

• ABSTRACTS FROM SCIENTIFIC FORUMS •



Success at Weight Loss before and After Reduction Mammoplasty

Norma I. Cruz, MD

Plastic Surgery Div., Dept. of Surgery, School of Medicine, University of Puerto Rico Medical Sciences Campus, San Juan, PR

Introduction: Patients after a reduction mammoplasty become more motivated and successful at weight reduction since they are relieved from the back and neck pain resulting from macromastia.

Method: A prospective cohort study was performed to evaluate the success at weight reduction of women before and after reduction mammoplasty. The weight, height and body mass index (BMI) of women after 12 months of conservative management (physical therapy, weight loss and analgesics) and 12 months after breast reduction surgery were recorded. Data collection included demographic questions, age, bra size, specimen weight, and if she was exercising. The study was IRB approved.

Results: The study evaluated 206 women with symptomatic macromastia who underwent reduction mammoplasty. The mean age at surgery was 31 ± 10 years, the mean bra size was 38-D and the mean specimen weight was 921 ± 124 grams. The initial mean BMI of the group was 31 ± 4 kg/m², decreasing to 30 ± 3 kg/m² at the time of surgery and to 27 ± 4 kg/m² at 12 months after surgery (Table 1). Preoperative weight loss occurred in 40% (82) of the patients, while postoperative weight loss occurred in 75% (155) of the patients. All the successful patients had incorporated exercise in their daily routines, while only 10% of the non-successful ones were exercising.

Conclusion: Women with symptomatic macromastia were more successful at losing weight and incorporating exercise in their lifestyle after reduction mammoplasty.

Table 1.

	Start	12 months later	P
Pre-op BMI (mean)	31 kg/m ²	30 kg/m ²	>0.05
Post-op BMI (mean)	30 kg/m ²	27 kg/m ²	<0.05

The Effect of Puerto Rico's Declining Birth Rate on the Pediatric Surgical Workload

Norma I. Cruz, MD, Elvis Santiago, MS, Francheska Nieves-Rivera, MD, Víctor Ortiz, MD

Department of Surgery, School of Medicine, University of Puerto Rico, San Juan, PR

Introduction: The number of births in Puerto Rico has decreased, from 34,434 in 2014 down 45% to 19,090 in 2021. We evaluated the effect these changes had in the pediatric surgical workload.

Method: Using the University of Puerto Rico (UPR) surgery department database, we evaluated the number of pediatric surgical cases and their characteristics during the years 2014 to 2021. The cases were separated into subgroups according to ages: neonates (birth to age less than 1 month), infants (age 1 month to less than 2 years), children (age 2 to less than 12 years), and adolescents (age 12 to 18). The total number of pediatric cases performed per year was compared to the ones recorded for the adult population during the same period. This database was IRB approved.

Results: A total of 4,079 pediatric cases had surgery between 1/1/2014 and 12/31/2021. Neonates represented 10.8%, infants 23.1%, children 38.7% and adolescents 27.4% of the group. As shown in table 1, there was a tendency to a steady decline in the total number of cases per year, aggravated by sharp drops in 2015 (retirement of 2 senior faculty members), 2017 (Hurricane Maria) and 2020 (COVID-19 pandemic). When compared to 2014 the number of pediatric surgical cases decreased 28% in 2021, while adult cases decreased 17% (4,193 vs. 3,483), a statistically significant difference $p < 0.001$.

Conclusion: Puerto Rico's declining birth rate has adversely affected the pediatric surgical workload, resulting in a decrease in the number of surgical cases.

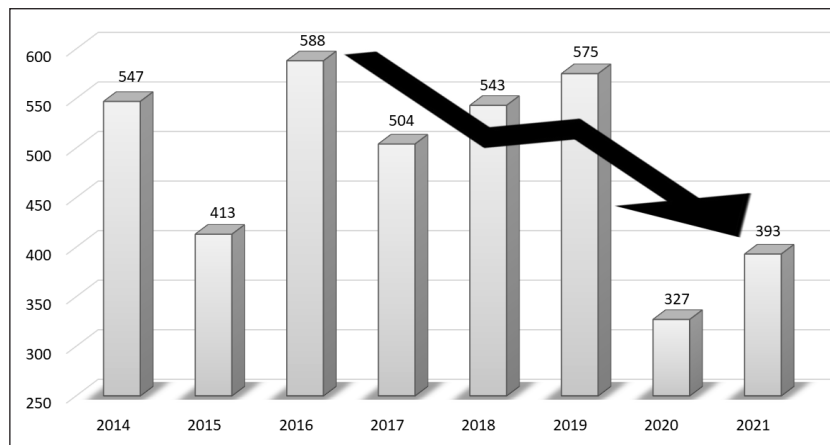


Table 1. Pediatric surgical cases per year

Differences in B Cell Activation State and Cytokine Correlations During Sepsis Process in Trauma Patients Stratified by Feeding Status

Lorivette Ortiz-Valentin, BS1; Yamil Gerena, PhD1,2; Ediel O. Ramos Meléndez, MPH, DrPH2,3; Lourdes Guerrios Rivera, MD, MSc 2,3; Pablo Rodríguez Ortiz, MD, FACS, FCCM, FACP, FCCP2,3

1Department of Pharmacology and Toxicology, University of Puerto Rico Medical Sciences Campus, School of Medicine P.O. Box 365067, San Juan, PR 00936-5067; 2Trauma Research Program, Department of Surgery, University of Puerto Rico, Medical Sciences Campus, PO Box 365067, San Juan, Puerto Rico 00967
3Puerto Rico Trauma Hospital, PO Box 2129, San Juan, Puerto Rico 00922

Introduction: Previously we found that IFN- γ , IL-6, and IL-10 correlated with the inflammatory and resolution process of sepsis in trauma patients. However, their possible role in B cell activation during sepsis has never been explored. In this study we quantified B cell activation and correlated with these plasma cytokines during and after sepsis in trauma patients.

Methods: We conducted an IRB approved Randomized Clinical Trial of septic shock patients (overall N=16) admitted to Puerto Rico Trauma Hospital and stratified by trauma mechanisms in blunt (N=10) and penetrating (N=6) and feeding status in Enteral Nutrition (EN) group (N=10) or NPO (N=6). The activation state of B cells using HLA-DR marker was quantified by flow cytometry before sepsis (baseline), during sepsis, and after sepsis (resolution).

Results: A significant increase in the % of inactivated B cells was observed from sepsis to resolution in overall group ($p=0.01$) and NPO subgroup ($p=0.04$), however no changes were observed in the EN subgroup. When stratified by trauma mechanism, a significant decrease in % of activated B cells was observed only in the penetrating subgroup from sepsis to resolution ($p=0.03$), but no changes were observed in the blunt subgroup. A positive correlation was observed between IFN- γ and HLA-DR levels in activated B cells only in the NPO subgroup ($r=0.90$, $p=0.01$).

Conclusion: Our study supports that different immune mechanisms are involved in the resolution of sepsis in trauma patients stratified by feeding status (NPO vs EN). IFN- γ may have an important role during sepsis process in NPO patients.

Trauma Epidemiology in Puerto Rico: In-hospital Mortality and Morbidity from 2012-2022

Ediel Ramos Meléndez, MPH, Dr.PH1, 2;

Lourdes Guerrios Rivera, MD1, 2;

Lynnette A. Martinez-Rivera1,

Pablo Rodriguez Ortiz, MD, FACS, FCCM, FACP, FCCP1, 2

1Trauma Research Program, Department of Surgery, University of Puerto Rico, Medical Sciences Campus,

PO Box 365067, San Juan, Puerto Rico 00967; 2Puerto Rico Trauma Hospital, PO Box 2129, San Juan, Puerto Rico 00922

Introduction: Our study aims to characterize the distribution of trauma in Puerto Rico, identifying the major trauma mechanisms that may affect the epidemiology of this preventable disease. Our goal is to evaluate trends in the Puerto Rico Trauma Hospital (PRTH) from 2012-2022.

Methods: We conducted an IRB-approved cross-sectional study using the PRTH trauma registry. All patients admitted secondary to the major injury mechanisms were selected. Group comparisons were performed using Pearson's chi-square and Kruskal-Wallis tests.

Results: A total of 5,277 patients were admitted due to road traffic accidents, 2,728 following falls, 2,308 gunshot wounds (GSW), 1,654 due to pedestrian accidents, and 939 following stab wounds (SW). GSW ($p<0.01$) and SW ($p=0.01$) admissions decreased over time, whereas those of pedestrians marginally increased ($p=0.06$). Falls and pedestrian accidents were the oldest subjects groups ($p<0.0001$), with a median age of 60 and 51 years, respectively. Pedestrians (14 pts.) presented with the highest median ISS, while SW- (9 pts.) and fall-related (9 pts.; $p<0.001$) admissions showed the lowest ones. The longest median hospital stay (12 days) and the greatest mortality rate (16%) were observed among pedestrians; SW, however, showed the shortest stay (5 days; $p<0.001$) and the lowest mortality (3%; $p<0.001$).

Conclusion: Compared to our previous study, we found an upward trend for pedestrian admissions, while this mechanism decreased during 2002-2011. Furthermore, mortality rates declined for all the mechanisms excluding falls, which increased from 10% to 12%. This updated data may inform policy initiatives and the development of preventive strategies for an underserved minority population.

The Impact of Unemployment on the Admission Rate Secondary to Intentional Penetrating Trauma in Puerto Rico

Diego A. Rodriguez-Guerrios BS, MS1; Omar García-Rodríguez, MS, DrPH1;

Ediel O. Ramos-Meléndez, MPH, DrPH1,2; Lourdes Guerrios-Rivera, MD, MSc1,2;

Pablo Rodríguez-Ortiz, MD, FACS, FCCM, FACP, FCCP1,2

1Trauma Research Program, Department of Surgery, University of Puerto Rico, Medical Sciences Campus,

PO Box 365067, San Juan, Puerto Rico 00967

2Puerto Rico Trauma Hospital, PO Box 2129, San Juan, Puerto Rico 00922

Introduction: The stagnant economic conditions of Puerto Rico (PR) over the past 15 years have provided a unique opportunity to study the impact of an economic recession on the trauma population. Our objective was to examine the relationship between unemployment and penetrating trauma and assess the association between the economic recession and the incidence of penetrating trauma in PR.

Methods: An IRB-approved ecological time-series using the trauma registry of the Puerto Rico Trauma Hospital (PRTH) was completed. All patients admitted secondary to stab wounds (SW) or gunshot wounds (GSW) from 2001-2019 were included. Annual hospital admission rates were analyzed using PR's unemployment rate, gross product, and consumer price index as predictor variables through linear regression models. Results are reported as Beta+/-SE.

Results: The sample included 6,793 patients. Of those, 3,408 (51%) were injured before the economic slowdown (2001-2008), whereas during the PR economic downturn (2009-2019) 3,385 (49%) were seen at PRTH. In a multivariate analysis accounting macroeconomic variables and the recession term, there was a statistically significant increase in the rate of annual unemployment associated with increasing rates of cases of SW and GSW admitted to PRTH (0.075+/-1.49, $p=0.009$ for SW; 0.112+/-0.017, $p<0.001$ for GSW) and male (0.079+/-0.026, $p=0.009$ for SW; 0.120+/-0.019, $p<0.001$ for GSW).

Conclusion: Our findings confirm that as unemployment rises, penetrating trauma cases also increase. These findings may be used for public policy initiatives as a way to calculate additional indirect costs and improve resource allocation to trauma centers and other programs during an economic crisis.

Incidence and Factors Associated with TBI Among Patients Suffering from ATV-Related injuries: A Hospital-based Study

Kyara M. Berrios Toledo MS.1;

Ediel Ramos Meléndez, MPH, Dr.PH1, 2;

Lourdes Guerrios Rivera, MD1, 2;

Pablo Rodriguez Ortiz, MD, FACS, FCCM, FACP, FCCP1, 2

*1Trauma Research Program, Department of Surgery, University of Puerto Rico,
Medical Sciences Campus,*

PO Box 365067, San Juan, Puerto Rico 00967

2Puerto Rico Trauma Hospital, PO Box 2129, San Juan, Puerto Rico 00922

Introduction: In recent years, a rise in popularity of all-terrain vehicles (ATV) has been met with an increase in trauma to those operating these machines. Amongst all traumatic injuries, traumatic brain injuries (TBI) are the most prevalent. Therefore, this study aims to investigate the incidence and factors associated with TBI among ATV-related admissions to the Puerto Rico Trauma Hospital (PRTH).

Methods: This is an IRB-approved cross-sectional analysis of all admissions to the PRTH secondary to ATV crashes from 2000-2022. The parameters evaluated included sociodemographic characteristics, injury profile, and outcomes. Factors associated with TBI were examined using Pearson's chi-square and Mann-Whitney tests.

Results: Three hundred forty-five patients were admitted to the hospital following an ATV crash, of which 77% were male with a median age of 26 years. The incidence of TBI for the study period was 36%. Those patients with TBI had higher ISS (medians: 22 vs. 13.5 pts.; $p < 0.0001$), longer TICU (medians: 16.5 vs. 7.5 days; $p = 0.01$) and hospital (19.5 vs. 8 days; $p < 0.0001$) stays, and higher mortality rates (20.5% vs. 0.9%; $p < 0.001$) than their counterpart without TBI. They also incurred higher in-hospital costs (\$38,086 vs. \$11,574; $p < 0.0001$).

Conclusion: The incidence of TBI is high among ATV-related admissions. Patients with TBI presented overall more severe injuries -as measured by the ISS-, worse outcomes, and increased cost of stay compared to those without TBI. These findings might guide the development of stricter public policies to reduce the morbidity and mortality associated with ATV crashes.

The Impact of Acute Vascular Center on Acute Limb Ischemia Outcomes

Gonzalez Gonzalez, Anndra, MS;

Mulero-Soto, Patricia, M.D;

Ortiz Fullana, Jose M.D.

Martinez- Trabal, Jorge, M.D. FACS;

Santini-Dominguez, Rafael, M.D.

*Division of Vascular Surgery, Department of General Surgery at St. Luke's Medical Center,
Ponce Health Sciences University, Ponce, Puerto Rico*

Introduction: In 2019, the Vascular Acute Care Surgery Center (VACS) was created at St. Luke's Episcopal Medical Center to treat these pathologies. Since it is the only vascular center on the island, this retrospective cohort study aims to determine how a center specializing in Acute Vascular Pathologies helps improve the outcomes of patients with Acute Limb Ischemia (ALI).

Methods: (Approved by IRB): We use patients that arrived at our center with a diagnosis of ALI from 2017 to 2020. We divided the period into pre-VACS (2017-2018) and post-VACS (2019-2020). We identified the severity of presentation, comorbidities and procedure performed. The primary endpoint was limb salvage, and the secondary endpoints were the increase in patients that arrived at our institution and the severity of the diseases.

Results: We received a total of 88 patients diagnosed with ALI. The most common comorbidities were hypertension and diabetes mellitus. Male patients diagnosed with ALI tended to have a tendency. There was an increase in the number of patients received after the center. The prevalence of amputation before and after the VACS center was not statistically significant, but we observed a decreasing trend.

Conclusion: We observed an increase in the number of patients treated in our institution, and we had been receiving patients at an early stage compared to the period before the establishment of our center, leading to the increased limb salvage rate.

Outcomes of Retrograde Endovascular Interventions for Patients with Chronic Threatened Limb Ischemia

Sebastián Castañer-Colberg, MD,

Ian Cummings-Ruiz, BS,

Luis Santiago-Sulsona, BS,

Gabriel Pereira-Torrellas, MD, Jorge Martínez-Trabal, MD,

Rafael Santini-Domínguez, MD

Ponce Health Sciences School of Medicine, Ponce, PR;

Centro Médico Episcopal San Lucas, Ponce, PR

Introduction: An alternative for patients who have failed antegrade endovascular intervention includes the use of retrograde access. This study examines the outcomes of patients with Chronic Threatened Limb Ischemia (CLTI) not candidates for bypass who underwent unsuccessful antegrade access.

Methods: A retrospective review was performed of all retrograde endovascular interventions performed from 2017 to 2022 at a single center. Data including patient's demographics, comorbidities, indications, and procedural characteristics were recorded. Outcomes analyzed were success rates, limb salvage rate, and post operative complications. Approved by IRB.

Results: Forty-eight patients presenting with CTLI who failed antegrade revascularization underwent retrograde endovascular intervention. Of these, 24 patients (50%) underwent popliteal artery access. 21 patients (44%) underwent tibial vessel access, and 3 (6%) underwent plantar access. 40 patients (83%) underwent successful retrograde intervention. Intervention failures were due to inability to cross the occlusion. Shorter lesion length demonstrated a trend for success ($p = 0.081$). At a mean follow up of 7.3 ± 8.0 months, the limb salvage rate was 85%. The procedural complication rate was 6%, with the most common complication being arterial dissection. The 30-day mortality for patients undergoing retrograde endovascular intervention was 4%. TransAtlantic InterSociety Consensus D classification was associated with an odds ratio of 2.3 for failure of retrograde endovascular intervention.

Conclusion: Retrograde endovascular revascularization is a safe alternative achieving acceptable limb salvage rate in patients with CTLI not candidates for bypass and failed antegrade revascularization. Longer lesions were associated with lack of technical success.

Implications of Skin Pigmentation on the Clinical Presentation of Acute Limb Ischemia

Rivera-Rivera, Ana Estefania MD;

Nieves Muñoz, Jose, MD;

Aboukheir Aboukheir, Aihab, MD;

Martinez-Trabal, Jorge, MD FACS

Department of Vascular Surgery, St. Luke's Episcopal Medical Center

Introduction: Skin color changes are a key component of diagnosing acute limb ischemia (ALI) and is the inciting sign that prompts patients to seek medical evaluation. In dark skin tones, ALI can be overlooked or initially missed because the classical "pallor" described is not as easily seen. We aim to develop a better understanding of the implications skin pigmentation has on the presentation of ALI and whether it affects treatment and limb salvage.

Methods: An IRB approved retrospective review was performed of patients with ALI from 2017 to 2022. Patients were classified according to Rutherford classification and skin color, using the Fitzpatrick scale. Variables evaluated were ALI arrival classification, skin color, initial treatment strategy, and limb salvage.

Results: A total of 57 patients were evaluated. The majority presented with ALI Rutherford 2A followed by 2B, 1, and 3. Of these, 28% were classified as Fitzpatrick type 1, type 2 (26%) type 3 (14%), type 4 (19%), type 5 (11%) and type 6 (2%). Patients were treated according to their Rutherford classification either with catheter-directed anticoagulation therapy, thrombectomy, or major amputation. Only 7 patients underwent major amputation.

Conclusion: No statistical significance was found between darker skin pigmentation and progressive stages of ALI or the rate of major amputations. This study is limited due to the small population size. We suggest that skin color might be a factor for a later presentation during the event that might lead to a major amputation rate, impacting outcomes in the darker skin population.

Surgical Approaches for Resection of Primary Adrenal and Paravertebral Neurogenic Tumors in Pediatric Patients

*Ana L. Melero-Pardo, BSc,b, Tarek M Zaghoul, MDa,d,
Andrew J Murphy, MDa,c, Lindsay Talbot, MDa,c, Suraj Sarvode Mothi, BEE,
Andrew M. Davidoff, MDa,c, Abdelhafeez H. Abdelhafeez, MDa,c*

*a Dept. of Surgery, St. Jude Children's Research Hospital, Memphis, TN
b School of Medicine, Central University of the Caribbean, Bayamon, PR
c Dept. of Surgery, University of Tennessee Health Science Center, Memphis, TN
d Dept. of Surgery, National Cancer Institute, Cairo University, Cairo, Egypt
e Dept. of Biostatistics, St. Jude Children's Research Hospital, Memphis, TN*

Introduction: Neuroblastoma is the most common solid tumor in children, and most retroperitoneal tumors are resected via open transabdominal surgery (OTS) due to organ and vessel involvement. Laparoscopic surgery (LS) is used for tumors without image-defined risk factors (IDRFs). Although retroperitoneoscopic surgery (RS) is increasingly used in pediatric patients, experience in neurogenic tumors is limited. We evaluated outcomes of adrenal and paravertebral neurogenic tumor resections based on surgical approach.

Methods: The IRB approved this study. We retrospectively reviewed pediatric patients who underwent OTS, LS, and RS resection of neurogenic tumors from 2018 to 2022. To evaluate differences between groups, we used the non-parametric Kruskal-Wallis test for continuous measures and Fisher's exact test for categorical measures.

Results: 44, 18, and 15 patients underwent OTS, LS, and RS, respectively. Tumor volume post-neoadjuvant chemotherapy was significantly larger ($p < 0.002$) in the OTS group. Post-neoadjuvant chemotherapy the OTS group had 24, LS had 1 and RS had 2 patients with preoperative IDRFs ($p < 0.213$). Operative time, length of stay, estimated blood loss, postoperative opioid use, and time to postoperative chemotherapy were significantly less in the minimally invasive approaches ($p < 0.001$). However, no significant differences were found between LS vs. RS. Within the minimally invasive approaches, RS has trends towards faster recovery and less postoperative opioid use ($p = 0.087$).

Conclusion: Large tumors were resected via OTS. However, small tumors with certain types of IDRFs were resected via RS. Minimally invasive resection of neurogenic tumors allows for fast recovery and low complication rates. Yet, the tumor characteristics determine the suitable approach.

Predictive Factors of Postoperative Complications After Distal Pancreatectomy

*A. Torres Olivieri, J. Yan Huang,
T. Longoria Dubocq, P. Hernandez Rivera*

*Department of Surgery, School of Medicine, University of Puerto Rico
Medical Sciences Campus, San Juan, PR.*

Introduction: Benign and malignant pathologies of the body and tail of pancreas are managed with distal pancreatectomy. Postoperative pancreatic fistula (POPF) remains a major source of morbidity, costs, and length of stay after distal pancreatectomy. In this study, we aim to identify those risk factors associated with POPF.

Methods: A single center retrospective analysis of consecutive patients undergoing distal pancreatectomy between July 2018 and July 2022 was performed. Patients were divided between surgical techniques (laparoscopic vs open), gender, age, American Society of Anesthesiologists (ASA) physical status classification, and final pathology. POPF graded according to the 2016 International Study Group of Pancreatic Fistula classification. This study was approved by IRB.

Results: A total of 61 patients (Females=41, Males=20) between the ages of 23 to 84 who underwent laparoscopic and open distal pancreatectomy with splenectomy were included in this study. 45 patients underwent laparoscopic distal pancreatectomy (73.3%), and 16 underwent an open approach (26.7%). Out of 60 patients, half developed a POPF. Incidence of POPF was higher in the laparoscopic approach compared to open ($p = 0.025$). Meanwhile, type of pathology (malignant vs benign vs premalignant), age, gender or ASA showed no association with development of POPF. No statistically significant difference was found in Clavien-Dindo complications between both groups.

Conclusion: In this cohort, POPF was most likely to occur in laparoscopic surgery. However, postoperative complications were comparable between both groups.

A Quality Improvement Plan to Reduce Morbidity and Mortality Among Pediatric Patients with Tracheostomy

*Soraya Abdul-Hadi, MD1, Alejandro Santiago Nazario, MD1,
Camila S. Ríos de Choudens, MD2, Carlos Gonzalez Aquino, MD, FACS1.*

*1. Department of Otolaryngology - Head and Neck Surgery, School of Medicine,
University of Puerto Rico Medical Sciences Campus, San Juan, PR*

*2. Department of General Surgery, School of Medicine, University of Puerto Rico
Medical Sciences Campus, San Juan, PR*

Introduction: There is increasing evidence that coordinated tracheostomy care reduces morbidity and mortality among pediatric patients with tracheostomy. For this, the main goal of our project is to establish a Pediatric Tracheostomy Care Program in Puerto Rico.

Method: Create a registry of all pediatric patients with tracheostomy in PR. The project comprises both retrospective and long-term prospective data collection. Examples of the data that will be collected and compared, pre- and post-implementation of our program are: date of birth; indication for tracheostomy; rate of lost to follow-up, and rate of successful decannulations. Furthermore, those patients that are lost to follow-up will be contacted to re-establish care. Study was IRB approved.

Results: We have obtained the data from 126 patients. From this cohort, 84% (106/126) were either lost to follow-up or have never established an initial record with us. Furthermore, from this cohort, it was established that 7% (7/106), were candidates to start the decannulation process. From these, 42% (3/7) of family members were successfully contacted and care was re-established.

Conclusion: The main goal of this project is to decrease tracheostomy-related morbidity and mortality among the pediatric population. With our program, we ensure high-quality care and adequate follow-up of each pediatric patient with tracheostomy. It is expected that the rate of lost to follow-up will be decreased and the rate of decannulation, as well as the rate of one-way valve use, will be increased. Also, the knowledge related to adequate tracheostomy care will be improved among family members and physicians.

Long Term Follow-Up In Patients With Continent Urinary and Fecal Catheterizable Stomas in Pediatric Patients with Neurogenic Bladder

*Esteban Tresgallo Parés, MD; Mario García Bruckman, MD; Andrés Vázquez, MD;
Carla Marín Márquez, MS-4; Marcos Pérez-Brayfield, MD FAAP*

Urologic Surgery Residency, University of Puerto Rico, Medical Sciences Campus, San Juan, Puerto Rico.

Introduction: Catheterizable stomas have revolutionized the management of neurogenic bladder. The study aim was to evaluate long-term outcomes and satisfaction in patients and caregivers after Continent Catheterizable Channel (CCC) and/or Malone Antegrade Continence Enema (MACE).

Methods: We retrospectively reviewed 32 pediatric patients who had undergone 53 CCC between 2007 and 2022. Data was analyzed including indication, type of channel, and complications. Patients and caregivers were contacted via telephone and a survey was conducted. The study was approved by IRB.

Results: Of the 32 patients, 81% had Mitrofanoff channel and 19% a Monti. 21 patients also underwent MACE procedure. The average age at surgery was 10.4y, ranging from 5-19y. The average length of follow up was 6.9 years, with 9 patients followed for more than 10y. 10 patients underwent revision with 8 due to channel stenosis. 90% of patients reported to still be using the CCC. In 65% of cases, it is the patient performing CIC. 6 reported incontinence thru the CCC, which was mild in all cases. In terms of satisfaction, 84% reported to be "very satisfied" with the procedure/outcomes. In terms of the MACE procedure, 89% reported to still be using the channel and 78% of patients reported complete fecal continence. 95% of patients reported to be "very satisfied" with the procedure.

Conclusion: Continent catheterizable stomas are feasible and reliable in long term follow up. Despite a high revision rate (33%) associated with CCC, our data shows that functional outcomes and patient/caregiver satisfaction remain high even after transition into early adulthood.