Liposuction for Superficialization of Deep Hemodialysis Vascular Access: A Novel Application

Currey M. Zalman et. al.
University of Nebraska Medical Center

Tell us how you used this information in this *short survey*.

Follow this and additional works at: https://digitalcommons.unmc.edu/gmerj

Part of the Higher Education Commons, and the Medicine and Health Sciences Commons

Recommended Citation

Liposuction for Superficialization of Deep Hemodialysis Vascular Access: A Novel Application

their knowledge and satisfaction with dialysis cares as well as preferred learning modalities. The survey included 29 multiple choices, yes/no, Likert Scale, and free response questions. Surveys were administered in English and Spanish. Assistance completing the survey was provided to consenting patients with visual impairment or other barrier to independent completion.

Results: Twenty-five of 40 patients completed the survey including 4 partial

responses. Seven questions exhibited a correct response rate of less than 60%. These questions pertained to anemia, volume overload, constipation medications, and how both the kidney and dialysis contribute to patients' health.

Conclusion: This survey identified several opportunities for improved patient education. Based on survey responses, educational pamphlets and videos are being created and disseminated to patients with the intention of

repeating surveys thereafter. If educational material improves patient knowledge, further investigation into its impact on outcome measures – interdialytic weight gain and serum phosphorous levels – ought to be pursued. Since dialysis education ought to be standardized across centers, interventions resulting in improvement in patient knowledge may be transferable to other centers.

Standardized Approach to Managing Adhesive Small Bowel Obstructions Reduces Hospital Length of Stay on the Emergency General Surgery Service

Rachael N. Newton[1], W.T. Hillman Terzian[1]

[1]Department of Surgery, College of Medicine, University of Nebraska Medical Center

Mentor: W. T. Hillman Terzian

Program: General Surgery

Type: Original Research

Background: The water-soluble contrast challenge (WSCC) has become the standard approach for differentiating operative from non-operative adhesive small bowel obstructions (ASBOs). An ingestible radiopaque contrast medium is followed by serial abdominal radiographs. Although well-described in theory, there are no resources available to guide administration of the WSCC, and management of ASBOs is usually dictated by individual surgeon practice. We hypothesized that a standardized approach to the WSCC would decrease hospital length of stay (LOS) and improve resource utilization.

Methods: We developed an evidence-based pathway for managing ASBOs (Figure 1) on our emergency general surgery (EGS) service at UNMC. Inclusion criteria was patients admitted with a presumed ASBO. Exclusion criteria was built into the pathway and included patients presenting within six weeks of abdominal surgery and specific medical or surgical conditions. We retrospectively compared hospital LOS for patients admitted two years prior to implementation of our pathway (PRE) vs patients admitted for six months after implementation of the pathway (POST). Comparison of proportions was calculated using χ2 test.

Results: A total of 153 patients were included (120 in the PRE group, 33 in the POST group). The mean LOS was 4.7 days in the PRE group vs 2.7 days in the POST group (p = 0.02), a reduction in LOS by two days.
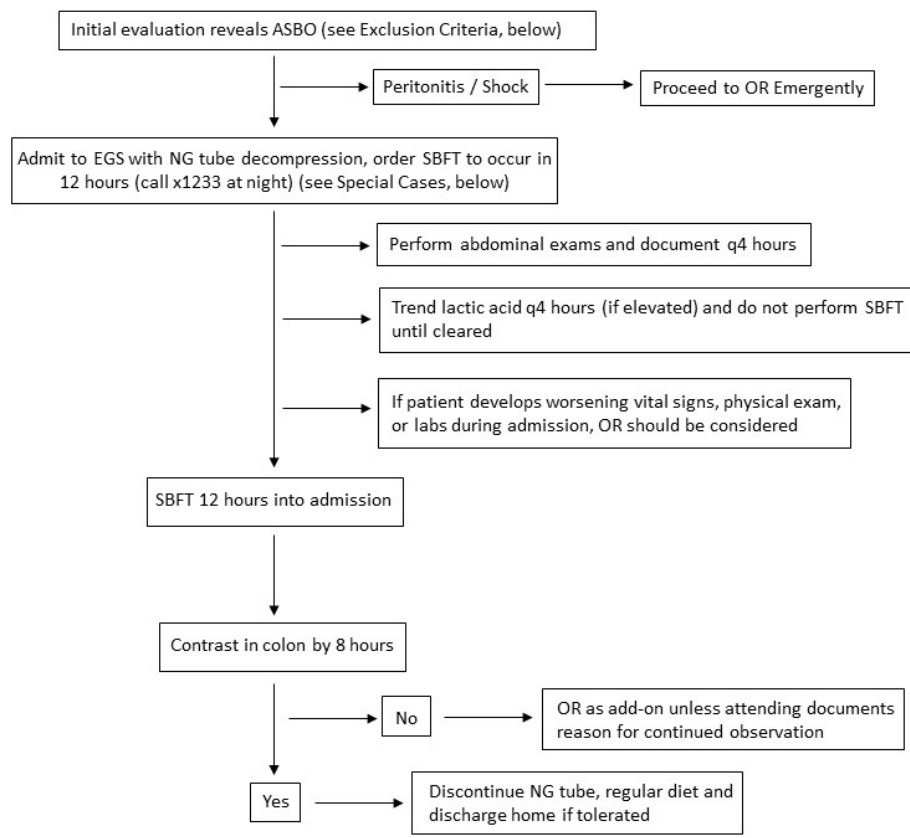
Exclusion Criteria – do not use this pathway if any of the following apply:
- Recent abdominal surgery (within six weeks)
- History of gastric bypass (admit to MIS)
- History of Crohn's / Ulcerative colitis (admit to colorectal)
- Large bowel obstruction or evidence of carcinomatosis
- Obstruction itself is directly caused by hernia of any kind
- Patient actively followed by surgical oncology or on chemoradiation (admit to surgical oncology)

Special Cases – if any of the following apply, discuss with attending before proceeding down pathway:
- Worrisome findings on imaging or labs—including, but not limited to, the following: closed-loop obstruction, high-grade obstruction, "whirl sign," mesenteric twisting, stranding, or thickening, poor or absent bowel wall enhancement, pneumatosis, portal venous gas, free fluid, lactic acidosis, leukocytosis, electrolyte abnormalities
- Obliterative peritonitis ("hostile abdomen") with known dense adhesions
- Virgin abdomen (carries 10% chance of occult malignancy causing obstruction despite CT scan report)

Figure 1. UNMC – Emergency General Surgery (EGS) Adhesive Small Bowel Obstruction (ASBO) Management Pathway.

Conclusion: Standardizing care on the EGD service significantly reduced hospital length of stay for patients with ASBOs. We are now piloting a revised pathway that can occur anytime on the floor to hopefully reduce LOS even further.

Resident Satisfaction with Didactic Curriculum and ABSITE Scores After a Major Curriculum Change

Kelsey R. Tieken[1], Michael R. Visenio[1], Sara Cartwright[1], Makayla Schissel[2], Tiffany Tanner[1], Jennifer A. Leinicke[1]

[1]Department of Surgery, College of Medicine, University of Nebraska Medical Center
[2]Department of Biostatistics, College of Public Health, University of Nebraska Medical Center

Mentor: Jennifer A. Leinicke

Program: General Surgery

Type: Original Research

Background: A surgery program's didactic curriculum is instrumental in preparing residents for patient care and the American Board of Surgery In-Training Exam (ABSITE). In the Department of Surgery, multiple curricular changes were implemented for the 2021-2022 academic year, including changing from resident-led to faculty-led lectures. Our objective was to determine if there were differences in resident perceptions of the curriculum and ABSITE scores after implementation of these changes.

Methods: A survey was administered to all general surgery residents consisting of a 5-point Likert scale on satisfaction with the curriculum, how well didactics prepared them for patient care and ABSITE, and how engaged they felt faculty were in their education before and after implementing these changes. Resident-led lecture responses were subtracted from faculty-led responses, and differences were compared using the Sign test. ABSITE percentiles from the past four years were collected for comparison.

Results: There was a significant median difference in overall resident satisfaction with the curriculum between resident-led (3.0) and faculty-led lectures (5.0), as well as perception of faculty engagement in resident-led (2.0) compared to faculty-led lectures (5.0). Residents felt that faculty-led lectures better prepared them for clinical duties and the ABSITE compared to resident-led lectures (Table 1). The average ABSITE percentile for 2022 was 78.38%, while the average for 2019-2021 was 56.27%.

Conclusion: Residents were more satisfied with the didactic curriculum that included faculty-led compared to resident-led lectures. A demonstrable improvement in ABSITE scores was seen. These findings suggest increased faculty involvement during didactics improves overall resident satisfaction and may improve ABSITE performance.

Table 1: Results of resident survey analysis on curriculum satisfaction before and after curriculum changes

Question	Resident-led Lectures (Median)	Faculty-led Lectures (Median)	Median Difference	p-value
How satisfied are you with the overall quality of the resident didactic structure?	3.0	5.0	2.0	0.0002
How well did you feel didactics prepared you to provide quality care for surgical patients?	2.0	4.0	2.0	0.0002
How well did you feel didactics prepared you for the ABSITE exam?	2.5	4.0	2.0	0.0010
How engaged did you feel the faculty members were in resident education?	2.0	5.0	2.0	0.0001

Comparison of Peripheral Biomarker Profiles Across Unique Multimorbidity Patterns in Rheumatoid Arthritis

Chloe Peyton[1], Yangyuna Yang[2], Punyasha Roul[2], Tate Johnson[2,3], Mike Duryee[2], Geoffrey Thiele[2], Ted Mikuls[2,3], Bryant England[2,3]

[1]Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center
[2]Division of Rheumatology and Immunology, Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center
[3]Division of Rheumatology and Immunology, Department of Internal Medicine, VA-Nebraska Western IA Health Care System

Mentor: Bryant England

Program: Internal Medicine

Type: Original Research

Background: Rheumatoid arthritis (RA) predisposes patients to developing multiple chronic conditions (i.e., multimorbidity), but the mechanisms underlying these associations are incompletely understood. We aimed to

determine how peripheral biomarker profiles may be associated with the clinical expression of distinct multimorbidity patterns.

Methods: From a multicenter, prospective cohort of U.S. Veterans with RA fulfilling classification criteria, we measured 51 peripheral biomarkers including pro-inflammatory cytokines/chemokines, matrix metalloproteinases, rheumatoid factor, anti-CCP antibody, and antibodies to

malondialdehyde-acetaldehyde (MAA) by MesoScale platform, ELISA, or nephelometry. Principal component analysis (PCA) was performed to generate distinct biomarker profiles (PCs). We applied four previously developed multimorbidity patterns based on the presence of up to forty-four pre-defined chronic conditions. Associations of PC scores with multimorbidity patterns were assessed using multivariable logistic regression models adjusting for potential confounders.

Results: Among 2,007 participants with RA, PCA derived 12 unique peripheral biomarker PCs (Table 1). PC5 (IL-12, IL-23p40 and IL-17a) was positively associated with all four multimorbidity patterns. PC4 (Anti-MAA albumin IgG, IgM, and IgA) and PC7 (anti-CCP and RF) were negatively associated with mental health and substance abuse multimorbidity. PC7 was also negatively associated with metabolic multimorbidity. PC11 (MMP3 and MMP7) was positively associated with cardiovascular multimorbidity. PC4, PC7, and PC11 were negatively associated with chronic pain multimorbidity.

Conclusion: We found that unique profiles of cytokines/chemokines, MMPs, and RA autoantibodies differentially associated with distinct multimorbidity patterns. These findings may indicate shared pathophysiologic mechanisms for the development of multiple chronic conditions in RA and provide therapeutic targets to reduce multimorbidity burden.

Table 1: Associations of peripheral biomarkers with multimorbidity patterns in rheumatoid arthritis.

PC	Biomarkers	Mental Health & substance abuse	Metabolic	Cardio-vascular	Chronic pain
PC1	3.IL-16, IL-27, mcp1, mcp4, mdc, tarc	0.99	0.98	0.98	0.97
PC2	IL-1beta, IL-2, IL-4, IL-6	0.96	1.00	0.96	0.98
PC3	IL-15, IL-3, IL-5	1.02	0.97	1.02	1.07
PC4	anti-MMA albumin IgG, IgM, IgA	0.93	0.98	1.01	0.93
PC5	IL-12, IL-23p40, IL-17a	1.14	1.19	1.17	1.08
PC6	anti-MMA col, fib, and vim IgM	1.03	0.97	1.05	0.96
PC7	anti-CCP, RF	0.84	0.84	0.90	0.85
PC8	anti-MMA col, fib, and vim IgG	1.05	0.98	0.99	0.99
PC9	anti-MMA col IgG, IgM, IgA	1.03	1.08	0.99	1.07
PC10	IL-13, VEGF, MMP1, MMP9	1.04	1.00	1.00	0.93
PC11	MMP3, MMP7	1.01	1.01	1.22	0.92
PC12	anti-MMA vim IgA, IL-23	0.98	1.02	1.02	1.00

Values are odds ratios from logistic regression models adjusting for age, sex. race, smoking status. Biomarkers listed are those with significant loadings (>0.3) onto the PC. P>0.05 indicated in bold. Positive associations indicated in red and negative associations indicated in green with color gradient.

Interactive Learning and UV Dosimetry as a means to Improving Sun Safety Knowledge and Behaviors

Elliot Blue[1], Elizabeth Mata[2], Sushmita Adhikari[2], Taylor Thieman[2], Marissa Lobl[3], Ashley Wysong[2], Adam Sutton[2]

[1]Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center
[2]Department of Dermatology, College of Medicine, University of Nebraska Medical Center
[3]College of Medicine, University of Nebraska Medical Center
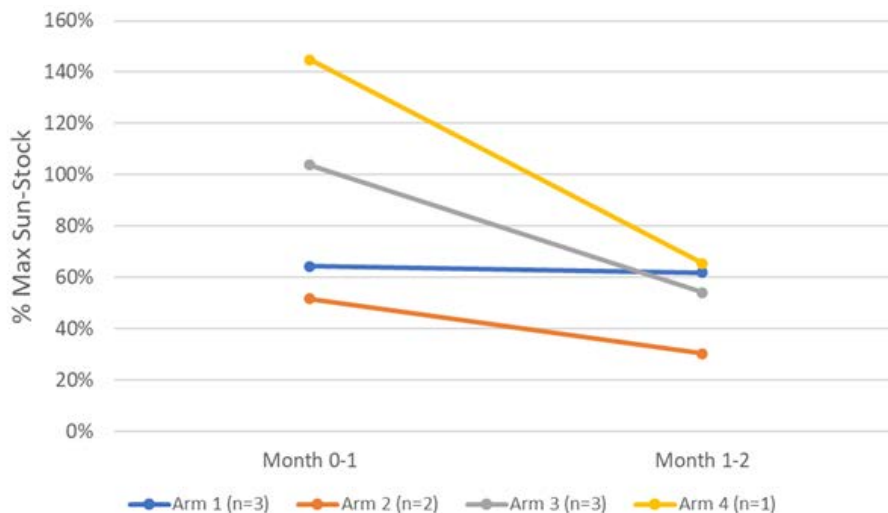
Mentor: Adam Sutton

Program: Internal Medicine

Type: Original Research

Background: This study assesses the feasibility of a multi-modal approach to sun-safety education in a high-risk population.

Methods: Patients with a history of organ transplantation were assigned to one of four treatment groups: weekly UV exposure feedback during month 2 (Arm 1), weekly UV exposure feedback month 1 and 2 (Arm 2), weekly UV exposure feedback month 1 and 2 + educational module on day 0 (Arm 3), or weekly UV exposure feedback month 1 and 2 + educational module at day 0 + sunscreen handout day 0 (Arm 4). All participants wore a UV tracker for 2 months. Surveys on sun safety knowledge and behaviors were completed on day 0, 30, and 60.

Results: All participants except one had decreasing trends in daily % max sun-stock between month 1 and 2 (Figure 1). Survey data compared from the beginning, middle, and end of the study revealed that sun safety knowledge was 10% greater in study arms 3 & 4 compared to study arms 1 & 2. This gap closed at completion of the study with only 1% difference between groups. A general trend towards more frequent sun protection behaviors was seen across all groups.

Figure 1. Average % max sun-stock first half vs second half per study arm. The greatest difference occurred in study arm 4 with a delta % max sun-stock of 79% while the smallest difference was observed in study arm 1 with a delta % max sun-stock of just 2.4%.

Conclusion: This proof-of-concept study showcases the potential for interactive learning modules and UV dosimetry to help patients better understand modifiable risk factors and semi-real-time exposure. Despite the small sample size and lack of power to deduce statistically significant results, the general trends are promising for using these tools as effective ancillary methods of patient care.

The Roles of Mucins MUC5AC and MUC16 in Lung Cancer

Elizabeth Blowers[1], Apar Ganti[2]

[1]Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center
[2]Division of Hematology and Oncology, Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center

Mentor: Apar Ganti

Program: Internal Medicine

Type: Original Research

Background: Lung cancer is one of the most common causes of cancer-related deaths worldwide. Most patients with lung cancer present at a late stage in which their cancer has already metastasized, making their disease incurable and treatment options minimal. At diagnosis, up to 25% of lung cancer patients have brain metastases. Even for those diagnosed at an early stage, nearly half will develop brain metastases. As such, understanding the underlying molecular drivers of lung cancer metastasis and developing a marker for lung cancer metastasis are key for the development of new targeted therapies for lung cancer. Mucins are high molecular weight glycoproteins. Their increased expression has been demonstrated in cancer development and metastasis. MUC5AC expression increases during the development of lung adenocarcinoma and appears to be a marker of poor prognosis and MUC16 elevation correlates with reduced survival rates in lung cancer patients.

Methods: We are using archived retrospective patient samples of lung cancer patients to study the expression of MUC5AC and MUC16 in primary lung cancer and the correlation, if any, between MUC5AC or MUC16 expression and overall survival.

Results: No association between MUC5AC or MUC16 expression in primary lung cancer tissue and overall survival was demonstrated but MUC16 may play a role in cancer progression through brain metastasis.

Conclusion: These studies will help us to understand the clinical role of MUC5AC and MUC16 in lung cancer development and metastasis and may help us develop a biomarker for early metastasis, particularly to the brain.

Liposuction for Superficialization of Deep Hemodialysis Vascular Access: A Novel Application

Currey M. Zalman[1], **Arthur S. Lanoux-Nguyen**[2], Lauren E. Weis[1], Sean C. Figy[3], Debra A. Reilly[3], Marius C. Florescu[4]

[1]College of Medicine, University of Nebraska Medical Center
[2]Department of Surgery, College of Medicine, University of Nebraska Medical Center
[3]Division of Plastic and Reconstructive Surgery, Department of Surgery, College of Medicine, University of Nebraska Medical Center
[4]Division of Nephrology, Department of Internal Medicine, College of Medicine, University of Nebraska Medical Center

Mentors: Sean C. Figy, Marius C. Florescu

Program: General Surgery

Type: Original Research

Background: Over 65% of patients with end-stage renal disease (ESRD) utilize arteriovenous fistulas (AVF) for hemodialysis. The increasing incidence of co-morbid ESRD and obesity (BMI >35kg/m2) precludes patients from kidney transplantation and underscores significant long-term access needs. Compared to traditional superficialization techniques for overlying adiposity, liposuction is minimally-invasive and well-tolerated, allowing for earlier fistula utilization with a lower complication profile. We present a practical solution to deep hemodialysis access in 14 patients undergoing liposuction for AVF superficialization.

Methods: Patients with well-matured but difficult-access fistulas due to adiposity were selected. Pre-operative ultrasound mapped fistulas, and adiposity superficial and lateral to the fistula were marked (Figure 1A & 1B) and infiltrated with Klein tumescent solution. Liposuction with Mercedes and spatula-tipped cannulas was completed in cross-hatched fashion (Figure 1C & 1D). Intra-operative ultrasound confirmed cannula positioning and measured fistula depth. A palpable thrill remained present throughout
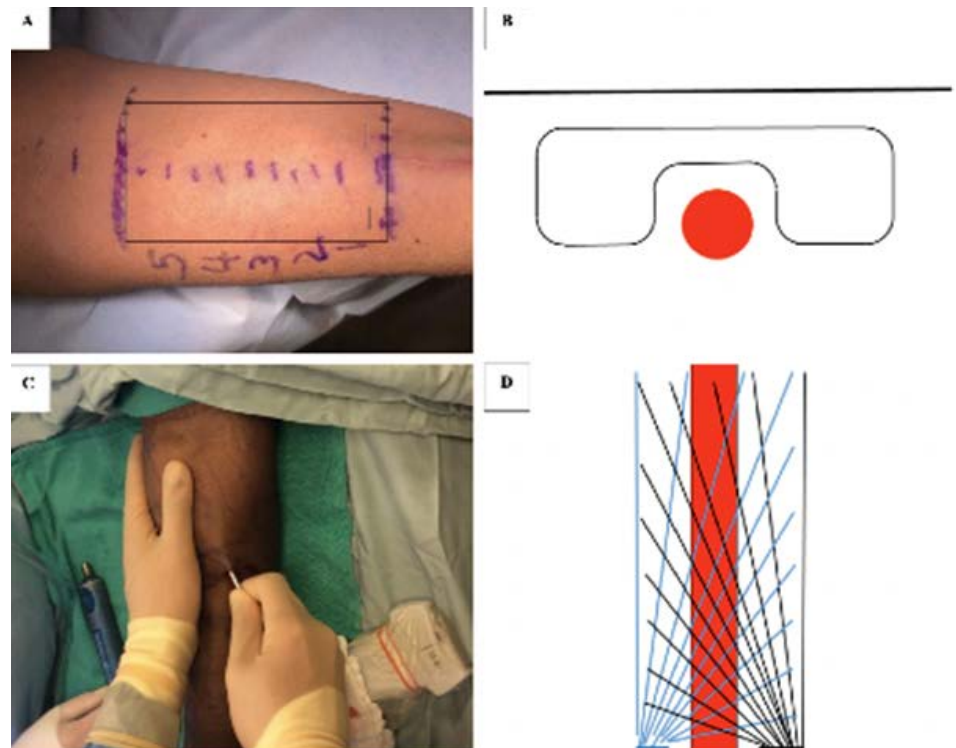
Figure 1. Liposuction for superficialization for deep hemodialysis vascular access. (A) Pre-operative ultrasound marking of the fistula in 1cm intervals with areas 2.5cm lateral to the fistula marked for treatment. (B) Schematic representing the targeted adipose tissue lateral and superficial to the fistula. (C) Liposuction of the target area with digital compression of the overlying skin to ensure proper cannula positioning and directionality, and precise movements. (D) Schematic representing the cross-hatch pattern for liposuction.

superficialization. Cannulation began 4-weeks post-operatively.

Results: Mean access depth pre-operatively was 10.9mm (8-15mm), immediately post-operative was 7mm (6-9mm), and at 4-weeks was 5.3mm (4-8mm). Thirteen fistulas were successfully accessed following liposuction superficialization. Average usable access length was 12.7cm (10-15cm) following surgery. All patients discharged home following surgery. There were no post-operative infections or hemorrhage.

Conclusion: Early experience with liposuction for superficialization of deep hemodialysis access is promising. It offers an innovative solution to an ever-growing problem, and the possibility of improved outcomes and quality of life for patients living with ESRD and obesity. Our experience shows this is a safe and effective superficialization technique to increase patient eligibility, enable successful and early cannulation, while decreasing recovery time.

Proceedings of the 5th Annual Graduate Medical Education Research Symposium | Poster Presentations — Original Research

Potential Prognostic Determinants for FET::CREB Fusion Positive Intracranial Mesenchymal Tumors

Frank M. Mezzacappa[1], Frankie Smith[2], Weiwei Zhang[2], Andrew Gard[3], Fatmagul Kusku Cabuk[4], Ignancio Gonzalez-Gomez[5], Jiancong Liang[6], Drew Pratt[7], Martha M. Quezado[7], Kenneth D. Aldape[7], Murat Gokden[8], Julia A. Bridge[2], Jie Chen[2]

[1]Department of Neurosurgery, College of Medicine, University of Nebraska Medical Center
[2]Department of Pathology and Microbiology, College of Medicine, University of Nebraska Medical Center
[3]Department of Neurological Surgery, MD West ONE
[4]Department of Pathology, Bakırköy DR. Sadi Konuk Training and Research Hospital
[5]Division of Pathology, Johns Hopkins All Children's Hospital
[6]Department of Pathology, Microbiology, and Immunology, Vanderbilt University Medical Center
[7]Laboratory of Pathology, National Cancer Institute, National Institutes of Health
[8]Department of Pathology, University of Arkansas Medical Center

Mentor: Jie Chen

Program: Neurosurgery

Type: Original Research

Background: Intracranial mesenchymal tumor (IMT) FET::CREB fusion-positive is a newly described tumor type in the 2021 WHO classification of CNS tumors with limited information available.

Methods: A literature review was performed to identify all IMTs with documented FET::CREB fusion. The factors associated with progression-free survival (PFS) and overall survival (OS) were evaluated by Kaplan-Meier analysis using individual patient data extracted from the search with inclusion of 5 newly described cases.

Results: A literature review identified 62 cases of IMTs and 5 new cases are included for a total of 67 cases. Outcome analysis revealed that GTR was associated with improved progression-free survival (PFS) compared with STR (60 v 12 months, respectively; p=0.0016). Additionally, patient age ≥14 years demonstrated longer time to progression compared with patient age <14 years (median 49 vs. 9 months, respectively; p=0.0334). However, no difference in PFS was demonstrated based on fusion subtype or tumor location. Furthermore, age < 14 (p=0.0285), STR (p=0.0480), EWSR1-ATF1 fusion partner (p=0.0243), and infratentorial tumor location (p=0.0244) were associated with worse OS.

Conclusion: IMT is a locally aggressive tumor with a high recurrence rate (>40%). Potential risk factors include subtotal resection, younger age, infratentorial location, and possibly EWSR1::ATF1 fusion. Larger case series are needed to better define prognostic determinants in these tumors.

Too Much Time on Their Hands? - Evolving Characteristics of Adult Trauma Patients During the COVID-19 Pandemic

Mark Ringle[1], Brett Waibel[1], Kevin Kemp[1], Emily Cantrell[1], Mike Matos[1], Zachary Bauman[1], Charity Evans[1], Mark Hamill[1]

[1]Department of Surgery, College of Medicine, University of Nebraska Medical Center

Mentor: Mark Hamill

Program: General Surgery

Type: Original Research

Background: The aim of the study was to investigate the characteristics of non-geriatric adult trauma during the pandemic at an ACS verified level 1 trauma center.

Methods: The trauma database was queried for adult patients (age 19-64) from March 1-October 30, 2020 with control data from March-October of 2017-2019. Patient variables included demographics, mechanism of injury, injury severity score (ISS), and positive blood alcohol.

Results: Overall adult trauma volumes increased by 16% during the study period. Patients were less likely to be Caucasian (64.7% vs 70.5%, p<0.001) and a decrease in blunt trauma (80.7% vs 84.4%, p=0.008). Significant differences in ratios of transportation injuries with shifts away from cars (64.2% vs 67.3%) and bicycles (4.0% vs 6.6%) towards motorcycles (7.4% vs 5.5%) and ATVs (7.4% vs 5.5%, p=0.019). Fewer patients were admitted to the ICU (21.4% vs 27.4%, p<0.001), those admitted had longer mean length of stays (4.8 vs 4.0 days, p=0.027). Less patients required mechanical ventilation (10.9% vs 13.0%, p=0.05), those ventilated had longer mean period of ventilation (6.8 vs 4.5 days, p=0.010). Patients had significantly higher rates of positive blood alcohol levels (40.0% vs 29.7%, p<0.001) (Figure 1).

Conclusion: Adult trauma volumes during the pandemic increased slightly. Patients had similar mortality, but longer ICU stays, longer