

World Trauma Congress Poster Session: Station I

Poster 1: 3:00 PM - 5:00 PM

**VIRAL SEPSIS IN CRITICALLY ILL PATIENTS REQUIRING  
ICU CARE, AN OBSERVATIONAL STUDY FROM A  
TERTIARY CARE HOSPITAL**

Ekta Gupta, MD

Invited Moderator: Paul Albini, MD

**Background:** Respiratory tract infections leading to sepsis remains an important cause of morbidity and mortality in critically ill patients requiring ICU care. In the Post COVID-19 era, viral infections have emerged as an important contributor of sepsis apart from bacterial causes. The aim of this study was to understand the role of respiratory viral infections in causation of sepsis in patients requiring ICU care.

**Methodology:** In this study, patients requiring admission in ICU from January 2019 to December 2022, with lower respiratory tract infection were reviewed. The criteria for sepsis was multiorgan failure with a change in the baseline SOFA (Sequential Organ Failure Assessment) score of more than equal to 2, as per the sepsis-3 definition. Respiratory viruses were identified using FilmArray 2.0 respiratory panel (BioFire Diagnostics, Utah, USA). Cases positive for SARS-CoV-2 were excluded.

**Results:** Out of 1391 patients enrolled in 23% (n=326), a viral etiology was detected. An overall male predominance 235 (72%) was seen. The mean age was  $48.9 \pm 16.3$  years. Among the viral etiologies detected, Rhinovirus/Enterovirus was the most frequent (142, 43%), followed by Influenza (73, 22%). Occurrence of sepsis was seen in 35% of RVI positive cases. Among these, isolated viral etiology with no other bacterial/fungal co-infection was found in 55% of patients. Patients with sepsis had a greater prevalence of associated co-morbidities. Most common comorbidity was diabetes (31, 27%) followed by obesity (17, 15%). The requirement of mechanical ventilation as well as in-hospital mortality was higher in the sepsis group as compared to the non-sepsis group ( $p = 0.001$ ). Higher age, hypertension and mixed-etiology, coinfections with virus and other pathogens, showed higher susceptibility to mortality.

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**AGGRESSIVE OXYGEN DELIVERY STRATEGIES DURING  
RESUSCITATION OF HEMORRHAGIC SHOCK AFFECTS  
KIDNEY MITOCHONDRIAL FUNCTION**

Nicolas Prat, MD

Invited Moderator: Paul Albini, MD

Hemorrhagic shock results from a reduced delivery of oxygen to tissues thus producing ischemic metabolic insufficiency, but aggressive resuscitation strategies could be deleterious. We investigated in a porcine model if a degraded medical care of combat casualty (CC) characterized by prolonged permissive hypotension and normoxia prevents or induces mitochondrial dysfunction compared to hyperoxia and whole blood (WB) transfusion, in kidney, a particularly vulnerable organ to demand-supply O<sub>2</sub> mismatch.

Traumatic-hemorrhagic shock (THS) was obtained by bilateral muscular contusions and femoral fractures associated with 60% withdrawal of the total blood volume (TBV). Shock was prolonged during 90min to mimic a CC environment before resuscitation with 4 mL/kg hypertonic saline for normoxia group and with 20% TBV of WB for hyperoxia group. At 90min FiO<sub>2</sub> was set to 100% in hyperoxia group. Control group underwent the procedure in normoxia, with no hemorrhage, trauma, nor fluid resuscitation. To determine mitochondrial renal dysfunction, oxygen consumption rate of renal tissue was determined by high-resolution respirometry (HRR) at the end of the procedure (4h). HRR was performed on permeabilized renal biopsies. A substrate, inhibitor titration SIT protocol was then performed to measure respiratory capacities and oxidative phosphorylation of complex I (CI) and IV CIV. Animals were randomized to control (n=6), normoxia (n=8) and hyperoxia (n=6) groups and parameters were evaluated as non-parametric via a Wilcoxon test.

Despite the fact that a significant kidney impairment was induced by THS ([creatinine]<sub>4h</sub>=1,5mg/dL [1,4-2,1], and 2mg/dL [1,35-2] vs 1,15mg/dL [1,1-1,25] for respectively normoxia, hyperoxia and controls, p=0,006 and p=0,0492), normoxia group showed no detrimental effect on renal mitochondrial function compared to control. Interestingly, hyperoxia with blood administration improved CI-driven mitochondrial respiration but decreases CIV respiration compared to normoxia (respectively p=0,0016 and p0,0001) and control (respectively p=0,0004 and p0,0001).

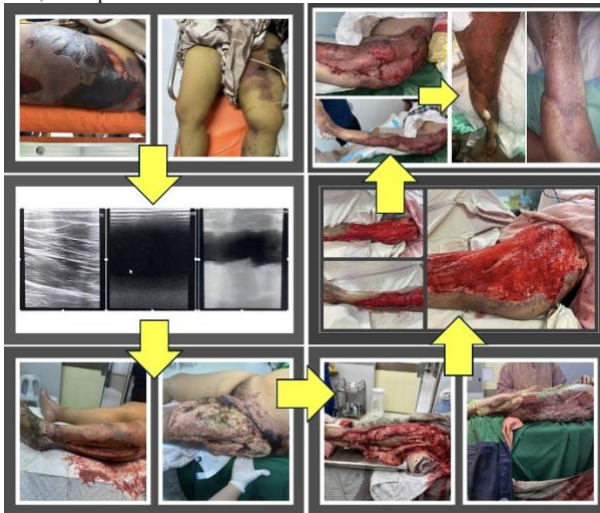
A typical CC medical care is safe and free of mitochondrial renal dysfunction during hemorrhagic shock. To preserve the vital prognosis and reduce delayed deaths, resuscitative strategies that preserve mitochondrial function should be more considered for shock patients in order to rather protect the ability of cells to utilize O<sub>2</sub> correctly than maximize the oxygen delivery.

## UNVEILING THE HIDDEN WOUNDS: A CASE REPORT OF MORE-LAVALLEE LESION

Rene Ogatis, MD

Invited Moderator: Paul Albini, MD

Morel-Lavallée lesions (MLL) represent a rare, yet potentially debilitating consequence of trauma, wherein there is a closed soft tissue degloving injury that results in effusion containing hemolymph and necrotic fat. This commonly occurs over the great trochanter, flank, buttocks, and lumbodorsal regions. We report a case of a 17-year-old female who sustained crushing injury on the left thigh and initially presented with soft tissue contusion with no associated fracture. She came back a week later septic, with a  $15 \times 13$  cm ecchymosis on the left thigh and a painful, tense left lower extremity with patchy areas of skin necrosis. Point-of-care ultrasonography of the left proximal lateral thigh revealed an anechoic space between the fascia and subcutaneous fat layer with no internal color flow. After resuscitation, she immediately underwent an emergency fasciotomy and repeated extensive debridement with negative pressure wound therapy, culture-directed antibiotic administration, hyperbaric oxygen therapy, and eventually a split thickness skin grafting and rehabilitation. Although MLL has been reported in literature, there is no current standard treatment algorithm for this pathology. Delay in diagnosis due to limited clinical experience has led to life-threatening consequences of infection, compartment syndrome, pain, and poor cosmetic outcomes.



## **FORCE OF PELVIC BINDERS – A COMPARISON OF MECHANICAL PERFORMANCE OF VARIOUS PRODUCTS**

Naoki Matohara, MD

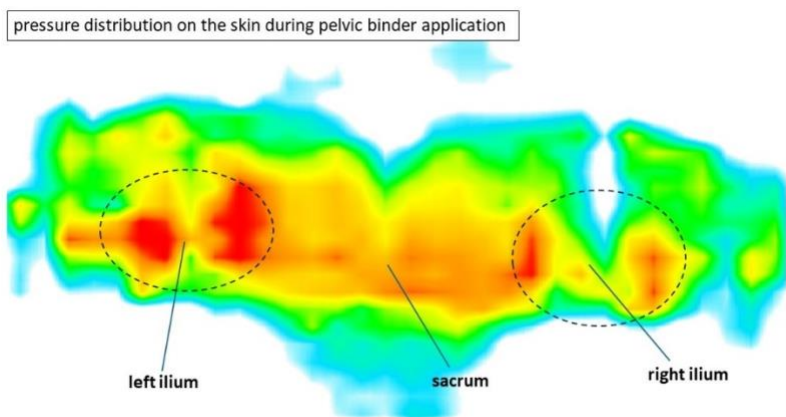
Invited Moderator: Paul Albini, MD

**Background and Objective:** Currently, several pelvic binders are commercially available, but their performance remains unclear. We hypothesized significant differences among these binders. This study aimed to measure the traction force of pelvic binders and pressure distribution on the skin and compare them.

**Methods:** Ten healthy men and women each wore Pelvicky®, T-POD®, SAM Sling®, and sheet wrapping. Traction force and pressure on the contacting skin were measured for each binder.

**Results:** The mean traction force was Pelvicky®:  $113 \pm 12$ N, T-POD®:  $119 \pm 13$ N, SAM Sling®:  $126 \pm 8$ N, sheet wrapping  $96 \pm 8$ N, showing significant differences among the binders. Moreover, considerable variability was observed among performers. Pressure distribution on the skin concentrated on prominent areas such as the anterior superior iliac spine and sacrum, with sheet wrapping exhibiting the lowest overall pressure.

**Conclusion:** Significant differences were observed in traction force and pressure on the skin among different pelvic binders. These disparities may impact clinical outcomes, warranting further research.



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## **SHORT-TERM TREATMENT OUTCOMES OF OPEN TIBIAL FRACTURES IN A TRAUMA CENTER**

Masahiro Miyashita, MD

Invited Moderator: Paul Albini, MD

**Introduction:** In the management of open tibial fractures, adequate and early intervention for soft tissue injuries along with bone fixation is essential. Especially in cases of polytrauma patients transported to the emergency trauma center, timely treatment is indispensable alongside managing concurrent injuries that threaten systemic conditions.

**Methods:** A retrospective analysis was conducted on 26 cases of open tibial fractures admitted to our trauma center from April 2019 to September 2023, focusing on surgical waiting days, complications, and functional recovery.

**Results:** There were 21 male and 5 female patients. The average length of hospital stay was 10.3 days with a mean observation period of 11 months. According to the Gustilo-Anderson classification, there were 2 Grade I, 10 Grade II, 9 Grade IIIA, 4 Grade IIIB, and 1 Grade IIIC cases. Eight cases involved isolated injuries, while 18 had multiple traumas. External fixation was performed in 10 cases. The mean waiting time for final internal fixation surgery was 3.3 days. Complications included one case of superficial infection, one case of deep infection, one case of delayed union, and one case of nonunion. At the final follow-up, three cases were walking with a cane, while 23 were able to walk alone without canes.

**Conclusion:** Even in cases of multiple traumas, performing surgery as early as possible resulted in favorable outcomes with minimal severe complications.

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**INTRAOPERATIVE USG IMAGING FOR CHEEKBONE  
(ZYGOMATIC) FRACTURE REPAIR: A RETROSPECTIVE  
STUDY**

Kuldeep Vishwakarma, MD

Invited Moderator: Paul Albini, MD

**Objectives:** Zygomatic complex (ZMC) fractures comprise up to 45% of all facial fractures second in frequency after nasal bone fracture. It becomes difficult to assess the perfect reduction of all the fractured sites through a limited surgical approach. This study aims to determine the feasibility and efficacy of intraoperative ultrasound imaging (USG) in the repair of ZMC fracture through a limited anterior approach.

**Materials and methods:** This single-center retrospective study evaluated the utility of intraoperative USG during corrective surgeries for ZMC fractures from 2020 to 2023. An intraoral vestibular incision was used to expose the Zygomaticomaxillary buttress region and for indirect reduction of the fractured zygomatic arch. An upper blepharoplasty incision was used to expose the fractured Frontozygomatic suture when indicated. Intraoperative USG was used to assess the perfect reduction of the unexposed fractured zygomatic arch.

**Results:** Three females and 12 males (mean age, 34.46 years; range, 26-55 years) were included. Reduced mouth opening (n=10) and facial deformity (n=8) were the most frequent indications for the repair of ZMC fracture. Mouth opening and facial symmetry were improved and satisfactory in all the cases.

**Conclusion:** Implementation of an intraoperative USG in ZMC fracture repair assists in obtaining predictable and accurate results. The equipment should be considered for precise operations such as ZMC fracture repairs particularly when using a limited surgical approach.

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**MYOCARDIAL INJURY AND CALCIUM HOMEOSTASIS  
REGULATION IN ANIMAL MODEL OF HEMORRHAGIC  
SHOCK INDUCED ARRHYTHMIA**

Jingjing Ye, MD

Invited Moderator: Paul Albini, MD

Hemorrhagic shock (HS) is a serious global problem that kills 1.9 million people worldwide each year and is characterized by hemodynamic instability, tissue hypoperfusion and cellular hypoxia. Irreversible fatal arrhythmia and cardiac dysfunction caused by traumatic hemorrhage are the main causes of early death in hemorrhagic shock. We established lethal HS mouse model and found severe ventricular arrhythmias occurred in 45% to 55% of blood loss. In the isolated primary adult mouse cardiomyocytes, we also observed that the imbalance of sarcoplasmic reticulum and cytoplasmic homeostasis; the amplitude of calcium transient and the amplitude of sarcoplasmic contraction were decreased during hypoxia; and arrhythmia was induced by high-frequency electrical stimulation. To understand the calcium homeostasis mechanism and the appropriate myocardial protection may provide new target for hemorrhagic shock induced arrhythmia and improve survival rate.

**PEDIATRIC PATIENTS WITH OPEN PELVIC FRACTURE  
TREATED IN THE HYBRID EMERGENCY ROOM SYSTEM  
(HERS) BY A MULTIDISCIPLINARY TEAM: TWO CASE  
REPORTS**

Tomoki Kanda, MD

Invited Moderator: Paul Albini, MD

**Background:** A hybrid emergency room system (HERS) is a trauma resuscitation room containing a computed tomography (CT) scanner, fluoroscopy unit, operating room setup, and angiography room setup. The initial resuscitation, diagnostic imaging, damage control surgery, and transcatheter arterial embolization (TAE) can be completed in one room without transferring the patient to the angio-suite or operating room. We report two cases of pediatric trauma patients with open pelvic fracture complicated by hemorrhagic shock treated in the HERS with feasible outcomes.

**Case 1:** A 9-year-old male who was run over his left leg by a truck. He was initially brought to another hospital in a shock. Initial evaluation revealed an open pelvic fracture, left lower limb degloving injury, splenic injury, left renal injury, perineal laceration with active bleeding. He was transferred from that hospital to our HERS with ongoing resuscitation. Immediately after we received him in the HERS, a damage control surgery including splenectomy and left nephrectomy, packing of the perineal wound, as well as TAE for hemorrhage from open pelvic fracture were performed simultaneously. The next day, he underwent pelvic external fixation, leg skin grafting, diverting loop colostomy, and perineal debridement. Injury severity score [ISS] 59, Revised Trauma Score [RTS] 4.1, TRISS Probability of survival [TRISS Ps] 0.11, respectively. He was discharged home 114 days after injury.

**Case 2:** An 11-year-old male who was involved in a motor vehicle collision was directly brought to our HERS in a shock. After initial resuscitation, a whole body-CT scan was taken within the HERS. It revealed unstable open pelvic fracture, open fracture of right lower leg, dislocated fracture of right hip, rectal injury, extraperitoneal bladder injury. TAE for hemorrhage from the pelvic fracture was performed in the HERS. Then he underwent external fixation of the pelvis, leg, and perineum debridement, and diverting loop colostomy. ISS 50, RTS 4.1, TRISS Ps 0.21, respectively. He was discharged home 112 days after injury.

**Conclusion:** HERS allows simultaneous resuscitation, diagnosis, and multidisciplinary treatment, and may be a useful modality for pediatric patients with open pelvic fracture.



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**HEMOSTATIC SPONGE BASED ON EASILY PREPARED  
CROSSLINKED GELATIN AND SODIUM ALGINATE FOR  
WOUND HEALING**

Jing Zhou, MD

Invited Moderator: Patricia Martinez Quinones, MD

Traumatic hemorrhagic shock is an important factor leading to human death; thus, it is critical to develop new hemostatic materials for emergency care during traumatic events. In the present study, a novel composite hemostatic sponge scaffold (GE/SA) was prepared by  $\text{Ca}^{2+}$  crosslinking and freeze-drying using gelatin and sodium alginate. GE, GE/SA1 (1:1), GE/SA2 (1:2), GE/SA3 (1:3), GE/SA4 (1:4) and commercial hemostatic sponge control samples were used to perform hemostasis experiments using a rat liver trauma model and a femoral artery trauma model. In addition, wound healing experiments were conducted using a rat dorsal full-layer skin defect model. Hemostasis time and blood loss values in the GE/SA3 group (liver hemorrhage model:  $227.35 \pm 3.22$  mg,  $77.83 \pm 4.31$  s; femoral artery bleeding model:  $494.17 \pm 48.66$  mg,  $76.50 \pm 3.94$  s) were significantly better than those in the other experimental groups and were similar to those in the commercial sponge group. In vitro experiments showed that SA promoted the adhesion and aggregation of platelets and red blood cells, which could further promote hemostasis by activating the clotting process. The results showed that the optimal ratio of gelatin to sodium alginate was 1:3, which provided a theoretical basis for the subsequent construction of a drug delivery system. The gelatin sodium alginate sponge scaffold prepared in the present study not only overcame the limitations of simple gelatin hemostatic sponges (such as decreased mechanical properties and poor hemostatic effects after water absorption) but also had excellent properties, such as good biocompatibility, low toxicity, high cost performance and good wound healing. Moreover, this scaffold had wide potential for clinical application.

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Poster 10: 3:00 PM - 5:00 PM  
**GUNSHOT AND BLAST INJURIES AND BLEEDING  
CONTROL TRAINING FOR MEDICAL STUDENTS AT A  
REGIONAL UNIVERSITY IN JAPAN**

Fumiaki Kawano, MD

Invited Moderator: Patricia Martinez Quinones, MD

**Background:** We have had little experience in treating patients with gunshot and blast wounds in Japan, and the medical students have few opportunities to learn about such trauma in the usual clinical lectures. In recent years, however, the Internet has made it easier to manufacture firearms and explosives, and the emergence of Lone Wolf terrorists as the Las Vegas mass shooting has become a reality according to the recent globalization in our country and we experienced an assassination of the Japanese Prime Minister in 2022. Thus, not only medical personnel but also many citizens have become aware that firearms and explosives are nearby and it is necessary to re-consider how education should be provided to medical professionals from the period of students.

**Results:** We gave a lecture on gunshot and blast injuries to medical students who were doing clinical practice between 2018 and 2019 as a pilot study. The purpose of this was to survey the awareness and ordinary knowledge of medical students. During the lecture, we also conducted practical training based on the American College of Surgeons' Bleeding Control Course. The results showed that medical students' awareness of gunshot or blast injuries, and mass casualty incidents was extremely low and, in addition, there was a lack of awareness of traumatology. Only about 5% of the students were able to explain the appropriate hemostatic technique including the Tourniquet procedure required in trauma cases. Practical training in bleeding control was given to all the medical students, and many could respond appropriately and use a combat tourniquet.

**Conclusion:** As traumatic injuries in Japan are mostly earthquakes, traffic accidents, falls, puncture wounds, and cuts, more education in emergency medicine is still focused on these injuries. The current social system has changed, and it is necessary to deepen knowledge of gunshot injuries and blast injuries as well, we stress desirable to actively conduct bleeding control training to spread this knowledge more widely at this stage.

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**A CASE OF RECTUS SHEATH HEMATOMA**

Yoshitomo Ashitate, MD

Invited Moderator: Patricia Martinez Quinones, MD

Rectus sheath hematoma (RSH) is an infrequent condition that occurs when epigastric arteries bleed into the rectus sheath and sometimes acts like an acute abdomen. In view of the fact that it is a rare case without specific clinical signs, misdiagnosis and use of invasive manipulations for patients are possible.

A 43-year-old woman had tried to commit suicide by stabbing herself with a kitchen knife into her stomach and applied to our hospital. The knife was removed. Contrast-enhanced computed tomography (CT) scan revealed a hematoma in the right rectus sheath. She was diagnosed with RSH. We selected a conservative treatment. The treatment course was uneventful, and she was eventually discharged 2 days after the admission.

RSH is caused by bleeding into the rectus sheath from a damaged superior or inferior epigastric artery or its branches; moreover, it can result from a direct tear of the rectus muscle. Although RSH is rare, it can be a fatal condition with a reported overall mortality of 4%. Similar to our case, many cases of RSH are conservatively managed. However, for unstable patients, an aggressive treatment with angiographic vascular embolization is essential. Moreover, surgery is needed if the hemorrhage cannot be controlled by angiographic selective vascular embolization.

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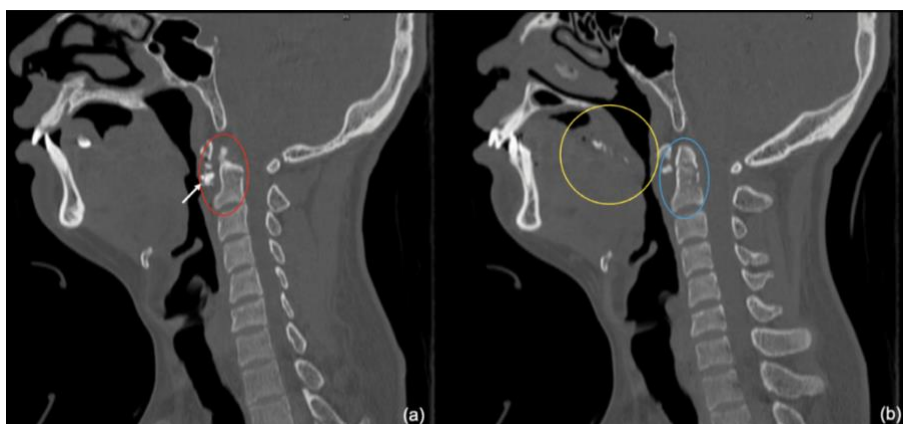
**THE VAPE GRENADE: A CASE OF MAXILLOFACIAL INJURIES  
WITH C1-C2 FRACTURE SECONDARY TO ELECTRONIC  
CIGARETTE BLAST INJURY**

Arden Aron Asuncion, MD

Invited Moderator: Patricia Martinez Quinones, MD

In recent years, the use of electronic cigarettes, as an alternative to conventional nicotine products has become increasingly popular. However, this trend has been accompanied by a rise in reported injuries caused by these devices. In this report, we present a case of a 24-year-old male who suffered a C1-C2 comminuted vertebral fracture, dental injuries, and avulsed lips and tongue, as a result of a vaporizing device explosion.

While electronic cigarette-related injuries can include thermal burns, blast injuries, and chemical pneumonitis, among others, the mechanism of injury in this report was due to a portion of the device acting as a projectile and penetrating through the patient's oral cavity through the posterior oropharyngeal wall, ultimately causing multiple dental fractures, avulsion of the lips, tongue, and uvula, and comminuted fractures of the C1-C2 vertebral fracture. Injuries from explosions from electronic cigarettes are a growing public health concern and can have serious consequences. Healthcare providers, policymakers, and the general public need to be aware of these potential risks and take steps to address them. This case underscores the need for injury prevention measures, such as strict product safety standards and public education campaigns, to eliminate the risk of injury associated with these vaporizing devices.



## **MODIFIED MESH-MEDIATED FASCIAL TRACTION, IN CONJUNCTION WITH ORTHOPEDIC ALUMINUM SPLINTS**

Yoshiaki Kawai, MD

Invited Moderator: Patricia Martinez Quinones, MD

**Introduction:** Primary fascial closure (PFC) in cases of open abdomen (OA) resulting from severe abdominal trauma or infection is typically achievable. However, challenging instances may arise. Therefore, various surgical techniques have been reported. Among them, Mesh-Mediated Fascial Traction (MMFT) is one method used to achieve PFC. However, medialization with direct suturing of the abdominal wall's fascial edge may result in tissue injuries and multiple small defects, potentially leading to a "swiss cheese hernia". Here, we introduce a method to protect the fascial edge using orthopedic aluminum splints for MMFT.

**Case:** A 76-year-old female underwent emergency laparotomy with Hartmann's procedure for sigmoid colon perforation, leading to postoperative peritonitis. After prolonged open abdominal management (OAM), severe lateral fascial retraction hindered PFC.

**Surgical Technique:** A heavyweight polypropylene mesh (Prolene™) is utilized without suturing around the fascial edge. Orthopedic aluminum splints are positioned on each side of the abdominal wound, placed over the lateral edge of the rectus sheath. Underlay Prolene meshes are then secured using heavy braided suture passing through all layers of the abdominal wall, including the skin, with knots tied over the aluminum splints (Figure 1). The mesh is subsequently divided down the middle, and traction is applied while suturing the two halves together with a continuous suture. The midline cut mesh edges are resutured to enhance tension for fascial reapproximation. Incremental tightening every 2 days facilitates abdominal wall medialization, leading to successful PFC by day 18.

**Conclusions:** Modified MMFT, in conjunction with orthopedic aluminum splints, effectively addresses the challenges associated with prolonged OAM, thereby protecting fascial edges.



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**A CASE OF LIGATION OF THE COMMON CAROTID  
ARTERY PENETRATING TRAUMA WHO SURVIVED  
WITHOUT NEUROLOGICAL DEFICIT**

Kaori Kono, MD

Invited Moderator: Patricia Martinez Quinones, MD

**Background:** Penetrating common carotid artery (CCA) injury is a dangerous trauma that can lead to fatal massive hemorrhage and severe neurological damage due to disruption of cerebral blood flow. Therefore, the principle of CCA injury treatment is restoration of blood flow through vascular repair, and ligation is only selected in the extreme case. We report a case in which a CCA disruption by penetrating trauma was ligated and the patient survived without neurological deficits.

**Case presentation:** A male in his thirties stabbed himself in his left neck. Upon arrival of the paramedics, a large amount of blood was seen at the scene, but the active bleeding from the wound had stopped. On arrival, he was alert and oriented, hypotensive but responded to initial resuscitative fluids. He was slightly hoarse. His physical examination revealed a 5cm transverse wound in the zone II of his left neck with non-expanding hematoma. Left CCA pulse was not palpable. Bruits and thrills were not present, neither. Noneurological abnormality was found. Contrast-enhanced computed tomography showed that the left CCA was thrombosed from its take-off from the aortic arch. The left neck exploration in the operating room revealed that the left CCA was completely transected, but there was no active hemorrhage because it was occluded by extensive thrombus on both the proximal and distal sides. It was determined that cerebral blood flow from the contralateral side was maintained, and both the proximal and distal ends of the dissected left CCA were ligated. Postoperatively, a brain MRI showed multiple micro-ischemic infarcts in the left cerebral hemisphere, but these were subclinical. He was discharged to a mental health facility without any neurological deficit except for residual hoarseness secondary to left recurrent nerve injury.

**Conclusion:** Although penetrating CCA injuries should be revascularized, ligation may be unavoidable to prevent massive hemorrhage and death and could be chosen without significant neurological damage when thrombotic occlusion is present and cerebral blood flow is maintained from the contralateral side.

**A CASE OF EARLY SURGICAL ESCHAROTOMY USING  
INTRAVASCULAR TEMPERATURE MANAGEMENT IS  
USEFUL FOR MAJOR DEEP BURN PATIENT**

Yuki Mochida, MD

Invited Moderator: Alexandra Brito, MD

**Introduction:** Body temperature management during burn surgeries is one of the most important factors for the prognosis of patients with major burns[1]. Although common methods of maintaining the body temperature involve administering warm fluids and raising the operating room temperature, it is often difficult to maintain the body temperature in cases of severe major burns[2]. We encountered a case of intravascular temperature management (IVTM) during a burn surgery and successfully maintained the body temperature of a patient who had a 95% deep burn surface area.

**Method:** The patient in her 20s had a 95% flame burn surface area for suicidal purposes. Five surgeries were performed within 1 week of the injury. Approximately 54% of the burn area was removed in four surgeries. A tracheostomy and some split-thickness skin grafting were performed in the last surgery. Chemical debridement of 27% of the burn area was performed. An IVTM catheter with three balloons (ICY heat exchange catheter and Thermogard XP console; Asahi Kasei Zoll Medical, San Jose, CA) was inserted from the femoral vein and used during the 3rd and 4th surgical escharotomies (this device was available only during this period).

**Result:** The patient had hypothermia of 35°C during surgeries without IVTM (1st, 2nd, and 5th escharotomies). These surgeries resulted in a drop in body temperature of 0.96°C per hour. Blood lactic acid levels increased after each surgery without IVTM. Conversely, surgeries with IVTM (3rd and 4th escharotomies) successfully maintained the body temperature above 36°C (Table.1). The IVTM device kept the three balloons of the catheter warm to prevent hypothermia during surgery. Blood lactic acid levels did not increase after each surgery with IVTM.

**Conclusion:** Using IVTM during surgical escharotomy for cases of major burns is useful for maintaining body temperature and can be a reliable strategy.

**THE EFFECT OF VACCUM-ASSISTED CLOSURE AFTER  
ABDOMINAL SURGERY FOR A PATIENT WITH A  
VENTRICULOPERITONEAL**

Naoki Oka, MD

Invited Moderator: Alexandra Brito, MD

**Case:** A 56-year-old male who has a history of hydrocephalus and ventriculoperitoneal shunt (VPS) placement was transferred from the district hospital. He was a motorcycle driver and collided with a car. His vital signs were stable except for a cerebral nervous system. At first, his consciousness was E3V4M5, but we decided to intubate him because his consciousness had deteriorated in emergency department.

We took a CT brain and it showed subarachnoid hemorrhage at the cerebellum and brainstem, bilateral acute subdural hematoma, mild ascending transtentorial herniation, and diffused brain edema with space of brain ventricle remained.

After admission, his blood pressure dropped to 70/53 mmHg. He was reevaluated and FAST was changed to positive in all three regions. We started resuscitation and decided to perform an exploratory laparotomy.

We found liver injury grade 2 at segment 5, splenic injury grade 1, non-expanding retroperitoneal hematoma at left zone 2, and the tip of VPS at the right upper quadrant. We decided to perform perihepatic and perisplenic packing and his blood pressure was going up after packing and resuscitation. We decided to keep the tip of VPS in his abdomen due to no contamination. Temporary abdominal closure with a handmade negative pressure dressing was performed. We ordered negative pressure between 40 to 100 mmHg and sent the patient to the intensive care unit (ICU). But 3 hours later after going back to ICU, this patient developed polyuria (1,000ml/h). Because we were worried about central Diabetes Insipidus, we sent him to CT brain again and it showed the progression of diffused brain swelling with effacement of bilateral brain ventricle, ascending transtentorial herniation, and whole brain ischemia. This patient died on 4th postoperative day.

We think there are three reasons why herniation deteriorated; first impact, secondary brain injury due to hypotension, and negative pressure via VPS. Theoretically, if we give negative pressure to the brain ventricle, this negative pressure is applied to the whole cerebrum and it provokes ascending transtentorial herniation.

**Conclusion:** Ascending transtentorial herniation could be developed or deteriorated by negative pressure to the abdomen after abdominal surgery for a patient with a VPS.



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**A CASE REPORT OF MANUAL COMPRESSION  
HEMOSTASIS FOR BRACHIAL ARTERY TRANSECTION  
WHILE BEING TRANSPORTED FROM AN ISOLATED  
JAPANESE ISLAND**

Shunsuke Saito, MD

Invited Moderator: Alexandra Brito, MD

**Background:** When severe extremity trauma is recognized as active bleeding from a site where it is difficult to apply a tourniquet, it is sometimes difficult to determine how to temporarily stop bleeding during transfer to a hospital with limited medical supplies and time. In this report, we describe a case in which a patient was transferred from a hospital on an isolated Japanese island after manual compression hemostasis was performed while permissive hypotension for a transected brachial artery.

**Case report:** A 46-year-old man fell into a 2-meter-deep hole during construction work and was transported to the emergency department after removing a rebar from his right shoulder. The patient was in cardiopulmonary arrest when he arrived at the hospital, but his heartbeat resumed 8 minutes later by advanced cardiovascular life support. A whole-body CT scan showed a crushed fracture of the right humeral head and transection of the right brachial artery. Because it was difficult to apply a tourniquet to the bleeding from the brachial artery, manual compression hemostasis was performed while maintaining a systolic blood pressure of around 80 mmHg, and the bleeding was successfully controlled. Because the hospital in the isolated area was unable to provide definitive treatment and had a limited amount of blood in reserve, we decided to transfer the patient to a hospital and requested a helicopter, which departed from our hospital 3 hours after the patient's arrival. The patient arrived at the destination hospital 5 hours after the patient's arrival.

**Conclusion:** Manual compression hemostasis with permissive hypotension may be an option for temporary hemostasis in cases of severe extremity trauma with active bleeding from a site where it is difficult to apply a tourniquet, even if the patient takes a long time to be transported.

**MULTIORGAN DYSFUNCTION FOLLOWING DELAYED  
TRAUMATIC HEPATIC PSEUDOANEURYSM AND BILOMA: A  
CASE REPORT**

Rene Ogatis, MD

Invited Moderator: Alexandra Brito, MD

Hepatic pseudoaneurysm (HPA) is a rare, delayed complication following complex liver trauma. While most cases are asymptomatic and are incidentally diagnosed on CT angiography, very few patients present with life-threatening symptoms of bleeding and/or sepsis. This is a case of a 34-year-old female sustaining a stab wound in the right upper quadrant of the abdomen with hemodynamic instability on admission. On exploratory laparotomy, there was a bleeding AAST Grade III liver injury on segment IVa, which was primarily repaired. She was subsequently discharged with no complications and was advised for outpatient follow-up after a week. On the 10th day post-injury, she arrived at the ED with sepsis-induced multiorgan dysfunction syndrome. She presented with hemodynamic instability, altered sensorium, fever, jaundice, shortness of breath, and oliguria. CT angiography revealed a right hepatic artery aneurysm with surrounding biloma on segments IVa, VII and VIII. Selective angioembolization (SAE) of the right hepatic artery pseudoaneurysm using steel coils was performed, with improvement of jaundice. Coupled with fluid resuscitation, vasopressors and culture-directed antibiotic administration, multiple sessions of hemodialysis, lung-protective ventilatory support, sedation, and prone positioning, there was marked improvement of her condition. However, 5 weeks after SAE, she once again presented with bleeding. Repeat SAE was done on the right hepatic pseudoaneurysm, as well as percutaneous drainage of biloma. On the 6th week, she was discharged from the surgical intensive care unit with rehabilitation. Early detection of HPA is crucial to achieve better treatment outcomes in patients with severe liver trauma. However, in situations where complications develop, it is essential to implement a multidisciplinary approach in critical care management to improve patient survival.



Selective angiography via the celiac artery showed a 4.2 x 3.2 cm saccular outpouching in the right hepatic artery with intraserial coils.

World Trauma Congress Poster Session: Station III  
Poster 19: 3:00 PM - 5:00 PM  
**HOMEMADE DYNAMIC FASCIAL CLOSURE**  
Taiki Yamataka, MD  
Invited Moderator: Alexandra Brito, MD

**Introduction:** In most cases of open abdomen (OA) due to severe abdominal trauma or severe intra-abdominal infection, primary fascial closure (PFC) is feasible. However, in some instances, achieving PFC can be challenging. Here, we present a dynamic abdominal closure technique utilizing readily available medical materials.

**Case and Surgical Technique:** A 52-year-old man underwent emergency laparotomy with omental patch repair for a perforated duodenal ulcer, leading to postoperative peritonitis. Open abdominal management (OAM) with negative pressure wound therapy (NPWT) was adopted. On day 10, an enteroatmospheric fistula developed, necessitating laparostomy. Despite improvement in the general condition, severe lateral fascial retraction prevented PFC. Due to unavailability of commercial devices, homemade dynamic fascial closure (HDFC) was utilized on day 56. This involved utilizing transfusion tubes and orthopedic aluminum splints for fascial reapproximating. Incremental tightening was performed every 2 days facilitating medialization of the abdominal wall, and PFC was achieved on day 65.

**Conclusions:** The HDFC technique can offer cost-effective dynamic closure, addressing challenges posed by prolonged OAM.

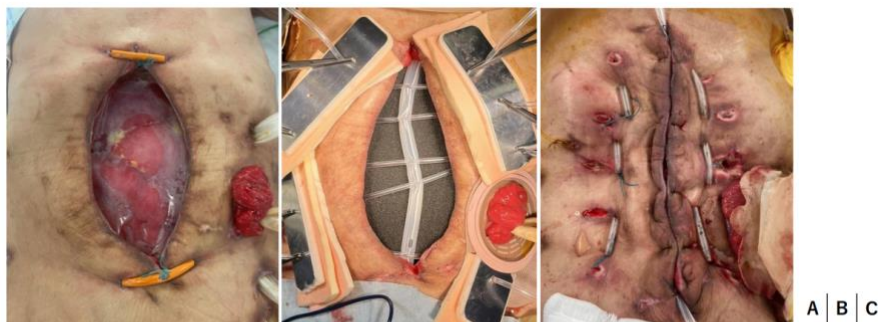


Figure 1. Prolonged open abdomen with lateral fascial retraction (A), apply homemade dynamic fascial closure using a transfusion tube and orthopedic aluminum splints on day 56 (B) and perform definitive abdominal closure supported by tension-reduction suture on day 65 (C).

**AGRICULTURAL FARM-RELATED INJURIES IN RURAL INDIA: A COMPREHENSIVE CASE SERIES**

Abdul Vakil Khan, MD

Invited Moderator: Alexandra Brito, MD

**Abstract:** This paper presents a case series on diverse agricultural farm-related head injuries encountered in rural India. The study highlights unique challenges and interventions, showcasing four distinct cases involving winnowing fan blades, bull's horns, agricultural boring machines, and tractor farm ploughers. Surgical interventions, outcomes, and implications for rural healthcare are discussed.

**Introduction:** Agricultural activities contribute significantly to India's economy but pose inherent risks, including head injuries. This paper aims to shed light on the complexities of managing such injuries in a rural context.

**Methods:** Cases were collected from the trauma surgery department at AIIMS Patna. Inclusion criteria focused on head injuries related to agricultural machinery. Data included patient demographics, injury details, Glasgow Coma Scale (GCS) scores, surgical interventions, and outcomes.

**Results:**

1. **\*\*Winnowing Fan Blade Head Injury:\*\***
  - GCS E2V2M5 on admission, treated with surgical debridement.
  - Discharged after 30 days with improved GCS (E4V5M6).
2. **\*\*Head Injury by Farming Bull's Horn:\*\***
  - GCS E3V4M5 on admission, treated with enucleation and duraplasty.
  - Discharged on post-op day 15 with improved GCS E4V5M6
3. **\*\*Agricultural Boring Machine Injury:\*\***
  - GCS E3V3M5 on admission, treated with debridement and duraplasty.
  - Discharged on post-op day 20 with improved GCS E4V5M6
4. **\*\*Head Injury by Tractor Farm Plougher:\*\***
  - GCS E1VTM5 on admission, treated with debridement and duraplasty.
  - Discharged on post-op day 20 with GCS E4V5M6

**Discussion:** There are unique challenges of agricultural-related head injuries, emphasizing the need for prompt surgical intervention, diverse surgical techniques, and multidisciplinary care. Improvement in rural healthcare infrastructure and preventive strategies.

**Conclusion:** This case series underscores the critical importance of tailored approaches in managing agricultural farm-related head injuries. By understanding the nuances of these cases, healthcare providers can optimize interventions and improve outcomes in rural settings

World Trauma Congress Poster Session: Station III

Poster 21: 3:00 PM - 5:00 PM

**PANCREATICOGASTROSTOMY AS RECONSTRUCTION  
FOR COMPLETE NECK TRANSECTION OF THE PANCREAS**

Jungchul Kim, MD

Invited Moderator: Alexandra Brito, MD

**Background and Purpose:** The optimal management for high grade pancreatic injuries remains controversial and depends on the location and extent of the injury. This article is to highlight the application of surgical method for pancreatic parenchymal preservation in patients with complete neck transection of pancreas.

**Material and Methods:** We present two similar cases of traumatic complete neck transection of the pancreas. Two patients: a 43-year-old man and a 23-year-old man admitted via the emergency department due to blunt abdominal trauma injury cause by struck on a motorcycle handle. Both patients' initial vital signs were stable. On physical examination they showed upper quadrant area pain. The laboratory findings showed leukocytosis and elevation of serum amylase level. An abdominal computed tomography (CT) showed a complete transection injury on the neck of pancreas. Two patients underwent exploratory laparotomy and complete transection of the pancreas neck area were revealed. Since both patients were hemodynamically stable, we performed primary repair of the remained pancreatic head parenchyma and duct. And pancreaticogastrostomy was done on poster area of stomach wall with preservation of the distal pancreas and spleen by handsewn suture. Both patients' postoperative courses were uneventful, and discharged with no other complications

**Results:** Pancreaticogastrostomy is feasible and reasonable technique. long-term exocrine, and endocrine pancreatic function may be preserved.

**Conclusions:** In selected cases of complete neck transection, when patients are hemodynamically stable and total transection of pancreatic parenchyme with disruption of the main pancreatic duct is found with clear margins on operative findings, pancreas preserving surgeries can be considered. Patient selection and decision making by operative findings should be carefully considered by experienced pancreatic surgeons.

**Keywords:** Pancreas, Pancreaticogastrostomy, Trauma