Coding For Craniosynostosis

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Cranial sagittal Synostosis

• Cranium job is to protect the brain
• The top portion of the skull, which protects the brain. The **cranium** includes the frontal, parietal, occipital, temporal, sphenoid, and ethmoid bone
What is Craniosynostosis

- **Craniosynostosis** is a condition in which one or more of the fibrous sutures in an infant skull prematurely fuses by turning into, this will change the growth pattern of the skull.
- This will cause the skull to expand perpendicular to the fused suture, it compensates by growing more in the direction parallel to the closed sutures.
- The resulting growth pattern provides the necessary space for the growing brain, but results in an abnormal head shape and abnormal facial features.
- In cases in which the compensation does not effectively provide enough space for the growing brain, craniosynostosis results in increased Intracranial pressure leading possibly to visual impairment, sleeping impairment, eating difficulties, or an impairment of mental development.
• Craniosynostosis

• It premature fusion of the skull resulting inability of skull expand as brain is growing
Normal Closure of Cranial sutures

- Normal Closure of Cranial sutures
- Metopic <1 year age
- Coronal 20-40 years old
- Sagittal >20 years old
- Lamboid 30-40 years old
Functional Disturbances

• What happens when the cavity does not have enough remove for brain
• Craniosynostosis results in increased intracranial pressure leading possibly to visual impairment, papilledema, behavior changes, sleeping impairment, eating difficulties, facial deformities or development delays
• Surgical correction around 6 months
Sagittal craniosynostosis

• Premature fusion of the sagittal suture that runs from the front to the back at the top of the skull forces the head to grow long and narrow. Sagittal craniosynostosis is the most common type.
CODING
ICD 10 CM Diagnosis Code

- **Craniosynostosis. Q75.0**
  - Includes
  - Acrocephaly
  - Imperfect fusion of skull
  - Oxycephaly
  - Trigonocephaly

- **Diagnosis Index** entries containing back-references to Q75.0:
  - Acrocephaly Q75.0
  - Brachycephaly Q75.0
  - **Closure**
    - cranial sutures, premature Q75.0
  - Craniosynostosis Q75.0
  - Craniostenosis Q75.0
  - Deficiency, deficient
    - craniofacial axis Q75.0
  - **Imperfect**
    - closure (congenital)
      - skull Q75.0
  - Ossification
    - fontanel, premature Q75.0
  - **Oxycephaly, oxycephalic** Q75.0
  - Scaphocephaly Q75.0
  - Tower skull Q75.0
  - Trigonocephaly Q75.0
Craniosynostosis Objective

• The objective of surgery is to relieve intracranial pressure and allow the skull to grow normally along the brain.
• The brain needs space.
Reason for Procedure

• Craniosynostosis is a non-positional cause of abnormal head shape in infants and occurs when one or more of the sutures in the infant's skull fuse prematurely.

• The premature fusion of one or more sutures puts pressure on the brain, potentially restricting brain growth and exerting pressure on the other skull bones to expand out of proportion, leading to abnormal skull shape.
OPERATIVE REPORTS
studies up. Using a #15 blade, the incision was created with a scarring of the epidermis, followed by electrocautery set at 10 with the insulated Bovie tip through the dermis down to the galea. Hemostasis was maintained and the incision was performed in a bicornal curvilinear fashion from ear to ear. Using a combination of sharp dissection and electrocautery, the galea was dissected off of the pericranium. This was done to the foramen magnum and the scalp was reflected back posteriorly. Hemostasis was meticulous and electrocautery was used to incise an incision in the pericranium, pericranium, and the pericranium was then dissected back, using periosteal elevators, down to the foramen magnum. Bone wax and electrocautery was used to stop bony bleeding. Wet Ray-Tec was placed over the scalp and pericranium, and irrigation was used to moisten the area. Next, a small Marchac template was placed over the posterior cranium. On the left posterior cranium a marking pen was used to outline the Marchac template in an area with appropriate curvature and space. Burr hole was placed adjacent to Marchac template outline and with an M3 drillbit. The dura was dissected off the inner table of the skull using a B1 footplate. B1 footplate was attached to the B1 on a Midas drill. A craniotomy was fashioned to the shape of the Marchac template. This was done without complication. The Marchac template was taken off the table and handed to the plastic surgeon. Next, the M3 drillbit with the Midas drill was then used to fashion a small burr hole midline at the posterior aspect of the
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and the bay leaf was placed over the puzzle for removal. The bone flap was taken off the table and, at this point, I assisted... with the bone contouring and cranioplasty. After the occipital plate from the Marchac template was contoured and attached to the foramen magnum with absorbable plates, this occipital plate was then secured to a strut, which was attached to the remaining native bone just posterior to the anterior fontanelle. Using the Cl drill tip with a straight guard, burr holes were fashioned in the midline bilaterally on the strut and occipital plate. Burr holes were also fashioned anteriorly on the native bone and laterally on the parietal and occipital bones. Using a 2-0 PDS, sutures were placed in previously mentioned holes in an interlocking lattice fashion. Contoured bone was then placed in the lattice network of sutures for complete coverage of the dura in bilateral parietal regions. The patient's calvarium was split using a 15 blade, followed by an 11 blade and osteotomes in order to create split-thickness bone graft for complete coverage. The periosteal flap was then taken and reflected over the cranioplasty, secured with 4-0 Nuzolon. The patient was irrigated profusely and the skin was reflected back and galea was closed with 3-0 Vicryl followed by a running locking skin closure with a 4-0 chromic gut. The patient tolerated the surgery well without complication and was transferred to the ICU in stable condition.
After that, attention was placed to the temporal area to harvest to the new occipital bone on a Marchac template. The harvesting of the bone was done first with the burr holes placed one posteriorly behind the anterior fontanella and one to the level of the parietal area where the Marchac bone template was placed. The rest of the craniotomy included the occiput and the parietal area on the contralateral side. No major bleeding was encountered and careful hemostasis was achieved.

On the back table, the harvested bone was split harvesting the autogenous autograft for a dimension of 20 x 20 cm. The cranioplasty was performed positioning the new occipital bone harvested from the parietal area over the Marchac template and then the new occipital bone was put in place. A 11 cm strip of bone was taken from the harvested bone and secured with reabsorbable plates and screws to the anterior fontanella area and to the new occipital bone. In this way the anterior-posterior diameter has been narrowed.

We then continued the cranioplasty placing 3-0 PDS suture to the parietal and occipital bone. The parietal and occipital harvested bone was remodeled with cortical cuts on the back table after scraping and harvesting the autogenous graft. The harvested bone was straightened. The harvested bone was positioned in the bilateral parietal areas and held in place with 3-0 PDS sutures. Small pieces of bone graft were also harvested to fill all the gaps. At the end of the procedure, there was no bleeding and then we proceeded to close the pericranial flap over the reconstructed cranial vault with 4-0 PDS sutures. And we were able to close completely. The complex closure was done with 3-0 Vicryl suture at the level of the galea layer and then with subcutaneous stitches with 3-0 Vicryl and then skin was closed with 4-0 chromic. A sterile dressing was applied with xeroform, bacitracin, gauze and kerlex. The patient
How is it repaired

• Open cranial vault with remodeling
• Reshaping of cranial
• Release suture
• Great long term results

• Endoscopic strip craniectomy or suturectomy with helmet therapy
• Endoscopic is usually removes of sutures and remodel with helmet therapy afterwards
• Results not as good
ICD-10-PCS - Structure Characters (Med/Surg)
Method

• The craniofacial surgeon will remodel or reshape the bones of the skull expanding and enlarging the space within the vault to allow room for your child's brain to grow while attempting to restore a more natural appearing shape of the skull.
How

• Surgery is done by a team which includes both a Craniofacial Plastic Surgeon and a Neurosurgeon. For a **Cranial Vault Reconstruction (CVR)** surgery, the head is cut in a zig-zag pattern from ear-to-ear (which allows for the scar to be more easily covered with hair in the future).
Steps

- The approach is open
- The abnormal suture is removed (Sagittal)
- The cuts in the parietal bones to remodel the cranial valve
- Barrel-stave to the temple bones or occipital bones
Steps

- About 2/3 of skull is removed at the back of the head
- The bone is cut into pieces to reshape the skull.
- The bones are repositioned and fixed in place with absorbable plates and screws
- Skull goes back into shape and fixation expand the skull wider
ICD-10-PCS - Structure Characters (Med/Surg)
Coding

- What is the objective of the procedure
- What are the techniques
- What is approach
Coding

• The body system involved is Head and facial bones
• The skull is repositioned
<table>
<thead>
<tr>
<th>Reposition</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Definition:</strong> Moving to its normal location, or other suitable location, all or a portion of a body part</td>
</tr>
<tr>
<td><strong>Explanation:</strong> The body part is moved to a new location from an abnormal location, or from a normal location where it is not functioning correctly. The body part may or may not be cut out or off to be moved to the new location</td>
</tr>
<tr>
<td><strong>Includes/Examples:</strong> Reposition of undescended testicle, fracture reduction</td>
</tr>
</tbody>
</table>
Medical and Surgical, Head and Facial Bones

- O: Section
- N: Reposition
- S: Approach
- : Device
- : Qualifier

**Head and Facial Bones**

**Body Part**
<table>
<thead>
<tr>
<th>Body Part</th>
<th>Approach</th>
<th>Device</th>
<th>Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Skull</td>
<td>0 Open</td>
<td>4 Internal Fixation Device</td>
<td>Z No Qualifier</td>
</tr>
<tr>
<td>R Maxilla</td>
<td>3 Percutaneous</td>
<td>5 External Fixation Device</td>
<td></td>
</tr>
<tr>
<td>T Mandible, Right</td>
<td>4 Percutaneous Endoscopic</td>
<td>Z No Device</td>
<td></td>
</tr>
<tr>
<td>V Mandible, Left</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Codes

- **ONS00ZZ** Reposition skull, open approach
- With graft

<table>
<thead>
<tr>
<th>Section</th>
<th>0</th>
<th>Medical and Surgical</th>
</tr>
</thead>
<tbody>
<tr>
<td>Body System</td>
<td>N</td>
<td>Head and Facial Bones</td>
</tr>
<tr>
<td>Operation</td>
<td>R</td>
<td>Replacement: Putting in or on biological or synthetic material that physically takes the place and/or function of all or a portion of a body part</td>
</tr>
<tr>
<td>Body Part</td>
<td>Approach</td>
<td>Device</td>
</tr>
<tr>
<td>0 Skull</td>
<td>0 Open</td>
<td>7 Autologous Tissue Substitute</td>
</tr>
<tr>
<td>1 Frontal Bone</td>
<td>3 Percutaneous</td>
<td>J Synthetic Substitute</td>
</tr>
<tr>
<td>3 Parietal Bone, Right</td>
<td>4 Percutaneous Endoscopic</td>
<td>K Nonautologous Tissue Substitute</td>
</tr>
</tbody>
</table>
Excision for Graft

- If an autograft is obtained from a different body part in order to complete the objective of the procedure, a separate procedure is coded.
- *Example Harvest*
- Bones skull
### Medical and Surgical

**Body System**
- **N** Head and Facial Bones

**Operation**
- **B** Excision: Cutting out or off, without replacement, a portion of a body part

<table>
<thead>
<tr>
<th>Body Part</th>
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<th>Qualifier</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 Skull</td>
<td>0 Open</td>
<td>Z No Device</td>
<td>X Diagnostic</td>
</tr>
<tr>
<td>1 Frontal Bone</td>
<td>3 Percutaneous</td>
<td></td>
<td>Z No Qualifier</td>
</tr>
<tr>
<td>3 Parietal Bone, Right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Parietal Bone, Left</td>
<td>4 Percutaneous Endoscopic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Temporal Bone, Right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Temporal Bone, Left</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7 Occipital Bone</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
• If brain is released root operation would be release
• Body System CNS
• Body Part  Brain
• Approach open
• 00N00ZZ
• 0NS00ZZ  Reposition skull, open approach
• The Absorbable plates are not coded as internal fixation because they quickly absorbed into bone and not removable
• Orbital bones may also be repositioned and would be an addition coded 0NSP0ZZ/0NSQ0ZZ
• **Question:** A five-month-old with sagittal synostosis (craniosynostosis of the sagittal suture) presents for cranial vault reconstruction with orbital advancement. The frontal bone was removed, reshaped and then utilized to reconstruct the deformity of the skull. What is the appropriate root operation for the cranial vault reconstruction?
Answer:

• Sagittal synostosis is the most common type of craniosynostosis. The condition occurs when the sagittal suture closes prematurely, and restricts the transverse growth of the skull, causing abnormal skull shape and length. Cranial vault reconstruction also referred to as cranial vault reshaping remolds by repositioning the bones of the skull in order to enlarge the space within the vault. The intent of the surgery is to relieve pressure, allowing room for the brain to grow, and a more natural appearing head. During surgery, an incision is done over the top of the head from ear to ear; the skull is removed; bone is dissected from the brain; and cuts are made in the bones of the skull to reshape the head. The bone is then put back in place, and may be held together with absorbable plates or sutures. For the cranial vault reconstruction, assign the following ICD-10- PCS code:

• ONS00ZZ  Reposition skull, open approach
Endoscopic strip craniectomy or suturectomy

• Method two tiny incisions on an infant’s head to accommodate the camera of an endoscope and a tiny cutting tool for removing a thin strip between the plates to free them.
Excision

Definition: Cutting out or off, without replacement, a portion of a body part

Explanation: The qualifier DIAGNOSTIC is used to identify excision procedures that are biopsies

Includes/Examples: Partial nephrectomy, liver biopsy
Approach

Percutaneous Endoscopic (4)

**Definition:** Entry, by puncture or minor incision, of instrumentation through the skin or mucous membrane and any other body layers necessary to reach and visualize the site of the procedure.

**Access Location:** Skin or mucous membrane, any other body layers.

**Method:** Puncture or minor incision.

**Type of Instrumentation:** With visualization.
<table>
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<td>Skull</td>
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<td>Z No Device</td>
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<td>Z No Qualifier</td>
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<td>4 Percutaneous Endoscopic</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4 Parietal Bone, Left</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5 Temporal Bone, Right</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 Temporal Bone, Left</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
CPT Repair

61550  Craniectomy for craniosynostosis; single cranial suture
       CDR  Anesth  OCE

61552  multiple cranial sutures
       CDR  Anesth  OCE

(For cranial reconstruction for orbital hypertelorism, see 21260-21263)
<table>
<thead>
<tr>
<th>Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>61556</td>
<td>Craniotomy for craniosynostosis; frontal or parietal bone flap</td>
</tr>
<tr>
<td>61557</td>
<td>Bifrontal bone flap</td>
</tr>
<tr>
<td>61558</td>
<td>Extensive craniectomy for multiple cranial suture craniosynostosis (e.g., cloverleaf skull); not requiring bone grafts</td>
</tr>
<tr>
<td>61559</td>
<td>Recountoring with multiple osteotomies and bone autografts (e.g., barrel-stave procedure) (includes obtaining grafts)</td>
</tr>
</tbody>
</table>
Other Types

• Fronto-orbital advancement may be used in the correction of **metopic**, **coronal**, or **multi-suture craniosynostosis**. It involves exposure of the upper eye socket and forehead through an ear-to-ear incision. The forehead bone is then removed with the assistance of the neurosurgeon. The misshapen upper eye socket is then cut free, reshaped, and replaced in a new position, held in place with resorbable plates and screws. The forehead is then reshaped and affixed to the upper eye socket.
• The use of sagittal springs with strip craniectomy may be recommended for sagittal synostosis if the child is younger than 5 months at the time of initial surgery. The surgery involves a strip craniectomy and placement of two to three stainless steel springs to help increase the amount of room for the brain to grow, improve the skull shape, and reduce the risk of the sagittal suture closing again.
Thank-You!

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OPERATIVE DATE:  

DICTATING PHYSICIAN:  

SURGEON:  

ASSISTANT:  

ANESTHESIOLOGIST:  

PREOPERATIVE DIAGNOSIS: Sagittal suture craniosynostosis.  

POSTOPERATIVE DIAGNOSIS: Same.  

ASSISTING SURGEON:  

PROCEDURE: Posterior 2/3 cranial vault craniotomy with periosteal flap, as primary surgeon. Co-surgeons with cranioplasty and cranial remodeling and assist with complicated skin closure.  

ANESTHESIA: General endotracheal anesthesia.  

COMPLICATIONS: None.  

HISTORY OF PRESENT ILLNESS: The patient is a who developed skull asymmetry and was found to have a premature closure of her sagittal suture. admitted electively for posterior cranial remodeling.  

DESCRIPTION OF PROCEDURE: The patient was brought into the room, where a central line was placed, and the patient was intubated without complication. The patient was positioned in prone position with her head on a head roll. Care was taken to make sure that her eyes were not being compressed. The patient was placed on gel rolls at her chest and her hips. The patient was dressed and draped in standard sterile fashion. Timeout was performed identifying correct patient, correct location, antibiotics given, and imaging studies up. Using a #15 blade, the incision was created with a scoring of the epidermis, followed by electrocautery set at 10 with the insulated Bovie tip through the dermis down to the galea. Hemostasis was maintained and the incision was performed in a bicoronal curvilinear fashion from ear to ear. Using a combination of sharp dissection and electrocautery, the galea was dissected off of the pericranium. This was done to the foramen magnum and the scalp was reflected back posteriorly. Hemostasis was meticulous and electrocautery was used to incise an incision in the periosteum, pericranium, and the pericranium was then dissected back, using periosteal elevators, down to the foramen magnum. Bone wax and electrocautery was used to stop bony bleeding. Wet Ray-Tec was placed over the scalp and pericranium, and irrigation was used to moisten the area. Next, a small Marchac template was placed over the posterior cranium. On the left posterior cranium a marking pen was used to outline the Marchac template in an area with appropriate curvature and space. Burr hole was placed adjacent to Marchac template outline and with an M3 drillbit. The dura was dissected off the inner table of the skull using a B1 footplate. B1 footplate was attached to the B1 on a Midas drill. A craniotomy was fashioned to the shape of the Marchac template. This was done without complication. The Marchac template was taken off the table and handed to the plastic surgeon. Next, the M3 drillbit with the Midas drill was then used to fashion a small burr hole midline at the posterior aspect of the craniotomy just posterior to the edge of the anterior fontanelle. Burr hole was also placed midline inferior occipital region at the occipital keel. Bone wax was used to minimize bleeding from the bone. Starting from the previous craniotomy created from the Marchac template. The incision was taken up and stopped 1 cm prior to the burr hole near the anterior fontanelle of the sinus. Then, starting from the burr hole just posterior to the anterior fontanelle over the sinus, the craniotomy was extended to the right completing the left
occipital bone cutting to the Marchac template. The Bi footplate was then placed inside the midline anterior burr hole and the craniotomy was extended laterally and posteriorly to the occipital bone. It stopped approximately 1 cm before the midline inferior occipital burr hole. The same thing was performed on the left side. Starting from the midline burr hole in the inferior occipital bone, the footplate was placed protecting the dura and the craniotomy was extended to previous bone defect. At this point, the craniotomy was complete and a pericranial autograft was used to separate the dural attachments from the bone flap at the sinuses. This was done under direct visualization. There was no complication, no dural tears. FloSeal was then placed on the dura and wet Ray-Tex were placed over the FloSeal for hemostasis. The bone wax was taken off the table and, at this point, I assisted with the bone contouring and cranioplasty. After the occipital plate from the Marchac template was contoured and attached to the foramen magnum with absorbable plates, this occipital plate was then secured to a strut, which was attached to the remaining native bone just posterior to the anterior fontanelle. Using the G1 drill tip with a straight guard, burr holes were fashioned in the midline bilaterally on the strut and occipital plate. Burr holes were also fashioned anteriorly on the native bone and laterally on the parietal and occipital bones. Using a 2-0 FDS, sutures were placed in previously mentioned holes in an interlocking lattice fashion. Contoured bone was then placed in the lattice network of sutures for complete coverage of the dura in bilateral parietal regions. The patient’s calvarium was split using a 15 blade, followed by an 11 blade and osteotomes in order to create split-thickness bone graft for complete coverage. The pericranial flap was then taken and reflected over the cranioplasty, secured with 4-0 Nurolon. The patient was irrigated profusely and the skin was reflected back and gales was closed with 3-0 Vicryl followed by a running locking skin closure with a 4-0 chromic gut. The patient tolerated the surgery well without complication and was transferred to the ICU in stable condition.

**DICTATING PHYSICIAN:**

**SURGEON:**
PREOPERATIVE DIAGNOSIS: Severe sagittal craniosynostosis

POSTOPERATIVE DIAGNOSIS: Same as preoperative

PROCEDURE PERFORMED:

Preoperatively, a CT scan showed a complete fusion of the sagittal suture with clinical evidence of occipital and frontal bossing. The patient had also temporal narrowing and bulging of the anterior fontanelle.

The patient was seen in the presence of her parents and long preoperative consultation was performed. The procedure risks and alternatives have been explained to the parents including strip craniectomy and total vault remodeling. It was explained to the parents and all questions answered. The preoperative consultation, it has been done for both first separately and then together for the second time...

DESCRIPTION OF PROCEDURE: The patient was brought to the operating room and same time was taken to place the central line and a Foley. We started the procedure around 4:15 in the afternoon. The patient was positioned prone on the operative table and the face was positioned on the Mayfield headrest. The eyes were protected with tegaderm and vetrab and extra padding was applied around the face and all decubitus areas including the shoulders, arms, hips and knees. The patient was prepped in the usual sterile fashion and a coronal incision was marked from the right to the left of the scalp crossing the apex of the skull.

6 ml of 1:100,000 epinephrine was injected at the surgical incision site.

After that, we proceeded to the elevation first of the scalp flap and then of the pericranial flap with periosteal elevators. Hemostasis with bone wax and coagulation was also done. The pericranial flap was raised anterior to posterior and was left intact and irrigated.

After that, attention was placed to the temporal area to harvest to the new occipital bone on a Marchac template. The harvesting of the bone was done first with the burr holes placed one posteriorly behind the anterior fontanelle and one to the level of the parietal area where the Marchac bone template was placed. The rest of the craniotomy included the occiput and the parietal area on the contralateral side. No major bleeding was encountered and careful hemostasis was achieved.

On the back table, the harvested bone was split harvesting the autogenous autograft for a dimension of 20 x 20 cm. The cranioplasty was performed positioning the new occipital bone harvested from the parietal area over the Marchac template and then the new occipital bone was put in place. A 11 cm strip of bone was taken from the harvested bone and secured with resorbable plates and screws to the anterior fontanelle area and to the new occipital bone.

In this way the anterior-posterior diameter has been narrowed.

We then continued the cranioplasty placing 3-0 PDS suture to the parietal and occipital bone. The parietal and occipital harvested bone was remodeled with cortical cut on the back table after scraping and harvesting the autogenous graft. The harvested bone was straightened. The harvested bone was positioned in the bilateral parietal areas and held in place with 3-0 PDS sutures. Small pieces of bone graft were also harvested to fill all the gaps. At the end of the procedure, there was no bleeding and then we proceeded to close the pericranial flap over the reconstructed cranial vault with 4-0 PDS sutures and we were able to close completely. The complex closure was done with 3-0 Vicryl suture at the level of the galea layer and then with subcutaneous stitches with 3-0 Vicryl and then skin was closed with 4-0 chromic. A sterile dressing was applied with xeroform, bacitracin, gauze and kerlex. The patient tolerated the procedure well and was taken to the ICU.