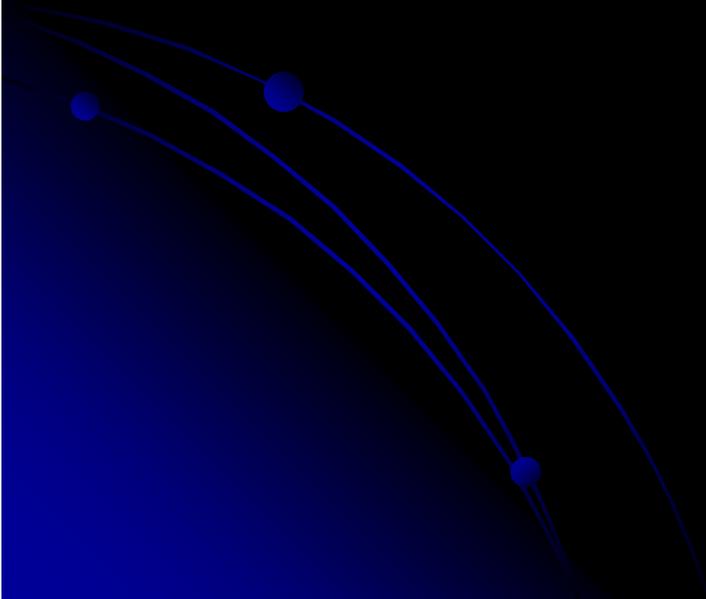




**INTRACRANIAL SUPPURATION, ENT AND  
THE NEUROSURGEON**

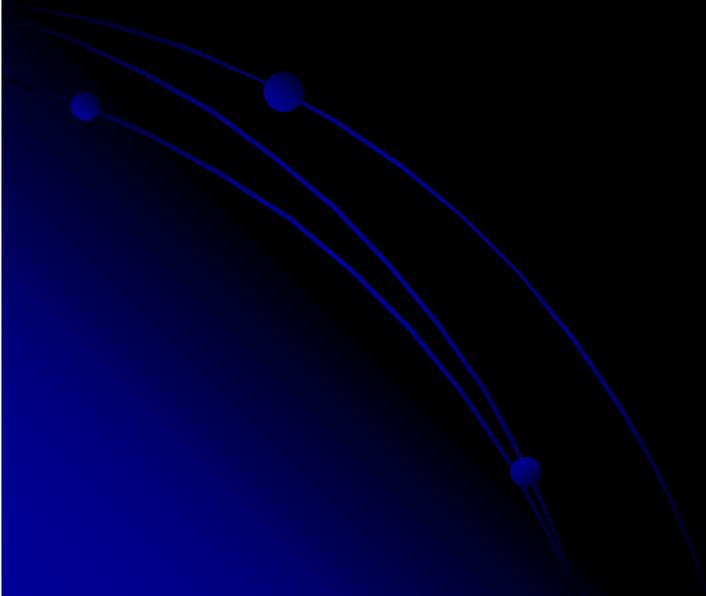
**Dr H. BOODHOO**  
**F.C.S**  
**Consultant Neurosurgeon**

# PATIENT 1



# PATIENT PROFILE

**8 yrs old male**



# HISTORY

- **Fever**
  - **Headache**
  - **Neck stiffness (day 3)**
- 

# ON EXAMINATION

## General physical examination

- Sick looking
- Extremely thin
- Unusually quiet
- Wt. 16kgs
- P: 92/min T/°C: 37.6 RR: 14/min
- ENT: nasal secretions ++ rt.>lt.

# On Examination (cont)

## Systemic examination

- **CVS**
- **Chest**
- **GIT**



**Normal**

# On Examination (cont)

## CNS examination

- GCS: E<sub>4</sub>M<sub>5</sub>V<sub>6</sub>
- Normal Higher mental function
- Mild neck stiffness
- No cerebellar signs
- Cranial nerve examination: normal
- Fundoscopy: no papilledema

# CT BRAIN (contrast)

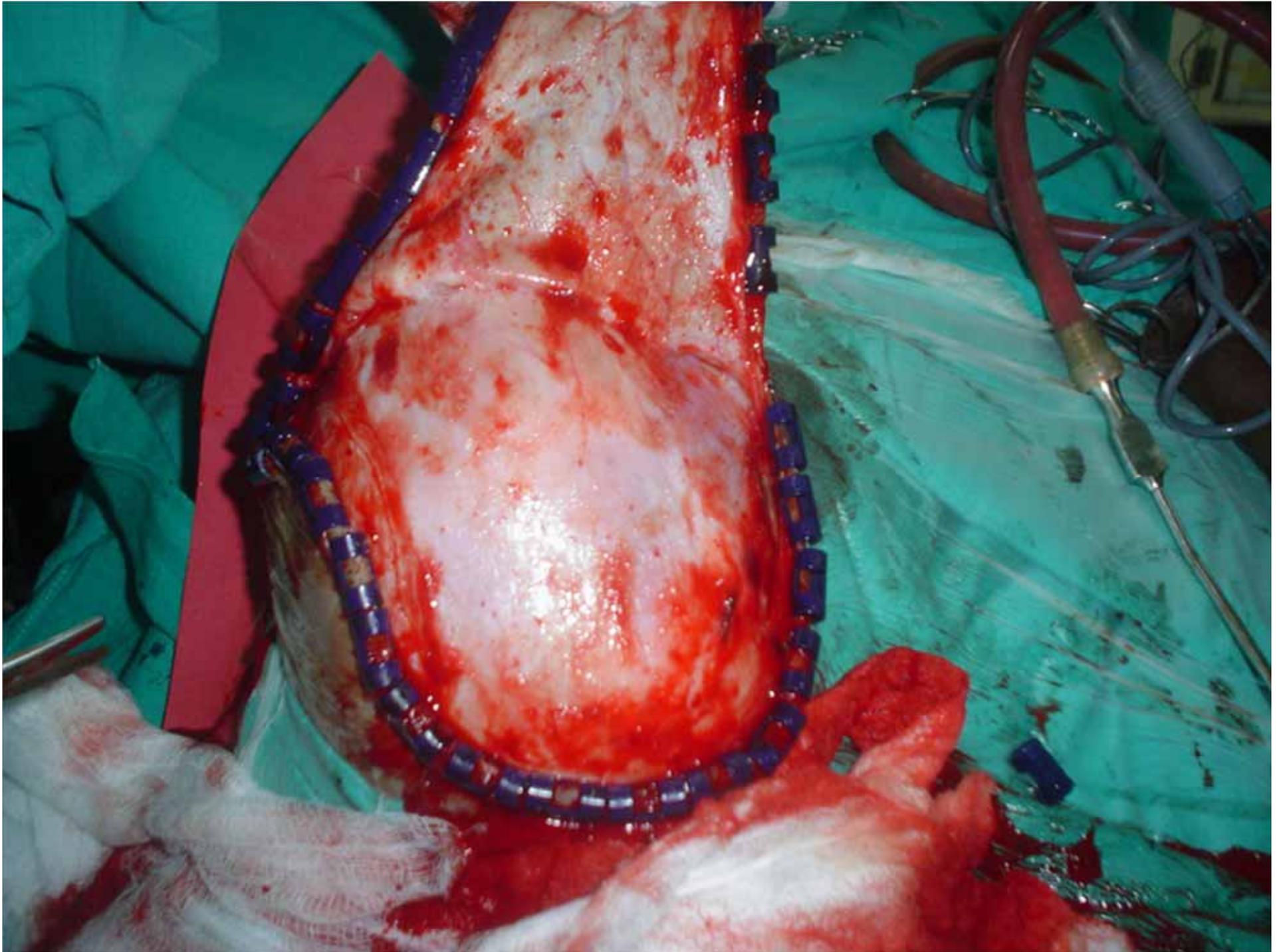
- Pansinusitis
  - Right frontal brain abscess
  - Right fronto temporo parietal subdural empyema
  - Referred urgently to neurosurgical unit, Victoria Hospital
- 

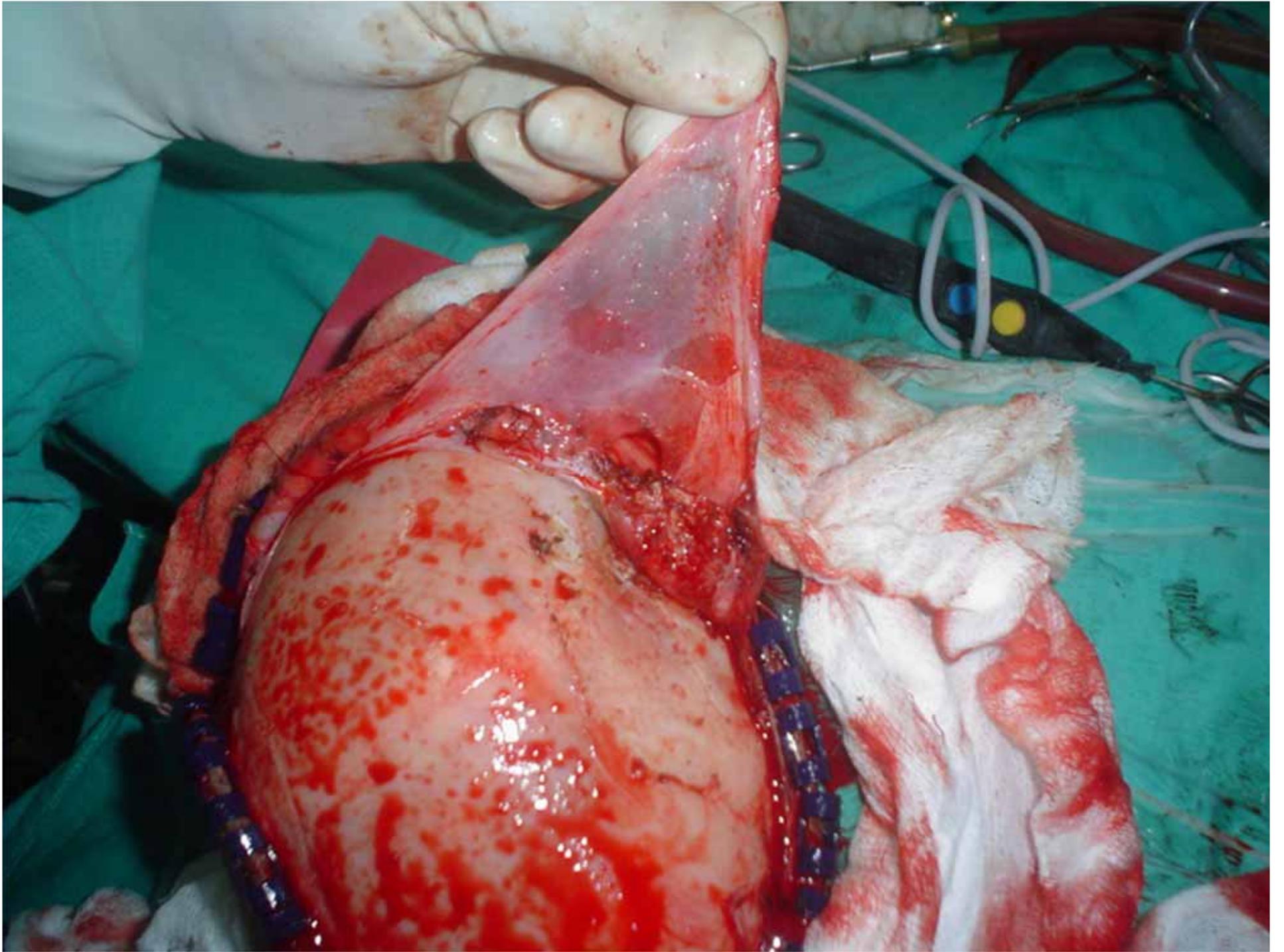
# MANAGEMENT

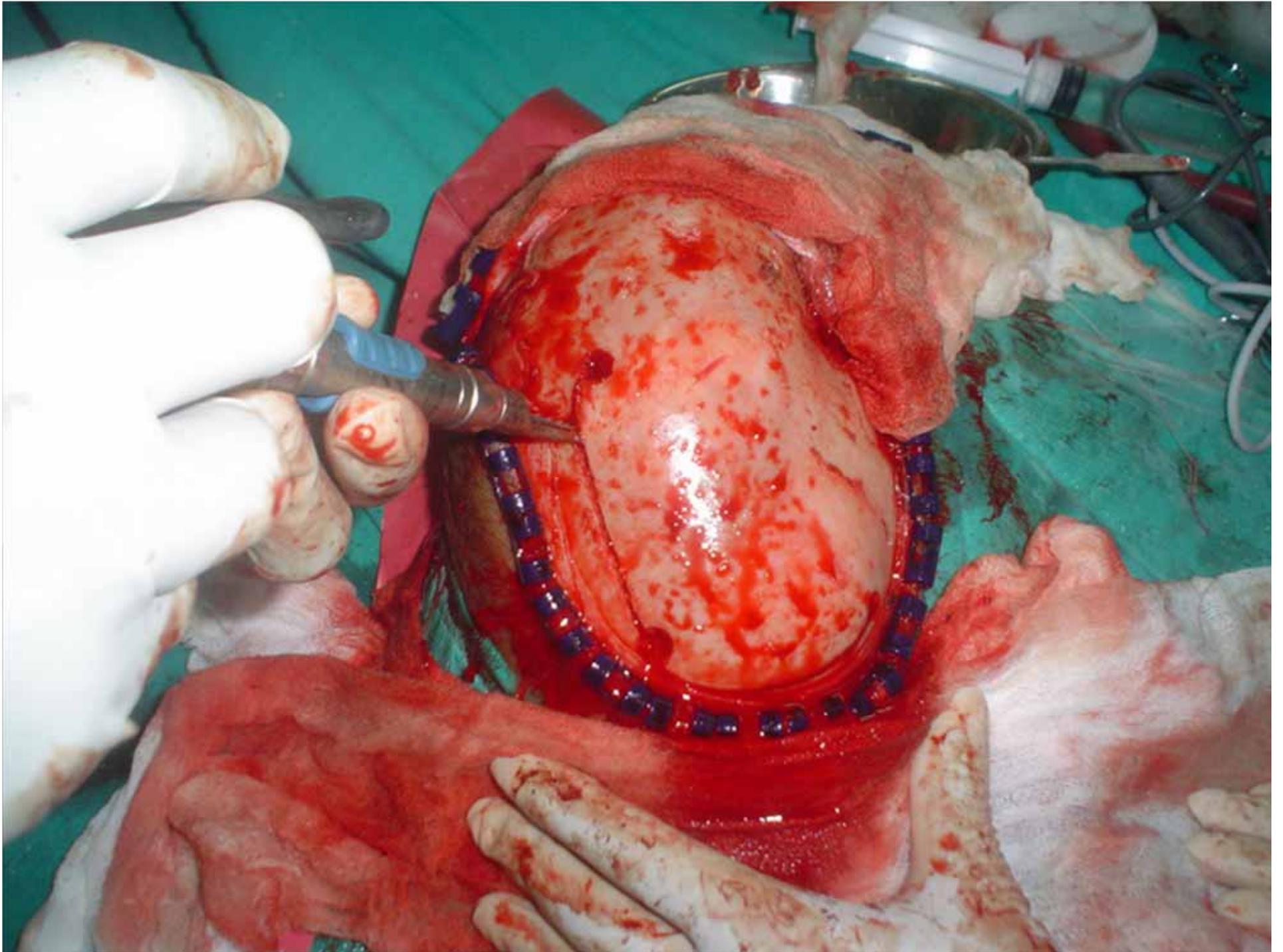
- Admitted
  - IV antibiotic therapy
  - Urgent referral to E.N.T Hospital
  - BAWO- Pus +++ right maxillary sinus
  - Back to VH next day
- 

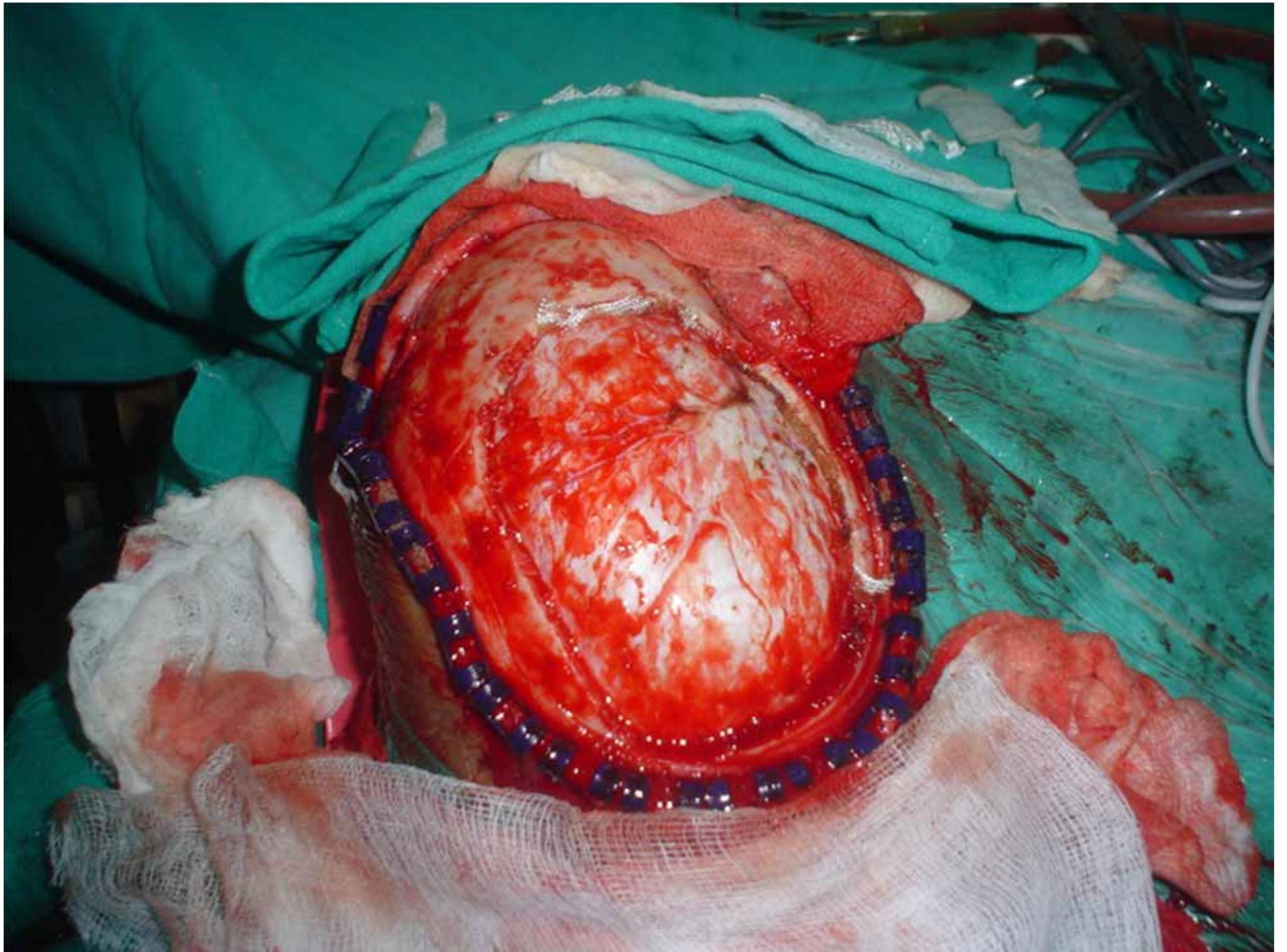
# MANAGEMENT (cont)

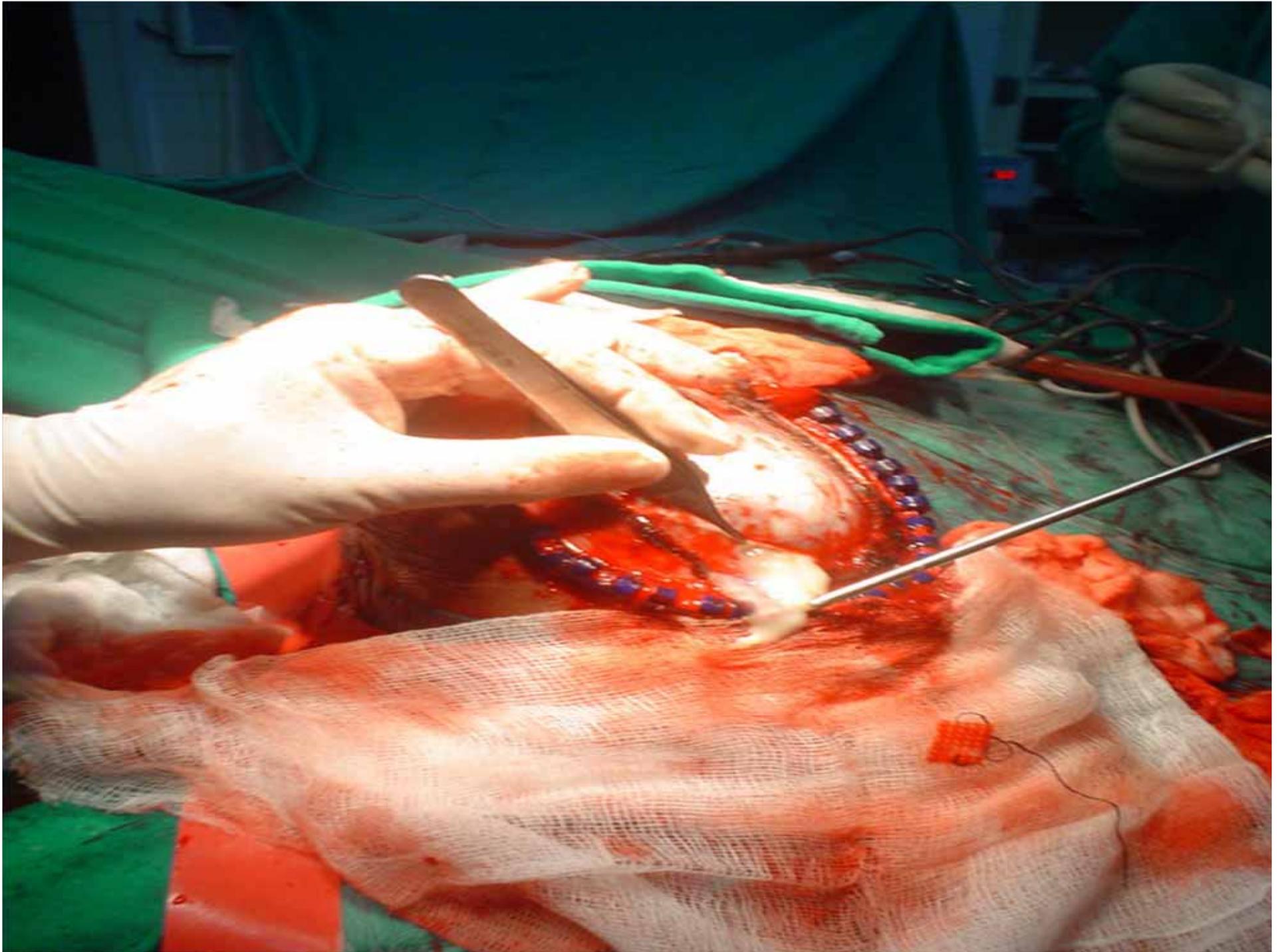
- 25/06/08: Cranial surgery
  1. Right small frontal craniotomy for drainage of brain abscess
  2. Wide temporoparietal craniotomy for evacuation of subdural empyema
- Nursed in ICU
- IV antibiotics/ antiepileptic

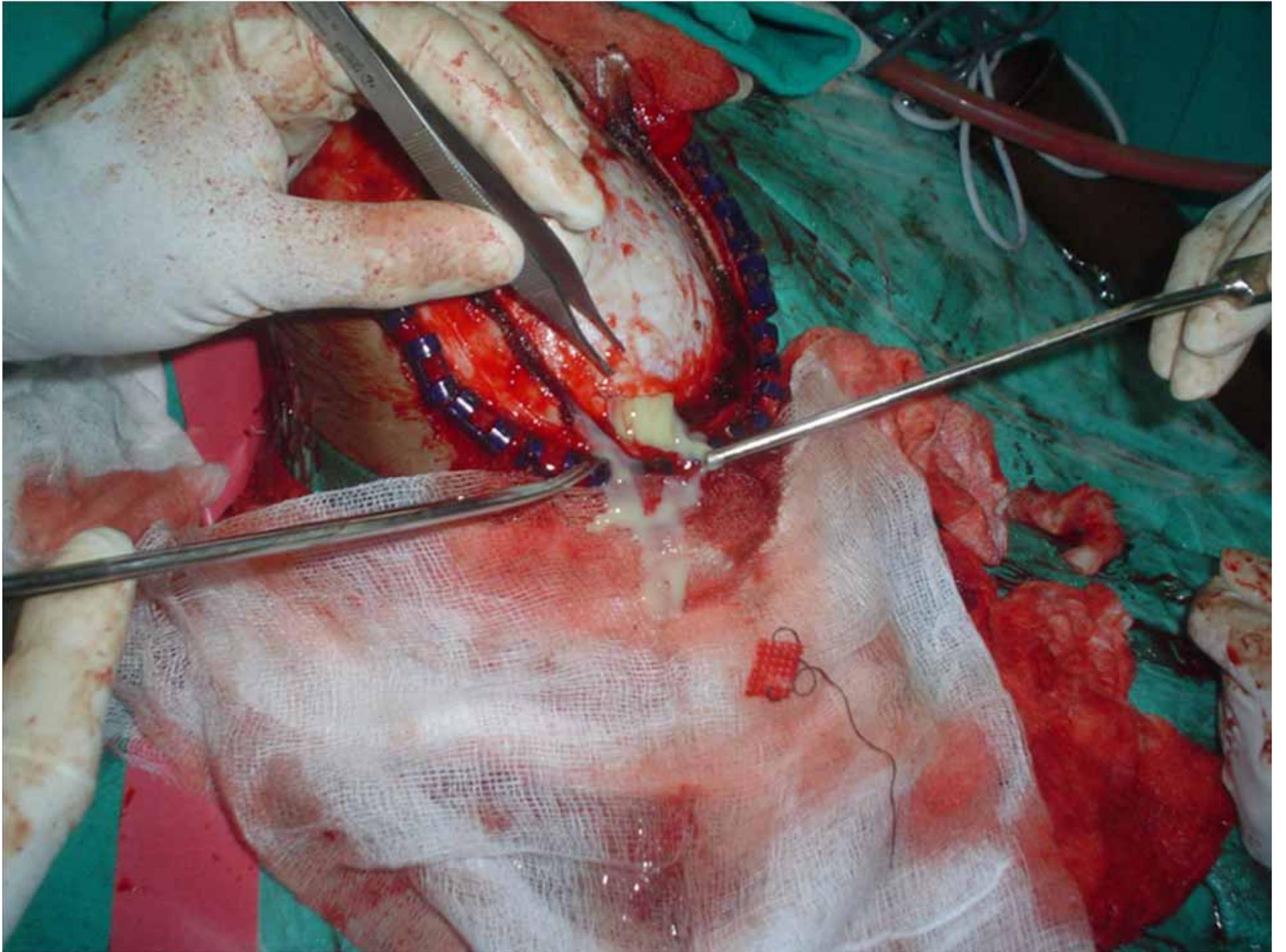




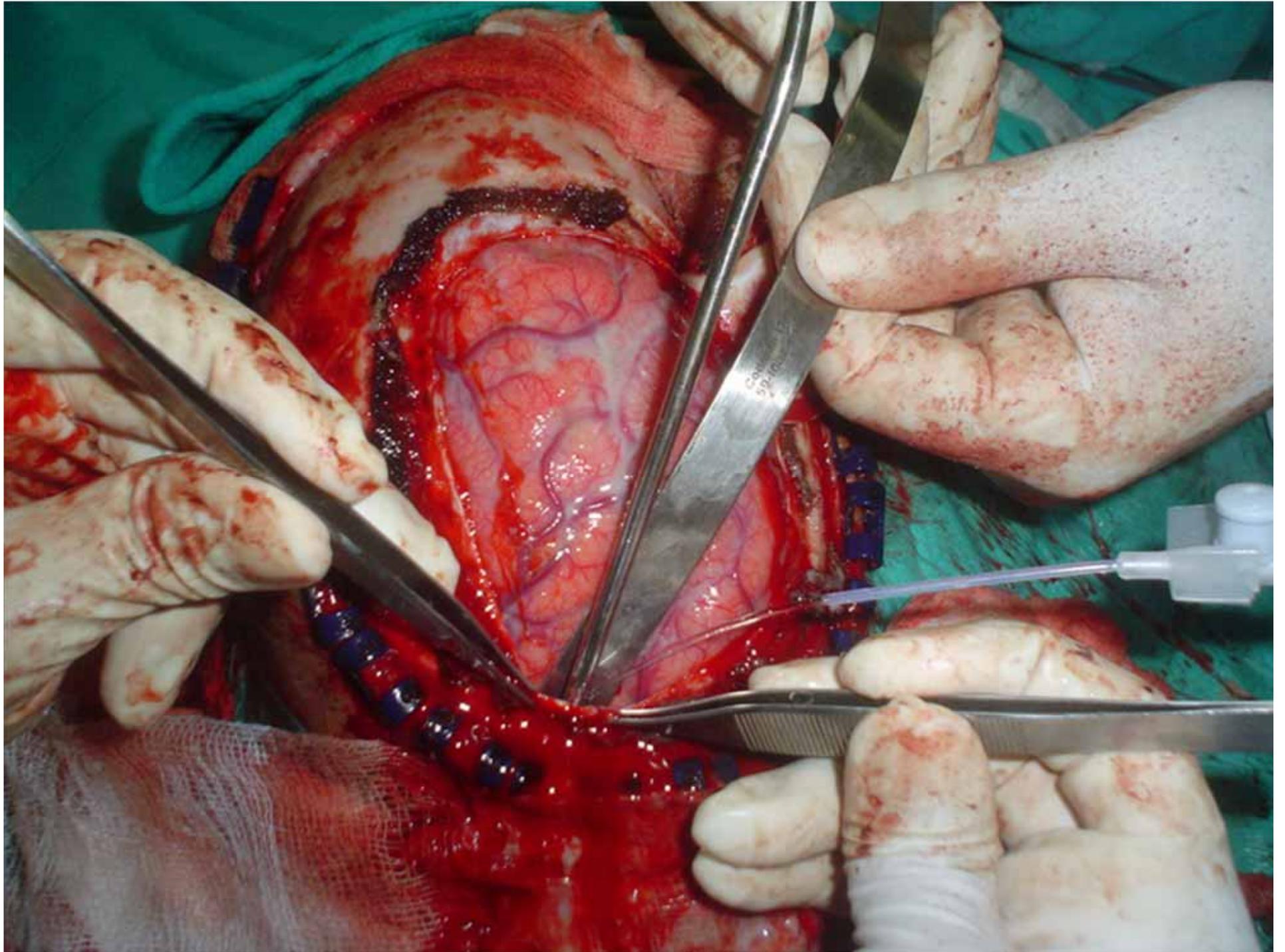


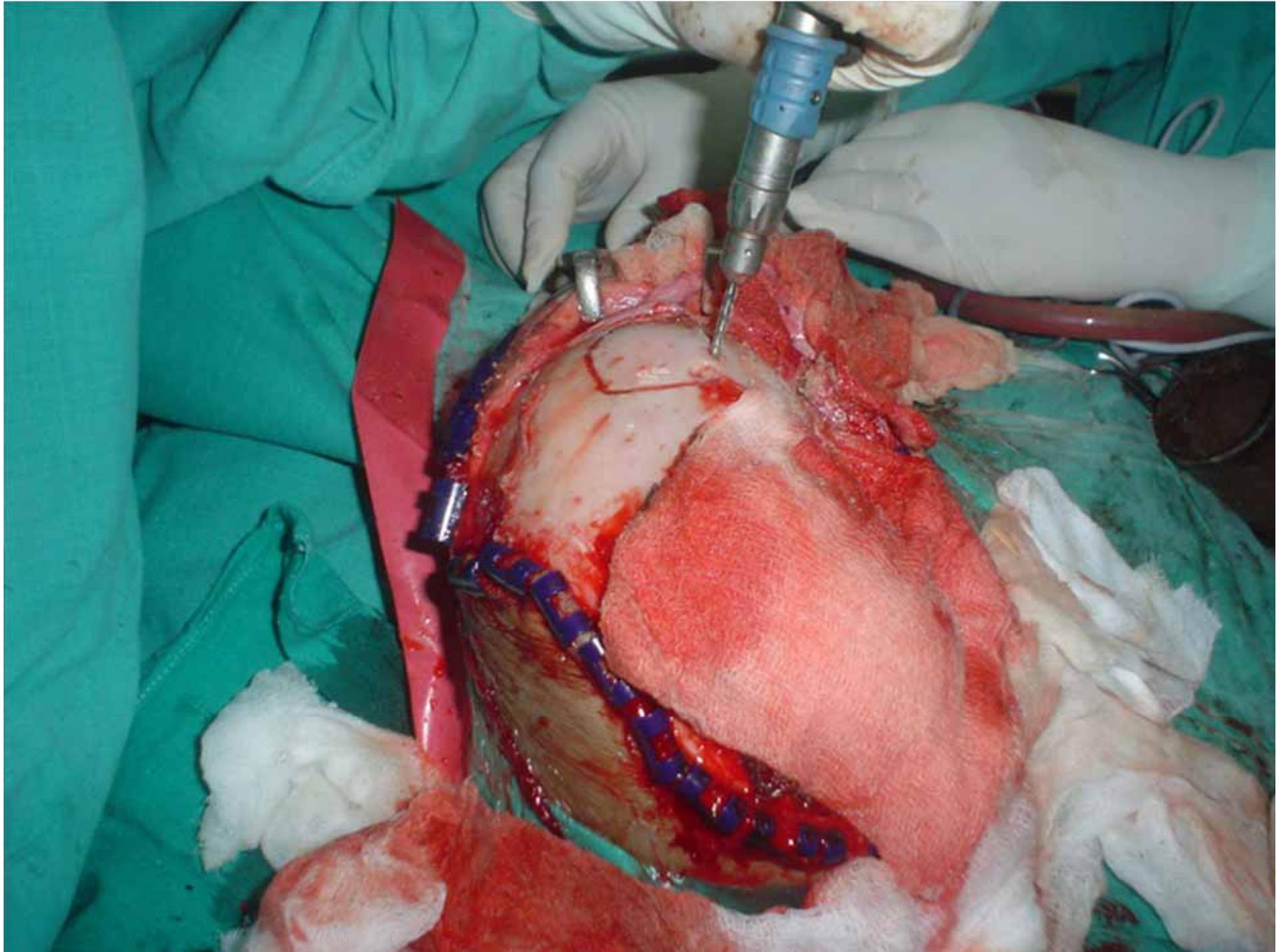


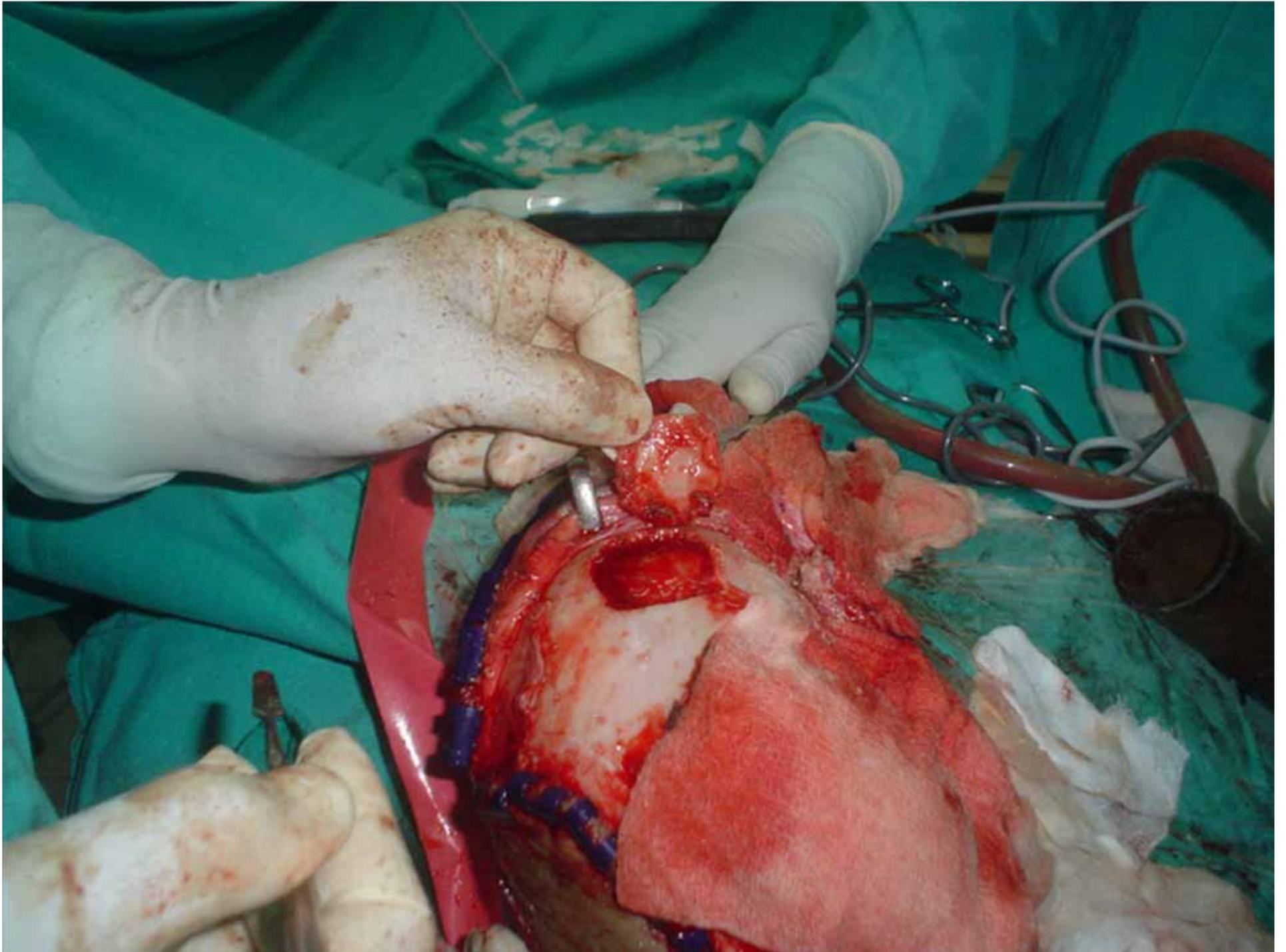


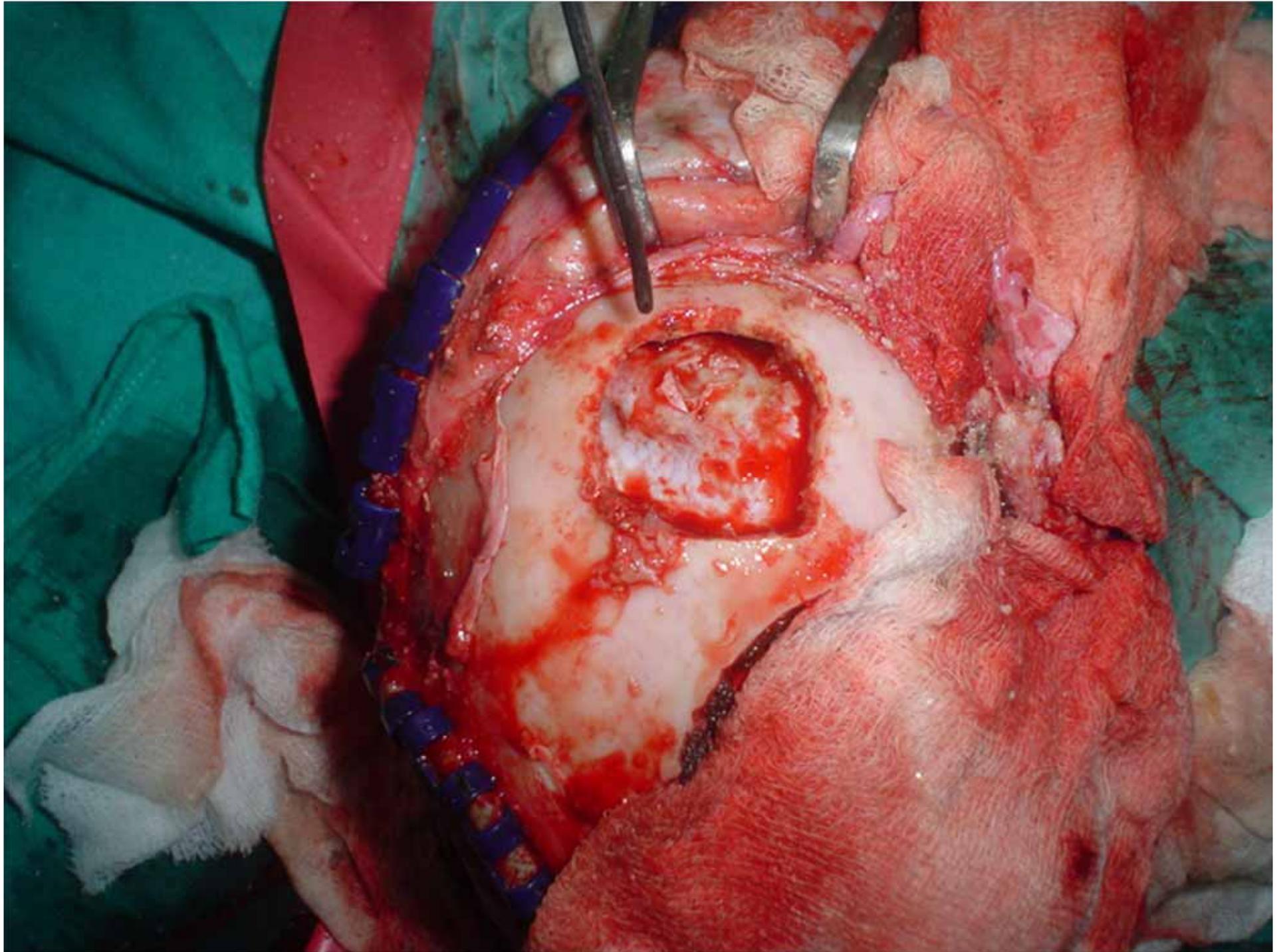


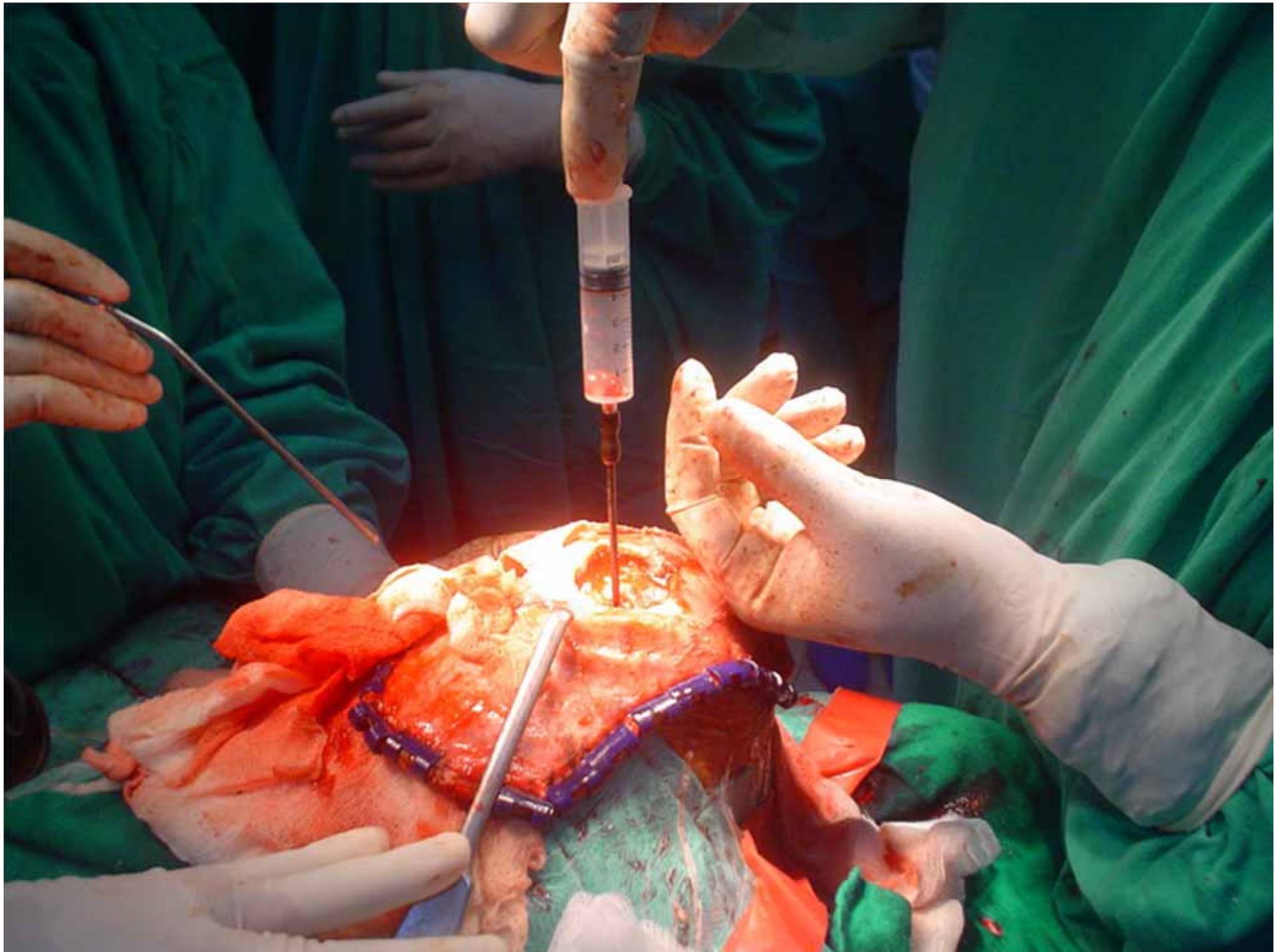




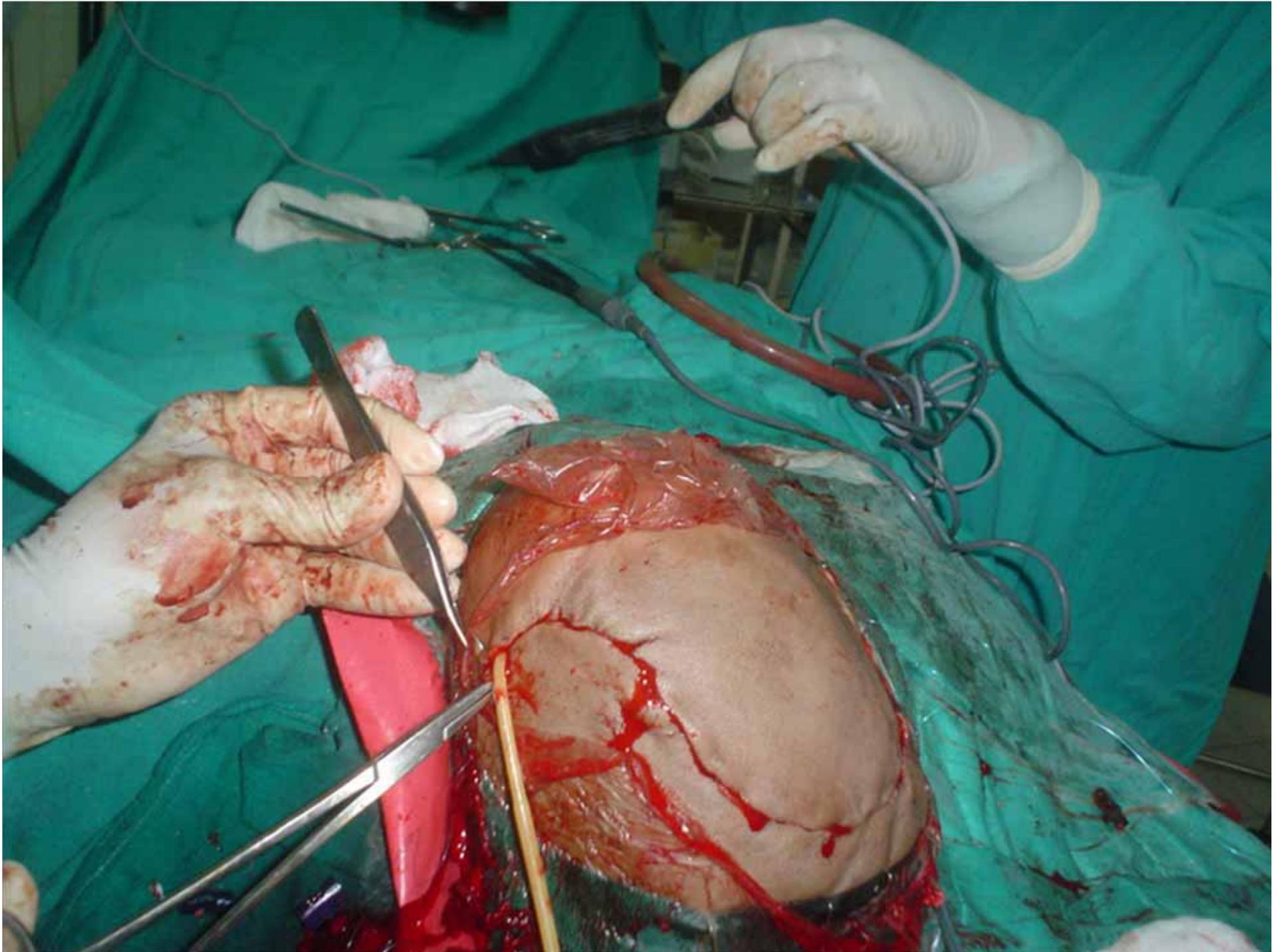












# POST-OP

- Marked improvement in clinical condition
- Uncomplicated recovery phase
- Lab culture report: sterile
- Referred to nutritionist- high protein diet
- Progress CT brain showed good evacuation of brain abscess & empyema, no features of infarct or  $\uparrow$  ICP
- Continued on IV antibiotics for two weeks

# Patient 2

- 16 years old Male
- Comores Island
- c/o Chronic discharge Left ear (untreated)
- Headache, confusion, fever
- GCS10/15 (E3M5V2)
- Spastic, neck stiffness

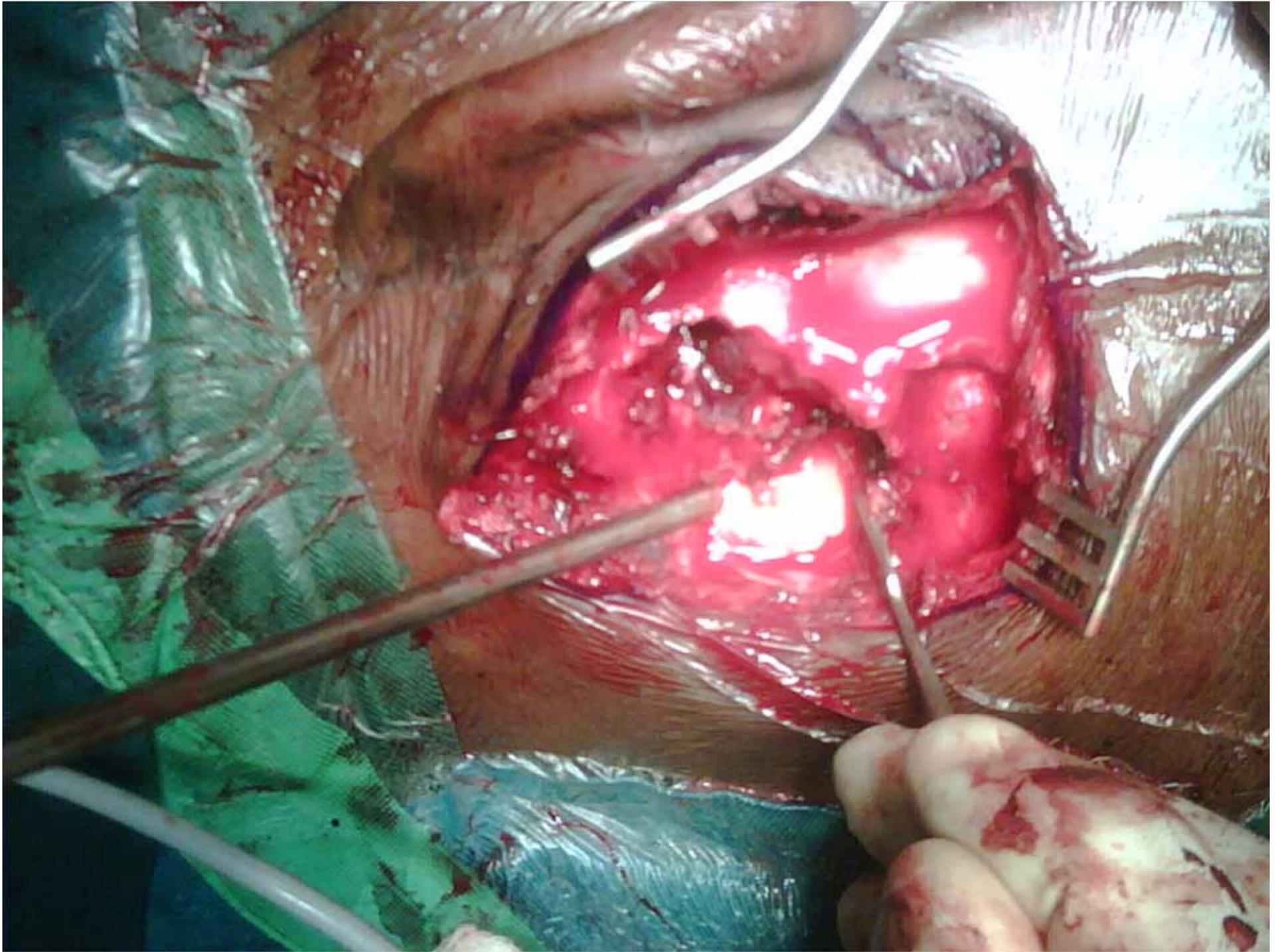
- **Emergency combined surgical treatment**

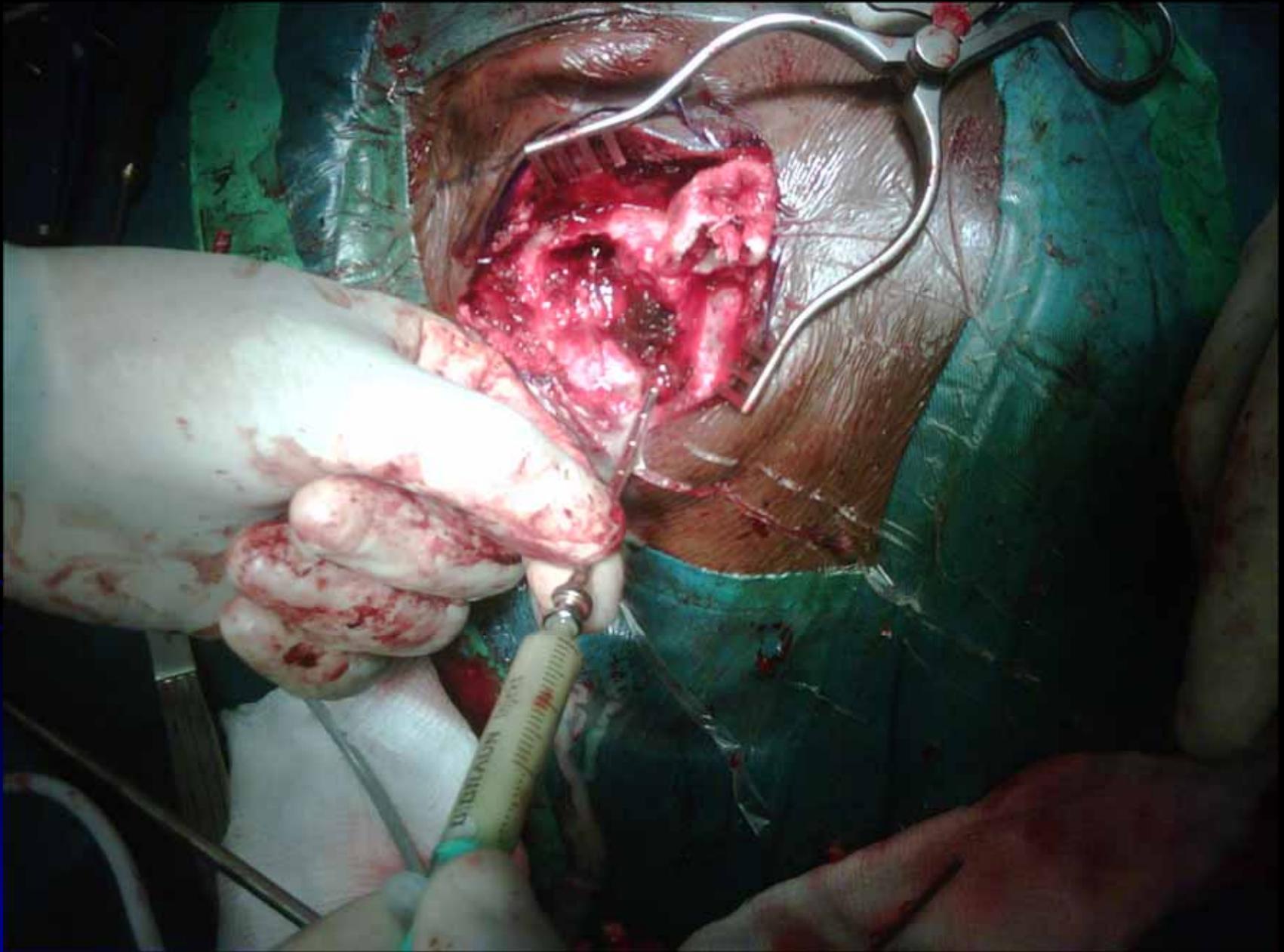
- **Radical mastoidectomy and posterior fossa craniectomy**

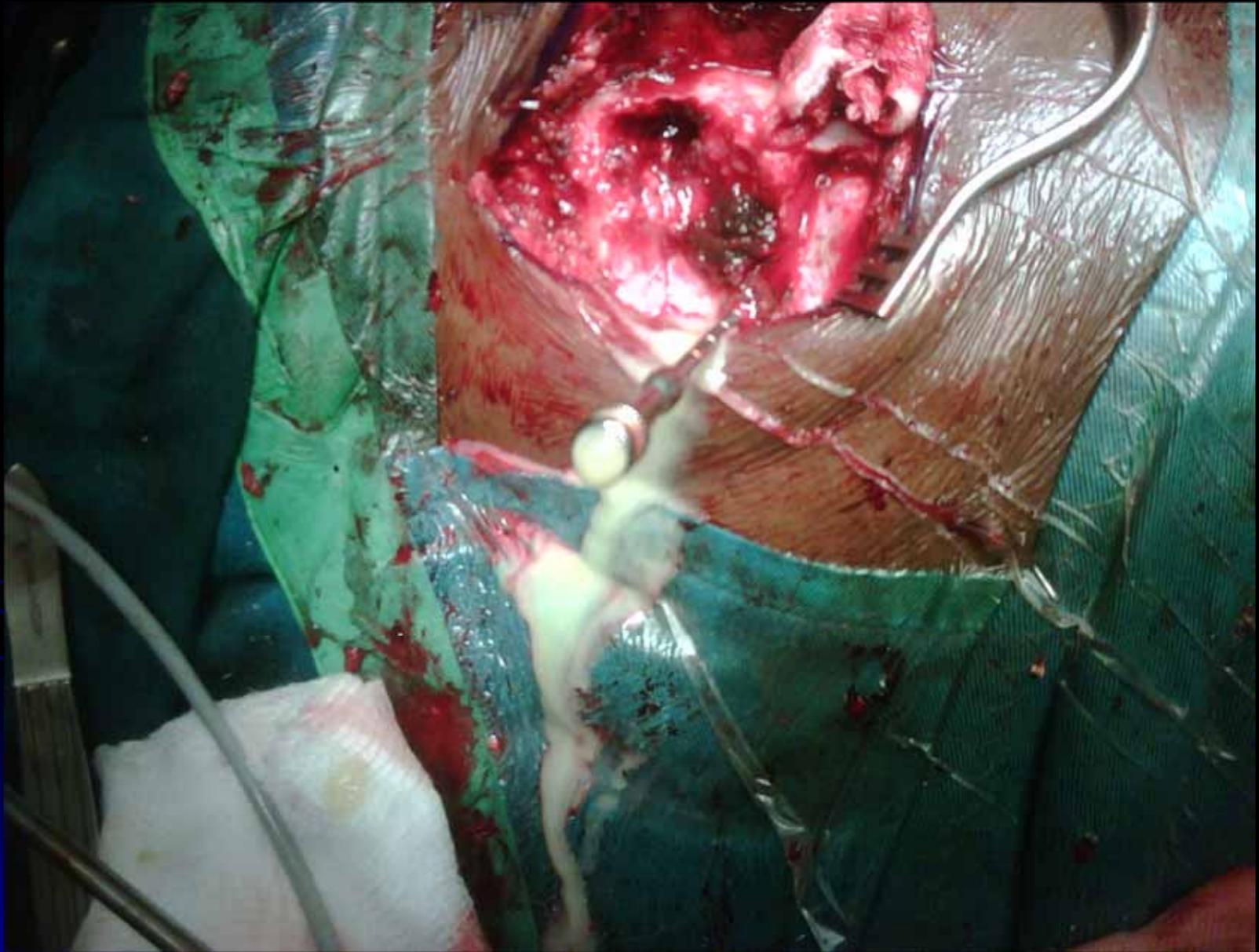


EAR









# PATIENT 3

# Case 3

## Patient profile

- **NAME** : A.K
- **AGE/SEX** : 20 years/male
- **OCCUPATION** : University student
- **D.O.A** : ENT- 20/05/10  
VH - 21/05/10

# AT ENT hospital

- C/o swelling with boil over the nose
- Signed DAMA on antibiotics

- Attended ENT Hospital with headache
- Increased swelling and redness over nose
- Patient admitted and put on I.V antibiotics- amoxyl, cloxacillin

# URGENT TRANSFER TO VH

- Next morning, altered level of consciousness with severe head ache
- Urgent referral to VH the same day for CT scan brain

# GENERAL PHYSICAL EXAMINATION

- GCS – E ( closed) M5 V3
- Neck stiffness
- Proptosis right eye

- One furuncle over nasal tip with swelling
- Redness over nose with burst boil over tip of nose

- Bilateral periorbital edema
- Mild proptosis right eye
- Chemosis B/L eyes

# Systemic Examination

- CVS

- R/S

- GIT

} within normal limits

# SYSTEMIC EXAMINATION(contd)

- CNS examination:

GCS - E5 M5 V3

Asymmetry of face

Multiple cranial nerves palsy

(3<sup>rd</sup> , 4<sup>th</sup> , 6<sup>th</sup> and lower cranial nerves )

# INVESTIGATION

- URGENT CT SCAN REPORT OF BRAIN+PNS(CONTRAST)
- Evidence of left cavernous sinus thrombosis with generalised brain edema
- Mild proptosis left eye

# MANAGEMENT

- ICU admission in VH
- Anticoagulants - HEPARIN
- IV antibiotics- AMIKACIN, VANCOMYCIN
- MANNITOL
- Ventilation

- Deterioration of general condition
- Drop in GCS
- Urgent CT scan brain repeated

# CT scan brain report

- Infarct both cerebellar lobes, brainstem, thalamus
- Cerebral edema

# MANAGEMENT

- Maximum therapeutic treatment
- Medical therapy continued
- Coagulation profile monitored daily

# COMPLICATIONS

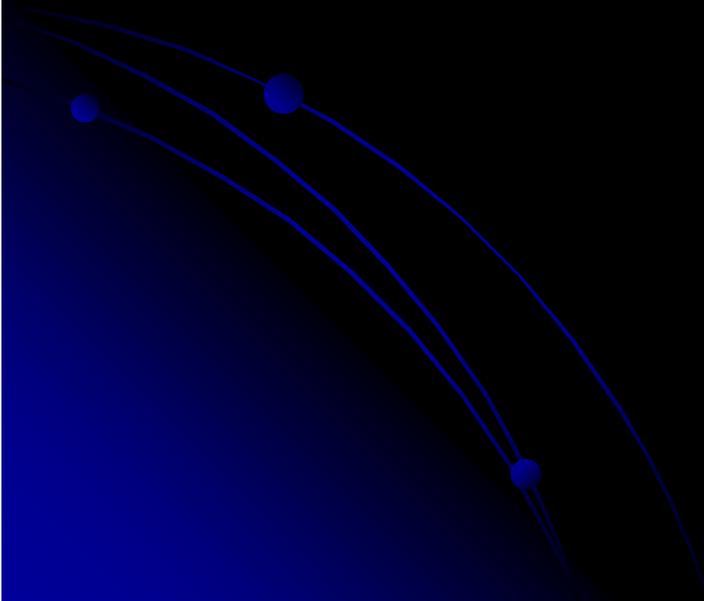
- GIT bleeding
- Hyponatremia
- Polyuria

**Diabetes insipidus**

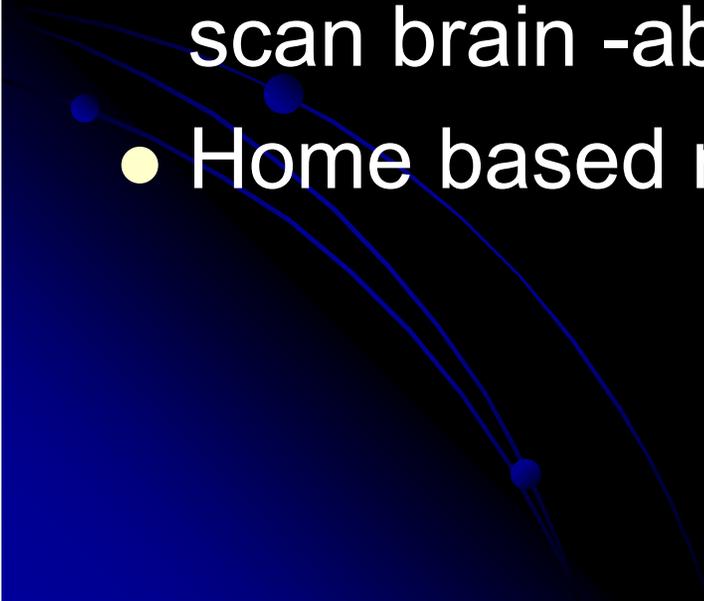
- Condition further deteriorated
- Both pupils dilated and unreactive
- Brainstem dysfunction – absent gag and corneal reflex
- Date of death : 26/05/10

# Patient 4

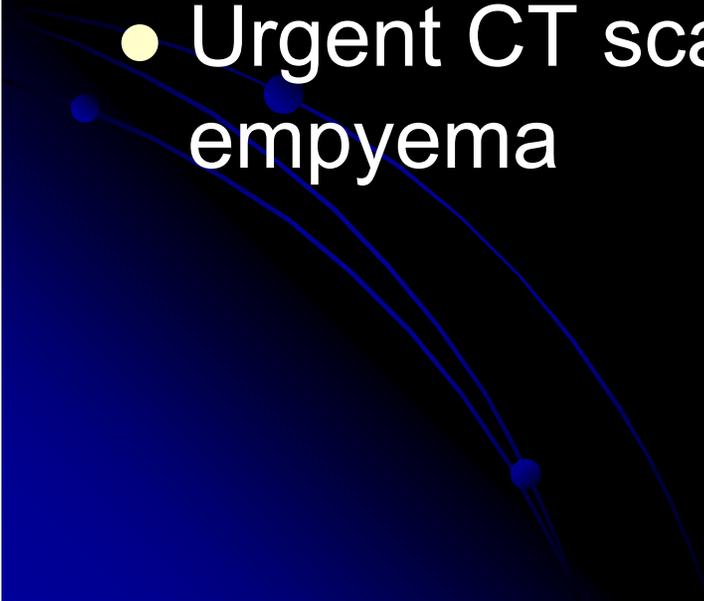
- Male, 27 yrs
- Serious dental carries
- Headache
- Visual deterioration



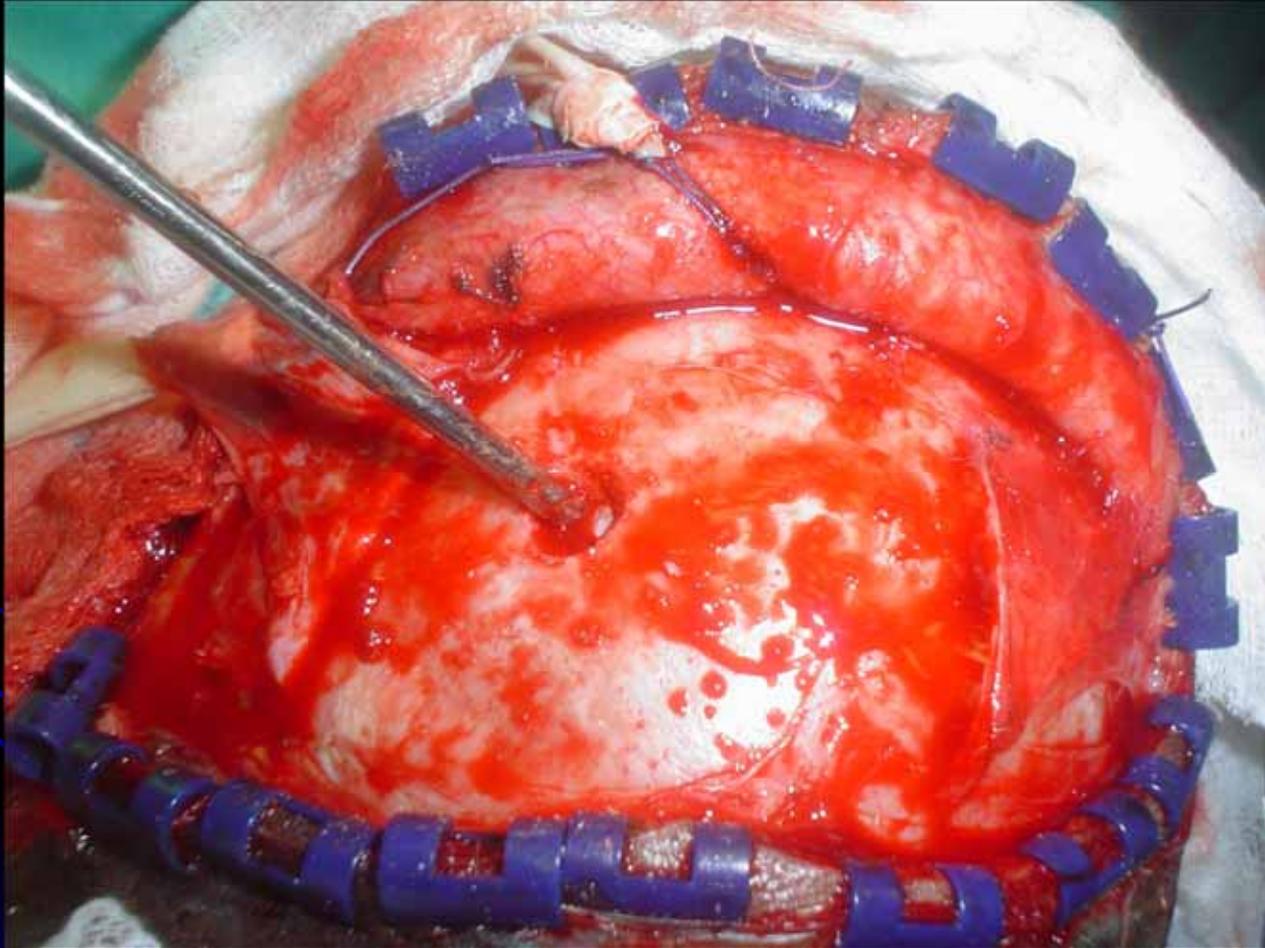
- HIV negative
- Tooth extraction
- IV antibiotics
- Cardiac murmur (one week later)
- Cardiac echo-Severe vegetation on valve
- Blood culture- *Strep melleri*

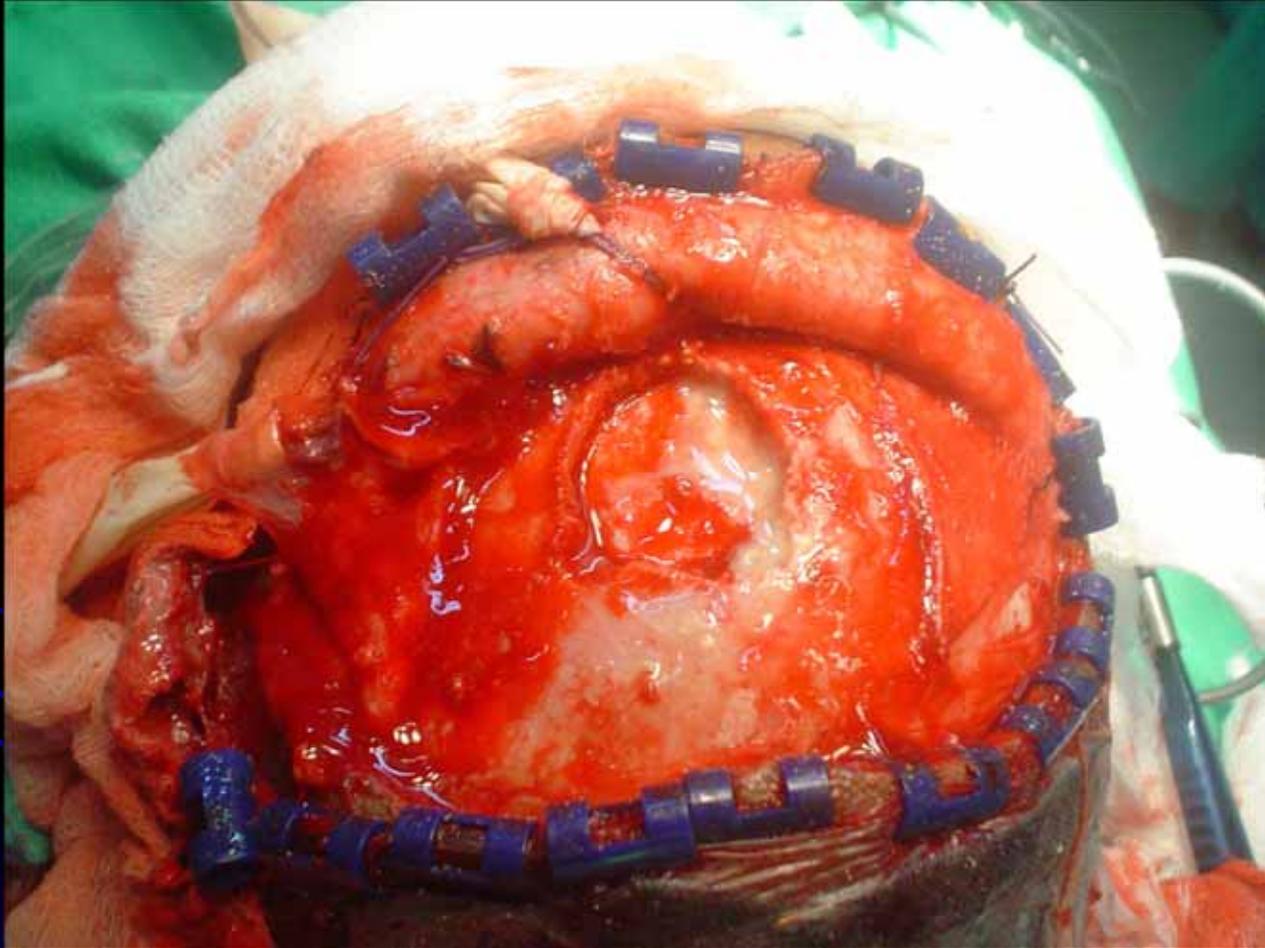
- Long term stay in hospital
  - Right sided Hemiparesis
  - Seizures
  - Follow up CT scan brain(resolution of CT scan brain -abcesses)
  - Home based rehabilitation
- 

# Patient 5

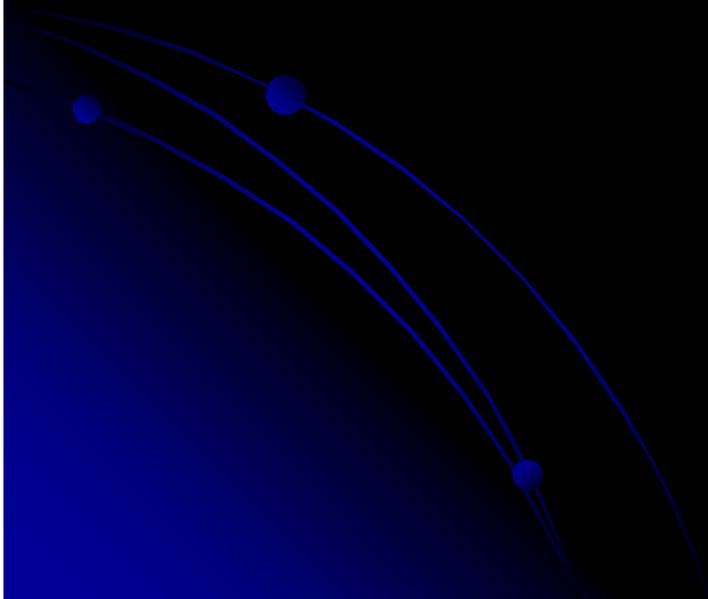
- 13 yr old male patient from ENT treated for Pansinusitis
  - Altered sensorium
  - Persistent headache
  - Urgent CT scan (Left frontal, extradural empyema)
- 







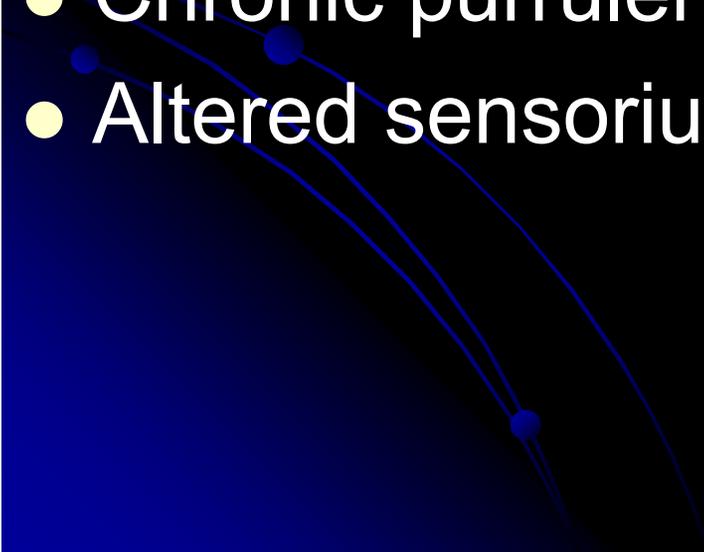
# Patient 6



# Patient 6

## UNCOMMON COMPLICATION OF A COMMON CONDITION

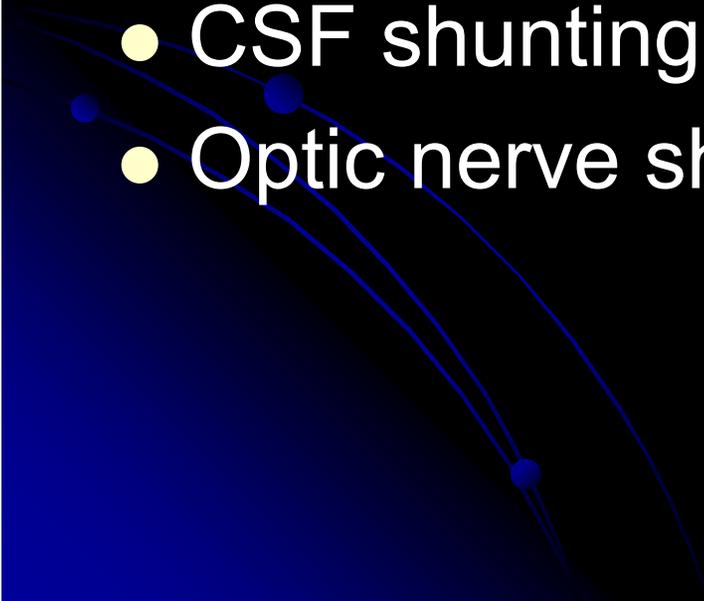
### Otitic hydrocephalus

- Male: 40 yrs old
  - Chronic purulent discharge from right ear
  - Altered sensorium
- 

# OTITIC HYDROCEPHALUS

- 1931 Symond's
- Acute otitis media with hydrocephalus
- Thrombosis of transverse sinus, superior sagittal sinus
- Hypercoagulable states, cyanotic heart disease, oral contraceptives, polycytemia, haemoglobinopathy, leukemia, SLE

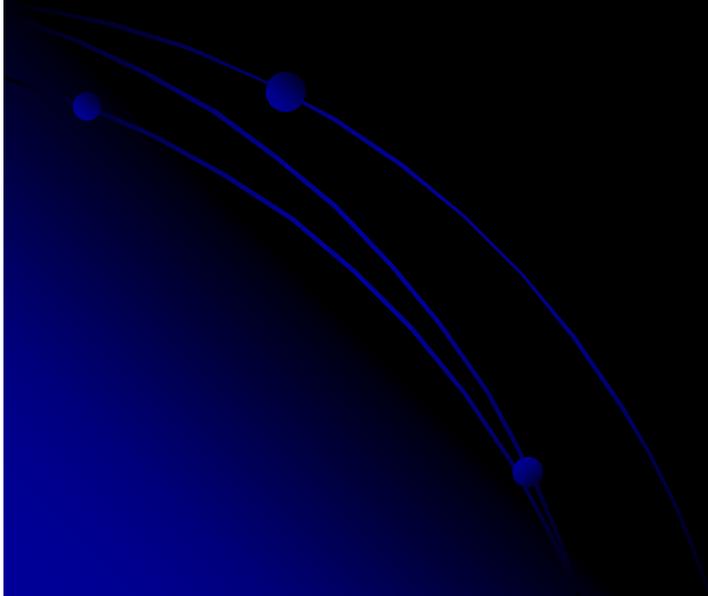
# INVESTIGATIONS & TREATMENT

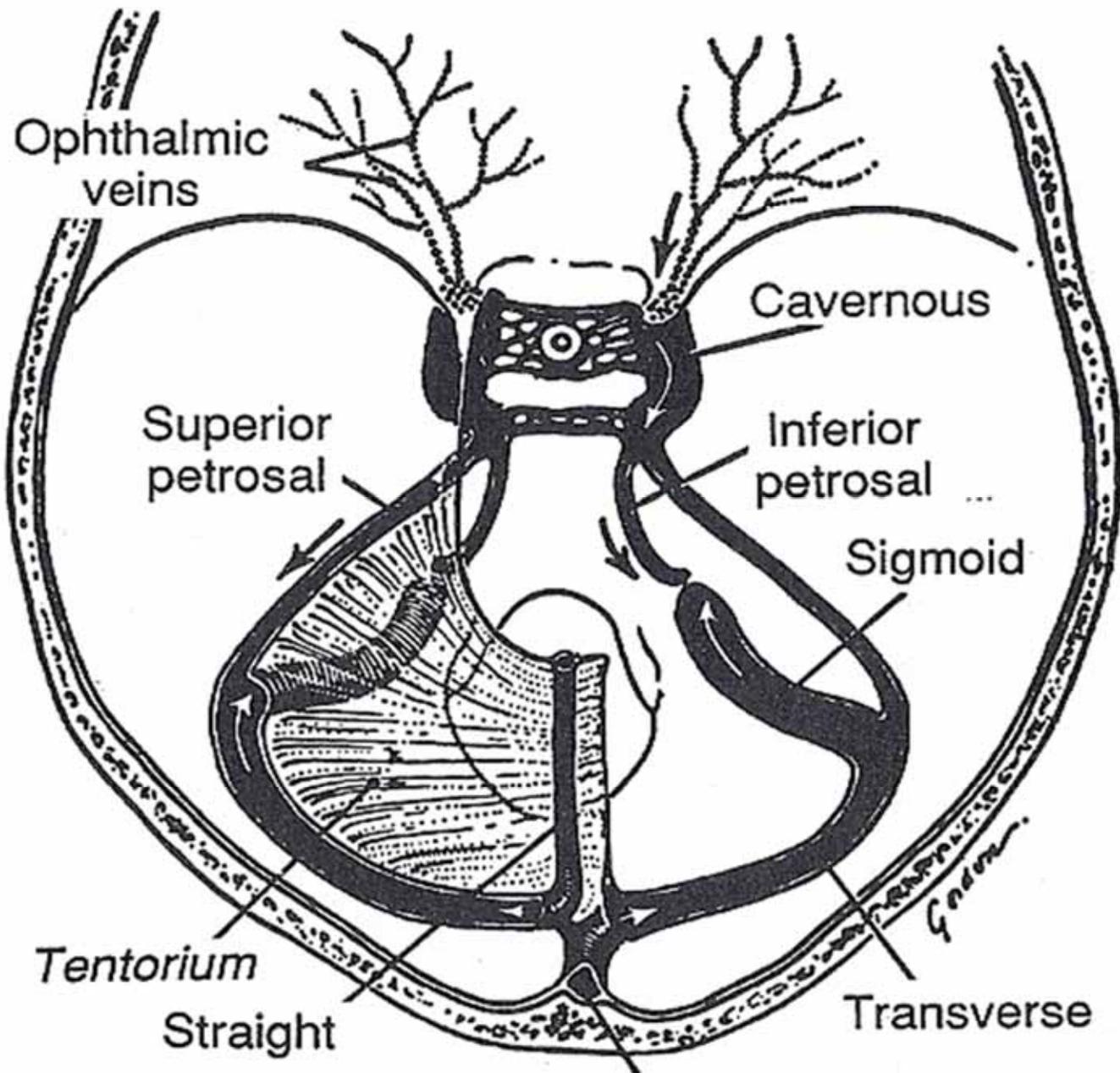
- MRI / MRV
  - Steroids, Antibiotics, mannitol, acetazolamide, anticoagulants
  - Lumbar puncture
  - CSF shunting
  - Optic nerve sheath fenestration
- 

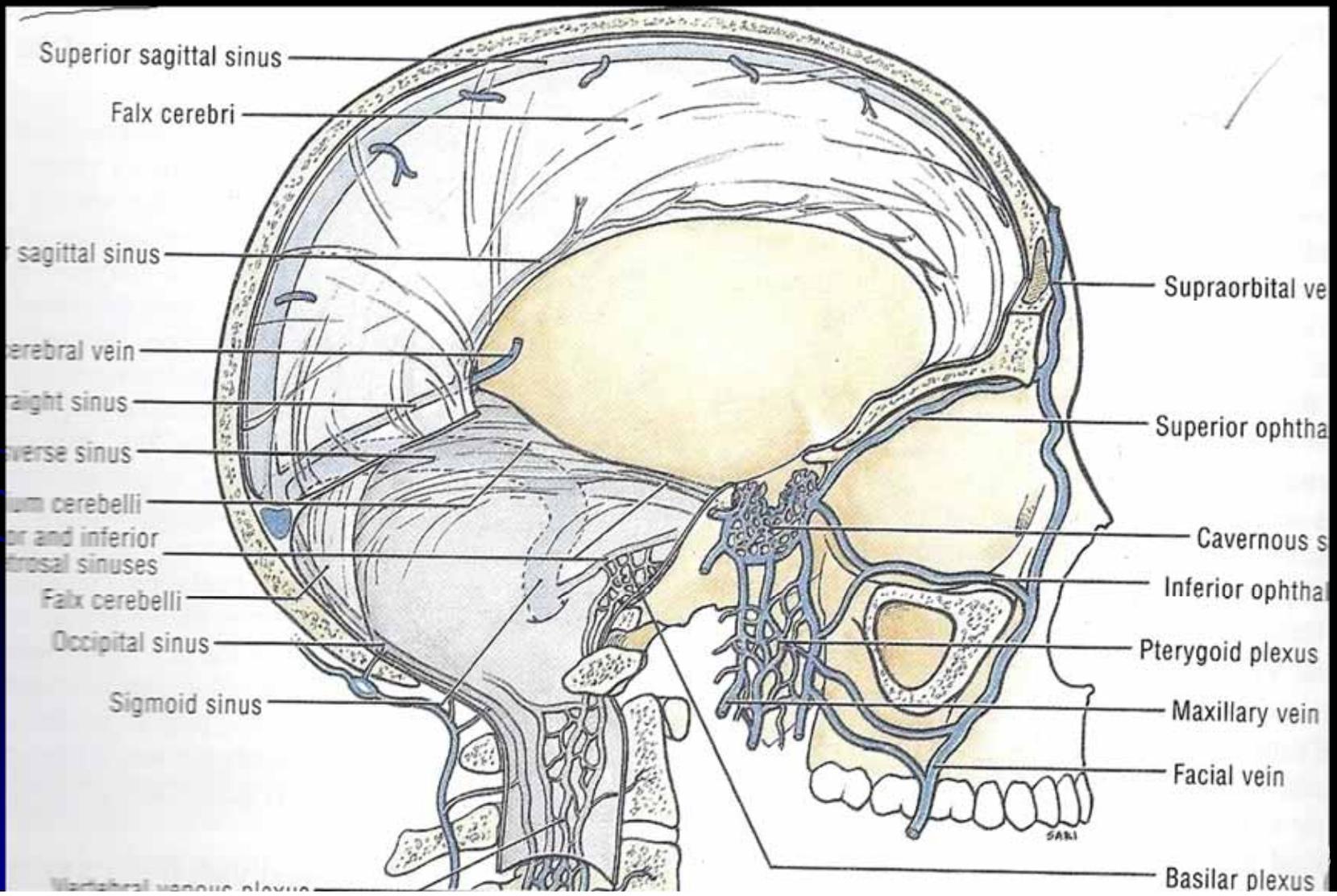
- OTITIC HYDROCEPHALUS can result in permanent vision loss and chronic headache

Although OTITIS MEDIA is a benign illness, clinicians must be alert to this complication

# CAVERNOUS SINUS THROMBOSIS







Superior sagittal sinus

Falx cerebri

Sagittal sinus

Cerebral vein

Straight sinus

Transverse sinus

Sinus cerebelli

Superior and inferior petrosal sinuses

Falx cerebelli

Occipital sinus

Sigmoid sinus

Supraorbital vein

Superior ophthalmic vein

Cavernous sinus

Inferior ophthalmic vein

Pterygoid plexus

Maxillary vein

Facial vein

Basilar plexus

Vertebral venous plexus

SAMI

# ANATOMY

- Posterior intercavernous sinus superior and inferior petrosal sinuses
- Receive blood from superior and inferior ophthalmic vein
- They drain posteriorly and inferiorly through the superior and inferior petrosal sinuses and pterygoid plexuses

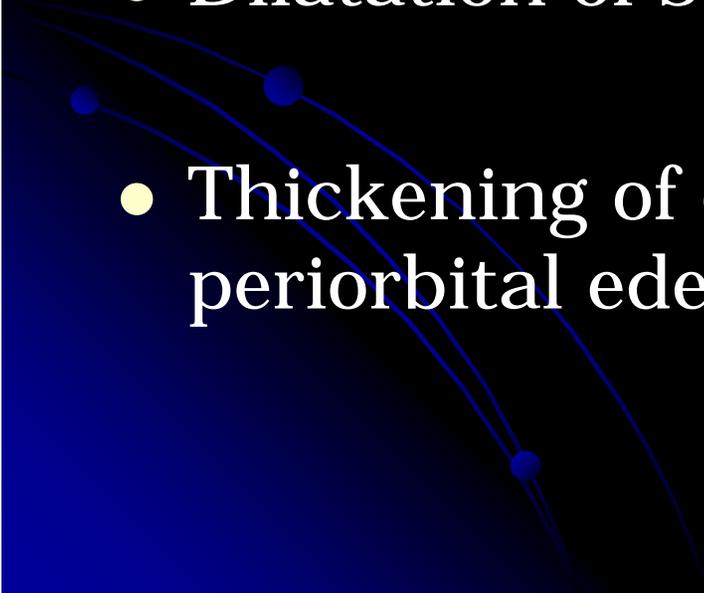
# SPREAD

- Infections of
  - Face, nose, orbit, tonsils, soft palate, pharynx, air sinuses, middle ear and mastoid can all spread to cavernous sinuses
- Sphenoid and posterior ethmoid sinuses
- Jaw –tooth extraction, maxillary surgery via (pterygoid plexuses)

# SYMPTOMS & SIGNS

- Fever
  - Ptosis/chemosis
  - Oculomotor palsies (III, IV, VI)
  - Contralateral hemiparesis (thrombosis ICA)
- 

# CT brain

- Irregular filling defect
  - Convex bulging of the lateral wall
  - Dilatation of superior ophthalmic vein
  - Thickening of extra ocular muscles and periorbital edema
- 

# TREATMENT

- **Antibiotics** (high doses)

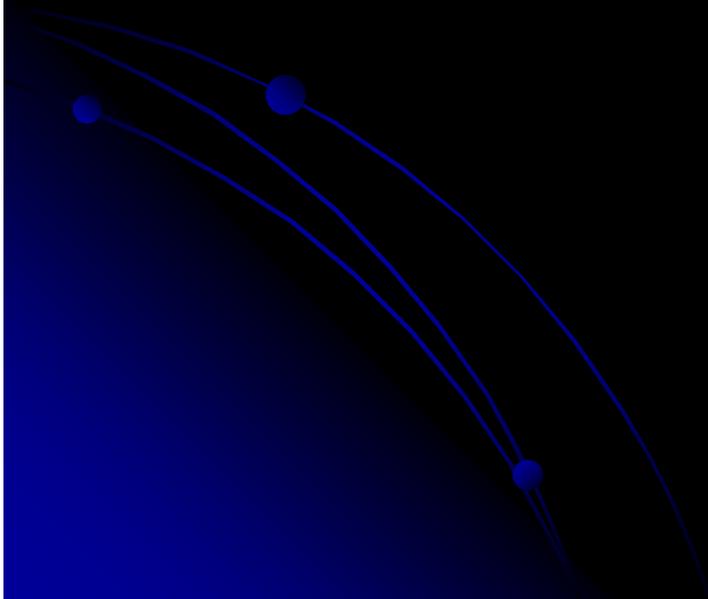
(*Staph aureus*, *Strep pneumonia*, *Haemophilus influenzae*)

- **Anticoagulant** (no evidence of cortical venous infarct)

- **Surgery**- sphenoid sinus sepsis

- 100 % mortality to 30 %

# Otorhinogenic intracranial sepsis



# Etiology

- Otorhinolaryngeal infection- 40-70 %

Paranasal sinusitis

Otitis media

Mastoiditis

- Cranial trauma- 6-30%

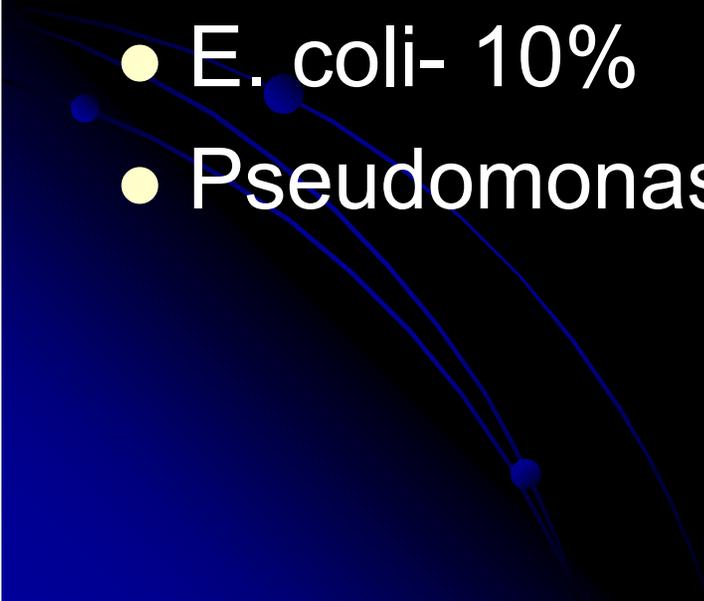
# Predisposing factors

- Diabetes Mellitus
- Alcoholism
- Chest infection
- Sepsis
- HIV
- Immunodepression- steroids, cytotoxic drugs
- Poor nutrition, poor hygiene, delayed treatment

*“Frequent use of broad spectrum antibiotics may contribute to subdural empyema”*



# Most common pathogens

- Strep pneumoniae- 16%
  - Group B strep- 13%
  - H. Influenzae- 13%
  - Salmonella spp- 13%
  - E. coli- 10%
  - Pseudomonas aeruginosa- 10%
- 

# Management

- Timing of surgery

Simultaneous neurosurgical and ENT intervention

- SDE requires surgical evacuation of infected material, irrespective of its volume

# Management

- Craniotomy was determined to be the surgical procedure of choice in SDE
  - Allows complete evacuation
  - Decompression of cerebral hemisphere
- 

## Subdural Empyemas

Clinical Features	No. of Patients
Symptoms	
Fever	536 (77%)
Seizures	273 (39%)
Focal	204 (29%)
Generalized	76 (4.2%)
Headaches	221 (32%)
Periorbital edema	
Unilateral	124 (31%)
Bilateral	83 (12%)
Vomiting	60 (8.6%)
Purulent nasal discharge	20 (2.9%)
Macrocephaly	19 (2.7%)
Signs	
Meningism	514 (74%)
Pott's puffy tumor	234 (33%)
Eyelid abscess	84 (12%)
Signs of tentorial herniation	40 (5.7%)
Hemiparesis and VIIth cranial nerve palsy	89 (13%)
Hemiparesis	178 (25.5%)
Monoparesis	28 (4%)
Gaze palsy	4 (0.6%)
Speech abnormalities	2 (0.3%)
No focal signs	289 (41%)

**TABLE 6. Bacteriological Spectrum for 699 Patients with Subdural Empyemas**

Organism	No. of Patients
Sterile	123 (17.6%)
<i>Streptococcus milleri</i>	121 (17.3%)
<i>Streptococcus B. haemolyticus</i>	51
Anaerobic organisms	42
<i>Staphylococcus aureus</i>	33
<i>Staphylococcus epidermidis</i>	31
<i>Haemophilus influenzae</i>	25
<i>Proteus mirabilis</i>	23
Multiple organisms	
>2	65
>3	34
<i>Escherichia coli</i>	17
<i>Pseudomonas aeruginosa</i>	12
<i>Klebsiella pneumonia</i>	12
<i>Enterobacteriaceae</i>	5
<i>Acinetobacter anitratis</i>	4
<i>Enterococcus faecalis</i>	3
<i>Mycobacterium tuberculosis</i>	1
<i>Salmonella typhi</i>	1

TABLE 2. Source of Infection Related to Age (n = 699)

Cause	No. of Patients							Total
	0-5 yr	6-10 yr	11-20 yr <sup>a</sup>	21-30 yr	31-40 yr	41-50 yr	51-70 yr	
Paranasal sinusitis	12	103	328 (70%)	22	2	1	1	469 (67%)
Otogenic source	4	12	33	4	3	3	5	64
Trauma	6	3	11	16	9	8	4	57
Miscellaneous	7	4	3	3	3	3	8	31
Meningitis	72	1					73	
Dental caries	1		1	1	2			5
Total	102	123	376 (54%)	46	19	15	18	699

<sup>a</sup> P < 0.001.

TABLE 3. Clinical Features for 699 Patients with

# Prognosis

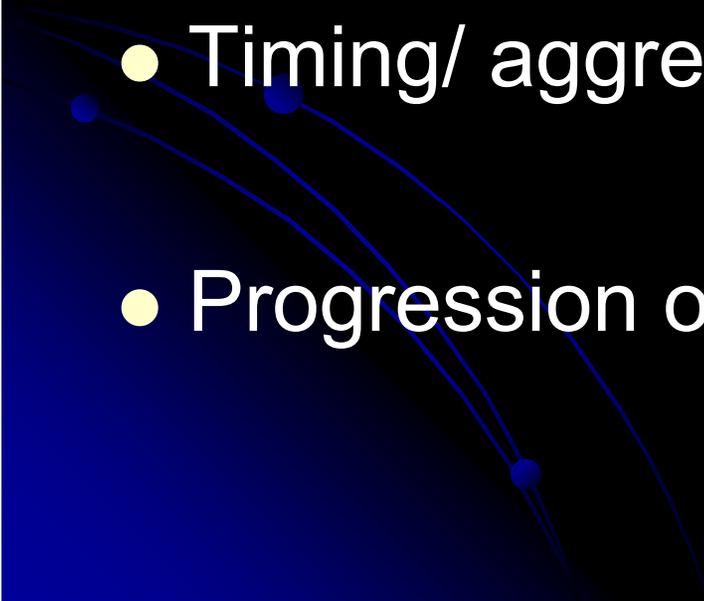
- Early diagnosis and treatment

- High degree of suspicion

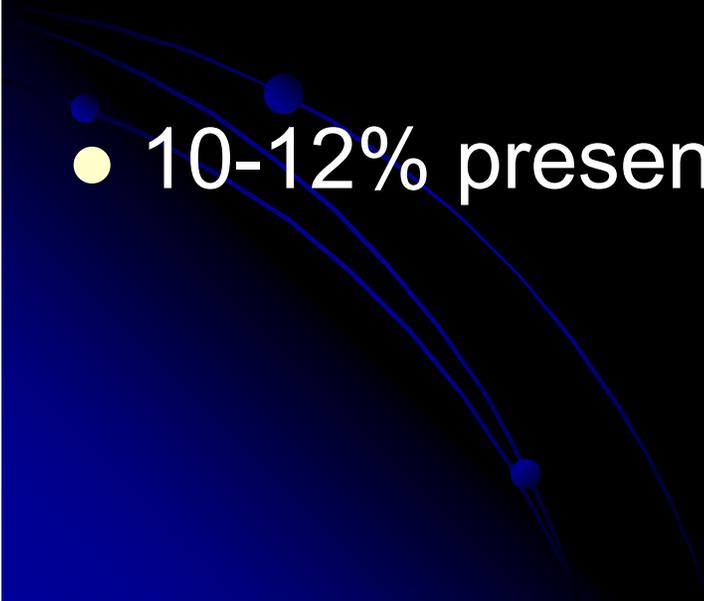
“Prolonged fever, seizures, neurological signs”



# Prognostic factors

- Age
  - GCS
  - Timing/ aggressiveness of treatment
  - Progression of disease
- 

# Outcome

- Mortality- 100% before advent of antibiotics & CT
  - Decreased to 40% after CT Scan
  - 10-12% presently
- 

- **Intracranial subdural empyema is a neurosurgical emergency**
  - **It is rapidly fatal if not recognised early and managed promptly**
- 

- **Early drainage, simultaneous eradication of the primary source of sepsis and intravenous administration of high doses of appropriate antibiotics agents represents the mainstay of treatment**
- 

# DIAGNOSIS

- **Infective sinustis**
- **Periorbital swelling (Pott's Puffy tumour)**
- **Purulent nasal discharge**
- **Positive Neurosurgical signs**



**MUST HAVE CT SCAN BRAIN  
& PNS**

*THANK YOU*

