Bicoronal Approach to the Frontal Sinus
Simple and Cosmetic

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INTRODUCTION

Surgical access and incisions to the frontal sinus region include:

A- Bicoronal.
B- Open sky.
C- Gullwing (eyeglass or spectacle).
D- Butterfly.
E- Sewall.
F- Incisions through the existing lacerations.
**A: Bicoronal**

- Coronally from the temporal region to the temporal region. 2-3 cm behind the hairline.
- It should not be used in men with a family history of baldness.

**B- Open sky:**

- Two incisions in the medial orbital region connecting over the nasal bridge.
- It leaves a deforming scar over the nasion region.
C- Gullwing (eyeglass or spectacle):

- Two curved incisions at or inferior to the brow, ending at the nasion
- It leaves unattractive scars, which are highly visible because of their presence in the prominence on the brow and the resultant reflection of the light.
- It usually divides supraorbital nerve which results in paresthesias and numbness of the forehead.

D- Butterfly:

- a combination of gullwing and the open sky incisions.
- It leaves a deforming H-shaped scar over the brows and the nasion region.
E- Sewall (Lynch):

- a single side medial orbital incision.
- Usually used for frontoethmoidectomy.
- It establishes communication between the floor of the frontal sinus and the anterior ethmoid cells.
Indications of the bicoronal approach

1- **Trauma to the frontal sinus**
   - Anterior table comminuted or displaced
   - Posterior table displaced or presence of bone fragments
   - Sinus floor fractures involving the nasofrontal duct

2- **Chronic suppuration of the frontal sinus** which has failed to respond to all other means of treatment

3- **Frontal mucocele**

4- **Tumours of the frontal sinus** e.g. osteoma and fibrous dysplasia

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**PRINCIPAL GOALS OF MANAGING FRONTAL SINUS LESIONS:**

1. To remove the lesion completely.
2. To protect the intracranial structures.
3. To control CSF leakage.
4. To prevent the posttraumatic inflammatory complications.
5. To restore frontal bone contour and symmetry.
1- Plain films are of little value
2- High resolution, 1mm to 1.5 mm thin-cut CT provides diagnostic power for assessing lesions of the frontal sinus
3- Contrast medium may be helpful for recognizing hematomas, contusions and vascular tumors.
4- MRI is useful in intracranial involvement.

4- Axial images are helpful in revealing the location, severity and degree of anterior and posterior table lesions.
5- Coronal images would reveal lesions of the frontal sinus floor and orbital roof
6- Sagittal views may facilitate assessing the nasofrontal duct
PREOPERATIVE MANAGEMENT

1- CT scans, which demonstrate the pathology
2- Ophthalmologic and neurosurgical consultations
3- A template of the frontal sinus is designed from anteroposterior radiograph taken at 6 ft of distance (Caldwell’s view).
1- Prophylactic antibiotics are given with the premedication
2- The hair is shaved 2-3 cm behind the hairline
3- The patient lies in the reversed Trendelenburg position, with the head placed so that the plane of the forehead is horizontal

4- Bilateral temporary tarsorrhaphies are performed

5- The line of incision is infiltrated with 1:200 000 adrenaline
INCISION

1- It is made 2-3 cm behind the hairline, in a strip which has been shaved
2- It is made through skin, subcutaneous tissue and frontalis muscle, taking care not to damage the periosteum
3- It is extended inferolaterally to just anterior to the root of the helix

PROCEDURE

1- The flap is raised in the plane between the frontalis muscle and the periosteum, as far as the supraorbital rims and glabella
2- Using the sterilized template, the frontal sinus is outlined using a marking pen.

3- The pericranial periosteum is incised around the outline and elevated 2-3 mm either side.
4- The bone is cut with a fissure burr just within the outline and is bevelled to provide a supportive rim on closure
5- Care is taken to preserve the supraorbital and supratrochlear nerves

6- The intersinus septum is broken with an osteotome allowing the flap to be prised down and forwards, hinged inferiorly
7- The diseased mucosa or tumor can be removed.
8. Two procedures are then possible: either drainage via the frontal sinus ostium or to obliterate the sinus.

- If the major portion of the mucous membrane is intact and normal e.g. with osteoma, the mucous membrane is left undisturbed and the naofrontal duct is left inviolate.

- If the pathologic change consists of chronic sinusitis with hopelessly diseased mucous membrane, all mucous membrane is meticulously removed.
• If the nasofrontal duct is patent, it is better to preserve the mucous membrane and to leave the duct intact

• If the duct is obstructed anywhere along its course from the frontal sinus to the infundibulum, either strip the mucosa very carefully and completely obliterate the duct or remove the obstruction and stent the duct
• If removal of all mucous membrane from the sinus wall is not possible, the remaining in the sinus will be the nidus for future problems, at this point, place an adipose tissue obtained from the anterior abdominal wall into the sinus cavity and duct to aid obliteration.

**CLOSURE**

1- The bone flap (from which the mucosa has been removed) is returned to its anatomic site.

2- Drill holes are placed in the bone flap and the surrounding bone to allow fixation of the flap with silk.
3- The periosteal layer is sutured with vicryl.
4- Stables are used to close the skin.
5- Drains may be inserted laterally.
6- A pressure dressing applied for 48 h.

Frontal sinus fracture
Fixation of the comminuted anterior table by plates and screws.
POSTOPERATIVE MANAGEMENT

1- Semi-Fowler position may reduce periorbital edema and ecchymosis.
2- Broad spectrum antibiotics.
3- Stables are removed after 10 days.

PITFALLS, COMPLICATIONS AND INSTRUCTIONS

1- Postoperative wound infection is relatively uncommon
   • Perioperative and postoperative antibiotics contribute to the low incidence
2- Haematoma under the flap
   • Can be prevented by careful haemostasis, drains and a pressure dressing
3- Necrosis of the flap
   • Preservation of the periosteum along the inferior edge of the anterior frontal sinus bone flap, forming a hinge, is most important because this is the source of blood supply to the periosteal bone flap
4- Injury to the inner table during the initial cut through the outer table
   • Bevel bone cutting inwards toward the sinus and make it slightly smaller than the x-ray template

5- Cerebrospinal fluid leak
   • This is usually due to injury or trauma to the posterior table with dural tear.
   • Preoperatively, the status of posterior table should be carefully evaluated in every patient
   • When compromise either due to infection or trauma is encountered, explore and repair dural defects at the time of surgical procedure.
The bicoronal approach:

- Provides excellent access to the frontal bone and sinus and upper face.
- Provides the most desirable aesthetic results.
- Affords a completely hidden scar without sensory denervation.
THANK YOU