RECONSTRUCTING OUR PATIENT’S LIVES

WHAT THE NUMBERS REALLY MEAN FOR THE NEUROSURGICAL PATIENT
In the beginning...

• Current Procedural Terminology 1966
• International Classification of Diseases go back to the early 1800’s
not
I AM SOOOO CONFUSED
AND OVER THIS....
WHY WE DON’T SEEM TO THINK ALIKE...

- Coders are yellow.
- Surgeons are red.
Neurosurgery
It’s not that simple

- The making of a Neurosurgeon

"Brain surgery? I have an app for that!"
How it all begins....

- First, Timmy is just plain born smart
Then, he’s the smartest kid in the class
He graduates at the top of his class.
UNDERGRAD, LOTS MORE BIOLOGY AND CHEMISTRY TO DO

• Not a lot of time for fun
FINALLY GET ACCEPTED INTO MED SCHOOL
WHY TIM CHOSE NEUROSURGERY

• It’s way more fun than Internal Medicine!
The public’s idea of the average Neurosurgeon
Then Tim slogs through 7 years of Residency...
SURVIVES HIS NS ATTENDINGS
Tim is finally on his own and they are all watching....

"Nurse, get on the internet, go to SURGERY.COM, scroll down and click on the 'Are you totally lost?' icon."
ok, he gets it now and by the way, it’s “doctor” to you...
Timothy finally gets to operate all day long!
Oh man, and sometimes it goes on all night....
Doctor, can I just talk to you about this code?
• (WTF), really, I’m about to scrub in!!!!!!
• The dreaded “QUERY”
• Why they are not always politically correct in responding to your sense of urgency.....
THIS IS NOTHING LIKE GREY'S ANATOMY.
The Basics

• POSITIONING
• INSTRUMENTS
• IMAGING
• TYPES OF SURGERIES
• POSITIONING
SUPINE

- ANTERIOR CERVICAL DISCECTOMY AND FUSION
- ODONTOID SCREW
- CRANIOTOMY/CRANIECTOMY/BURR HOLES
- ALIF/XLIF
- TRANSPHENOIDAL
SUPINE WITH MAYFIELD
SUPINE WITH MAYFIELD
SITTING WITH MAYFIELD

- POSTERIOR CERVICAL FORAMINOTOMY
PRONE ON FACE PILLOW

- THORACIC
- LUMBAR
POSTERIOR CERVICAL FUSION
PRONE ON
WILSON FRAME
PRONE ON WILSON FRAME

- THORACIC AND LUMBAR DECOMPRESSIONS
- DISCECTOMIES
LATERAL IN PINS

- LATERAL CRANIOTOMY
LATERAL FOR LUMBAR FUSION

- XLIF (EXTREME LATERAL INTERBODY FUSION)
XLIF IN ACTION

- L2-4 XLIF BETWEEN RIBS AND ILIAC CREST
JACKSON TABLE

- WITH TRACTION FOR ACDF
JACKSON WITH WILSON FRAME
JACKSON WITH BUMPY PADS

Figure 1.2 - Jackson Spinal Surgery Top with Standard Components
FLIPPING PATIENT ON JACKSON FRAME
FLIPPING ON JACKSON
• HEAD FRAMES
HORSESHOE FRAME

- PRIMARILY FOR BURR HOLES FOR SDH
SUPINE WITH SHOULDER BUMP
LATERAL OBLIQUE

- PREVENTS OVER ROTATION OF NECK THAT MIGHT IMPAIR INTRACRANIAL VENOUS RETURN
LEKSELL FRAME
PATIENT IN LEKSELL FRAME
TOOLS OF THE TRADE
suctions
What we’d rather be doing when we are suctioning
THE BASIC INSTRUMENTS
KERRISONS FOR BITING BONE
PITUITARIES FOR GRABBING SOFT TISSUE
RONGEURS FOR BITING LARGE PIECES OF BONE
GELPIES
CEREBELLARS
VERSA-TRAC
SHADOWLINE CERVICAL RETRACTORS
USE IN ACDF’S
CERVICAL SCREWS AND PLATES
CARLAN CRANK
MALLETS
COBBS
CURETTES
SIMPLE SET-UP
BUSY BACK TABLE
OMG! REALLY?
YOU’RE KIDDING ME!
LUMBAR SCREWS
Aids to navigate our way

- Microscopes
- Fluoroscopy
- Stereotactic frames
- Stealth navigation
  - Cranial
  - Spinal
“Arms”, “Turkey feet” and Trajectories

• BETTER TO SEE YOU WITH
Operating microscope
Just 2 weeks out of hip surgery herself, Dr. Zhu is right on the front line.
Arms of all sizes

- Flex arms (skinny)
- C-Arms (big)
- O-Arms (jumbo)
not the kind of arms we are talking about
Skinny arms
flex arms

- Used to secure tubes in place for minimally invasive surgery
Big Arms
C-Arms
Jumbo Arms
O-Arms
O-Arm opened up, getting in position
It’s a big machine
taking the image, we have all left the room
Stealth for spinal instrumentation
Axial and sagittal views
placement of screws under stealth guidance
Stereotactic biopsy frame
Applying the frame
Getting ready to get imaged
Final set-up, patient is awake
coming out of the frame
Stealth for craniotomy essentially gps
provides the trajectory
• Herniated discs
Herniated Lumbar disc
Cephalad migration
Caudal migration
• Cervical Stenosis
Critical Stenosis
ACDF

• The most common surgery for cervical stenosis
Cervical Corpectomy

(A)

(B)
Cervical Kyphosis
posterior cervical

Source: Spine © 2008 Lippincott Williams & Wilkins
Posterior Cervical
Pulled out screws with kyphosis
Occipito-cervical fixation
360 degree fusion
Corpectomy
Giant Osteophyte
Cervical Disc Replacement
Odontoid Fractures
Odontoid Screws
Technically very difficult

NAILED THE ODONTOID

ON THE 1ST TRY
Trigeminal Neuralgia
Neurolysis with Glycerol

Glycerol
BACK PAIN
Lumbar stenosis patient
Lumbar stenosis
Spondylolisthesis
Minimally Invasive
MIS Incisions
Obviously NOT minimally invasive
Lumbar screws
Compression fractures
BALLOON KYPHOPLASTY
Tumors

- Benign tumors
- Metastases
- Primary malignant tumors
Meningioma Sites
Meningiomas
Frontal lobe

Tumor invading skull and scalp
Very large meningioma
Spinal Meningioma
METASTASES

- Prostate
- Ovarian
- Esophageal
- Colorectal
- Gastric
- Melanoma
- Breast
- Lung
Metastases
Cerebellar mets
I have brain metastasis, what's your excuse?
Intra-operative GBM
• HEMATOMAS
Subdural Hematomas

- Subdural Space with Bleeding
- Dura
- Skull
- Brain
Bleeding from bridging veins
Parafalcine ASDH
Nonoperative

- Nonsurgical
Acute Subdural
Intra-op acute subdural
Chronic SDH
Chronic SDH with settling out
Famous good lookin guy with a subdural
Typical patient with a subdural hematoma
Epidural vs SDH

Epidural EDH vs SDH
Spinal EDH
“worst Headache of life”
Subarachnoid hemorrhage
Intraventricular hemorrhage
Angiogram
# Hunt and Hess Scale

## Hunt and Hess Grading Scale for Subarachnoid Hemorrhage

<table>
<thead>
<tr>
<th>Grade</th>
<th>Clinical Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Asymptomatic or minimal headache and slight neck rigidity</td>
</tr>
<tr>
<td>2.</td>
<td>Moderate-to-severe headache, neck rigidity, and no neurologic deficit other than cranial-nerve palsy</td>
</tr>
<tr>
<td>3.</td>
<td>Drowsiness, confusion, or mild focal deficit</td>
</tr>
<tr>
<td>4.</td>
<td>Stupor, moderate-to-severe hemiparesis, and possibly, early decerebrate rigidity and vegetative disturbances</td>
</tr>
<tr>
<td>5.</td>
<td>Deep coma, decerebrate rigidity, and moribund appearance</td>
</tr>
</tbody>
</table>
Fisher Scale

<table>
<thead>
<tr>
<th>Points</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>Unruptured</td>
</tr>
<tr>
<td>1</td>
<td>No blood detected</td>
</tr>
<tr>
<td>2</td>
<td>Diffuse or vertical layers</td>
</tr>
<tr>
<td></td>
<td>&lt;1 mm thick</td>
</tr>
<tr>
<td>3</td>
<td>Clot and/or vertical layer</td>
</tr>
<tr>
<td></td>
<td>&gt;1 mm thick</td>
</tr>
<tr>
<td>4</td>
<td>Intracerebral or intraventricular clot</td>
</tr>
</tbody>
</table>
Fisher Scale

Fisher scale for grading subarachnoid hemorrhage and vasospasm risk.

- **Fisher grade 1**: No SAH visualized. Low risk for vasospasm.
- **Fisher grade 2**: Diffuse SAH without clots or vertical layers of blood. Low risk for vasospasm.
- **Fisher grade 3**: Localized blood clots in the subarachnoid space or blood clot more than 1 mm thick in the vertical plane (parenchymal tissue, brain oedema, or ambient oedema). High risk for vasospasm.
- **Fisher grade 4**: Intracerebral or intraventricular blood with only diffuse blood or without blood in the basal cisterns. Low risk for vasospasm.
3D reconstruction
Circle of Willis
Hemorrhage due to AVM
Drugs that worsen bleeding
Intracranial hemorrhage
Enlarging Intracranial hemorrhage
Cracking skulls & Saving brains
Hemicraniectomy
Usually done for malignant cerebral edema
Hemorrhage with edema
Flap in the belly
Fixing the defect
Urban Cranial fixation
Cranial fixation plates and mesh
Figura 16. Colgajo libre de epiplon para el sellado de la fosa craneal anterior.
Is my head too big?
Deformed skull from HCP
VP Shunt
Shunt valves

Fig 1. Illustrative picture of the SPHERA® valve: spring coil mechanism, seat and ruby sphere; chamber for digital pumping or puncture and membrane-type antisiphon mechanism (when the pressure distal to the antisiphon mechanism becomes negative, the membrane temporarily occludes).
Peritoneal incision
Shunt problems
deep brain stimulation
The Battery Pack
OCD and Depression

Deep Brain Stimulation & Treatment-Resistant Depression
the trauma room
GSW to the spine
open comminuted fx