

2013 Abstract Award Winners

The Dean Echols Award for Best Laboratory or Research Presentation

Dr. David Connor

Proteomic Analysis of Cerebrospinal Fluid in Patients Following Traumatic Brain Injury and Subarachnoid Hemorrhage

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Introduction:

Traumatic Brain Injury (TBI) and aneurysmal subarachnoid hemorrhage (SAH) represent highly disparate mechanisms of neurologic injury; however share a similar range of outcomes. Attempts have been made for decades to positively predict the severity of and prognosis following injury utilizing radiographic, clinical and laboratory indices, however no single system has yet proven foolproof. Proteomic analysis of cerebrospinal fluid (CSF) has shown promise in identifying potential markers of injury and deciphering pathophysiologic changes in neurologic diseases ranging from multiple sclerosis (MS) to Alzheimer's disease. In applying this technique to TBI and SAH CSF, we propose to identify biomarkers of severity of brain tissue injury, with the hopes of shedding further light upon the mechanism of secondary injury common to both pathologies.

Methods:

Consecutive patients presenting to the Neurosurgery service with the admitting diagnosis of either TBI or SAH were prospectively enrolled. Additional patients undergoing cerebrospinal fluid sampling for diagnostic procedures including lumbar puncture or myelography were enrolled as controls. All CSF aliquots were subjected to 2-dimensional gel electrophoresis (2D GE), followed by analysis with a laser densitometer (Model PDSI, Molecular Dynamics Inc, Sunnyvale, CA) to determine spot percentages, equal to density above background for all polypeptide migration bands. Increased or decreased expression as compared to control specimens was defined in terms of fold-change in spot percentages. Polypeptide spots found to show consistent expression change across TBI or SAH specimens as compared to control were manually excised from the 2D gel and subjected to Matrix-Assisted Laser Desorption/Ionization (MALDI) mass spectrometry. Generated polypeptide masses were then matched to known standards utilizing a search of the NCBI and/or GenPept databases for a protein match.

Results:

Eight-hundred and fifteen separately identifiable polypeptide migration spots were identified on all 2D GE gels. Seventy-seven polypeptide spots showed consistent (> 3-fold) increase in

expression across all samples as compared to controls, while 73 polypeptides showed similar decrease in expression. From these a subset of spots showing spot fold increase or decrease greater than fivefold were considered for protein identification utilizing MALDI-MS. Twenty-two separate spots were chosen for analysis, and, of these, 10 specimens showed upregulation and 12 showed downregulation. Mass spectrometry successfully identified 13 of 22 2D GE spots as recognizable polypeptides. Statistically significant increases were noted in expression of fibrinogen (β chain), carbonic anhydrase-1 (CA I), peroxiredoxin-2 (Prx-2) and both α and β chains of hemoglobin in TBI and SAH specimens, as compared to controls ($p = 0.00002$ - 0.02176). Polypeptides identified to consistently decrease among experimental samples included serotransferrin, serum albumin and N-terminal haptoglobin (Hpt) ($p = 0.00003$ - 0.04649). The greatest mean fold-change among all specimens was seen in CA I and Hpt at 30.7 and -25.7, respectively. Comparison of SAH with TBI specimens showed a trend toward greater mean increases in CA I and Prx-2 in TBI patients (43.8 vs. 17.7 and 28.4 vs. 10.5), though this failed to reach statistical significance ($p = 0.1377$ and 0.2164 , respectively). Similarly, Hpt and serotransferrin means trended toward greater fold change in TBI samples (-30.4 vs. -21.0 and -10.3 vs. -7.0) with p values of 0.3062 and 0.3443, respectively.

Conclusions:

These data suggest a similar pathogenesis of brain injury in cases of TBI and SAH as reflected in the CSF proteome. Consistent CSF elevation of CA I, Prx-2 with concurrent depletion of Hpt and serotransferrin may represent a useful combination of biomarkers for the prediction of severity and prognosis following brain injury. We believe these results strongly support further research into the proteomic mechanisms of secondary injury following primary CNS insult.

2013 Abstract Award Winners

The John Jackson Award for Best Clinical presentation

Dr. Jayme Trahan

Guns and Drugs in Post-Katrina New Orleans: Gunshot Wounds to the Spine

Jayme Trahan, MD; Daniel Serban, MD; Gabriel Tender, MD
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Background:

Gunshot wounds (GSW) to the spine represent a major health concern within today's society. The goal of our study was to assess the epidemiologic characteristics of patients with GSW to the spine treated after Hurricane Katrina at the Level One Trauma center in New Orleans.

Methods:

A retrospective chart review was performed from January 2007 through November 2011 on all patients who were seen in the emergency room at the Interim Louisiana State University Public Hospital Level One Trauma center in New Orleans and diagnosed with a new gunshot wound to the spinal axis. Epidemiologic factors including age, gender, race, and marital status, as well as the results of admission toxicology screening, were noted. Outcome analysis was performed on patients undergoing conservative versus operative management for their injuries. Clinical outcomes were assessed using the ASIA classification system. Complications related to initial injury, neurosurgical procedures, and hospital stay were noted.

Results:

Within the period under review, 147 patients suffered GSW to the spine. Of those diagnosed with a GSW to the spine, 88 (59.8%) received an admission toxicology screen. Seventy-three (83%) patients out of those tested had a positive screen with the most common substances detected being THC, cocaine, and alcohol. In regards to management, 127 (87%) patients were treated conservatively. Of those that were managed non-operatively, one (0.7%) patient improved clinically from ASIA D to E. Of the 20 patients who underwent surgery, one (5%) patient had clinical improvement post-operatively from ASIA C to D.

Conclusions:

This study evaluates the largest number of patients with GSW to the spine per year treated in a single center, illustrating the violent nature of the city of New Orleans after Hurricane Katrina. In this urban population, there was a clear correlation between drug use and suffering a GSW to the spine injury. Surgical intervention was seldom indicated in these patients and was predominately used for fixation of unstable fractures and decompression of compressive injuries, particularly below T11. Minimally invasive techniques were used successfully at our institution to minimize the risk of post-operative CSF leak.

Dr. Nnenna Mbabuiké

Decompressive Hemicraniectomy for Malignant Cerebral Infarction: The Experience and Outcome of One Institution; a Case Series and Review of the Literature.

Nnenna Mbabuiké, MD, Roger Smith, MD, Olawale Sulaiman, MD, PhD, Marcus Ware, MD, PhD, Sunik Lee, MD Edison Valle, MD Ilias Caralopolous, MD, Lora Kahn, MD and CJ Bui, MD.
Tulane-Ochsner Neurosurgery Program, New Orleans, LA

Introduction:

Malignant cerebral infarction is a large hemispheric infarction with poor outcome attributable to ischemic edema that causes an early rise in intracranial pressure with subsequent brain herniation and death. Death usually occurs from swelling of ischemic brain tissue, focal increase in intracranial pressure, and extension of ischemia into adjacent vascular areas. Decompressive hemicraniectomy is thought to relieve or reduce high intracranial pressure by creating additional space for edematous brain to expand, thus preserving cerebral blood flow and preventing downward herniation. We present the experience of at our institution regarding cases of decompressive hemicraniectomy done for malignant cerebral infarction and associated outcome.

Methods:

Retrospective chart review of all cases of decompressive hemicraniectomy done for malignant cerebral infarction from 2009-2012 at Ochsner Medical Center Foundation Hospital. These included ACA and MCA territory strokes and excluded those cases of decompressive hemicraniectomy done for trauma.

Results:

There were 22 cases of decompressive hemicraniectomy for malignant cerebral infarction done between July 2009-September 2012 at Ochsner Medical Center. There were 15 men and 7 women ranging in ages 32-67. All were the result of malignant ACA and MCA cerebrovascular accidents as determined by noncontrast head CT or MRI with diffusion weight imaging. The shortest time to intervention was 8 hours and longest time was 51 hours from clinical presentation. Amongst the 22 cases, 6 had an outcome of mortality (27%), and 16 (72%) had significant impairment requiring continuous assistance for activities of daily living (ADLs). A review of the literature demonstrates controversy over time to surgery, upper age limit that still benefits from intervention, and quality of life after decompressive craniectomy.

Discussion:

Our cases series opens the discussion for decompressive hemicraniectomy and the ability to predict efficacy according to pre intervention evaluation. Our series outcome reflects what has been found in the literature: younger patients who are taken to surgery in less than 48 hours do better. The limits of our study include an inadequate reflection of quality of life in the survivors of this disease dispute good functional outcome, the bias of surgical evaluation by the staff of one institution, and small sample size.

Conclusion:

While there is continued controversy over the efficacy of decompressive hemicraniectomy in specific patients it is worth the continued research into predictable preoperative factors because it has been demonstrated to save life, albeit with little known to the quality of that life.

Abstracts

Scientific Session I

Moderator: Dr. Bharat Guthikonda

Justin Haydel, MD (LSUHSC-S)

Fluoroscopic radiation emission in minimally invasive spine procedures: A single surgeon's experience of last four years of clinical practice

Ilias N. Caralopoulos, MD (Tulane)

Cerebral aneurysm research at Tulane. A brief introduction

Walid Radwan, MD (LSUHSC-NO)

A novel patient positioning technique for bilateral supraorbital and bilateral occipital nerve stimulation for the treatment of chronic migraines

David E. Connor, Jr, DO (LSUHSC-S)

Endoscopic Transphenoidal Surgery: A Transition to Neurosurgery-ENT Collaboration Producing Better Outcomes

Jai Deep Thakur, MD (LSUHSC-S)

Micro-Surgical Resectability, Clinico-neurological Outcome and Tumor Control in Meningiomas Occupying the Cavernous Sinus: Lessons learnt over 17 years

Justin Haydel, MD (LSUHSC-S)

Fluoroscopic radiation emission in minimally invasive spine procedures: A single surgeon's experience of last four years of clinical practice

Authors: Sunil Kukreja MD, Justin Haydel MD, Anil Nanda MD MPH, Anthony Sin MD*

Object:

Minimally invasive spine surgeries (MISS) have gained immense popularity in last couple of years. Concern about the radiation exposure has also been raised. The purpose of our study is to demonstrate the impact of the progressive learning experience of the operating surgeon on the radiation emission during various MISS procedures. We also aim to evaluate the effect of body mass index (BMI) of the patients to the amount of the radiation exposure during MISS.

Methods:

A retrospective analysis of total 346 patients was performed, who underwent 405 MISS procedures from January 2010 to August 2013 by a single surgeon (AS) at our institution. Dose of radiation emission available from the fluoroscopic equipment was recorded from the electronic database. Most common procedure was TLIFs in this series (n=176) followed by minidiscectomy (n=131), decompression (n=80) and vertebroplasty (n=18). Patients in TLIFs group had either unilateral (n=106) or bilateral instrumentation (n=70). The patients in the each procedure group were categorized into two BMI sub-groups; <30 (non-obese) and ≥30 (obese). Pearson's correlation test and Kruskal-Wallis tests were used for the statistical analysis.

Results:

Mean age of the patients was 54.93 years (range 16-87) with almost the same number of male and female patients (173/178). Patients who underwent bilateral TLIF had highest radiation exposure (135.32±9.2 mGy), whereas discectomy required the minimal exposure (19.04±1.6 mGy). There was a significant correlation between radiation exposure and BMI of the patients during all MISS procedures ($r < 0.05$, $p < 0.05$). The radiation emission was less during 2013 as compared to 2010 in most of the categories; however this observation was not statistically significant.

Conclusion:

To the authors' knowledge, this is the first study which has evaluated the impact of learning curve of an operating surgeon on the radiation exposure during MISS procedures. Radiation emission was higher during the MISS procedure performed on large patients (BMI≥30). Surgical experience of the surgeon seems to be associated with lower radiation exposure to the operating room personnel, however further studies should be performed to examine this effect.

Ilias N. Caralopoulos, MD (Tulane)

Cerebral aneurysm research at Tulane. A brief introduction.

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Tulane University School of Medicine Department of Neurosurgery, New Orleans, LA 70112.

Introduction:

Cerebral aneurysm (CA) rupture is a catastrophic event leading to significant morbidity and mortality. The pathophysiology of aneurysm formation, progression and rupture, particularly at the cellular and molecular levels, remains incompletely understood.

Methods:

Continuing the senior author's previous work, we are investigating the effect of inflammatory stimuli and potential salvaging interventions on the clinical course and molecular phenotype of CA in animal models of the disease. We use a previously described mouse model of CA involving induced hypertension and injection of elastase in the basal cistern, which we have also newly adapted to rats. The effects of cigarette smoking are examined both by direct exposure to cigarette smoke in our animals and by the addition of cigarette smoke extract in the primary cell culture medium of cerebral vascular smooth muscle cells. Superoxide dismutase or the PPAR γ agonist, rosiglitazone are hypothesized to inhibit the molecular phenotype changes and clinical progression of CA in cigarette smoking. Direct exposure to inflammatory cytokines is also hypothesized to lead to CA formation, progression and rupture.

Conclusion:

In this presentation, we summarize the background, rationale, methods and preliminary results for the work we are undertaking to better characterize the molecular, cellular, and clinical features of CA with a translational aim.

Walid Radwan, MD (LSUHSC-NO)

A novel patient positioning technique for bilateral supraorbital and bilateral occipital nerve stimulation for the treatment of chronic migraines

Walid Radwan, M.D., Jason Wilson, M.D., Erich O. Richter, M.D.

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Background:

Positioning is of key importance for patients undergoing bilateral supraorbital nerve stimulator (SONS) and bilateral Occipital nerve stimulator (ONS) implantation. Traditionally, after intubation and general anesthesia, the patient is positioned with the head in a prone headrest and the arms tucked at the sides. This positioning offers excellent surgical access to the occiput for ONS portion of the surgery. However, this positioning makes it difficult to control the Tuohy guide needle at the forehead for the SONS, a potential complication of skin perforation and suboptimal electrode placement.

Clinical Presentation:

Methods:

We describe a novel way to position a patient for excellent access to bilateral SON and bilateral ON in one operation.

Conclusion:

We provide a novel way for positioning a patient for bilateral SON and bilateral ON stimulation that will assist surgeons in doing this surgery in one stage.

Equipment:

Mayfield, Tuohy needle, Boston Scientific Instrumentation.

David E. Connor, Jr, DO (LSUHSC-S)

Endoscopic Transphenoidal Surgery: A Transition to Neurosurgery-ENT Collaboration Producing Better Outcomes

David E. Connor, Jr., DO, Matthew Clavenna, MD, Chiazio Amene, MD, Vikas Mehta, MD, Timothy Lian, MD, Sudheer Ambekar, MD, Anil Nanda MD, MPH, Bharat Guthikonda, MD

Departments of Neurosurgery and Otolaryngology, Louisiana State University Health Sciences Center-Shreveport, Shreveport, LA

Introduction:

Endoscopic transphenoidal surgery has become a mainstay in the treatment of pituitary adenomas, craniopharyngiomas, CSF leaks and other anterior and middle skull base pathologies. Many centers employ a collaborative management team consisting of a skull base neurosurgeon working together with an ENT surgeon with expertise in advanced endoscopy, while a single service strategy is preferred by many for management of these lesions. We have recently converted from a single service management to a collaborative team approach for skull base endoscopy; and have appreciated significant improvements in our outcomes, especially as they relate to the rates of conversion to open (microscopic) approach and extent of tumors resection.

Methods:

A prospectively maintained database was reviewed to identify all endoscopic transphenoidal procedures performed from August 2007 until November 2013. Cases were divided into cohorts based upon whether they were performed by the neurosurgical service alone utilizing the collaborative neurosurgery / ENT team. Our primary endpoint was the rate of conversion to an open microscopic procedure. Secondary endpoints included extent of resection of neoplastic lesions, CSF leak recurrences (in the cases performed for CSF rhinorrhea), intraoperative blood loss and incidence of complications.

Results:

A total of 60 endoscopic transphenoidal cases were evaluated. 50 were performed by neurosurgery alone and 10 were performed by the combined neurosurgery / ENT team. The rate of conversion to an open microscopic approach rate was found in 18% of the cases performed by neurosurgery alone and in 0% of the cases utilizing the combined neurosurgery / ENT approach. Both cohorts had one instance of recurrent CSF rhinorrhea requiring subsequent transcranial repair. Extent of resection of pituitary macroadenomas was greater and overall blood loss was lower in cases performed by the combined neurosurgery / ENT team.

Conclusions:

Our experience has supported the concept of achieving better outcomes in endoscopic transphenoidal surgery by using a combined neurosurgery / ENT team. We have noted a lower rate of conversion to open microscopic surgery, lower blood loss, and improved extent of tumor resection.

Jai Deep Thakur, MD (LSUHSC-S)

Micro-Surgical Resectability, Clinico-neurological Outcomes and Tumor Control in Meningiomas Occupying the Cavernous Sinus: Lessons learnt over 17 years.

Jai Deep Thakur¹, Vijayakumar Javalkar², Imad Saeed Khan³, Ashish Sonig⁴, Anil Nanda¹

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Introduction

Cavernous sinus meningiomas (CSM) represent a cohort of challenging skull base tumors where the challenge lies in achieving a balance between optimal surgical resection, restoration of cranial nerve functions and good quality of life. To assess the preoperative, intraoperative and postoperative factors in relation to the clinico-neurological outcomes, morbidity, mortality and tumor control in CSM.

Methods

A single surgeon (A.N.) performed microsurgical removal of CSM on 65 patients from January 1996 to August 2013. Sekhar classification, Modified Kobayashi grading and KPS were used to define tumor extension, tumor removal and clinical outcomes respectively.

Results

Pre-operative cranial nerve dysfunction (CND) was evident in 64.6% patients. Most common was the second CN deficit. CN V was most amenable to some form of improvement while CN II followed by CN IV showed the worst form of recovery. Complete resection was achieved in 41.5% of cases and had no significant association with functional CN recovery. ICA encasement significantly limited the complete microscopic resection of CSM ($p < 0.0001$). Overall, 18.5% of the patients showed symptomatic recurrence after their initial surgery. The recurrence was significantly lower in the cohort of patients for which adjuvant SRS was administered ($p=0.04$). The use of adjuvant SRS for microsurgery independently decreased the recurrence rate ($p=0.04$).

Conclusion

Modified Kobayashi tumor resection Grade I-IIIb was possible in 41.5% patients. CN recovery and tumor control was not dependent on the extent of tumor removal. Safe maximal resection with adjuvant SRS can achieve excellent tumor control and the use of adjuvant SRS independently decreased the recurrence in CSM.

Abstracts

Scientific Session II

Moderator: Dr. Ricky Medel

Jayne Trahan, MD (LSUHSC-NO)

Penetrating injuries to the Neuroaxis from 2008- 2013: a New Orleans Experience

Edison P. Valle-Giler, MD (Tulane)

Novel approach to decrease venous plexus bleeding in C1-2 instrumentation. A technical note

Richard Menger, MD (LSUHSC-S)

Misconceptions About Rugby Headgear and Concussion Prevention: a Call For Education, Evaluation, and a Cultural Shift

M. Daniel Eggart, MD (LSUHSC-NO)

Improving Neurosurgical Discharge Dispositions for Patients with Public Health Insurance Plans” A Prospective Quality Improvement Study For At Risk Patients Using A Targeted Documentation Program

Christopher Storey MD, PhD (LSUHSC-NO)

When and if to operate? A National Inpatient Sample Database Study on Outcomes of Nontraumatic Subdural Hematomas and Coagulopathies.

Jayme Trahan, MD (LSUHSC-NO)

Penetrating injuries to the Neuroaxis from 2008- 2013: a New Orleans Experience

Clifford Lemont Crutcher II M.D.^a, Jayme Trahan M.D.^a, Erin Fannin M.S.^b, Jason Wilson M.D.^b

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Introduction:

Traumatic injury to the nervous system is often permanently devastating, if not fatal. Young single African American males are often cited as those most at risk for traumatic spinal cord injury (TSCI) and traumatic brain injury (TBI)^{1,3,4}. It is well known that New Orleans ranks among the top most violent cities in America. According to the FBI, the 2012 New Orleans murder incidence was 53.2/100,000². In this light, we retrospectively sought to determine the trends in penetrating neurotrauma at our institution.

Methods:

A retrospective chart review was performed using the Louisiana State University Health Sciences Center- New Orleans Trauma Registry. We queried patients from 2008 – present with neurosurgery consults for penetrating injuries.

Results:

From 2008 until current (10-22-2013) there were 368 neurosurgery consults for penetrating wounds. Of those, 338 met inclusion criteria. The number of patients with penetrating neurotrauma in 2008, 2009, 2010, 2011, 2012 and 2013 were 30, 60, 78, 55, 66, and 49 respectively. The median age was 26 (range 1-83). 88% of patients were males. 73.7% of victims were African-American. 89.35% patients were single. Gunshot wounds accounted for 92.9% of injuries. Wounds to the head, spine and extremities accounted for 51.18%, 40.22%, 8.58% respectively. The majority of the patients (70.1%) were deemed inoperable. Most patients (81.7%) survived. 39.3% patients has positive toxicology screens, while 29.9% were clean, and 30.% had unknown results. 21.3% were positive for alcohol, 50.3% were negative for alcohol, and 28.4% had unknown alcohol levels.

Conclusion:

Penetrating head and spine trauma continue to plague New Orleans and surrounding referral areas. Young single African American males constitute the majority of patients. Gunshots contributed the overwhelming majority of injuries. Over half of those injuries are to the head with followed by spine. The majority of the patients survived, had positive toxicology screens, and were not intoxicated with alcohol. Continuing efforts need to be undertaken to prevent gun violence in New Orleans.

Edison P. Valle-Giler, MD (Tulane)

Novel approach to decrease venous plexus bleeding in C1-2 instrumentation. A technical note.

Edison P. Valle-Giler, M.D.^{1,2}; Cuong Bui, M.D.^{1,2}, Olawale Sulaiman, M.D., Ph.D.^{1,2}

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²The Ochsner Spine Center, New Orleans, Louisiana, USA.

Background

Posterior C1-2 instrumentation is often associated with excessive bleeding, especially when the venous plexus between C1-2 lateral masses is disrupted. As an attempt to reduce intraoperative bleeding we describe a novel variation to the *Harms* C1-2 instrumentation.

Materials and Methods

A retrospective chart review between August 2010 and December 2012 was done.

Surgical technique consisted in sub-periosteal blunt dissection carried from the C2 lamina to the lateral mass and pars of C2 upward towards the C1-2 joint and C1 lateral mass. This maneuver allowed to “push up” the C2 nerve root along with the venous plexus without disrupting it. Then, the usual steps in the *Harms* technique were followed (Figure 1).

Univariate analysis of demographic data, main diagnosis, estimated blood loss, body mass index and perioperative complications were analyzed.

Results

Nine patients ages 12 to 82 were operated using this technique by the same surgical team. Type 2 odontoid fractures were the most common diagnosis. Average blood loss was 181 cc when including all patients, but only 88 cc when the “tumor resection” patients were eliminated from the pool (table 1). There were no intra-operative complications during the surgeries. Mean hospital stay was 4.5 days.

Conclusions

We present a variation to the *Harms* technique where the surgeon can minimize venous plexus bleeding in a well-known bloody surgery.

Richard Menger, MD (LSUHSC-S)

Misconceptions About Rugby Headgear and Concussion Prevention: a Call For Education, Evaluation, and a Cultural Shift

Richard Menger MD; Austin Menger BS; Anil Nanda MD, MPH, FACS

Objective

To illustrate descriptive data, trends, behavior, and misconceptions regarding the use of protective headgear for concussion prevention in college rugby players.

Introduction

Rugby is the third most popular sport in the world. USA rugby has over 450,000 registered players with 67,000 high school student athletes. However, injuries are part of the game; on average a team will have 18% of their roster unavailable due to injury for a given match. Randomized prospective studies have shown headgear statistically unreliable for protection against concussion. This study looks to understand the behavior and attitudes regarding the use of protective headgear among rugby players in the United States.

Methods

Data was constructed by internet survey solicitation among collegiate rugby players across 19 college clubs playing at the Division I to Division III level. Participants answered questions providing information regarding current club, age, years of experience, use of headgear, if having a concussion would incline them to use headgear, main reason for use of headgear (concussion vs. laceration prevention), playing time, and whether or not they played football or wrestling in high school. Multiple regression analysis as well as an appropriate adjustment for collinearity were used to determine significant variables.

Results

122 players responded. The average age is 19.5 years old. The youngest player is 18 and the oldest is 24. The average player has 2.68 years of experience with 23.7% of players being first year players. 23/122 (18.85%) of players wear protective headgear. 81.15% (99/122) do not wear headgear while playing. 44.63% are backs with 55.37% of players listing forward as their primary position. 55/120 (45.83%) of players play 70-80 minutes per game. 44.63% (54/121) played football or wrestled in high school. 67/121 or 55.37% did not participate in these particular contact sports in high school.

38.14% (45/118) wear or would wear headgear for the primary reason of preventing a concussion. 73/118 (61.86%) stated they wear headgear or would consider wearing headgear because it prevents head and ear lacerations. 39/120 (32.5%) wear or would wear a headgear if they had a concussion. 81/120 (67.5%) do not or would not wear headgear as a result of suffering a concussion.

Intuitively, those who stated they would wear headgear if they had a concussion are more likely to believe headgear prevents concussions. This held true through multivariable regression ($p = <.001$). On average, people who would wear headgear if they had a concussion are 43.4% more likely to wear headgear for the prevention of concussions than those who answered no to

both questions.

Conclusions

38.14% of rugby players surveyed cite concussion prevention as their main reason for wearing protective headgear despite multiple studies showing headgear offers no statistically significant protection against concussions. 32.5% of all participants responded that they would wear headgear if they suffered a concussion. Most importantly, those who stated they would wear headgear if they had a concussion are more likely to believe that headgear prevents concussions ($p < 0.001$). Education of rugby players in the United States is essential to promote safety in a country where rugby is not the dominant contact sport.

M. Daniel Eggart, MD (LSUHSC-NO)

Improving Neurosurgical Discharge Dispositions for Patients with Public Health Insurance Plans” A Prospective Quality Improvement Study For At Risk Patients Using A Targeted Documentation Program

M. Daniel Eggart M.D.
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Neurosurgical Patients often require extended post op therapy in an acute care inpatient rehab setting with a team approach of doctors, therapists, and nurses to manage comorbidities, wounds, and to avoid complications during patient recovery. Historically payers deny coverage for the more expensive inpatient rehab placement and in exchange offer coverage for home health therapy in healthier patients and skilled nursing facilities for sicker patients. In the future physician reimbursement rates will be directly tied to patient complications and length of stay. This documentation program seeks to better understand which insurance companies are prolonging inpatient stays and how to overcome and avoid payer denials for inpatient rehab admission.

A review of all West Jefferson Neurosurgical patients N=49 submitted for inpatient rehab admission from June 2012 to May 2013 was conducted. Inclusion criteria were all patients with public insurance deemed appropriate for inpatient Rehab according to a standardized criteria. In June of 2013, the LSU Department of Neurosurgery held an insurance seminar on disposition targeted documentation improvement and inpatient rehab criteria. The seminar was repeated for all new rotating clinicians monthly. Inpatient Rehab denial and acceptance rates for each patient and insurance company were compared before and after implementation of the documentation improvement program.

Denial rates before documentation improvement program (DIP) were 32 % with an average time to admission (TTA) of 4.82 days. Denial Rates after the DIP were 41 % with an average TTA of 5.07 days. Interestingly, 66% of all denials for one insurer were overturned with peer to peer telephone consultation surgeon to payer. With these high rates of denial and known overturn rates of 66%, these results suggest that despite greater efforts for our patients, surgeons have limited power to effect change in insurance companies to help their patients.

Christopher Storey MD, PhD (LSUHSC-NO)

When and if to operate? A National Inpatient Sample Database Study on Outcomes of Nontraumatic Subdural Hematomas and Coagulopathies.

Christopher Storey MD, PhD PGY-3 LSUHSC-Shreveport

Introduction:

Chronic subdural hematomas (cSDH) account for a significant burden to society. When cSDH occur in a patient with coagulopathies, the picture becomes clouded on when and if surgery should be performed to allow the patient to return to society as a functioning member. Previous studies using the HCUP NIS database looked at outcomes for traumatic SDH but did not focus on how the coagulopathies or surgical timing affected the outcomes.

Methods:

Utilizing the HCUP NIS Database, a subset of patients was taken that had ICD 9 Codes that matched SDH that were not trauma related. A multivariate analysis was performed to examine the AHRQ coagulopathy and surgical timing and their relationship to in hospital mortality, total charges, length of stay, and discharge disposition. To standardize discharge disposition, a ranked list from 0-7 was created to cover status of patient at discharge base on Medicare billing codes.

Results:

From 2005-2010, there were 46922 nontraumatic SDH admissions in patients with age over 40 years of which 12.9% had a coagulopathy whether congenital or acquired. Evacuation within 24 hours displayed significant decrease in length of stay, improved discharge disposition and decreased total cost. No significant difference was seen in mortality for early versus delayed evacuation, but evacuation versus conservative measures did decrease mortality. In patients with coagulopathy there was a significant increase in length of stay, on average 3 days and in total cost of admission, significant difference in mortality. Decreased mortality was seen in coagulopathic patients who received evacuation within 24 hours. Although conservative management had not significant change in length of stay, outcomes were significantly improved in both coagulopathic and noncoagulopathic patients. Delayed evacuation led to the longest length of stay and highest cost per admission.

Conclusions:

By analyzing these national databases, we are able improve clinical decision making for when to evacuate a subdural hematoma. Based on this data, evacuation within 24 hours of admission not only improves clinical outcomes with only minimal increased cost over conservative management. The inability of ICD 9 codes to differentiate acute, subacute, and chronic subdural, size or patient's neurological status can make the NIS data difficult to apply

Abstracts

Poster Session

David E. Connor, Jr, DO (LSUHSC-S)

Tonic Contractility of Cultured Human Brain Vascular Smooth Muscle Cells (HBVSMC): An In Vitro Model of Post Subarachnoid Hemorrhage (SAH) Vasospasm: Effects of Formed Human Blood Elements.

Rimal Hanif, MD (LSUHSC-S)

Intrathecal fluorescein (IF) is increasingly being used in the identification CSF leaks. The aim of this article is to perform a systematic analysis of the literature to determine the utility IF in the endoscopic repair of CSF leak.

Nnenna Mbabuike, MD (Tulane)

Deep brain stimulation (DBS) for movement disorders in 95 patients at a single center: Incidence of surgical complications and subjective outcomes

Lora Kahn, MD (Tulane)

Subtemporal Decompression for the Treatment of Increased Intracranial Pressure in a Patient with Job's Syndrome: Case Report and Review of the Literature

Jerome Volk, MD (LSUHSC-NO)

Traumatic Thoracic Spinal Subdural Hematoma Presenting as Paraplegia

David E. Connor, Jr, DO (LSUHSC-S)

Tonic Contractility of Cultured Human Brain Vascular Smooth Muscle Cells (HBVSMC): An *In Vitro* Model of Post-Subarachnoid Hemorrhage (SAH) Vasospasm: Effects of Formed Human Blood Elements.

David E. Connor, Jr., DO, Crystal Singleton, BS, Anil Nanda, MD, MPH, FACS, J. Steven Alexander, PhD

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Introduction

We propose a novel '*ex vivo*' model capable of reliably evaluating graded tonic constrictions in cultured HBVSMC with potential clinical correlations to post-SAH vasospasm. By studying gels subjected to differing concentrations of formed human blood elements and plasma mediators we propose to elucidate those fractions most associated with contraction.

Methods

HBVSMC (ScienCell, Carlsbad, CA) gels were plated into pre-siliconized 24 well culture plates and detached from the walls of the culture vessels. Replicate (n=4) HBVSMC gels were exposed to experimental solutions, incubated at 37°C and allowed to undergo tonic contraction over seven days. Control gel areas were photographed at 1 day intervals and compared to gels incubated in heparinized FBS, purified laboratory hemoglobin (0-100mg/dL), whole blood in low and high concentrations (1% vs. 10%), unlysed RBCs, lysed (sonicated) RBCs in two concentrations, platelets in two concentrations and platelet-free plasma in two concentrations, as well as differing concentrations of hydrogen peroxide (H₂O₂ 0-2mM). Surface areas of individual gels were compared utilizing ImageJ analysis software (NIH, Bethesda, MD).

Results

Significant increases in contractility compared to control were observed in several experimental groups, including HBVSMC incubated with unlysed RBCs, low concentration lysed RBCs, as well as both concentrations of whole blood (**p<0.01.) Similarly, HBVSMC contraction was dose-dependently and significantly increased by FBS concentration (0-20%), as well as total number of cells incorporated into collagen gels (0-50,000cells/gel). Interestingly, incubation with clinically relevant concentrations of heparin sulfate (2.5-50U/ml) significantly inhibited HBVSMC contraction. While high concentrations of heparinized whole blood (10%/vol) significantly increased HBVSMC contraction compared to controls as early as 24 hours post polymerization (**p<0.01), high concentrations (10%/vol.) of lysed blood failed to demonstrate a similar response. HBVSMC contraction was dose dependently *decreased* by H₂O₂, with 0.5-2mM completely inhibiting contraction (0-5d, **p<0.01).

Conclusions

The HBVSMC collagen gel contraction assay represents a novel, reliable and reproducible model of graded tonic contractility with possible application to *ex vivo* research into the functional pathways for post-SAH vasospasm.

Rimal Hanif, MD (LSUHSC-S)

Introduction

Intrathecal fluorescein (IF) is increasingly being used in the identification CSF leaks. The aim of this article is to perform a systematic analysis of the literature to determine the utility of IF in the endoscopic repair of CSF leak.

Methods

English language literature was reviewed from 1995-2013 using Medline/Pubmed, Google Scholar, and Cochrane database. Overall, 23 studies met inclusion criteria for the systematic review, including 23 studies that employed IF in endoscopic CSF leak repair versus 10 that did not.

Results

1338 patients were analyzed in this review. Studies using IF for endoscopic CSF leak repair were 13 (n=980) and not using IF were 10 (n=358). Mean follow up in IF group was 32.1 months vs. 33.1 months in non-IF group ($p>0.05$). Early CSF leak recurrence in IF group was (<6 weeks) noted in 1.3% vs. 0.5 % in non-IF group ($p=0.3$). Late CSF recurrence was 2.5 % in IF group vs. 2.2% in non-IF group ($p=0.89$). Intra-operatively, IF was detected in 58% vs 98.3% in IF vs non IF ($p=0.0001$). A total of 2107 patient in our literature search underwent intrathecal fluorescein injections, of which major dye related complications were reported in 19 patients (0.9%).

Conclusions

The systematic review did not demonstrate a statistical advantage of using IF dye endoscopically to detect CSF leaks. Further case-matched prospective randomized studies are required to ascertain the efficacy of endoscopic use of IF dye. The cumulative rate of complications using the intrathecal fluorescein dye is very low (0.9%).

Nnenna Mbabuike, MD (Tulane)

Deep brain stimulation (DBS) for movement disorders in 95 patients at a single center: Incidence of surgical complications and subjective outcomes

Objective:

To review postoperative surgical complications of DBS at a single center with the goal of contributing to a repository of results from multiple centers. This will assist patients and physicians to compare centers, perform risk/benefit analysis and make informed decisions.

Background:

Variable rates of surgical complications in DBS have been reported with infections, intracranial hemorrhage and lead migration being the most common. This retrospective review aimed to evaluate the incidence of postoperative surgical complications in 128 DBS procedures performed at our institution between 2006 and 2010.

Methods:

Analysis of data from 95 patients who underwent DBS lead implantation (128 procedures) between 2006 and 2010 by the neurosurgeon (R.S) at our institution was conducted and rate of incidence of surgical complications was assessed. Subjective improvement of symptoms (per patient report) was reviewed.

Results:

Incidence of infection was 1.05% of patients (1/95) and 0.78% of procedures (1/128). Other complications included lead migration which occurred in 2.1% of patients (2/95), transient post-operative delirium in 5.26% of patients (5/95), intracranial hemorrhage without clinical sequelae in 2.1% of patients (2/95) and lead malfunction in 1.05% of patients (1/95). Diagnoses included Parkinson's disease (70 patients; 58 males, 12 females; mean age at DBS: males 62, females 59 years); Essential Tremor (23 patients; 10 males, 13 females; mean age at DBS: males 65, females 69.5 years); other indications (2 patients). Mean length of hospital stay was 3.05 days. Percentage of patients reporting symptomatic improvement post-operatively was 96.4%.

Conclusion:

Postoperative incidence of infection and lead migration at our center is low at 1.05% and 0.78% respectively with majority of patients reporting improved symptom control. Systematic analysis of surgical data from different movement disorder centers will help us share information regarding techniques, outcomes and complications.

Lora Kahn, MD (Tulane)

Subtemporal Decompression for the Treatment of Increased Intracranial Pressure in a Patient with Job's Syndrome: Case Report and Review of the Literature

Lora Kahn, MD; Edison Valle, MD; Ilias Caralopoulos, MD; C.J. Bui, MD

Background and importance:

Subtemporal decompression (STD) is a classic technique for management of increased intracranial pressure (ICP) first described by Cushing in 1905 that is no longer commonly employed. Job's syndrome is a rare genetic immunodeficiency disorder leaving its carrier prone to recurrent infections.

Clinical presentation:

We present a patient with Job's syndrome who required CSF diversion for symptomatic increased ICP. Shunting was complicated by multiple recurrent methicillin-resistant *Staphylococcus aureus* (MRSA) infections of the shunt hardware and pleural and peritoneal abscesses together with MRSA sepsis. Attempted endoscopic third ventriculostomy was also unsuccessful. Having exhausted the usual CSF diversion techniques, bilateral STDs were performed. Close follow-up has demonstrated effective normalization of ICP and symptomatic improvement.

Conclusion:

We present the first reported case of STD for Job's syndrome. This case is also unique in demonstrating symptomatic increased ICP in a patient with Job syndrome. We propose that STD remains a viable treatment option for refractory ICP cases and should be part of the modern day neurosurgical arsenal.

Jerome Volk, MD (LSUHSC-NO)

Traumatic Thoracic Spinal Subdural Hematoma Presenting as Paraplegia

Jerome Volk, M.D. & Gabe Tender, M.D.

Methods: The case of a 26 year-old male is presented. A PubMed search was performed.

Results: Our patient presented as a trauma activation after a motor vehicle collision. The patient was neurologically intact on admission, but had numerous orthopedic injuries requiring fixation and traction of bilateral lower extremities. The patient complained of acute loss of movement and sensation of bilateral lower extremities 3 days after admission. An MRI was performed which showed a dorsal subdural hematoma from T6-8. The patient was brought to the OR for an urgent laminectomy with evacuation of hematoma.

Conclusion: Intradural extramedullary spinal hematomas are very rare. When they occur, they are usually associated with bleeding disorders, vascular malformations, neoplasm, or iatrogenic. Spinal subdural hematomas associated with trauma are even more infrequent, with only 26 other cases being reported in the literature. Management consists of surgical decompression in most cases, but some authors advocate for observation or lumbar puncture. The prognosis is extremely variable and usually associated with the level of compression.

Abstracts

Scientific Session III

Moderator: Dr. Gabriel Tender

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Osama Ahmed, MD (LSUHSC-S)

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Anthony M. DiGiorgio, DO (LSUHSC-NO)

Trauma workup in the initial management of head trauma affects times to neurosurgical evaluation and operative decompression

Anthony M DiGiorgio, DO; Erin S Fannin, MS; Robyn R Givens, NP; Jason D Wilson, MD; Frank Culicchia, MD

Introduction

Traumatic brain injury (TBI) is an important public health problem both in the United States and world-wide. Globally, an estimated 10 million people are affected by TBI each year. There are approximately 5.3 million Americans living with disability related to TBI, totaling a cost of \$60 billion annually. Many complications of traumatic brain injury require emergent surgical intervention, typically a decompression via craniotomy or craniectomy. When an acute surgical lesion is found, shorter time to the operating room has been shown to affect outcomes for the better.

Methods

A chart review of patients receiving neurosurgical intervention after a traumatic brain injury was performed from the period of July 2012 through November 2013 at University Hospital, a Level I trauma center serving Southern Louisiana. Time points from arrival were recorded using chart review (including time to CT scan, neurosurgical evaluation, entrance to the operating suite and incision). Patients were included if neurosurgery was consulted as part of their initial workup and the initial neurosurgical consult included an emergent decompression as part of the plan. Patients were excluded if they had other injuries that necessitated a delay in neurosurgical intervention.

Results

42 patients met the criteria defined above. The method of injury was 15 falls, 11 gunshot wounds, 6 motor vehicle crashes, 4 auto versus pedestrian, 3 assaults and 3 found down. 38 (90.5%) of the patients were "trauma activations." The average time to neurosurgical evaluation was 1:32 (SD 1:07, Range 0:21 – 6:45) and the average time from arrival to incision was 3:02 (SD 1:10, Range 1:23 – 7:30). The patients that arrived as a trauma activation differed significantly in time to neurosurgical evaluation (Activated: 1:22, Unactivated 3:01 ($p = .004$)) and time to incision (Activated: 2:50, Unactivated 5:01 ($p = .0001$)). They did not differ significantly in time from neurosurgical evaluation to incision (Activated: 1:27, Unactivated 1:59 ($p = .17$)).

Conclusion

A significant number of intracranial hemorrhages are not worked up as "trauma activations." This leads to significant delays in evaluation by neurosurgery and time to operative decompression. It is unknown if these delays lead to a change in outcome, and a study correlating time from decompression to outcomes can be done in the future. However, these data should prompt further investigation into better screening for head trauma.

Osama Ahmed, MD (LSUHSC-S)

THE UTILITY AND LIMITATIONS OF INDOCYANINE GREEN VIDEO ANGIOGRAPHY FOR ANTERIOR CIRCULATION ANEURYSM SURGERY

Osama Ahmed MD, Menarvia Nixon MD, Sudheer Ambekar MD, Mayur Sharma MD, Chiazio Amene MD, Anil Nanda MD, Bharat Guthikonda MD LSU HSC Shreveport

Background:

The aim of this study was to analyze the clip repositioning rate and the correlation between indocyanine green angiography (ICGA) and post-operative angiography for completeness of aneurysm occlusion and parent/branching vessel compromise during anterior circulation aneurysm surgery.

Methods:

A total of 116 patients with 130 aneurysms who underwent microsurgical clipping of anterior circulation aneurysms and ICGA during surgery from January 2008 to September 2013 were included in this study. Age, gender, aneurysm size, location and rupture status were included in the model for analysis. Results: In 10 patients (8%), ICGA resulted in clip reposition during surgery. Discordance between ICGA and postoperative angiography was observed in six patients (4%). There was no significant difference of ICGA-postoperative angiography discordance between ruptured and unruptured aneurysms ($P= 0.56$). On multivariate analysis, patient age, gender, aneurysm size, and rupture status did not reach significance. Ophthalmic ICA aneurysms were more likely to have discordance when compared to all other aneurysms ($P = 0.04$; OR = 10.8; CI 1.5 - 75.94).

Conclusion:

ICGA is a very useful modality for intraoperative assessment of the adequacy of aneurysmal obliteration and patency of parent/ perforating vessels. However, ICGA is not absolutely reliable as a standalone method during clipping of ophthalmic artery or anterior communicating artery aneurysms and can be complemented with IA. ICGA can be used either as an alternative or complementary to IA during aneurysm surgery.

Clifford L. Crutcher II, MD (LSUHSC-NO)

Gunshot Wounds to the Head: Characteristics and Outcomes at a Level 1 Trauma Center

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Introduction:

Gun violence is a problem that continues to affect many urban cities in America. It is known that penetrating craniocerebral trauma has a high mortality rate. Recent analysis of the characteristics and outcomes for craniocerebral gunshot wounds is sparse. This paper seeks to analyze gunshot wounds to the head from 2008-the present.

Methods:

A retrospective chart review was performed using the Louisiana State University Health Sciences Center- New Orleans Trauma Registry. We queried patients from 2008-present (10-22-2013) for neurosurgery consults with penetrating trauma. We included only patients with penetrating intracranial gunshot wounds (GSW)

Results:

From 2008- present (10-22-2013), there were 368 patients queried of which 111 met inclusion criteria. The median age was 26, the majority were single (91%) males (87%). Overall, the majority of patients (58%) survived. 43% had positive toxicology screens whereas only 23% were intoxicated with alcohol. The median LOS was 5 days. Half of the patients received a surgical procedure. The average admission Glasgow Coma Score (GCS) was for all patients 7.39 and 11 for survivors. The average discharge GCS was 7.75 for all patients and 13.77 for survivors. Overall the median length of stay was 5 days. The final dispositions were 43% deceased, 26% to rehab, 21% to home, and 10% to other institutions/unknown.

Further analysis revealed that 29% of GSW to the head were self-inflicted (SI) and the majority of SI GSW (81%) were Caucasian. 41% of head GSW were not SI and more often occurred to African Americans (80%)

Conclusion:

The results of this study demonstrate a clear racial disparity in penetrating craniocerebral GSW in New Orleans. Young Caucasian males are disproportionately affected by SI GSW to the head. This study also reaffirms that single young African American males are disproportionately affected by inner-city gun violence.

Juanita Garces, MD (Tulane)

Fetal Surgery for Spina Bifida in Louisiana – A Year Later

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Introduction:

Spina bifida aperta with myelomeningocele (MMC) remains a formidable challenge for pediatric neurosurgeons due to the significant morbidity and mortality associated with functional impairment, hindbrain herniation, and hydrocephalus. The results of the MOMs trial have demonstrated the benefits of early fetal repair with regards to the congenital defect. Last year, we reported Louisiana's first case of intrauterine MMC repair and now we present our first year's experience.

Results:

We have actively participated in the care of 10 children born after in utero repair of MMC: 6 cases performed at Ochsner Medical Center and 4 cases performed at one of the original MOMs institution and then delivered and cared for at Ochsner. All patients met the original inclusion criteria set out by the MOMs trial. The average gestational age of repair was 26.5 weeks (range: 25-28 weeks). There were no mortalities of either the mother or fetus. There were no intraoperative complications. All but one case (which required alloderm supplementation) was closed primarily. All babies were delivered via C-section. Six babies were delivered at 36 weeks or later, however, three were delivered 30 weeks or earlier. Only one baby is shunted. Two babies are being closely followed for ventriculomegaly, but are not shunted. Three babies have normal sized ventricles at 3 months and three have normal size ventricles at 6 month. Eight of ten babies had ventriculomegaly on prenatal ultrasound and MRI imaging. Four of ten babies currently have radiographic evidence of hindbrain herniation (Chiari II). All had in utero evidence of hindbrain herniation on pre-natal fetal MRI imaging. Nine of ten babies have good movement at the hips and knees while six of ten have good moments at the ankles. There were no cases of wound infection, dehiscence, or CSF leakage.

Discussion:

Our early data appears to mirror and support the results of the MOMs trial. There appears to be a positive impact on hydrocephalus, hindbrain herniation, and leg function. Preterm labor and delivery remains a significant risk for mothers choosing in utero repair. Long term follow-up for these cases and continued standardized follow-up of cases is needed to validate our results against well established, high volume institutions of the original MOMs trial. The phenomenon of "arrested hydrocephalus" needs to be better evaluated.

Currently not all patients in Louisiana diagnosed with in utero spina bifida have the means for out of state evaluation and treatment. Continued support of in state fetal surgery repair is one of the best ways to ensure that our patients have a viable and affordable in-state option for fetal repair of spina bifida.

Anil Nanda, MD, MPH, FACS (LSUHSC-S)

The Far Lateral Approach: Modifications and Lessons Learnt

Anil Nanda M.D., MPH, F.A.C.S., Sudheer Ambekar M.D.

Background:

The far-lateral approach is an extension of the sub-occipital approach and is used for accessing lesions lateral and anterolateral to the brainstem and craniovertebral junction

Objective:

To describe the modified far-lateral technique and report the morbidity and outcome of patients who underwent surgery using the modified far-lateral approach.

Methods:

From 1994 to 2011, a total of 35 patients underwent surgery with the modified far-lateral approach. We retrospectively reviewed the records of these patients to analyze their clinical outcome.

Results:

Of the 35 patients, 18 had aneurysms of the proximal PICA, proximal basilar artery, vertebrobasilar junction and AICA and 17 patients had various tumors of which foramen magnum meningioma, C1-C2 neurofibroma, pontine cavernoma and petroclival meningioma were predominant. Complete resection was possible in all but one case of foramen magnum meningioma and the aneurysms were clipped in all cases. Follow-up data was available for 28 patients (80%), the mean duration of follow-up being 32 months. One patient died in the post-operative period due to systemic complications and another died 6 years later due to an unrelated cause. At last follow-up, 15 patients (54%) had good recovery (GOS 5), 9 patients (32%) had moderate disability (GOS 4) and 4 patients (14%) remained in the same functional state (GOS 3). One patient had recurrence of foramen magnum meningioma. Three patients had persistent hydrocephalus after surgery and required ventriculo-peritoneal shunting procedure. The overall approach related permanent morbidity and mortality was 8.6% and 2.9% respectively.

Conclusion:

The far-lateral approach is an excellent approach to access lesions located in ventro-lateral brainstem, ventro-lateral and ventral foramen magnum and vertebro-basilar junction area. Modified far-lateral approach without condyle resection and vertebral artery mobilization is associated with comparable outcomes and lower procedure related morbidity.

