| Author and Co-authors: | Charles Tsuro, NP; Daniel Wu, MD; Salil Gulati, MD  
Medical Center of Plano, Burn and Reconstructive Centers of Texas, Plano, TX |
|-------------------------|---------------------------------------------------------------------|
| Objectives:             | Upon completion of the lecture, attendees should be better prepared to:  
- Describe a rare but critical condition |
| Abstract:               | Background: Takotsubo Cardiomyopathy is a rare syndrome that is more common in females. It is an extreme response to severe stress on the body leading to acute myocardial dysfunction and mimics a coronary event. We present a case report and review of literature of this unusual cardiomyopathy. The purpose of this research was to find out if there is a link between burn injury and Takotsubo cardiomyopathy.  
Case Report: A 38 year old female patient presented with a small burn of bilateral feet and upper extremities. The patient was taken to the operating room for debridement of wounds and placement of a skin substitute. The patient had a significant cardiac episode postoperatively. The patient’s treatment course was complicated by the underlying cardiomyopathy requiring intubation, volume expansion, and vasoactive medications. After treatment for her burn injuries, her cardiac myopathy resolved, and she was discharged home.  
Methods: The authors conducted a literature search for this lesser known diagnosis and its association if any with burn injuries. An online internet search including PubMed was performed.  
Results: Takotsubo cardiomyopathy is characterized by severe left ventricular dysfunction that is associated with severe psychological or physical stress. Takotsubo cardiomyopathy can be incited by any severe stress including burns and surgery. Although rare, this condition is very dramatic in presentation and is life threatening. |
| Disclosure:             | Charles Tsuro - No Relevant Financial Relationships to Disclose  
Daniel Wu - No Relevant Financial Relationships to Disclose  
Salil Gulati - No Relevant Financial Relationships to Disclose |
Similarities Between Burns and Medical Adhesive Related Skin Injury (Marsi): A Case Study

Author and Co-authors: Sylvia E. Britt, PhD, RN, Karen M. Coles, DNP, RN; Shannon S. Polson, MSN, RN, CWCN, CFCN, CNL, LCSW, PIP
University of Alabama, School of Nursing, Birmingham, AL

Objectives:
- Discuss the causes of Marsi
- Identify similarities between skin burn injuries and Marsi
- Develop an understanding of how Marsi may threaten patient safety and increase patient care costs

Abstract:
Introduction: Are there treatment and other similarities between burns and Marsi? The link between burns and Marsi is removal of the barrier layer. This presentation purposes to broaden awareness of the similarities shared by skin burns and Marsi. In 2012 a consensus summit convened to identify the state of the science of medical adhesive related skin injuries (Marsi) and best practices for prevention of these skin injuries. The outcome established 25 Consensus Statements on the assessment, prevention and treatment of adhesive product skin injuries. However, review of the literature shows little is known about the impact of Marsi on patient’s physical wellbeing, treatment expenditures and emotional costs. Marsi affects patients of every age across the continuum of care and is often overlooked and misunderstood by health care providers. A case study reports Marsi on a healthy 67 year old white female after emergency laparoscopic appendectomy when adhesive bandages covered abdominal incisions after a reported tape allergy.

Method: Three skin tears, the largest a Payne Martin Class III, occurred upon removal of a 4x2 inch nonporous, non-latex adhesive bandage. On evaluation, silver sulfadiazine was prescribed to address infection. Two weeks later, treatment was changed to oat beta glucan to prevent further maceration and promote wound healing. Epithelialization occurred over 3 months.

Results: The report details causes of the skin injuries, use of medications, healing time, bandage/dressings issues, and identification of applicable Marsi Consensus Statements. Pictures of initial wounds, healing progression related to medications, an improvised barrier dressing and a repurposed fashion garment which stabilized the dressing are exhibited.

Conclusions: Conclusions include takeaways to be employed to prevent similar injuries in the future. The authors suggest application of information from the Marsi Consensus Statements to identify actions and communications to improve patient care and prevent similar injuries. The authors propose how Marsi Consensus Statements may be used as evaluative measures for patient safety and quality improvement in health care settings as well as guide further research.

Disclosure:
Sylvia E. Britt - No Relevant Financial Relationships to Disclose
Karen M. Coles - No Relevant Financial Relationships to Disclose
Shannon S. Polson - No Relevant Financial Relationships to Disclose
AUTHOR AND CO-AUTHORS:

Sarah J. Murray, PhDc, MSN, RN, ACNS-BC1; Maria L. SerioMelvin, MSN, RN, CNS-BC, CCRN1; Sena R. Veazey, MS1; Craig Fenrich, BS1; Greg Rule, MS2; Christopher Nemeth, PhD2; Jose’ Salinas, PhD1; Jeremy C. Pamplin, MD1
1United States Army Institute of Surgical Research, Ft. Sam Houston, TX
2Applied Research Associates, San Antonio, TX

OBJECTIVES:

Upon completion of the lecture, attendees should be better prepared to:
- Evaluate how new technology can improve team communication
- Identify the need for better health IT to facilitate team communication
- Consider using simulation to test health IT

ABSTRACT:

BACKGROUND: We describe the first hybrid simulation study testing an IT system with a simulated patient in the same unit in which actual patient care is being provided. Care in the burn intensive care unit (BICU) is complex and challenging. Clinicians must sift through thousands of clinical data variables that are recorded and stored in the electronic medical record (EMR), searching for the most important, or salient, information to make optimal patient care decisions. Our three year project developed the Cooperative Communication System (CCS) a real time health information technology (IT) system, to support BICU individual and team clinical decision making and communication. The CCS is designed to “lay on top” of the existing EMR to drawing stored clinical data and present these data to the clinician according to clinical practice. A total of 15 people on 4 different teams were needed to conduct this study. They include the observer research team (n=3), simulation (SIM) research team (n=5), the IT support team (n=7) and the care team study participants (n=6). Two scenarios were run over 4 separate days (one per day), each scenario lasting approximately 6 hours. Each care team participated in scenarios counterbalanced with the legacy EMR or the CCS on two separate days for a total of 12 hours each. Each scenario began with shift report/resident handoff and concluded when each team came to a final decision point. Scenario endpoints were predetermined by the research team, and depended on decisions made by the care team.

METHODS: The prospective mixed methods crossover design study was conducted under an approved IRB protocol. Two care teams were recruited to participate as dedicated members of a BICU multidisciplinary team: the bedside nurse, resident, and attending physician. Each care team participated in two simulated patient care scenarios (Scenario 1: 85% burn; Scenario 2: Toxic epidermal syndrome) comparing team decision making and communication with either the legacy EMR, or the CCS. Members of the research team acted as the additional members of the care team (i.e. therapists, charge nurses, consultants). A high fidelity male, SimMan3G(TM) manikin was used to simulate a patient with realistic features including audible heart/lung/bowel/verbal sounds, palpable pulses, and reactive pupils. In addition, the “patient” was given simulated wounds and covered in wound dressings reflecting the typical burn patient, including wet-downs. The study was conducted over a 3 day period for each team. On the first day, participants were oriented to the CCS application and the simulation environment located in a BICU room reserved for this study. Qualitative data were collected by direct observation (video and note taking) during the simulation and the after action review interview. Survey data were collected at the end of the simulation sought to discover participant perceptions related to decision making, communication, and overall team performance. Student test was used to analyze comparative differences in each question conducted in the survey with statistical significance (p<0.05) and confidence interval at 95%.

RESULTS: Participants reported better ability to find information, make decisions, and identify trends. Statistically significant differences were found between the standard of care using the EMR and/or the CCS systems when asked about team communication. Subjects felt the CCS
system was better at allowing one to communicate more effectively ($p<0.02$) and communication was easier (0.001). Subjects perceived no difference in scenario realism, overall team performance and communication between the legacy EMR the CCS. Qualitative interview data revealed that subjects felt the CCS messaging system enhanced team communication. All participants remarked that conducting the study in the real patient care environment with real clinicians made the simulation realistic, and that enhanced their ability to suspend disbelief and become fully engaged in the scenario. Attending physicians ($n=2$) reported they rarely use IT for decision making while nurses ($n=1$) use IT for data entry and not decision making. Residents ($n=2$) reported he CCS allowed quicker access to imaging.

CONCLUSION: Participants found integration of messaging in the CCS made it easier to initiate, share and track information among their team members compared with traditional phones, pagers, and seeking others out on the unit. Participants also reported that the CCS improved their team’s ability to find and use salient information. Interestingly, as the acuity of the patient increased, participants spent more time at bedside and communicated by phone and face to face.

Disclosure:

Sarah J. Murray - No Relevant Financial Relationships to Disclose
Maria L. SerioMelvin - No Relevant Financial Relationships to Disclose
Sena R. Veazey - No Relevant Financial Relationships to Disclose
Craig Fenrich - No Relevant Financial Relationships to Disclose
Greg Rule - No Relevant Financial Relationships to Disclose
Christopher Nemeth - No Relevant Financial Relationships to Disclose
Jose' Salinas - No Relevant Financial Relationships to Disclose
Jeremy C. Pamplin - No Relevant Financial Relationships to Disclose
A Surfactant Polymer Paste Potentiates Antimicrobial Efficacy in Biofilm Disruption

Sunday, November 6
8:15 - 8:30 am

Author and Co-authors:
Sashwati Roy, PhD; Shomita Steiner, PhD; Piya Das Ghatak; Priyanka Pandey; Chandan K. Sen, PhD
Ohio State University, Wexner Medical Center, Columbus, OH

Objectives:
Upon completion of the lecture, attendees should be better prepared to:
- Describe key points about biofilm and recalcitrance to antimicrobial therapy
- Demonstrate the potential application of surfactant paste in overcoming biofilm tolerance to antibiotics
- Recognize the importance of developing new strategies to target biofilm resistance/tolerance to antimicrobials

Abstract:
BACKGROUND AND AIMS: PluroGel® is a 100% water-soluble surfactant polymer paste that is biocompatible, nonionic and non-allergenic. Preliminary observations support that in patients, treatment with PluroGel® improves wound closure. The mechanism of action of PluroGel® in wound healing remains unclear. Biofilm infection is a significant problem that hinders proper wound closure. Our aim was to initially characterize the effect of PluroGel® on bacterial biofilm development in vitro.

METHODS: Static biofilms (48h) of the primary wound pathogens Pseudomonas aeruginosa (PA01), Acinetobacter baumannii (19606) and Staphylococcus aureus (USA300) were grown on polycarbonate membranes and treated with PluroGel® with and without antibiotics for an additional 24h. The standard antibiotics – ciprofloxacin and tobramycin (1, 5, 10, 20μg/ml) for PA01 and 19606 and vancomycin (1, 5, 10, 20μg/ml) for USA300, were used in these studies. Following 24h treatment with and without antibiotics, the biofilms were characterized using scanning electron microscopy (SEM) based imaging.

RESULTS: SEM imaging identified that PluroGel® alone partially disrupted the biofilm development of PA01 and 19606 but not USA300. Treatment with antibiotics alone had none to marginal effects on biofilm development. However, antibiotics in combination with PluroGel® significantly disrupted the biofilm development of all three wound pathogens.

CONCLUSIONS: The inherent antimicrobial tolerance of biofilms necessitates extremely high dosages of antibiotics to be used for inhibition. The ability of PluroGel® to synergize with antibiotics to effectively disrupt impenetrable biofilms provides a potentially effective anti-biofilm treatment option that is likely to lower effective dosages needed for treatment. Future studies will address the mechanism(s) of PluroGel® disruption of the matrix barrier.

Disclosure:
Sashwati Roy- No Relevant Financial Relationships to Disclose
Shomita Steiner- No Relevant Financial Relationships to Disclose
Piya Das Ghatak- No Relevant Financial Relationships to Disclose
Priyanka Pandey- No Relevant Financial Relationships to Disclose
Chandan K. Sen- No Relevant Financial Relationships to Disclose
The BUGG Initiative (Burn Unit Gloves and Gown)

**Author and Co-authors:**
Kristine N. Chafin, MBA, RN, CIC\(^1\); Scott A. Phillips, MSN, RN, CCRN, ACNS-BC\(^1\); Jimmy G. Rodriguez, BSN, RN\(^2\); Bernadette L. Thompson, BSN, RN\(^2\)

\(^1\)United States Army Institute of Surgical Research, Ft. Sam Houston, TX
\(^2\)Brooke Army Medical Center, Ft. Sam Houston, TX

**Objectives:**
Upon completion of the lecture, attendees should be better prepared to:
- Identify the patient issues with isolation precautions
- Identify the three levels of PPE needed for the BUGG Initiative
- Identify the best practice for this burn unit

**Abstract:**

Introduction: The U.S. Army Burn Center Intensive Care Unit (BICU) is a 16-bed intensive care unit. The standard of practice for patient safety is to put on a pair of gloves and a disposable isolation quality gown (PPE) upon entry into a burn ICU room to care for a burn patient. This process is time consuming, costly, and may present a communication barrier between the patient and care provider. Furthermore, clinicians are less likely to enter the room to assess patient needs if they have to constantly don new PPE, leaving the patients feeling “isolated.” Clinicians wanted to try a new process that kept patients safe, but also reducing the amount of PPE worn each day. Other non-burn units have successfully reduced the amount of PPE worn if clinicians adhered to other safety measures. The goals of this new process called the BUGG Initiative (Burn Unit Gloves and Gown) were to 1) improve quality and frequency of communication between care providers and patients in the BICU; 2) improve care provider response times to call bells and patient alarms; 3) save money spent on personal protective equipment (gloves and gown; and 4) increase nurse and patient satisfaction.

Methods: This project was initiated by the infection control nurse as part of her normal performance improvement processes and did not meet the criteria for a research protocol. The BUGG initiative was introduced to the staff during the morning huddles. The protocol for hand hygiene did not change; it was always performed pre and post task. Instead of universal PPE use, PPE was worn according to task performed. The first level was the BUGG Zone, where all care providers wearing burn center scrubs would be able to enter the first few feet of the room without donning PPE. This was only to answer call bells, assess alarms, or to chat with the patient (no touch). The second level of PPE was gloves. If staff needed to touch patient equipment, he/she would don gloves. The third level of PPE was full gown and gloves; this was if the patient required hands on care. This initiative did not apply to the patient on true MDR (Multidrug Resistant) Contact Precautions. This initiative also did not apply to staff wearing military uniforms or visitors. During this three month process, clinical staff were observed for their compliance with the BUGG initiative and the levels of PPE worn.

Results: The BUGG initiative ran for three months, from December 1, 2015 thru February 29, 2016. During that time, 192 observations of all levels of PPE were performed. The rate of compliance was 72% (n=139). Hand hygiene compliance improved while proper use of gown and gloves declined. Also, the Burn ICU MRSA rate rose, nearly doubling from the baseline years (MRSA cases/patient days x 10,000 patient days): 2013 = 11.68 ; 2014 = 17.54 and 2015 = 23.77. In the first quarter of 2016, the rate was 35.04. The three cases from 2016 all had the same strain of MRSA.

Conclusions: Although there are potential risks of psychological isolation to patients, increased costs due to PPE, and risk of lower nurse/patient satisfaction, the risk to patient safety was too high to continue this initiative. We found that our current practice of PPE (gloves and gown) for all burn patients was the safest and that reducing levels of PPE was not feasible for the BICU patient. Further research may reveal measures that decrease the physical barrier to our patients,
and this pilot performance improvement initiative indicates that more investigation on this problem is needed.

### Disclosure:

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<th>Name</th>
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<td>Kristine N. Chafin</td>
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<td>Bernadette L. Thompson</td>
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# A Modified Chitosan Dressing (mCSD) Potently Inhibits Biofilm-Forming Bacteria

**Sunday, November 6**  
8:45 - 9:00 am

**Author and Co-authors:**  
Sashwati Roy, PhD; Shomita Steiner, PhD; Piya Das Ghatak; Priyanka Pandey; Chandan K. Sen, PhD  
Ohio State University, Wexner Medical Center, Columbus, OH

**Objectives:**  
Upon completion of the lecture, attendees should be better prepared to:  
1. Describe critical anti-biofilm properties  
2. Demonstrate effectiveness of a soluble factor with antibacterial effects  
3. Recognize potential anti-biofilm properties of chitosan

**Abstract:**  
**BACKGROUND AND AIMS:** Chitosan, the deacylated derivative of chitin (found in the shells of crustaceans) is traditionally used as a topical hemostat in surgical wounds and trauma. A modified chitosan dressing (mCSD, Opticell™, Medline Industries Inc.) with gelling technology is the first application of this advanced biological material for chronic wound care. Preliminary clinical studies indicate improved wound closure, however, mechanism(s) particularly related to infection remain unclear. Our aim was to characterize the antimicrobial properties of mCSD.  
**METHODS:** Static biofilms (48h) of the primary wound pathogens Pseudomonas aeruginosa (PA01), Staphylococcus aureus (USA300) were grown on mCSD and characterized using scanning electron microscopy (SEM) based imaging. Additionally, the effect of mCSD (intact and supernatant) on growth of PA01 and USA300 were tested.

**RESULTS:** Initial studies on 48h static cultures of showed that the chitosan fibers themselves serve as a suitable substrate for robust biofilm formation of all the primary wound pathogens tested. Interestingly, in growth curve studies with PA01 and USA300, intact mCSD was found to attenuate the growth kinetics of these pathogens suggestive of a bacteriostatic effect on both organisms. Furthermore, when these cultures were exposed to mCSD supernatant, there was a potent inhibition of growth of both organisms, compared to untreated cultures.

**CONCLUSIONS:** Our observations indicate that the mCSD may have two non-mutually exclusive roles to play in wound infection: i. the adhesion of bacteria to the dressing may serve to sequester pathogens away from the wound surface, and ii. inhibitory effect of a unique soluble factor(s) may prevent establishment of infection in the wound.

**Disclosure:**  
Sashwati Roy - No Relevant Financial Relationships to Disclose  
Shomita Steiner - No Relevant Financial Relationships to Disclose  
Piya Das Ghatak - No Relevant Financial Relationships to Disclose  
Priyanka Pandey - No Relevant Financial Relationships to Disclose  
Chandan K. Sen - No Relevant Financial Relationships to Disclose
Burn Dressing Team Consistency of Care - Positive Impact on Optimal Outcomes for Burn Survivors!

Sunday, November 6  
9:00 - 9:15 am

Author and Co-authors: 
Karen M. Coles, DNP, RN; Rebecca W. Langner, RN, MSN, CNML; Martha Pratt, RN; Alan R. Dimick, MD  
University of Alabama, Birmingham, AL

Objectives: 
Upon completion of the lecture, attendees should be better prepared to:  
- Assess the value of the relationship between consistent care by the BDT and the physical, emotional and functional positive outcomes for the burn survivors.  
- Identify the patient, family, and staff satisfaction as a result of the consistent care delivered by BDT.  
- Understand the BDT remained a major factor in the physical care, emotional support and teaching, regardless of changes in the Burn Center Medical Director leadership and treatment practices.

Abstract: 
Introduction: Burn injuries result in major social and economic consequences, for the patient and their family. Attitudes towards personal appearance are also impacted by the burn injury. Assisting the burn survivor to achieve a level of preinjury status as a functional member of his or her family and society, health care providers must render efficient, quality care to promote optimal wound healing and desired patient outcomes.

Since inception, the Burn Dressing Team (BDT) has played a major role in the physical care of the burn wounds and emotional support to the patients, at our Burn Center. On a daily basis, the BDT has provided consistent care to the patients along with discharge planning education. With the advancement in burn care and changes in Burn Center Medical Directors, treatment practices varied as did the use of burn wound products. However, the care given by the BDT remained consistent and a major factor in the physical care and emotional support. The purpose of this abstract is to demonstrate the positive effects of consistent BDT members delivering wound care, emotional support, and discharge instructions to the burn patients and their families.

Conclusions: With daily dressing changes, the team nurse was able to relate the information regarding the status of wounds to physicians, staff nurses, and therapists. Consistency in care and retention of BDT members resulted in an increase in patient, family, BDT and Burn Unit staff satisfaction. Burn Unit staff could then focus on pain management, monitoring of nutrition, exercise, splinting, pastoral needs, and providing face care twice to three times a day according to the institutional Face Care Standard for the product ordered. A combination of these practices resulted in optimal wound healing, functional status and a decrease in the patient hospital length of stay.

Disclosure:  
Karen M. Coles - No Relevant Financial Relationships to Disclose 
Rebecca W. Langner - No Relevant Financial Relationships to Disclose 
Martha Pratt - No Relevant Financial Relationships to Disclose 
Alan R. Dimick, MD - No Relevant Financial Relationships to Disclose
New Onset Atrial Fibrillation in the Burn Patient - The When, Why and What

Sunday, November 6
9:15 - 9:30 am

Rita M. Gayed, PharmD; Juvonda Hodge, MD; Walter Ingram, MD
Grady Health System Burn Center, Atlanta, GA

Objectives:
Upon completion of the lecture, attendees should be better prepared to:
- Identify widely recognized risk factors for the development of new onset atrial fibrillation in the burn critical care setting
- Discuss possible pharmacological management strategies for new onset atrial fibrillation

Abstract:
Introduction: New onset atrial fibrillation (NOAF) is a common arrhythmia in the critical care setting. Burn patients may be at higher risk of developing NOAF secondary to burn shock and fluid resuscitation, inflammatory response to the burn injury, multiple surgeries, and sepsis among other risk factors. The management of NOAF in the critically ill has not been well defined. We sought to determine the incidence, patterns, risk factors, management of NOAF as well as patient disposition in our burn center.

Methods: This was a retrospective chart review of adult patients (≥ 18 years) admitted to Grady Health System burn center with a burn injury between the years of 2012 and 2015 and a diagnosis of NOAF. The primary outcome of the study was annual incidence of NOAF in adult burn patients. Secondary outcomes included time of NOAF occurrence, possible risk factors (steroids, vasopressors, electrolyte abnormalities, central venous catheters), pharmacological management, intensive care unit (ICU) and hospital length of stay (LOS), in-hospital mortality, outpatient cardiology follow up post discharge, and discharge rate/rhythm control agents. Descriptive statistics were used for statistical analysis.

Results: Thirty seven adult burn patients developed NOAF over the course of 4 years. The calculated annual incidence was 0.7%, higher than NOAF rates reported in the literature. The patient population consisted of 35% females, and had a median age of 61 years (IQR 54;73). Common comorbidities included hypertension (35% of patients), coronary artery disease (27%), pulmonary disease (COPD and asthma; 24%), and diabetes mellitus (22%). The main mechanism of injury was flame burns (81%), with a median total body surface area involvement of 22% (IQR 13;40). NOAF occurred on day 10 of admission (IQR 4;26). Sixty five percent of these cases represented perioperative NOAF, occurring a median of 4 days postoperatively (IQR 2;6), and 89% of all cases occurred in the ICU. Common risk factors included the use of steroids (49% of patients), vasopressors/ inotropes (43%), as well as presence of subclavian catheters (38%), electrolyte abnormalities (59%), poor renal function (43%), and sepsis (65%). Amiodarone was the most commonly used agent for NOAF management (81% of patients), followed by beta blockers (57%) and calcium channel blockers (14%). Only one patient received inpatient anticoagulation. None of the study population developed a cardioembolic stroke. The median ICU LOS was 34 days (IQR 14;59) and median hospital LOS was 45 days (IQR 14;68). In-hospital mortality was 38%. Of the burn survivors who got discharged (n=23), 9% had an outpatient cardiology follow-up scheduled, and 43% were discharged on a rate/rhythm controlling agent (100% of patients on beta blockers, 20% on amiodarone and 10% on digoxin).

Conclusions: NOAF is a known complication in the burn population. Risk factors should be assessed and minimized if possible. Despite limited guidance on NOAF management in the critical care setting, rate/ rhythm control strategies should be implemented, along with weighing benefits vs. risks of anticoagulation. Upon discharge, patients should be reevaluated for need for cardiology follow up, as well as continuing NOAF management.
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