Endonasal Endoscopic Repair of Orbital Floor Defects

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ABSTRACT

We have previously published an endonasal endoscopic technique of inferior orbital floor reconstruction, for the surgical management of the “silent sinus syndrome” and “blow-out” orbital fractures. Based on the same principles, we present another version of the technique with the advantage of an “overlay” approach to the bone defect.

After creating a large middle meatal antrostomy, an endonasal endoscopic technique of inferior orbital floor repair is performed, and potentially the use of synthetic grafts. This technique provides excellent functional and aesthetic results in the surgical management of orbital floor fractures.

INTRODUCTION

Orbital Floor Defects usually occur either A) in acute craniofacial trauma, with “blow-out” fractures of the orbital floor, or B) in the chronic silent sinus syndrome (SSS), a rare condition with slowly progressing severe sinusitis in an asymptomatic maxillary sinus with sinus dehiscence. (1)

Basically, the surgeon has the option of an external, transconjunctival or subciliary, approach to the orbital floor defect, or, alternatively, choose an endonasal endoscopic route to the orbit, which allows an “overlay” approach to the bone defect.

METHODS

After an enlarged middle meatal antrostomy is created, the size of the orbital floor defect can be thoroughly assessed from below through the antrostomy. (Figure 1a)

An anterior and posterior ethmoidectomy is performed to expose the entire length of the lamina papyracea. The middle turbinate can be either preserved or sacrificed, depending on one’s requirements.

In the next step, the lamina papyracea is vertically incised at its anterior part and horizontally at its inferior part – usually using a sickle knife or a size 12 blade – and carefully elevated – with, for instance, a Freer Elevator – to the utmost care not to damage the underlying orbital periosteum (Figure 1b). Once again, preservation of the lamina papyracea depends on the surgeon’s needs, or, more often, the thickness of the lamina itself, with thicker lamina bones sometimes allowing a repositioning of the lamina at the end of the reconstruction.

With a curved blunt instrument – i.e. a burr/ aspirator – the subperiosteal plane is then laterally dissected along the upper surface of the orbital floor, until the bone defect on the orbital floor is fully exposed, now from above (Figure 1c). A correct assessment of the dehiscence area is crucial, and, with this technique, the surgeon has the particular advantage of accessing the bone defect from both above and below, at the same time. It is followed by the collection of an autologous bone graft from the vomer region of the nasal septum (preferably with all mucosal or skin incisions on the septum being made on the opposite nasal cavity). This graft is then crafted to the patient’s specific anatomy, and is introduced in the subperiosteal plane through the opened medial orbital wall (Figure 1d), to be placed horizontally in such a way that it completely occludes the orbital bone defect from above. The use of fibrin glue at this stage is helpful, but optional. With the graft in place, the orbital contents are layered on top of it, and any lamina papyracea remnants may be repositioned (Figure 2c). Finally, a light packing is placed in the middle meatus.

DISCUSSION

This technique allows, with minimally invasive surgery, a solid overall orbital floor augmentation, with, in our hands, excellent immediate and long term aesthetic and functional results, respecting any pre-existing anatomic variations in the orbital floor. This technique allows a “fine tuning” of the results (Figure 2). Also, as a number of surgeons feel that a slight overcorrection of the endonasal approach may be necessary to compensate for the eventual absorption of the bone graft, all graft size adjustments and intra-orbital floor repositioning are possible (the elevation of the lamina papyracea allows for a good degree of plasticity of the orbital content), and even additional grafts may be added. This technique also warrants that a graft considered larger-than-the-defect is easily positioned over the dehiscent area, to the degree that the surgeon feels that the reconstruction is solid enough not to risk later collapse into the maxillary sinus and that a simultaneous maxillary sinus balloon expansion or intra-sinus packing is no longer required. This goal, we feel, is comparatively easier to achieve with this approach than with the graft placed from below technique.

CONCLUSIONS

The minimal morbidity, allowing for a very short hospitalization, the excellent immediate and long term results in the absence of a external scar, the stability and the tailored nature of the grafting procedure, all make this technique, in our hands, the first treatment for surgical management of not only the silent sinus syndrome but also of a good number of orbital blow-out fractures, particularly with favorable anatomy and preserved orbital periosteum.

REFERENCES


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