



SURGICAL RESEARCH
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FORUM

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Chairman

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Moderator

  Raffucci Surgical Education Foundation
American College of Surgeons, Puerto Rico
Department of Surgery, UPR-RCM

Complications of Breast Reduction Surgery in Patients with a BMI ≥ 40

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Introduction: It is currently not clear if surgical complications of breast reduction are higher in patients who have a body mass index (BMI) of 40 or above.

Method: A prospective cohort study was performed to evaluate postoperative complications after reduction mammoplasty in women with BMI < 40 as compared to women with BMI ≥ 40 . The patients were divided into two groups on the basis of BMI. Data collection included demographic questions as well as bra cup size, BMI, if diabetic or smoker, specimen weight, and postoperative complications. This study was IRB approved.

Results: This study evaluated 274 women who had reduction mammoplasty. Of the group 123 (45%) had a BMI < 40 and 151 (55%) had a BMI ≥ 40 . The groups were not significantly different in age (29 ± 10 vs. 28 ± 11), frequency of diabetes (5% vs. 4%), frequency of smokers (2% vs. 2%) and weight of breast tissue resection (911 ± 129 vs. 927 ± 113 grams). A significant difference was noted in the morbid obesity group regarding postoperative complications such as surgical site infection (12% vs. 2%, $p < 0.05$), fat necrosis (10% vs. 1%, $p < 0.05$) and nipple necrosis (9% vs. 1%, $p < 0.05$). However, there were no significant differences in the need for revisions or re-operations (5% vs. 5%). There were no deaths or major systemic complications in either group.

Conclusion: A BMI ≥ 40 is associated with an increased risk of postoperative complications. However, the majority of complications were minor and outcomes were satisfactory as indicated by the absence of a significant difference in revisions or re-operations.

Frequency of Cancer Cases in the Surgical Workload of UPR-Affiliated Hospitals

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Introduction: Cancer incidence was stable during the past 10 years but dropped sharply in 2020 due to the COVID-19 pandemic that disrupted health services worldwide.

Method: Using the University of Puerto Rico surgery department database, we evaluated the number of surgical cases and their characteristics during the years 2016 to 2022. The cases were separated into two groups: cancer and non-cancer surgery. The variables evaluated included age, gender, diagnosis (by ICD-10 codes), American Society of Anesthesiology (ASA) classification, and outcome. This database was IRB approved.

Results: A total of 31,388 cases had surgery between 1/1/2016 and 12/31/2022. Of that group 8,670 (28%) had cancer. The mean age of cancer patients was significantly ($p < .05$) higher (57 ± 19 vs. 48 ± 23). Gender distribution showed that a significantly ($p < .05$) greater number of females had cancer surgery (68% vs. 33%). However, they did not have a higher frequency of ASA scores ≥ 3 (34% vs. 36%) or mortality (0.2% vs. 0.6%). The most frequent diagnosis were breast cancer (2369, 27%) and gastrointestinal cancer (2,053, 24%). In 2020 a drop in cases was noted from the COVID-19 pandemic. The frequency distribution per year is shown in the table.

Year	Cancer cases	Non-cancer cases
2016	1,291 (28%)	3,317 (72%)
2017	1,282 (30%)	3,056 (70%)
2018	1,548 (29%)	3,723 (71%)
2019	1,405 (28%)	3,635 (72%)
⇒ 2020	992 (28%)	2,572 (72%)
2021	947 (24%)	2,988 (76%)
2022	1,205 (26%)	3,427 (74%)
Total	9,873 (28%)	26,088 (72%)

Conclusion: The frequency of cancer cases has remained at 28% of the total surgical workload.

In-Patient Rehabilitation of Trauma Patients in Puerto Rico

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Introduction: Current research highlights a need for evidence quantifying the outcomes and value of rehabilitation post-trauma. This study examines the sociodemographic and clinical profiles, as well as functional outcome measures for trauma patients at the in-patient rehabilitation facility (IRF) in the Puerto Rico Trauma Hospital.

Method: An IRB-approved retrospective cohort study of all admissions to the IRF from August 2021 through February 2023 was performed using the Trauma Registry and the IRF database. Functional progress during IRF stay was assessed by comparing Self-Care and Mobility scores from admission to discharge with a paired t-test.

Results: During the study period, 114 patients were admitted to the IRF, of which the majority were males (75%) with 41 ± 19 years. Road traffic accidents were the predominant mechanism of injury (60%) and the median (interquartile range [IQR]) injury severity score was 17 (10). Sixty-six percent of the patients were admitted to TICU, 64% required mechanical ventilation, and the median (IQR) hospital length of stay prior to rehabilitation was 21.5 (24) days.

Patients experienced significant improvement in functional outcomes from admission to discharge, as measured by Self-Care (16.4 ± 7.4 vs. 29.7 ± 10.0 ; < 0.0001) and Mobility (28.0 ± 9.1 vs. 59.6 ± 21.9 ; < 0.0001) scores.

Conclusion: This study provides the sociodemographic and clinical profiles of trauma patients who benefit from IRF services, which may inform the development of further guidance for early assessment of potential rehabilitation patients. Our results showed that IRF services were effective, as trauma patients significantly improved their functional status, underscoring the essential role of rehabilitation after trauma.

Influence of Parenteral and Early Enteral Nutrition in Distinct Monocyte Subpopulations and Plasma Cytokines During and After Sepsis in Polytraumatized Patients

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Introduction: Nutrition is known to influence inflammatory network during sepsis in trauma patients. However, the relationship between monocyte subpopulations, plasma cytokines, and early enteral nutrition (EN) during sepsis has never been explored. In this study, we investigated if monocyte subsets [classical (CLM), intermediate (ITM), and non-classical (NCM)] were influenced by EN in polytraumatized patients during and after sepsis and if their percentage and activation state correlated with cytokine levels.

Method: We conducted an IRB-approved Randomized Clinical Trial of septic shock patients (N=15) admitted to PR-Trauma Hospital, stratified by feeding status in EN (N=10) or NPO (N=5) subgroup. The percentage and activation of monocyte subsets were quantified by flow cytometry using CD14, CD16, and HLA-DR markers before (baseline), during, and after sepsis (resolution).

Results: In EN subgroup, the percentage of ITM significantly increased from baseline to sepsis ($p=0.01$) and decreased from sepsis to resolution. In NPO subgroup, CLM percentage increased significantly from baseline to sepsis ($p=0.01$), followed by a decrease in resolution. The NCM percentage significantly decreased from baseline to sepsis in NPO subgroup ($p=0.04$), followed by an increase in resolution. A negative correlation was observed between plasma IL-1 β and percentage of activated ITM ($p=0.02$) and NCM ($p=0.03$) in resolution for EN subgroup. No significant correlations were observed in NPO subgroup.

Conclusion: Our study suggests that EN has an important role modulating activated monocyte subsets and cytokine levels simultaneously after sepsis among polytraumatized patients. ITM and NCM may have a significant role regulating IL-1 β levels during resolution phase for EN-treated patients.

Vascular Surgery Workforce and Wellbeing Survey in Puerto Rico

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Introduction: There's a nationwide deficit of vascular surgeons, 1.01 per 100,000 of population in the United States, with areas affected disproportionately. In Puerto Rico, the ratio increases to 1:250,000, with 14 vascular surgeons specialized in the field. A recent survey done by Society for Vascular Surgery members identified 41% of responders who reported feelings of burnout.

Method: Members from the Vascular Society of Puerto Rico were recruited to complete a specialized questionnaire that includes Copenhagen Burnout Inventory and Brief Resilience Scale. Respondents rate their experiences on a Likert scale. Demographics, hospital resources, work-life balance, personal and job characteristics also described. Project IRB exempt.

Results: 12 out of 14 of vascular surgeons were able to complete the survey. Median age was in the range of 55-64 years, all male in gender. 50 hours per week was the average working hours, where 78% of that time was focused on surgery. Half of participants frequently felt feelings of burnout, whereas a quarter of participants found their job tiresome. 70% referred diminished energy to spend with family and friends during leisure time. 85% of participants tend to bounce back quickly after hard times.

Conclusion: Recruitment of around twenty specialized surgeons may relieve the burden against present disparities. The migration of healthcare professionals to the mainland, limited residency programs and insufficient incentives to retain physicians should be addressed. In sum, there are few vascular surgeons, near a retiring age, in need of assistance to provide the best healthcare to our people.

Bypass Surgery as a Viable Option for Chronic Limb-Threatening Ischemia Patients with Chronic Kidney Disease

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Introduction: Chronic limb-threatening ischemia represents the most severe manifestation of Peripheral Artery Disease. Literature suggests that patients with Chronic Kidney Disease experience elevated rates of limb loss and mortality compared to non-CKD patients when undergoing bypass surgery.

Method: This study compares limb salvage and mortality outcomes between non-CKD and CKD patients undergoing lower extremity bypass surgery. This retrospective IRB approved cohort study included 208 consecutive patients who underwent lower extremity bypasses at a single center between 2018 and 2023. Primary end point was limb salvage at 1-year follow-up; secondary endpoints were major adverse events and mortality rate.

Results: 118 non-CKD patients and 90 CKD patients underwent lower extremity bypasses. One-year limb salvage rates were 80% for CKD patients and 79.7% for non-CKD patients, with a non-significant p-value of 0.9. Major amputations occurred within the first 100 days post-bypass surgery in both groups. Survival rates at one year were 88% for CKD patients and 94% for non-CKD patients. 53% of CKD patients presented with Rutherford classification 6, compared to 43% of non-CKD patients (p-value:0.266). Amputation frequency was assessed by CKD stage, 16% amputation risk for CKD stage 3, 28% for CKD stage 4 and a 29% for CKD stage 5 (p-value: 0.653). End-Stage Renal Disease was not associated with a worse outcome in patients undergoing bypass surgery for revascularization.

Conclusion: Limb salvage does not significantly differ between CKD and non-CKD patients, while CKD patients exhibit higher mortality rates. ESRD is not associated with a worse outcome in patients undergoing bypass surgery for revascularization.

Endovascular Revascularization Outcomes in Octo- & Nonagenarians with Critical Limb-Threatening Ischemia from a Single Vascular Surgery Care Center in Puerto Rico

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Introduction: As average lifespan lengthen, critical limb threatening ischemia (CLTI) prevalence increases. CLTI is associated with high morbidity and mortality rates as well as, worse quality of life. In the elderly population, endovascular interventions have been associated with lower in-hospital mortality, myocardial infarction, stroke when compared to open revascularization techniques. The aim of our study is to evaluate endovascular revascularization outcomes in octo- and nonagenarians in Puerto Rico.

Method: This retrospective cohort study, approved by PHSU IRB, included patients ≥ 80 y/o who underwent endovascular revascularization due to CLTI from January 2019 through June 2023. We excluded patients with previous bypass and diagnostic angiography. All variables were recorded in accordance with the SVS reporting guidelines. The primary end point was limb salvage at 1-year follow up; secondary end points were major adverse events and mortality rate.

Results: Total of 152 patients underwent digital subtraction angiography with angioplasty. Overall, high prevalence of females (53.9%), 80-89y/o (84.9%), hypertension (88.2%), diabetes mellitus (71.7%), and CKD (53.2%). Amputation-free survival was 82% while mortality rate was 21% at 1-yr follow. Six percent (6%) of patients required post-operative transfusion which was associated with major amputation (p-value 0.002). Cox regression analysis showed that patients with diabetes mellitus (OR 1.3), hypertension (OR 1.2) and decreased functional status (OR 1.4) were at higher risk of major amputation.

Conclusion: The benefit of endovascular procedures in octo- and nonagenarian is up for debate. Considering the low perioperative complication rate and acceptable amputation free survival, endovascular interventions should be offered to this population.

Epidemiological and Clinical Characteristics of Craniomaxillofacial Traumas in Puerto Rico

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Introduction: Craniomaxillofacial (CMF) trauma is a significant problem in the United States. Facial fractures occur based on factors including facial structure and mechanism of injury. Demographic, social, cultural, and environmental factors can contribute to particular trauma, leading to injury rates among populations. This study aims to provide the first data on the prevalence of CMF trauma in Puerto Rico.

Method: Retrospective study including patients of 0 to 99+ years with CMF from 2018 to 2022 in Puerto Rico. Demographic and clinical data were collected, including mechanism of injury, craniofacial structures involved, treatment, and outcome. Statistical analysis using One-way ANOVA and T-tests were performed. Approved by IRB.

Results: 1099 patients (83.5% male, 16.5% female) with CMF injuries were included. Median age was 37 years. Most common mechanisms were non-car-MVA (23.7%), car-MVA (23.0%), pedestrian (18.5%), falls (16%), and gunshots (10.5%). Cranial fractures occurred in 32.7% of patients in the regions: temporal (15.6%), sphenoidal (11.9%), frontal (10.2%), parietal (7.6%), and occipital (5.1%). Facial fractures occurred in 68.4% of patients in the regions: middle (60.5%), lower (17.3%), and upper face (8.8%). 76% of patients underwent surgical management. Mortality was 11.8% in the cohort. The Glasgow Coma Scale (GCS), Injury Severity Score (ISS), and Trauma Injury Severity Score (TRISS) were statistically significant in cranial ($p < 0.001$) and facial ($p < 0.001$) fractures.

Conclusion: Most patients were adult males. Etiologies of injury were similar to those reported in the literature. Facial fractures were more prevalent than cranial fractures. Patients with high-severity injuries were more likely to be managed surgically.

The Impact of the COVID-19 Pandemic on Colorectal Patients: A Comparative Analysis

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Introduction: COVID-19 as a global pandemic and recondite disease required reallocation impacting cancer screening programs. This led to a worldwide decline in preventive care, treatment, and diagnosis increasing mortality. Our aim is to evaluate the effects on colorectal cancer as a result of delay in treatment and diagnosis; and compare demographics, comorbidities, surgical interventions, and rate of ostomy creation.

Method: Retrospective data was gathered from a colorectal clinic in San Juan PR and NeoMed EHR. Additionally, pre-operative work-up is evaluated to determine the stage of disease at the time of diagnosis. Groups were divided into "Pre-COVID group" and "COVID group". Inclusion criteria were patients diagnosed with colorectal cancer and exclusion criteria included patients with colorectal cancer history treated before 2019. Approved by IRB.

Results: A total of 478 patients were included in the study [pre-COVID (PC) 264; COVID 214]. The most common age between groups was 61-80 y/o without gender differences. Comorbidities were hypertension, diabetes mellitus, and hypothyroidism. On TNM stages, there was a 7% increased incidence of T3 tumors. In terms of staging, an increased rate of stages 1 and 3 was observed. The study suggests that continuous care was provided to newly diagnosed colon and rectal cancer patients during the pandemic.

Conclusion: Contrary to our hypotheses, no significant differences were seen in advanced stages at the time of diagnosis, nor was access to care delayed to referred patients, with only a 50-patient difference among both periods. This study highlights the importance of specialized centers during times of crisis to minimize deleterious effects on patient care.

Unveiling Disparities: Head and Neck Cancer Presentation and Healthcare Access in Puerto Rico

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Introduction: Head and Neck cancers (HNC) pose a significant health challenge, especially in Puerto Rico. This study categorizes key sociodemographic variables by segmenting patient data into municipality, cancer stage at presentation, and health insurance data. Through an examination of demographic and healthcare access factors, this study reveals health disparities for the first time, providing valuable insights that can guide the development of targeted public health strategies for addressing HNC in Puerto Rico.

Method: Our approach involves a retrospective chart review and analysis of the patients consulted to the Otolaryngology department by use of case logs in the Puerto Rico Medical Center using CPT and ICD-10 codes dating from January 2022 to December 2023. This study, which has IRB approval, examines the relationship between the severity of cancer, patient demographic information such as municipality of origin, and the healthcare plan they have.

Results: The findings suggest that patients from remote municipalities in Puerto Rico exhibit more advanced and metastasized HNC, identifying disparities in early detection and healthcare access. Additionally, the study underscores a significant lack of healthcare coverage in these areas, emphasizing the necessity for targeted public health initiatives to improve outcomes for this vulnerable population.

Conclusion: The research reveals notable disparities in HNC presentation in Puerto Rico, emphasizing the prevalence of advanced-stage cancers and limited healthcare coverage. This study identifies and describes these disparities for the first time, highlighting the urgent need for targeted interventions and improved healthcare access to enhance early detection and overall healthcare outcomes in affected populations.
