Oral Presentations
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500. Pre- and Postoperative Skin Preparation Using Chlorhexidine-Alcohol in Patients Undergoing Lumbar Instrumented Fusion: Results of a Novel Antisepsis Protocol

Peter C. Gerszten, MD, MPH, FAANS; Erin Paschel; Ramesh Grandhi, MD; David Okonkwo, MD, PhD; Adam Kanter, MD; Yue-Fang Chang, PhD (Pittsburgh, PA)

Introduction: Wound infection following lumbar instrumented fusion surgery is a potentially preventable complication that is associated with major morbidity and cost. The purpose of this investigation was to demonstrate that the postoperative application of a skin antiseptic agent in addition to standard preoperative skin preparation reduces surgical site infection. The study was also designed to identify risk factors for the development of infection in this population.

Methods: A prospective cohort analysis of 250 consecutive patients who underwent elective instrumented fusion of the lumbosacral spine for degenerative disease over 5 years at a single institution was conducted. For all patients, a chlorhexidine-alcohol skin preparation (Chloraprep, CareFusion) was applied immediately prior to incision, after skin closure, and daily on postoperative days 3-17. Data collected included comorbidities, immunologic and nutritional markers, and perioperative information.

Results: There was a single (0.4%) subfascial infection requiring reoperation and 7 (3%) superficial infections requiring antibiotics alone. A significant relationship between infection occurrence and the following variables was demonstrated: surgical blood loss (p=0.005); levels fused (p=0.006); blood transfusion (p=0.01); hypoalbumin (p=0.021). No relationship between infection occurrence and the following was demonstrated: diabetes (p=6.25); smoking (p=1.0); revision surgery (p=.303); BMI (p=.48); prealbumin (p=1.0); Vitamin D (p=0.63); HbA1c (p=1.0); length of surgery (p=.314)

Conclusions: Chlorhexidine-alcohol is an inexpensive and effective means of preventing surgical site infection after open lumbar fusion surgery. The incidence of infection for this cohort was substantially lower than published series. This low incidence was independent of multiple variables known to increase the risk of surgical site infections.

501. Trends in the Management of Pediatric Traumatic Brain Injury: 1997-2012

Jacob Kushkuley; Abdullah Feroze, BS; Omar Choudhri, MD (Worcester, MA)

Introduction: Traumatic head injury is increasingly recognized as a source of pediatric morbidity and mortality. Early diagnosis and management of pediatric head trauma is an increasing focus of neurosurgical care, as previous evidence suggests the natural history of such injury to differ versus adult injury in terms of recovery and long-term sequelae.

Methods: The records of children under the age of 18 years were queried using the AHRQ Kids' Inpatient Database (KID) for years 1997 and 2012 to define characteristics and trends in pediatric head injury and neurosurgical management over the course of the past decade. Diagnosis related group-associated variables assessed within our analysis included for traumatic stupor and coma 1) total number of discharges, 2) length of stay, 3) charges, and 4) hospital type.

Results: In 1997, there were a recorded 18,891 discharges for the treatment of traumatic stupor and coma nationally (2:1, male:female ratio). The majority of children treated were at teaching institutions (60.0%) in large metropolitan centers (92.6%). 52.6% of cases received care at a designated children's hospital. Median length-of-stay was 1.0 days and median charges totaled $3,919. In comparison, 14,778 pediatric patients were treated for the same presentation in 2012 (2.2:1, male:female ratio). Similar trends were noted in the presentation to predominantly large, metropolitan teaching institutions. However, only one-quarter of such cases received care at a designated children's hospital.

Conclusions: Traumatic brain injuries in the pediatric population continue to be an important contributor to pediatric morbidity and mortality country-wide. The overall incidence of trauma associated pediatric coma decreased in 2012, perhaps reflecting the success of awareness and prevention efforts. However mortality rates remain unchanged from 1997 - 2012, indicating a clear role for future efforts to better describe, characterize, and treat the underlying pathology.

502. Effect of Antiplatelet Therapy and Platelet Function Testing on Hemorrhagic and Thrombotic Complications in Patients with Cerebral Aneurysms Treated With the Pipeline Embolization Device™: A Review and Meta-Analysis

Susana L. Skukalek, DNP, NP-C; Anne Winkler, MD; Jian Kang, PhD; Jacques Dion, MD; C. Cawley III, MD; Adam Webb, MD; Mark Dannenbaum, MD; Albert Schuette, MD; Bill Asbury; Frank Tong, MD (Atlanta, GA)

Introduction: The Pipeline™ Embolization Device (PED) necessitates dual anti-platelet therapy (APT) to decrease thrombotic complications while possibly increasing bleeding risks. The role of APT dose, duration and response in patients with hemorrhagic and thromboembolic events warrants further analysis.

Methods: A PubMed and Google Scholar search from 2009 to 2014 was performed using the following search terms individually or in combination: pipeline embolization device, aneurysm(s), and flow-diversion, excluding other flow-diverters. Review of retrieved articles' bibliographies yielded nineteen single and multicenter studies. A statistical meta-analysis between aspirin dose (low dose < 160 mg, high dose < 300 mg), loading doses of APT agents, post-PED APT regimens, and platelet function testing (PFT) with hemorrhagic or thrombotic complications was performed.

Results: Aspirin therapy for ≤ 6 months post-PED was associated with increased hemorrhagic events. High dose ASA ≤ 6 months post-PED was associated with fewer thrombotic events compared to low dose ASA. Post-PED clopidogrel for ≤ 6 months demonstrated increased incidence of symptomatic thrombotic events. Loading doses of ASA plus clopidogrel demonstrated decreased incidence of permanent symptomatic hemorrhagic events. PFT did not show a statistically significant relationship with symptomatic hemorrhagic or thrombotic complications.

Conclusions: High dose ASA < 6 months is associated with fewer permanent thrombotic and hemorrhagic events. Clopidogrel therapy ≤ 6 months is associated with higher rates of thrombotic events. Loading doses of ASA and clopidogrel were associated with decreased incidence of hemorrhagic events. PFT did not have any significant association with symptomatic events.

503. Mini invasive Surgery (craniostomy) for chronic subdural hematoma: Applied Research

Ahamad Fawad Pirzad, MD; Ahmad Pirzad, MD (Kabul, Afghanistan)

Objective: To evaluate the results of surgical treatment options for chronic subdural hematoma in Mini invasive craniostomy vs Classic surgical Methodes (Craniotomy) Applied Research.

Method: A prospective study on patients with chronic subdural Hematoma surgically treated by Mini-invasive method (5mm incision and 2mm drill for crniostomy) vs retrospectively other invasive methods. The study focused on duration of operation, Incision, Anesthesia, Bleeding during operation, Stay duration in Hospital, cost and accompanying disease. recommendation applied Mini-invasive method.

Results: 200 cases were reviewed (100 prospective and 100 retrospectiv). Evaluation of the results showed that twist drill and burr hole craniostomy are safer(98%); than craniotomy. Irrigation lowers the risk of recurrence in twist drill craniostomy and does not increase the risk of infection. Drainage reduces the risk of recurrence in burr hole craniostomy, and a frontal position of the drain reduces the risk of recurrence. Drainage reduces the risk of recurrence in twist drill craniostomy, and the use of a drain does not increase the risk of infection. Burr hole craniostomy appears to be more effective in treating recurrent haematomas than twist drill craniostomy Also the study showed effective on duration of operation, Incision, Anesthesia, Bleeding, cost and accompanying disease.

Conclusions: Twist drill and burr hole craniostomy can be considered first tier treatment, while craniotomy may be used as second tier treatment. results on duration of operation, Incision, Anesthesia, Bleeding during operation, Stay duration in Hospital, cost and accompanying disease. craniotomy should be considered the treatment of last choice for recurrences.

504. M1 Macrophages Demonstrate a Superior Phagocytic Response Against Glioblastoma Multiforme Following Anti-CD47 Treatment

Michael Zhang; Suzana Kahn, PhD; Tej Azad, BA; Siddhartha Mitra, PhD; Sharareh Gholamin, MD; Samuel Cheshier, MD, PhD (Stanford, CA)

Introduction: Glioblastoma multiforme (GBM) is the most aggressive and common malignant primary brain tumor affecting adults, and it is known to express CD47, an antigen that inhibits macrophage phagocytosis of the expressing cells. In vivo studies have shown that mice xenografted with GBM and treated with anti-CD47 antibodies survive longer. However the macrophage population is heterogeneous, encompassing M1, pro-inflammatory macrophages, and M2, protumoral macrophages.

Methods: We quantified the rate of phagocytosis of M1 and M2 mouse and human macrophages in vitro by flow cytometry. Each subtype was co-cultured with tumor cells, with or without anti-CD47 antibodies, and stained with identifying markers. Finally, we quantified in vivo the frequency of M1 macrophages present in the peritumoral space of mice xenografted with GBM and randomized to a treatment regimen, with or without an anti-CD47 antibody.

Results: In vitro addition of anti-CD47 treatment significantly raised the M1 to M2 human macrophage phagocytosis rate ratio from 0.45 to 1.47, while also significantly elevating the rate of phagocytosis for both subtypes. In vivo, mice randomized to the treatment group presented with a peritumoral macrophage population that was significantly more M1-like (72.2%) than that observed in mice in the control group (33.7%).

Conclusions: In vitro disruption of the CD47-SIRPa signal induced a response from both M1 and M2 macrophages; however, the rate and responsiveness of phagocytosis by M1 macrophages was consistently greater. In addition, phenotypic evaluation of local macrophages surrounding xenografted GBM in mice suggests that anti-CD47 treatment promotes a larger local M1 population.

505. Targeting Ezh2+ Cells with an Oncolytic Virus in Treatment of Glioma

Kushal Shah, MD; Warner Peng, MD; Brandon Ricke; Paul Camarata, MD; Paul Arnold, MD; Darren Lovick, MD; Mike Salacz, MD; Faris Farassati (Kansas City, KS)

Introduction: As a member of polycomb group (PcG), Ezh2 (enhancer of zeste homologue 2) is overexpressed in brain tumors, resulting in silencing of promoters of tumor suppressor genes. GBM stem cells have been shown to maintain their undifferentiated characteristic nature through Ezh2. We have designed a novel oncolytic virus named Signal Smart 3 (SS3) which targets Ezh2+ cells.

Methods: Many cell lines are commercially available which mimic glioma. Proliferation assays and invasion assays were performed using the SS3 virus. Subcutaneous models in athymic nude mice with U87 cells (expressing luciferase) were used to test therapeutic intratumoral injection vs. placebo injection. Intracranial model with U87 cells was tested with intratumoral injection vs. placebo injection.

Results: U251 stem cells express a significantly higher level of Ezh2 (1.63 ± 0.04 ng/ml) compared to non-stem cells (1.05 ± 0.07 ng/ml) (p=0.009). Proliferation assays showed a significant reduction in growth after two or three days post-infection with SS3 in many glioma cells. Invasion assays on U118 and U251 showed reduction to 42.3 ± 25.7 (p=0.05) and 22.9 ± 13.3 (p=0.001) percent of control, respectively. The subcutaneous mouse model comparing therapeutic vs. placebo showed a 75% reduction in tumor size once the tumors were intratumorally injected with SS3 (6 injections). Intracranial model showed smaller tumor mass (1/3 of control) with two single intracranial injections of the virus.

Conclusions: Our experiments have shown that glioma cells are responsive to the SS3 virus in vitro and in vivo. The SS3 virus may play a role in the treatment of glioma and further studies are warranted.

506. Incidence of Alzheimer's disease in patients with clinical signs of normal pressure hydrocephalus and the efficacy of high volume lumbar puncture in predicting successful outcomes

Jonathan Pomeraniec; Aaron Bond, MD, PhD; M Beatriz Lopes, MD, PhD; John Jane, Sr, MD, PhD (Charlottesville, VA)

Introduction: Normal pressure hydrocephalus (NPH) remains most often a clinical diagnosis responsive to cerebrospinal fluid (CSF) shunting. The high co-incidence of Alzheimer's disease (AD) and NPH symptoms leads to poorer outcomes. This study reviews a