead or brow lifting. It is difficult to know if this branch was damaged during our dissection secondary to the young age of our patients.

In conclusion, we have successfully resected orbitofacial masses using an endoscopically assisted approach in a small series of pediatric patients. Our results correlate well with those published previously. This technique is both safe and effective, while providing a superior cosmetic result compared with the traditional approach. Although the potential risk of nerve injury is increased, a thorough knowledge of frontotemporal anatomy will minimize this risk. We believe that the absence of a conspicuous facial scar provides a cosmetic advantage that outweighs the potential risk of this approach.

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REFERENCES