INDEX SURGICAL CRITICAL CARE AND EMERGENCY MEDICINE

The comparison of the effects of hot milk and hot water scald burns and factors effective for morbidity and mortality in preschool children. 3

Nutrition therapy for critically ill and injured patients. 4

Nutritional support in patients following damage control laparotomy with an open abdomen. 5

Prophylactic sequential bronchoscopy after inhalation injury: results from a three-year prospective randomized trial. 6

Protection of medical personnel in armed conflicts-case study: Afghanistan..... 7

Feed the gut, feed early and with the right stuff, but do not forget total parenteral nutrition.. 8

Gastrointestinal tract access for enteral nutrition in critically ill and trauma patients: indications, techniques, and complications (vol 39, pg 235, 2013). 9

Gastrointestinal tract access for enteral nutrition in critically ill and trauma patients: indications, techniques, and complications. 10

Disease-specific nutrition therapy: one size does not fit all. 11

Risk stratification, management and outcomes in emergency general surgical patients in the UK. 12

Beta-hemolytic streptococcal infections in trauma patients. 13

Dalteparin versus Enoxaparin for the prevention of venous thromboembolic events in trauma patients. 14

Fast Track by physician assistants shortens waiting and turnaround times of trauma patients in an emergency department. 16

Traumatic deaths at hospital: analysis of preventability and lessons learned. 17

The effect of evolving trauma care on the development of multiple organ dysfunction syndrome. 18

Best practice for needlestick injuries..... 19

Trauma care in Scotland: effect of rurality on ambulance travel times and level of destination healthcare facility. 20

Whole body imaging in the diagnosis of blunt trauma, ionizing radiation hazards and residual risk. 21

Epidemiology and management of trauma patients in a Greek multispecialty hospital in the absence of a dedicated trauma center. 22

Percutaneous dilatational tracheostomies in a newly established trauma center: a report from Qatar. 23

Pain and quality of life 1 year after admission to the emergency department: factors associated with pain. 24

Symptomatic venous thromboembolism in Asian major trauma patients: incidence, presentation and risk factors. 25

The epidemic of pre-injury oral antiplatelet and anticoagulant use. 27

Assessing the gap between the acute trauma workload and the capacity of a single rural health district in South Africa. What are the implications for systems planning? 28

Trauma risk perception related to alcohol, cannabis, and cocaine intake. 29

Electrical burn injuries of 246 patients treated at the University Clinical Center of Kosovo during the period 2005-2010. 30

Age and mortality after injury: is the association linear? 31

Bullhorn and bullfighting injuries. 32

Adherence to protocol in pregnant trauma patients? A 12-year retrospective study. 33

Urban versus rural trauma recidivism: is there a difference? 34

The comparison of the effects of hot milk and hot water scald burns and factors effective for morbidity and mortality in preschool children.

Aliosmanoglu I, Aliosmanoglu C, Gul M, Arikanoglu Z, Taskesen F, Kapan M, Onder A.

Eur J Trauma Emerg S. 2013;39(2):173-176.
10.1007/s00068-012-0246-2

Scald burns are the leading cause of burns in children, especially in those younger than 5 years of age, however, they are easily preventable. Our aim in this study was to emphasise the importance and impact of scald burns caused by hot milk.
A total of 334 patients below seven years of age were included in this study. Of these, 252 were admitted with acquired hot water scald burns (Group 1) and 82 with hot milk scald burns (Group 2) between August 2009 and September 2010. Demographic data of the patients were retrospectively investigated.
The depth of the burns was determined to be higher in Group 2 ($p < 0.001$). The total burnt body surface area in Group 1 and Group 2 were 17.1 +/- A 12.3 and 16.3 +/- A 10.9 ($p = 0.99$), respectively. Skin grafting was performed in 23 patients in Group 1 and 16 patients in Group 2 ($p = 0.01$) and complications developed in three patients in Group 1 and in five patients in Group 2 ($p = 0.01$). The mean length of hospital stay was 9.1 +/- A 7.4 days in Group 1 and 14.9 +/- A 9.8 days in Group 2 ($p < 0.001$) and the mortality rates were similar between the two groups.
More emphasis should be placed on the effects of hot milk scalding due to its ominous clinical course and the high healthcare costs associated with this type of scalding. We believe that taking simple precautions would help reduce the physical, psychological effects and financial consequences of hot milk scalds.

Keywords
hot milk burn - scalding - children - pediatric burn - epidemiology

Nutrition therapy for critically ill and injured patients.

Afifi I, Elazzazy S, Abdulrahman Y, Latifi R.

Eur J Trauma Emerg S. 2013;39(3):203-213.
10.1007/s00068-013-0272-8

Nutrition support has undergone significant advances in recent decades, revolutionizing the care of critically ill and injured patients. However, providing adequate and optimal nutrition therapy for such patients is very challenging: it requires careful attention and an understanding of the biology of the individual patient's disease or injury process, including insight into the consequent changes in nutrients needed.
The objective of this article is to review the current principles and practices of providing nutrition therapy for critically ill and injured patients. Review of the literature and evidence-based guidelines.
The evidence demonstrates the need to understand the biology of nutrition therapy for critically ill and injured patients, tailored to their individual disease or injury, age, and comorbidities.
Nutrition therapy for critically ill and injured patients has become an important part of their overall care. No longer should we consider nutrition for critically ill and injured patients just as "support" but, rather, as "therapy", because it is, indeed, a key therapeutic modality.

Keywords
nutrition therapy - critically ill patients - intensive care unit - immune nutrition - immune-enhancing diet - immune-modulating diet - intensive-care-unit - inflammatory response syndrome - resting energy-expenditure - total parenteral-nutrition - enteral nutrition - double-blind - infectious morbidity - randomized-trial - clinical-trial - hospitalized-patients

Nutritional support in patients following damage control laparotomy with an open abdomen.

Bansal V, Coimbra R.

Eur J Trauma Emerg S. 2013;39(3):243-248.
10.1007/s00068-013-0287-1

Damage control laparotomy (DCL) and the open abdomen have been well accepted following either severe abdominal trauma or emergency surgical disease. As DCL is increasingly utilized as a therapeutic option, appropriate management of the post-DCL patient is important. Early caloric support by enteral nutrition (EN) in the critically ill patient improves wound healing and decreases septic complications, lung injury, and multi-system organ failure. However, following DCL, nutritional strategies can be challenging and, at times, even daunting.
Even though limited data exist, the use of early EN following DCL seems safe, provided that the patient is not undergoing active resuscitation or the bowel is not in discontinuity. It is unknown as to whether EN in the open abdomen reduces septic complications, prevents enterocutaneous fistula (ECF), or alters the timing of definitive abdominal wall closure. Future investigation in a prospective manner may help elucidate these important questions.

Keywords
damage control laparotomy - open abdomen - enteral nutrition - early enteral nutrition - major abdominal-trauma - assisted fascial closure - control open celiotomies - ventral hernia rate - control resuscitation - intraabdominal hypertension - compartment syndrome - septic morbidity - ill patients

Prophylactic sequential bronchoscopy after inhalation injury: results from a three-year prospective randomized trial.

Carr J A, Crowley N.

Eur J Trauma Emerg S. 2013;39(2):177-183.
10.1007/s00068-013-0254-x

That the prophylactic, sequential use of bronchoscopy after inhalation injury as a therapeutic tool to remove secretions and carbonaceous material and to screen for the early detection of pneumonia will improve outcome.
A three-year prospective randomized trial at a regional burn center.
Thirty-three patients with inhalation injury requiring mechanical ventilation were admitted over three years. The bronchoscopy group had a higher initial carboxyhemoglobin level at 11.9 % (95 % CI +/- A 9.6 %) versus the control group at 9.9 % (95 % CI +/- A 5.7 %, p = 0.7). There was no difference in the incidence of pneumonia between groups (p = 0.6). There was a trend toward fewer days of antibiotic use in the bronchoscopy group, at 4.5 days (95 % CI +/- A 4.5 days) versus 9.3 days (95 % CI +/- A 7.1 days, p = 0.3). Fewer patients were treated with antibiotics in the bronchoscopy group (4/13, 31 %) versus the control group (9/15, 60 %, p = 0.1). There was a statistically significant difference in the morbidity that favored the bronchoscopy group (3/13, 23 %) over the control group (9/15, 60 %, p = 0.04). There was no statistically significant difference between the two groups in days of mechanical ventilation (bronchoscopy 5.1 days, 95 % CI +/- A 3.6 days, control 6.7 days, 95 % CI +/- A 6.3 days, p = 0.7), ICU days (bronchoscopy 10 days, 95 % CI +/- A 10 days, control 18 days, 95 % CI +/- A 12 days, p = 0.4), and hospital days (bronchoscopy 21 days, 95 % CI +/- A 12 days, control 26 days, 95 % CI +/- A 12 days, p = 0.5), although the trends favored the bronchoscopy group for all of the endpoints.
In conclusion, this program of scheduled, sequential bronchoscopy after inhalation injury showed several strong trends towards less morbidity, fewer days of mechanical ventilation, and a shorter length of stay. There was also a strong trend towards less antibiotic use and a shorter duration of treatment. This data is promising and should promote a larger, multi-institutional trial in the future.

Keywords
inhalation injury - bronchoscopy - pneumonia - smoke inhalation - bronchoalveolar lavage - ventilator-associated pneumonia - bronchoalveolar lavage - burn patients - fiberoptic bronchoscopy - diagnosis - management - prognosis

Protection of medical personnel in armed conflicts-case study: Afghanistan.

Goniewicz M, Goniewicz K.

Eur J Trauma Emerg S. 2013;39(2):107-112.
10.1007/s00068-013-0251-0

International humanitarian law affords special protection to medical property and personnel whose mission is to save lives and provide health care for civilians and combatants alike.
This paper presents the legal aspects of medical-personnel protection in armed conflicts. Presented below are examples of the Afghanistan analyses where, as a result of war situations, people are most vulnerable. Discussed are the minimum protection and standards applicable to such situations specified by the international humanitarian law.
Its rules and provisions obligate fighting parties to take all necessary measures to protect and respect medical missions in all circumstances.

Feed the gut, feed early and with the right stuff, but do not forget total parenteral nutrition.

Latifi R, Uranues S.

Eur J Trauma Emerg S. 2013;39(3):201-202.
10.1007/s00068-013-0259-5

Keywords
injured patients - critically-ill - support - therapy

Gastrointestinal tract access for enteral nutrition in critically ill and trauma patients: indications, techniques, and complications (vol 39, pg 235, 2013).

Tuma M, Latifi R, El-Menyar A, Al-Thani H.

Eur J Trauma Emerg S. 2013;39(3):305-305.
10.1007/s00068-013-0294-2

Gastrointestinal tract access for enteral nutrition in critically ill and trauma patients: indications, techniques, and complications.

Tuna M, Latifi R, El-Menyar A, Al Thani H.

Eur J Trauma Emerg S. 2013;39(3):235-242.
10.1007/s00068-013-0274-6

Enteral nutrition (EN) is a widely used, standard-of-care technique for nutrition support in critically ill and trauma patients.
To review the current techniques of gastrointestinal tract access for EN.
For this traditional narrative review, we accessed English-language articles and abstracts published from January 1988 through October 2012, using three research engines (MEDLINE, Scopus, and EMBASE) and the following key terms: "enteral nutrition," "critically ill," and "gut access." We excluded outdated abstracts.
For our nearly 25-year search period, 44 articles matched all three terms. The most common gut access techniques included nasoenteric tube placement (nasogastric, nasoduodenal, or nasojejunal), as well as a percutaneous endoscopic gastrostomy (PEG). Other open or laparoscopic techniques, such as a jejunostomy or a gastrojejunostomy, were also used. Early EN continues to be preferred whenever feasible. In addition, evidence is mounting that EN during the early phase of critical illness or trauma trophic feeding has an outcome comparable to that of full-strength formulas. Most patients tolerate EN through the stomach, so postpyloric tube feeding is not needed initially.
In critically ill and trauma patients, early EN through the stomach should be instituted whenever feasible. Other approaches can be used according to patient needs, available expertise, and institutional guidelines. More research is needed in order to ensure the safe use of surgical tubes in the open abdomen.

Keywords
enteral nutrition - feeding tube - percutaneous endoscopic gastrostomy - gastrostomy - gastrojejunostomy - nasojejunostomy - percutaneous endoscopic gastrostomy - nasogastric tube position - feeding jejunostomy - injured patients - open abdomen - parenteral-nutrition - critical illness - care patients - t-fasteners - placement

Disease-specific nutrition therapy: one size does not fit all.

Yeh D D, Velmahos G C.

Eur J Trauma Emerg S. 2013;39(3):215-233.
10.1007/s00068-013-0264-8

The delivery of adequate nutrition is an integral part of the care of the critically ill surgical patient, and the provision of nutrition may have a greater impact on outcome than many other therapies commonly employed in the treatment of certain disease states.
A review of the existing literature was performed to summarize the evidence for utilizing disease-specific nutrition in critically ill surgical patients.
Enteral nutrition, unless specifically contraindicated, is always preferable to parenteral nutrition. Methodological heterogeneity and conflicting results plague research in immunonutrition, and routine use is not currently recommended in critically ill patients.
There is currently insufficient evidence to recommend the routine initial use of most disease-specific formulas, as most patients with the disease in question will tolerate standard enteral formulas. However, the clinician should closely monitor for signs of intolerance and utilize disease-specific formulas when appropriate.

Keywords
nutrition - immunonutrition - renal failure - hepatic failure - obesity - pulmonary failure - critically-ill patients - intensive-care-unit - severe acute-pancreatitis - early enteral nutrition - gamma-linolenic acid - systemic inflammatory response - total parenteral-nutrition - short-bowel syndrome - mechanically ventilated patients - acute lung injury

Risk stratification, management and outcomes in emergency general surgical patients in the UK.

Johnstone M, Pennick M, Gossedge G, Oshin O, Sutton P, Dunne D, Jackson R, Ghaneh P, Halloran C, Sheel A, Howes N, Siddique K, Jones S, Emelifeonwu J, Walsh C, Butler J, Hancorn K, Tighe M, Vitone L, Snashall E, Joel A, Kaul A, Zeiderman M, Hepburn E, Owens R, Saunders R, Slavin J, Mekhail P, Ward S, Edwards P, Vimalachandran D, Grp M S, Grp M S, Surg M R G.

Eur J Trauma Emerg S. 2014;40(5):617-624.
10.1007/s00068-014-0399-2

Introduction
The Royal College of Surgeons of England (RCS) published guidance in 2011 setting standards for the management of emergency surgical patients with the aim of reducing surgical mortality. These suggested the presence of a consultant surgeon and anaesthetist, and transfer to a higher level of care postoperatively for all patients deemed high risk.

Objective
This prospective multi-institutional study sought to evaluate whether adherence to these standards was associated with reduced mortality.
Design Data were prospectively collected on all emergency general surgery operations performed in emergency theatres across Merseyside, UK, during a 30-day period in September-October 2011. Patients were risk assessed using P-POSSUM (Physiological and Operative Severity Score for the enUmeration of Mortality and morbidity). High-risk patients were classified as those with a P-POSSUM predicted mortality of >= 10 %, and moderate-risk patients as those with a P-POSSUM predicted mortality of 5-10 %.

Results
Some 494 procedures were performed on 471 patients. Twenty-four patients (5 %) died within 30 days of surgery. Mortality in the 65 patients identified as high risk was 27 % (14 patients undergoing 17 procedures), with a consultant surgeon present in 46 of 65 high-risk cases (71 %), a consultant anaesthetist in 43 (66 %), and 46 (71 %) cases were admitted to level 2 or 3 care postoperatively. There was no association between adherence to standards and postoperative mortality in either the whole cohort or specifically the high-risk group.

Conclusions
There is currently incomplete adherence to the national guidelines, but this does not seem to adversely impact postoperative mortality.

Keywords
emergency surgery - unscheduled care - consultant surgeon - perioperative risk - mortality - surgery - database

Beta-hemolytic streptococcal infections in trauma patients.

Mathur P, Bhardwaj N, Gupta G, Punia P, Tak V, Misra M C.

Eur J Trauma Emerg S. 2014;40(2):175-181.
10.1007/s00068-013-0326-y

Purpose
beta-hemolytic streptococci (beta HS) causes a diverse array of human infections. The molecular epidemiology of beta-hemolytic streptococcal infections in trauma patients has not been studied. This study reports the molecular and clinical epidemiology of beta-hemolytic streptococcal infections at a level 1 trauma centre of India.

Methods
A total of 117 isolates of beta HS were recovered from clinical samples of trauma patients. The isolates were identified to species level and subjected to antimicrobial susceptibility testing. Polymerase chain reaction (PCR) assay was done to detect exotoxin virulence genes. The M protein gene (emm gene) types of GAS strains were ascertained by sequencing.

Results
Group A Streptococcus (GAS) was the most common isolate (64 %), followed by group G Streptococcus (23 %). A large proportion of GAS produced speB 99 %), smeB (91 %), speF (95 %) and speG (87 %). smeZ was produced by 22 % of GGS. A total of 25 different emm types/subtypes were seen in GAS, with emm 11 being the most common. Resistance to tetracycline (69 %) and erythromycin (33 %) was commonly seen in GAS.

Conclusions
beta-hemolytic streptococcal infections in Indian trauma patients are caused by GAS and non-GAS strains alike. A high diversity of emm types was seen in GAS isolates, with high macrolide and tetracycline resistance. SpeA was less commonly seen in Indian GAS isolates. There was no association between disease severity and exotoxin gene production.

Keywords
beta-hemolytic streptococci - group a streptococcus - spe emm types - antimicrobial resistance - trauma patients - group-a streptococcus - south-india - groups c - emm - resistance - pyogenes - erythromycin - anginosus

Dalteparin versus Enoxaparin for the prevention of venous thromboembolic events in trauma patients.

Okoye O T, Gelbard R, Inaba K, Esparza M, Belzberg H, Talving P, Teixeira P G, Chan L S, Demetriades D.

Eur J Trauma Emerg S. 2014;40(2):183-189.
10.1007/s00068-013-0333-z

Background
The use of low-molecular-weight heparin (LMWH) for the chemoprophylaxis of venous thromboembolism (VTE) in trauma patients is supported by Level-1 evidence. Because Enoxaparin was the agent used in the majority of studies for establishing the efficacy of LMWH in VTE, it remains unclear if Dalteparin provides an equivalent effect.

Objective
To compare Dalteparin to Enoxaparin and investigate their equivalence as VTE prophylaxis in trauma.

Patients/setting
Trauma patients receiving VTE chemoprophylaxis in the Surgical Intensive Care Unit of a Level-1 Trauma Center from 2009 (Enoxaparin) to 2010 (Dalteparin) were included.
Measurements The primary outcome was the incidence of clinically significant VTE. Secondary outcomes included heparin-induced thrombocytopenia (HIT), major bleeding, and drug acquisition cost savings. Equivalence margins were set between -5 and 5 %.

Main results
A total of 610 patient records (277 Enoxaparin, 333 Dalteparin) were reviewed. The two study groups did not differ significantly: blunt trauma 67 vs. 62 %, p = 0.27; mean Injury Severity Score (ISS) 17 +/- 10 vs. 16 +/- 10, p = 0.34; Acute Physiology and Chronic Health Evaluation (APACHE) II score 17 +/- 9 vs. 17 +/- 10, p = 0.76; time to first dose of LMWH 69 +/- 98 vs. 65 +/- 67 h, p = 0.57). The rates of deep venous thrombosis (DVT) (3.2 vs. 3.3 %, p = 1.00), pulmonary emboli (PE) (1.8 vs. 1.2 %, p = 0.74), and overall VTE (5.1 vs. 4.5 %, p = 0.85) did not differ. The absolute difference in the incidence of overall VTE was 0.5 % [95 % confidence interval (CI): -2.9, 4.0 %, p = 0.85]. The 95 % CI was within the predefined equivalence margins. There were no significant differences in the frequency of HIT or major bleeding. The total year-on-year cost savings, achieved with 277 patients during the switch to Dalteparin, was estimated to be $107,778.

Conclusions
Dalteparin is equivalent to Enoxaparin in terms of VTE in trauma patients and can be safely used in this population, with no increase in complications and significant cost savings.

Keywords
trauma - low-molecular-weight heparin - deep venous thrombosis - pulmonary embolism - venous thromboembolism prophylaxis - cost savings - molecular-weight heparin - spinal-cord-injury - deep-vein thrombosis - intermittent pneumatic compression - reported dvt rates - low-dose heparin - quality-of-care - unfractionated heparin - surveillance bias - 1602 episodes

Fast Track by physician assistants shortens waiting and turnaround times of trauma patients in an emergency department.

Theunissen B H J J, Lardenoye S, Hannemann P H, Gerritsen K, Brink P R G, Poeze M.

Eur J Trauma Emerg S. 2014;40(1):87-91.
10.1007/s00068-013-0324-0

We sought to determine whether the introduction of a separate patient flow comprising patients with simple, non-complex health issues [Fast Track (FT)] in a Dutch emergency department setting (ED), without the introduction of additional staff, and treated by a physician assistant, would have favourable effects on waiting and turnaround times without deleterious effects for patients with a higher urgency.
We used a prospective comparative intervention design for our study.
The waiting times and length of stay for surgical and orthopaedic patients in the ED were measured and compared 3 months before and 3 months after the introduction of FT.
During the study period, 1,289 patients were treated before, and 1,393 after the introduction of FT. After the introduction of FT, we observed a decrease of 12 min (13 %) in the median length of stay for the total group. The median waiting time decreased by 41 min (69 %). The group comprising patients with low to moderate urgency levels showed a median reduction of 12 min in length of stay, whereas the length of stay for urgent patients was reduced by 19 min. The waiting time for the low to moderate urgency patients decreased by 68 min, while the urgent patient group showed a reduction of 32 min.
The introduction of FT performed by a physician assistant resulted in a significant drop in waiting time and length of stay in a Dutch ED setting. This reduction was realised without the allocation of additional staff and even reduced waiting and turnaround times for the patients with a high urgency.

Keywords
fast-track - emergency care - waiting time - trauma - a-and-e - hip-fractures - performance - care

Traumatic deaths at hospital: analysis of preventability and lessons learned.

Vahaaho S, Soderlund T, Tulikoura I, Reitala J, Niemela M, Handolin L.

Eur J Trauma Emerg S. 2014;40(6):707-713.
10.1007/s00068-013-0372-5

The aim of the present study was to characterize traumatic deaths of major trauma patients occurring in a university trauma centre and to assess retrospectively the quality of given care by evaluating whether any of the deaths could be identified as potentially preventable.
All consecutive deaths of trauma patients between January 1, 2004 and December 31, 2008 in the Toolo Hospital Trauma Centre were retrospectively reviewed. The inclusion criterion was death of a trauma patient occurring during stay at hospital. Patients aged > 65 years with an isolated proximal femoral fracture, burn patients, patients with isolated limb fracture other than femoral or tibial shaft fracture, and patients with isolated traumatic brain injuries were excluded as well as patients admitted more than 24 h after injury.
A total of 130 patients fulfilled the inclusion criteria. The autopsy reports were obtained for 103 of the cases (80.4 %). The majority of the patients were male, and the median age was 58 years (range 1-95 years). Blunt trauma was the most common type of injury. The most common injury mechanisms were fall from a higher level (31 %), fall from the level of the patient (21 %), and motor vehicle accident (17 %). Of the injuries not diagnosed before autopsy, the most common were liver lacerations, rib fractures, pulmonary contusions, sternum fractures, and blunt cardiac injuries. In our study population 12.5 % of the cases were considered potentially preventable. The reasons for preventability were inadequate treatment of coagulopathy, overuse of opioid medication, and loss of airway as well as failing to treat impending pneumonia and DVT. Trauma resuscitation was inadequate in 7.8 % of the cases.
The most common error made was not recognising and treating traumatic coagulopathy adequately.

Keywords
trauma - emergency room - trauma patients - coagulopathy - injury severity score - coagulopathy - errors

The effect of evolving trauma care on the development of multiple organ dysfunction syndrome.

van Wessem K J P, Leenen L P H.

Eur J Trauma Emerg S. 2014;40(2):127-134.
10.1007/s00068-014-0392-9

Introduction
Multiple organ dysfunction syndrome (MODS) is still a major threat to polytrauma patients, since sepsis-related organ failure is the most common cause of late mortality in these patients. In this article, the development of trauma surgery and evolution of trauma care from early total care to damage control surgery is discussed. Increasing knowledge of the pathophysiology of trauma has enabled us to identify the inflammatory response induced by trauma. By understanding the pathophysiology, we may be able to fully comprehend the origin of multiple organ dysfunction related sepsis. Further, it is important to appreciate the influence of surgery on the inflammatory response induced by trauma, and subsequently on the development of inflammatory complications. It is crucial to offer the polytrauma patient the appropriate type of surgery at the right time to prevent further deterioration.

Conclusion
MODS is still highly lethal, and once it has developed it is difficult to treat, so it is vital to be able to predict its occurrence. If we knew how to predict MODS, we might be able to develop strategies to prevent this syndrome.

Keywords
polytrauma - inflammatory response - organ failure - damage control orthopedics - inflammatory response syndrome - respiratory-distress-syndrome - prolonged abdominal packing - activate human neutrophils - potent immune activators - femoral-shaft fractures - open abdomen - c1-esterase inhibitor - polytrauma patients

Best practice for needlestick injuries.

Wicker S, Walcher F, Wutzler S, Stephan C, Marzi I.

Eur J Trauma Emerg S. 2014;40(2):151-158.
10.1007/s00068-014-0376-9

Purpose
Needlestick injuries (NSIs) are a significant health hazard. Occupational transmission of bloodborne pathogens among healthcare workers (HCWs) is rare but has been repeatedly reported in the literature.

Methods
In October 2010, new regulations were introduced for medical aftercare of HCWs following NSIs at the University Hospital Frankfurt. In June 2013, a university hospital-wide early intervention program was introduced that gives HCWs immediate 24/7/365 access to an HIV postexposure prophylaxis kit after confirmed or probable occupational HIV exposure.

Results
Interdisciplinary collaboration between the attending surgeon and occupational health as well as infectious disease specialists facilitates optimal postexposure medical treatment of HCWs who suffer NSIs. Complete reporting of NSIs is a prerequisite for achieving optimal treatment of the affected HCWs.

Conclusion
An NSI is an emergency and needs to be evaluated immediately and, if necessary, treated as soon as possible. A standardized algorithm for initial diagnostic and treatment has proven to be helpful.

Keywords
needlestick injury - occupational infection - hiv - hepatitis - postexposure prophylaxis - hepatitis-c virus - health-care worker - postexposure prophylaxis - occupational-exposure - hiv seroconversion - management - transmission - guidelines - diagnosis - patient

Trauma care in Scotland: effect of rurality on ambulance travel times and level of destination healthcare facility.

Yeap E E, Morrison J J, Apodaca A N, Egan G, Jansen J O.

Eur J Trauma Emerg S. 2014;40(3):295-302.
10.1007/s00068-014-0383-x

The aim of this study was to determine the effect of rurality on the level of destination healthcare facility and ambulance response times for trauma patients in Scotland.
We used a retrospective analysis of pre-hospital data routinely collected by the Scottish Ambulance Service from 2009-2010. Incident locations were categorised by rurality, using the Scottish urban/rural classification. The level of destination healthcare facility was coded as either a teaching hospital, large general hospital, general hospital, or other type of facility.
A total of 64,377 incidents met the inclusion criteria. The majority of incidents occurred in urban areas, which mostly resulted in admission to teaching hospitals. Incidents from other areas resulted in admission to a lower-level facility. The majority of incidents originating in very remote small towns and very remote rural areas were treated in a general hospital. Median call-out times and travel times increased with the degree of rurality, although with some exceptions. Trauma is relatively rare in rural areas, but patients injured in remote locations are doubly disadvantaged by prolonged pre-hospital times and admission to a hospital that may not be adequately equipped to deal with their injuries. These problems may be overcome by the regionalisation of trauma care, and enhanced retrieval capability.

Keywords
traumatology - rurality - trauma systems - scotland - mortality - urban

Whole body imaging in the diagnosis of blunt trauma, ionizing radiation hazards and residual risk.

Kepros J P, Opreanu R C, Samaraweera R, Briningstool A, Morrison C A, Mosher B D, Schneider P, Stevens P.

Eur J Trauma Emerg S. 2013;39(1):15-24.
10.1007/s00068-012-0201-2

Ever since the introduction of radiographic imaging, its utility in identifying injuries has been well documented and was incorporated in the workup of injured patients during advanced trauma life support algorithms [American College of Surgeons, 8th ed. Chicago, 2008]. More recently, computerized tomography (CT) has been shown to be more sensitive than radiography in the diagnosis of injury. Due to the increased use of CT scanning, concerns were raised regarding the associated exposure to ionizing radiation [N Engl J Med 357:2277-2284, 2007]. During the last several years, a significant amount of research has been published on this topic, most of it being incorporated in the BEIR VII Phase 2 report, published by the National Research Council of the National Academies [National Academy of Sciences, Washington DC, 2006]. The current review will analyze the scientific basis for the concerns over the ionizing radiation associated with the use of CT scanning and will examine the accuracy of the typical advanced trauma life support work-up for diagnosis of injuries.

Keywords
carcinogenesis - computerized tomography - radiation - radiography - linear-no-threshold - decreases missed injuries - row computed-tomography - solid cancer incidence - atomic-bomb survivors - altered mental status - 5-view plain films - cervical-spine - abdominal-trauma - dose reduction

Epidemiology and management of trauma patients in a Greek multispecialty hospital in the absence of a dedicated trauma center.

Lanitis S, Kontovounisios C, Zafeiriadou P, Sgourakis G, Karkoulias K, Armoutides V, Papaconstandinou T, Karaliotas C.

Eur J Trauma Emerg S. 2013;39(4):369-374.
10.1007/s00068-012-0221-y

In the absence of dedicated trauma centers, surgical emergency departments in hospitals assigned as trauma centers accept a huge load of trauma patients. In this audit, we aim to document and assess the epidemiologic data of trauma patients and their injuries in order to give a picture of the impact of trauma in the workload of a surgical department in the Greek healthcare system.
During a period of 2 years, we managed 6,041 trauma patients in the accident and emergency (A&E) department based on the Advanced Trauma Life Support (ATLS) protocols. We retrospectively reviewed the emergency department registry and the admissions.
47.56 % of the patients seen in the A&E department were trauma patients. The mean age of the trauma patients was 44.52 years (range 15-106 years). The majority were men (60.4 %). The leading cause of trauma was motor and vehicle accidents, followed by slip and fall accidents, physical assault, fall from height, and vehicle pedestrian accidents. The majority of the patients were discharged from the hospital. Only 29 (4.6 %) out of 624 patients who were admitted to the general surgery department underwent an operation, while the rest were admitted for observation. On the other hand, patients were admitted to other departments only when surgical treatment was necessary.
In the absence of level one trauma centers, in multispecialty urban hospitals, the coordination of trauma burdens the general surgery team. This has financial and administrative implications. The collection of important epidemiologic data from these hospitals is mandatory in order to develop national prevention measures against injuries.

Keywords
epidemiology - trauma - emergency department - primary assessment - trauma patients - life-support atls – registry

Percutaneous dilatational tracheostomies in a newly established trauma center: a report from Qatar.

Parchani A, Peralta R, El-Menyar A, Tuma M, Zarour A, Kumar S, Abdulrahman H, AbdulRahman Y, Al-Thani H, Latifi R.

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10.1007/s00068-013-0299-x

Percutaneous dilatational tracheostomy (PDT) is a routine surgical procedure for critically ill patients who require prolonged ventilatory support.
We conducted a retrospective cohort study of all PDTs performed at the adult Trauma Intensive Care Unit (TICU) of Hamad Medical Corporation in Doha, Qatar, from January 2009 through September 2012. For all adult patients, we analyzed the demographic characteristics, mean ventilator time before the procedure, injury severity score (ISS), complications, and outcomes.
Of the 1,442 trauma patients admitted to the adult TICU during our study period, 124 (8.5 %) underwent PDT using the Ciaglia Blue Rhino technique. The vast majority were male (94.3 %). The mean age was 35 +/- A 15.6 years; mean ventilator time before the procedure, 12 +/- A 3 days; and mean ISS, 24.2 +/- A 9.3. More than half of patients had head injury (56 %), followed by chest and abdomen (26 %) and cervical spine injuries (18 %). Early complications included difficult tube placement (0.8 %), hypoxemia (0.8 %), minor bleeding (1.6 %), and hypotension (0.8 %), but the vast majority (93 %) of patients had no complications. The procedure-related mortality rate was 0 %.
PDT is safe and can be performed with minimal complications even in a newly established trauma center.

Keywords
tracheostomy - complications - intensive care unit - ciaglia blue rhino - dilational tracheostomy - surgical tracheostomy - bedside procedure - randomized-trial - tracheotomy - forceps

Pain and quality of life 1 year after admission to the emergency department: factors associated with pain.

Tecic T, Lefering R, Althaus A, Rangger C, Neugebauer E.

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10.1007/s00068-013-0271-9

This study describes the prevalence of pain in trauma patients 1 year after hospital admission and investigates separately health-related quality of life (QoL) for patients suffering severe pain and for those without pain. Moreover, psychosocial factors are examined for their impact on pain.
Patients were contacted 12 months after admission in order to complete the following questionnaires: Medical Outcomes Study 36-Item Short Form Health Survey (SF-36), Trauma Outcome Profile (TOP), Beck Depression Inventory (BDI), State-Trait Anxiety Inventory (STAI), Impact of Event Scale-Revised (IES-R) and additional questions concerning satisfaction, work and financial status. Relevant pain at follow-up was defined as < 80 points on the pain subscale of the TOP.
Two hundred and twenty patients were included. The Injury Severity Score (ISS) ranged from 1 to 41. Fifty-three percent (53 %) of patients suffered a severe trauma (ISS > 15). One year after injury, 55 % of patients had relevant pain according to the TOP. Patients with pain were older (41.4 vs. 34.4 years, $p = 0.003$) and had slightly more severe injuries (ISS 17.1 vs. 14.9, $p = 0.115$). There were significant differences between pain and no-pain patients on all domains of QoL ($p < 0.001$) and on the BDI, STAI and IES-R ($p < 0.001$). Pain patients more often experienced a stressful event and job-related and financial difficulties. Multivariate logistic regression analysis revealed post-traumatic stress disorder (PTSD) as the strongest predictor for pain [odds ratio (OR): 4.38, $p = 0.015$], followed by a stressful life event (OR: 4.08, $p = 0.001$).
Pain is strongly associated with psychosocial complaints 1 year after trauma. For the treatment of pain following a traumatic event, social reintegration and emotional regulation by means of occupational rehabilitation and psychotherapy should receive more attention.

Keywords
pain - quality of life - trauma - ptsd - psychosocial - posttraumatic-stress-disorder - major trauma - injured patients - persistent pain - intensive-care - work status - health - prevalence - predictors - disability

Symptomatic venous thromboembolism in Asian major trauma patients: incidence, presentation and risk factors.

Wong T H, Koh M P, Ng J.

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10.1007/s00068-013-0292-4

Trauma patients are known to be at increased risk of venous thromboembolism (VTE), and pulmonary embolism (PE) is one of the preventable causes of mortality in trauma patients. The incidence of VTE in Asian populations was believed to be lower than in Caucasians, but the recent literature suggests that this is not the case. The purpose of this study was to assess the incidence of VTE in Asian major trauma patients and to examine the manner of presentation, use of prophylaxis and risk factors for VTE. While other studies of VTE have addressed general and high-risk populations within Asia, our study is one of the few to examine Asian major trauma patients.
Data for all patients with VTE were extracted from the Singapore General Hospital trauma database over a 10-year period from 1998 to 2007. Patient profiles and clinical factors were compared to patients without a diagnosis of VTE admitted with injuries in the same time period.
There were 8,615 patients entered into our database in this 10-year period. Thirty-four patients had VTE, with an overall incidence of 0.39 %. Thirteen patients had pulmonary embolism, an incidence of 0.15 %. Of note, 30 % of patients with deep vein thrombosis (DVT) presented with fever alone without limb symptoms. Almost all 34 patients who developed VTE had either head injury, a spinal cord injury or a pelvic/extremity injury. Eighteen patients had head injury, 22 patients sustained pelvic or extremity injury, and three patients had spinal cord injury with paraplegia. Head injury and spinal cord injury with neurologic sequelae were statistically significant risk factors for VTE ($p < 0.05$).
The incidence of symptomatic VTE in the Asian trauma population is no lower than in the West. The incidence found in this study is similar to the incidence of VTE according to a study using data from the American national trauma data bank using similar study methods and with a similar study population. It is also higher than the incidence in the literature for general post-surgical Asian patients. Fever was the presenting factor in some patients and screening for VTE should not be forgotten when assessing fever in the trauma patient. The strong association between head injury, spinal cord injury and VTE confirms that we should pay special attention to VTE prophylaxis for our patients with these injuries.

Keywords
venous thromboembolism - pulmonary embolism - deep vein thrombosis - race - asia - trauma - injury - deep-vein thrombosis - pulmonary-embolism - orthopedic-surgery - prophylaxis - prevalence - injury - population - prevention - ethnicity – Singapore

The epidemic of pre-injury oral antiplatelet and anticoagulant use.

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10.1007/s00068-014-0404-9

As the population ages, an increasing number of trauma patients are taking antiplatelet and anticoagulant medications (ACAP) prior to their injuries. These medications increase their risk of hemorrhagic complications, particularly intracerebral hemorrhage. Clopidogrel and warfarin are common and their mechanisms well understood, but optimal reversal methods continue to evolve. The novel direct thrombin and factor Xa inhibitors are less well described and do not have existing antidotes.
This article reviews the relevant literature on traumatic outcomes with use of ACAP medications, as well as data on ideal reversal strategies. Suggested algorithms are introduced, and future research directions discussed.
Although they are beneficial in preventing clot formation, once bleeding occurs ACAP medications contribute to increased morbidity and mortality, particularly in geriatric patient populations. The efficacy of clopidogrel reversal with platelet transfusions and DDAVP remains unclear. Warfarin use is best treated with the algorithm-driven use of plasma, vitamin K, prothrombin complex concentrates (PCCs) and possibly recombinant factor VIIa depending upon specific patient and injury factors. Optimal treatment for direct thrombin and factor Xa inhibitors has yet to be developed, but PCCs are promising for rivaroxaban and apixaban while dabigatran is best treated with medication cessation and the possible addition of activated PCCs or hemodialysis.
New developments in reversal of the ACAP medications are promising, particularly PCCs for warfarin and the factor Xa inhibitors. Function assays and clear antidotes are needed for the thrombin and Xa inhibitors. Research on outcomes and appropriate treatments is actively ongoing.

Keywords
anticoagulation - antiplatelet - intracranial hemorrhage - prothrombin complex concentrate - coagulopathy - prothrombin complex concentrate - recombinant factor viia - traumatic brain-injury - activated factor-vii - factor xa inhibitor - nonvalvular atrial-fibrillation - international normalized ratio - direct thrombin inhibitor - rapid warfarin reversal - minor head trauma

Assessing the gap between the acute trauma workload and the capacity of a single rural health district in South Africa. What are the implications for systems planning?

Clarke D L, Aldous C, Thomson S R.

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10.1007/s00068-013-0369-0

This study focuses on a single rural health district in South Africa, and attempts to establish the burden of disease and to review the capacity of the district hospitals to deal with this load.
Ethical approval to undertake this study was obtained from both the University of Kwa-Zulu Natal and the Department of Health. The audit was performed over a 6-month period in the four district hospitals of rural Sisonke District. There were four components to this audit. 1. Information on the hospital incidence of acute trauma in Sisonke was also sourced from the epidemiology unit of the Department of Health in Pietermaritzburg
Each of the district hospitals was visited and the medical manager was interviewed. The medical manager was asked to complete the World Health Organization's Tool for Situational Analysis to Assess Emergency and Essential Surgical Care. (SAT).
The operative registers were reviewed to determine the number of index cases for trauma. This information was used to determine the unmet need of acute trauma in the district.
Each hospital was classified according to the Trauma Society of South Africa (TSSA) guidelines for levels of trauma care.
The annual incidence of trauma in the Sisonke District is estimated to be 1,590 per 100,000 population. Although there appeared to be adequate infrastructure in the district hospitals, the SAT revealed significant deficits in terms of capacity of staff to adequately treat and triage acute trauma patients. There is a significant unmet need for trauma care in Sisonke. The four district hospitals can best be classified as Level IV centers of trauma care.
There is a significant burden of trauma in the Sisonke District, yet the capacity to deal with this burden is inadequate. Although the physical infrastructure is adequate, the deficits relate to human resources. The strategic choices are between enhancing the district hospitals' capacity to deal with acute trauma, or deciding to bypass them completely and deliver all acute trauma patients to large regional trauma centers. If the first option is chosen, urgent intervention is required to build up the human resource capacity of district hospitals.

Keywords
acute trauma - district hospitals - rural health - global surgery - burden of disesease - surgcial capacity - quality improvement - disease - burden

Trauma risk perception related to alcohol, cannabis, and cocaine intake.

Cordovilla-Guardia S, Guerrero-Lopez F, Maldonado A, Vilar-Lopez R, Salmeron J M, Romero I, Pose S, Fernandez-Modejar E.

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10.1007/s00068-014-0384-9

A high perception of risk may exert a preventive effect against the initiation of risky activities. The aims of the present study were (1) to analyze the risk perception for traumatic incidents according to drug intake (alcohol, cannabis, cocaine, no consumption) by trauma patients admitted to our hospital, and (2) to explore the influence of drugs on trauma recidivism.
Between 1 November 2011 and 1 April 2012, 404 patients aged between 16 and 70 years were admitted to our hospital for trauma cases. In 363 (89.9 %) of the patients, data were gathered on age, the trauma mechanism, and the consumption of alcohol and other drugs. Out of these 363 patients, 286 (78.8 %) attended a motivational interview and reported their consumption habits and their perception of the risk of trauma after alcohol and/or illegal drug consumption, as well as the antecedents of previous traumatisms.
Alcohol and/or illegal drugs were detected in 37 % of the sample, with alcohol being the most frequently detected, followed by cannabis, cocaine, and other drugs. Among the trauma patients with no consumption, a high perception of trauma risk was associated with alcohol intake by 95.9 %, with cannabis consumption by 68.4 %, and with cocaine consumption by 53.4 %, whereas these percentages were significantly lower for patients testing positive for substances (79.3, 21.1, and 8.3 % respectively). Among the patients experiencing their first trauma, the mean age was almost 15 years younger in those who were positive for these substances than in those who were negative ($p < 0.001$). Finally, a history of previous trauma was reported by a majority (64 %) of the trauma patients testing positive for alcohol and/or drugs, but by a minority (36 %) of those testing negative ($p < 0.001$).
The low perception of risk associated with alcohol, cannabis, or cocaine consumption by trauma patients under the influence of these substances on admission may be a predisposing factor for recidivism. Recommendations for both primary and secondary prevention are presented.

Keywords
alcohol - drugs - motivational intervention - trauma recidivism - risk perception - vehicle collision risk - brief interventions - injury - drugs - prevalence - abuse - recidivism - recurrence - accidents - committee

Electrical burn injuries of 246 patients treated at the University Clinical Center of Kosovo during the period 2005-2010.

Duci S B, Arifi H M, Ahmeti H R, Selmani M E, Buja Z A, Gashi M M, Zatriqi V K, Mekaj A Y.

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10.1007/s00068-014-0379-6

In the developing world, the incidence of electrical injuries has increased in the past few years. Electrical injuries represent approximately 5 % of all burn admissions to burn units in the United States.
The objective of this study is to understand the causes of electrical burns in our population, sex, age, duration of treatment, distribution of electrical burns by season, accompanying other traumatic injuries with electrical burns, entry lesions of high-voltage electrocution, location of injuries, the methods of treatment, duration of treatment, and mortality.
This is a retrospective study that included 246 patients with electrical burns treated in the 2005-2010 period at the Department of Plastic and Reconstructive Surgery in Kosovo. The data were collected and analyzed from the archives and protocols of the University Clinical Center of Kosovo. Data processing was done with the statistical package InStat 3. From the statistical parameters the structural index, arithmetic median, and standard deviation were calculated. Data testing was done with the chi(2) test and the differences were considered significant if $p < 0.05$.
The high mortality, 9.1 %, and 7 patients (10.6 %) transferred out of our country for treatment is a reflection of the lack of a burn center in our department.

Keywords
electrical burns - distribution - lack - rehabilitation - management

Age and mortality after injury: is the association linear?

Friese R S, Wynne J, Joseph B, Hashmi A, Diven C, Pandit V, O'Keeffe T, Zangbar B, Kulvatunyou N, Rhee P.

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10.1007/s00068-014-0380-0

Multiple studies have demonstrated a linear association between advancing age and mortality after injury. An inflection point, or an age at which outcomes begin to differ, has not been previously described. We hypothesized that the relationship between age and mortality after injury is non-linear and an inflection point exists.
We performed a retrospective cohort analysis at our urban level I center from 2007 through 2009. All patients aged 65 years and older with the admission diagnosis of injury were included. Non-parametric logistic regression was used to identify the functional form between mortality and age. Multivariate logistic regression was utilized to explore the association between age and mortality. Age 65 years was used as the reference. Significance was defined as $p < 0.05$.
A total of 1,107 patients were included in the analysis. One-third required intensive care unit (ICU) admission and 48 % had traumatic brain injury. 229 patients (20.6 %) were 84 years of age or older. The overall mortality was 7.2 %. Our model indicates that mortality is a quadratic function of age. After controlling for confounders, age is associated with mortality with a regression coefficient of 1.08 for the linear term ($p = 0.02$) and a regression coefficient of -0.006 for the quadratic term ($p = 0.03$). The model identified 84.4 years of age as the inflection point at which mortality rates begin to decline.
The risk of death after injury varies linearly with age until 84 years. After 84 years of age, the mortality rates decline. These findings may reflect the varying severity of comorbidities and differences in baseline functional status in elderly trauma patients. Specifically, a proportion of our injured patient population less than 84 years old may be more frail, contributing to increased mortality after trauma, whereas a larger proportion of our injured patients over 84 years old, by virtue of reaching this advanced age, may, in fact, be less frail, contributing to less risk of death.

Keywords
geriatric trauma - outcome is elderly trauma patients - old age and mortality - intensive care unit admission and old age - geriatric trauma patients - elderly trauma - frailty - management - outcomes - severity - patterns - survival - disease - old

Bullhorn and bullfighting injuries.

Garcia-Marin A, Turegano-Fuentes F, Sanchez-Arteaga A, Franco-Herrera R, Simon-Adiego C, Sanz-Sanchez M.

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10.1007/s00068-014-0381-z

Our purpose was to present our hospital experience with bullhorn injuries.
A retrospective analysis of patients in our Trauma Registry (1993-2012).
Fifteen patients were included. All were hemodynamically stable on presentation, with a mean Glasgow Coma Scale (GCS) score and a Revised Trauma Score (RTS) of 15 and 11.9, respectively. The Injury Severity Score (ISS) and New Injury Severity Score were 13.6 +/- A 6 and 15.9 +/- A 9, respectively. Seven had an ISS > 15. Injuries resulted from an isolated blunt trauma (BT) in four, penetrating trauma (PT) in seven, with extensive soft tissue injuries (STI) in three, and a combined BT + PT mechanism in four patients, with extensive STI in all. Three patients had injuries to vessels in the groin, two with prehospital vein ligation. Five patients had abdominal visceral injuries, and another had a sheathed goring, with a traumatic abdominal wall hernia and retroperitoneal hematoma. Four patients had thoracic injuries, and one of them had a traumatic thoracoplasty with a large open thoracic wound, a flail chest, and extensive STI. Two patients had traumatic brain injury, and six had bone fractures. Two-thirds of patients required a surgical procedure under general anesthesia. Morbidity included three surgical site infections, one leg compartment syndrome, and one persistent lymph drainage. There was no mortality, and the mean length of hospital stay was 16 days.
Bullhorn and bullfighting injuries frequently have a multimechanistic origin which goes beyond a pure penetrating trauma. Associated blunt and STI were common in our series, and the overall prognosis of patients admitted to hospital was good.

Keywords
bullfighting - bullhorn - penetrating trauma - blunt trauma - soft tissue injuries - taurina - spain

Adherence to protocol in pregnant trauma patients? A 12-year retrospective study.

Horstmann P, Larsen C F, Gronborg H.

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10.1007/s00068-014-0378-7

Purpose
We investigated whether the standard (ATLS) trauma protocol was adhered to in cases of suspected multi-traumatized pregnant patients and if serious injuries were overlooked. We hypothesized that radiographic studies would be less frequent in pregnant trauma patients.

Methods
Forty-eight pregnant trauma patients were received in the observational period from January 2000 until May 2012; median age 30 years (range 16-40) and median stage of pregnancy 22 weeks (range 4-40). A retrospective review of patient files was performed.

Results
Twenty-one percent of the pregnant trauma patients received a full trauma CT (T-CT) scan (head to pelvis), which was significantly lower than the percentage (62 %) of all primarily referred trauma patients in the same period. In the last four years of observation, the use of radiographic studies among pregnant trauma patients increased considerably. Along with this increase in the tendency to use T-CT over time during the observational period, there was also a rise in the median ISS. In addition, radiographic studies of the pelvis and abdominal area were performed only half as frequently as studies of the neck and chest.

Conclusions
Adherence to the ATLS protocol in pregnant trauma patients was low in relation to radiographic studies but, in spite of this, no known significant injuries were missed. We found that a pelvic fracture seems to be predictive of a high risk of obstetric complications, such as intrauterine death or the need for cesarean section, but we were not able to relate trauma in general to a higher risk of cesarean section or premature birth.

Keywords
trauma - trauma in pregnancy - pelvic fracture in pregnancy - atls - radiation in pregnancy - outcomes

Urban versus rural trauma recidivism: is there a difference?

Rogers A, Horst M, Rittenhouse K, To T, Gibson S, Schwab C W, Rogers F.

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10.1007/s00068-013-0355-6

Understanding the characteristics of trauma recidivists may allow trauma centers to tailor prevention programs. We hypothesized that there would be an increased incidence of violent injuries and falls in the urban vs. rural recidivists, respectively.
Trauma admissions from 2000 to 2011 were queried for incidences of recidivism. Age (< 65 or a parts per thousand yen65 years), gender, Injury Severity Score (ISS, < 9 or a parts per thousand yen9), mortality, and injury cause (fall, violence, or other) were analyzed with univariate analyses to test for differences between urban and rural patients. Significant variables were then included in a binary logistic model and further stratified based on environment.
There were a total of 19,600 trauma admissions from 2000 to 2011, representing 18,711 unique patients, with 1,690 admissions (8.6 %) attributed to 801 recidivists (4.3 %). The overall percentages of recidivist trauma admissions attributed to urban and rural patients were 8.6 and 6.9 %, respectively ($p < 0.001$). When adjusting for age a parts per thousand yen65 years as well as falls and violent injuries, patients from urban environments were at 1.12 times higher odds of being a recidivist than their rural counterparts [odds ratio (OR) 1.12; 95 % confidence interval (CI) 1.01-1.25; $p = 0.039$]. When stratified into rural and urban groups, falls and violent injuries were significant in both groups of recidivist admissions; however, age a parts per thousand yen65 years was only significant in rural recidivist admissions.
An urban trauma admission had 12 % higher odds of being attributed to a recidivist than its rural counterpart, when controlling for age and mechanism of injury (MOI). Age a parts per thousand yen65 years was a significant variable in rural but not urban recidivist admissions. Characterizing the recidivist may allow for targeted prevention and intervention programs to decrease repeat hospital visits.

Keywords
urban trauma - rural trauma - recidivism - violence - injury recidivism - risk-factor - violence - population - disease