CASE REPORT

Stab Wound in the Skull Treated with a Medial Supraorbital Craniotomy Through an Incision in the Eyebrow—a Minimally Invasive Approach

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Abstract The eyebrow incision associated with medial supraorbital craniotomy is a minimally invasive alternative approach to the lesions located in the medial anterior cranial fossa. The main advantages of the medial supraorbital craniotomy regarding frontolateral supraorbital craniotomy are the absence of manipulation of the temporal muscle, less risk of injury to the frontotemporal branch of the facial nerve and a more medial view of the anterior structures such as frontal sinus, olfactory groove and frontal lobe. We report a unique case of cranial stab wound in which a piece of the knife stayed in the frontal sinus and removal was performed using the medial supraorbital approach. There were no complications during surgery, the patient reported mild hypoesthesia in the left frontal region and was discharged on the 7th postoperative day. During follow-up after 2 months, good cosmetic result of the surgical wound and preserved sensitivity of the left frontal region were noted.

Keywords Surgical approach · Supraorbital craniotomy · Stab wound · Minimally invasive surgery

Introduction

Historically, access to the skull base and frontal sinus was performed through large skin incisions and extensive craniotomies [1, 2]. However, the development of microsurgical technique and anatomical knowledge enabled the advent of safe minimally invasive techniques that allow adequate exposure, low morbidity and satisfactory cosmetic result. We report a rarely described minimally invasive approach to the anterior cranial fossa for removal of a piece of knife.

Case Report

A male patient, 20 years old and previously healthy, was the victim of assault with a stab wound in the skull. Entrance hole of the blade 1.5 cm above the left eyebrow was observed and the patient had no neurological signs. Computed tomography (CT) showed an object of metallic density, located in transverse position inside the frontal sinus (Fig. 1). The patient underwent surgery to remove the knife blade through the incision in the eyebrow region (Fig. 2a, b) associated with small craniotomy in the medial supraorbital region. The blade was about 3.5-cm long and after its removal, cranialization of the frontal sinus was performed with removal of the mucosa and inner table. There was no evidence of injury to the dura mater.

There were no complications during surgery, and the patient was submitted to therapy with broad-spectrum antibiotics for 7 days. Postoperative CT showed the correct postoperative bone alignment and absence of blood or air collections. The patient reported mild hypoesthesia in the left frontal region and was discharged on the 7th postoperative day. During follow-up after 2 months, good cosmetic result of the surgical wound and preserved sensitivity of the left frontal region were noted (Fig. 2c).

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Fig. 1 X-ray and head CT showing the presence of a metallic object in the frontal sinus region. *A*—metallic object inside the frontal sinus (sagittal skull X-ray), *B*—metallic object inside the frontal sinus (axial head CT)

Discussion

Classically, lesions located in the medial region of the anterior cranial fossa and frontal sinus are usually approached through large skin incisions behind the line of implantation of hair associated a bifrontal craniotomy [1, 2]. The frontolateral supraorbital craniotomy through eyebrow incision is an elegant alternative and versatile approach for lesions located in the anterior cranial fossa allowing adequate exposure of virtually all tumours in this area [1–5]. However, there are few reports of the usefulness of its variant, the medial supraorbital craniotomy through eyebrow incision [1].

The main advantages of the medial supraorbital craniotomy regarding frontolateral supraorbital craniotomy are as follows: the absence of manipulation of the temporal muscle, less risk of injury to the frontotemporal branch of the facial nerve by dissecting the frontalis vertically and a more medial view of

the anterior structures such as the frontal sinus, olfactory groove and frontal lobe [1].

The main limitation of this approach is the presence of the supraorbital and supratrochlear nerves in the region. However, one can avoid damaging these structures by releasing the supraorbital nerve from its notch and the skin incision has the supratrochlear nerve as medial limit. Studies show that the supratrochlear nerve is 9–15 mm medial to the supraorbital nerve [1, 6, 7]. In our approach, we use these anatomic parameters to avoid inadvertent injury to these nerves.

Conclusion

The medial supraorbital craniotomy with eyebrow incision proved to be a useful alternative approach for epidural lesions

Fig. 2 Intraoperative figures of blade and patient picture on follow-up consultation. *C*—white arrowhead: image with intraoperative visualization of the blade inside the skull. *D*—red arrowhead: lamina after removal. *E*—aesthetic results after 2 months of follow-up

located in the medial region of the anterior cranial fossa, allowing adequate exposure of the structures in the region with good cosmetic result.

Conflict of Interest The authors declare that they have no competing interests.

Authors' Contributions João Luiz Vitorino Araujo has participated in the making of the concept, design, definition of intellectual content, literature search, data acquisition, data analysis, manuscript preparation, manuscript editing and manuscript review. Vinicius Ricieri Ferraz has participated in the making of the concept, literature search, data acquisition, data analysis, manuscript preparation, manuscript editing and manuscript review. Denes Vilela has participated in the making of the concept, literature search, data acquisition, data analysis, manuscript preparation, manuscript editing and manuscript review. Marcelo Sette has participated in the making of the concept, design, definition of intellectual content, literature search, data acquisition, data analysis, manuscript preparation and manuscript editing.

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