HIGH CASUALTY ENVIRONMENT POSTERS

PPO1

Mass Casualty Incident Management in Military Medical Facilities: Strategies for Improvement in Developing Countries

SO Ameh, OA Ogunbivi
Headquaters, Nigerian Army Medical Corps, Bonny Cantonment, Victoria Island, Lagos, (NIGERIA).

A mass casualty incident (MCI) is that which requires a response beyond standard deployment. These can result from natural or artificial events. Casualties can present in peacetime or be evacuated from battle fields. Mass casualty management in most military health facilities in developing countries is not optimal. There are challenges occasioned by dearth of trained, specialized manpower, lack of understanding of the processes involved and under- funding among others. These prevent immediate and qualitative response to MCI. This communication thus highlights strategies for improvement in mass casualty incident management in these facilities while attention is drawn to the need for a general organization of a mass casualty incident response. Recommendations are made for an improved approach to mass casualty incident management in Military health facilities in developing countries. Keywords: Mass casualty incident, triage, military, strategies

PPO2

Research and Management of Blast Injuries in Oral and Maxillofacial Region

Liu Gui-cai, Ma Qin, Liu Yan-pu, Lei De-lin, Zhao Jin-long, Wang Zhao-ling
Department of Oral and Maxillofacial Surgery, School of Stomatology, Fourth Military Medical University, Xi’an, 710032, Shaanxi Province, (CHINA).

Objective: To establish efficient explosive models with spherical explosives and compound injury induced by blast waves and high velocity projectiles for the study of blast injury and its wound characteristics in the maxillofacial region. Methods: Two animal models were used in this study. First, different spherical explosives were used to produce blast waves and the animal model was established. The other model of compound injury was established by blast waves and high velocity projectiles. The wounding parameters and the injuries of targets after explosion were recorded. The mechanism, damage area and treatment principle of explosive injuries in early and middle-late period were studied. Results Simple blast injury was different from other injuries and was more serious. A special split fracture of the mandibles was found. The compound injury model induced by blast waves and high velocity projectiles could simulate the explosive effect and the two major factors. In local injuries, blast-fragment combined injury was more serious than simple blast injury. At 72 h after the injury, the soft tissue injury was the most serious. Muscles at a 0-0.8 cm distance from the wound track were completely necrotized. The damage extended to more than 1.6 cm from the wound track, and the combined injury might occasionally lead to injuries of the temporomandibular joint, the adjacent brain tissues, and the heart and lungs. Conclusions: The blast injury models with spherical explosives and the model of compound injury induced by blast waves and high velocity projectiles can be used for the study of blast injury in the laboratory.
Medical Support in Peace Support Operations: A Study of the Nigerian Army Experience in Darfur

A O Amusu, 68 Nigerian Army Reference Hospital, Yaba, Lagos, (NIGERIA).

Medical support is an important component of all military operations and contributes to success of the mission. Health issues are therefore important in all stages of the Peace Support Operations (PSOs): pre-deployment, in the theatre of operation and post-deployment. Multiple factors account for poor health situations in PSOs. Nigeria’s participation in PSOs dates back to soon after her independence in 1960, when Nigerian troops were part of the peacekeeping mission in the present-day Democratic Republic of the Congo. Since then, the country has participated in over twenty PSOs and is currently one of the top 20 troops contributing countries to PSOs under the banner of the United Nations (UN). The role of the medical services in PSOs is to ensure that peacekeepers are fit and healthy, have available a high standard of care and are able to return to active duty at the shortest possible time after illness or injury. Nigeria, like many African countries, has financial constraints translating to low budgetary allocation to health in military operations and PSOs. The changing nature of conflicts and conflict management ranging from peacekeeping to peace enforcement has also increased the hazards to which peacekeepers are exposed. The tendency towards regional deployment means Nigerian contingents are more likely to be deployed within Africa, to places with relatively high prevalence of communicable diseases made worse by conflict. This paper reviews the medical support available to Nigerian military personnel in PSOs using the African Union/UN Hybrid Operation in Darfur (UNAMID) as case study. It examines the challenges faced by the Nigerian Army in the deployment of medically fit personnel, the medical factors that affect the field effectiveness of military personnel and the health-related issues that affect military personnel post-PSO deployment. It also suggests possible policy changes to improve the health of deployed personnel in PSOs.

Mass Casualty Concept an Update

Aljashamy Adnan Mohammed, 6th Iraqi Army Division Surgeon, (IRAQ).

Introduction Mass casualty situations occur when the number of casualties exceeds the available medical capability to rapidly treat and evacuate them. In disaster relief operations and in the aftermath of terrorist incidents, mass casualty situations frequently occur. For example, a disaster that destroys a significant amount of property may result in a mass casualty situation even though the number of injured is relatively low. By destroying a significant number of the medical assets within the community, those injured cannot obtain care locally and, therefore, overwhelm the remaining medical assets. Objectives: Putting a spot light on the main concepts of mass casualty events, how to organize the community in general for such events and how to deal with them trying the best of us to save lives as much as possible. Background Mass casualty situations are normally chaotic. Victims are in various stages of pain and distress. Casualties may have single or multiple injuries, or may have conventional injuries which are complicated by NBC exposure (such as in a toxic spill or nuclear power plant accident). Casualties will range in age from infants to geriatric patients. Parents and loved ones may
not want to be separated from the victim, even to permit the provision of medical care. Severity of medical conditions will vary from relatively minor injuries to severe, life threatening trauma. Medical care provided may be complicated due to pre-existing medical conditions (Disease, injury, or disability). Conclusion: Mass Casualty can occur at any time, whether at times of peace or war, it comes as unexpected events, at unexpected place. So, we must be prepared for such an event, the whole community can participate through well organized plan that is well prepared already, every resource should be sought and put in mind to be used at such events, the overall participation and good planning are the key factors for the plan to be succeeded, periodic training of the medical and the nonmedical personnel simulating the event and the main target is to try the best to save lives as much as possible.

PPO5

Mass Casualty Situation - Organization of Medical Care

Dimovic Zoran, Novaković Marijan, Romic Predrag, Todorovic Veljko
Military Medical Academy Belgrade 11000 Belgrade, (SERBIA)

In the past 20 years, about 30 million people have died due to natural disasters and almost a billion people have suffered their detrimental consequences. 22-45 % of injuries are caused by demolition and about 55% are the result of inadequate behaviour during and after mass casualty situations. From the medical point of view, a mass casualty situation is each incident which causes death or jeopardizes people’s health to such a great extent that it surpasses the capacities and resources of medical staff to provide medical attendance. Depending on what causes them, mass casualty situations can be divided into: natural disasters, anthropogenic disasters and modern warfare as a special category. All the consequences of catastrophes can be divided into 4 key groups: economic, social, health and psychological consequences. Major issues which result from these consequences are: locating and extracting casualties as well as providing medical assistance to the injured, attending to the disaster-stricken people, providing food and water, providing clothes, shoes and other necessities, removing waste (toxic) materials, prevention and control of infectious diseases and poisoning, treatment of psychological disorders, graves registration and rebuilding destroyed towns and villages. Medical Corps of the Serbian Army is organized in such a way that it provides all types of health care, preventive medicine, medical treatment and rehabilitation and it carries out appropriate preparations concerning these measures. In order to provide medical assistance in mass casualty situations, a functional link between Medical Corps and Healthcare Service must be established. For Healthcare Service to function effectively in mass casualty situations, it is important that its organization corresponds with the system of staged treatment which consists of: triage, evacuation and treatment. Medical Corps of the Serbian Army has established forces for emergency medical response in large-scale emergencies. The teams work independently. They have been formalized by regulations which cover all the issues concerning their structure, calling for an emergency, emergency team response, issuing of equipment, etc. Besides the team of surgeons, teams for attending to preventive medical problems (mixed preventive teams) have been established. At the scene of a mass casualty incident, medical triage is carried out (sorting out the injured into groups according to the type of injury or disease, the priority of emergency and the place of medical assistance and evacuation; its purpose is to provide the best possible assistance to the largest possible number of injured or diseased), first aid is administered, urgent surgical assistance is provided, and temporary reception camps are established.
(military mobile field hospitals) and transportation of the injured and the diseased is carried out either by land or air depending on the priority of emergency.

PPO6

Fast Repair of Large Battlefield Vascular Defects Using Modular Components

**Liang Xiangdang,** Zhang Boxun, Hao Yongyu
Department of Orthopedics, General Hospital of PLA, Beijing, 100853, (CHINA)

**Objective:** To develop modular vascular anastomotic components for rapid repair of large vascular defects to reduce battlefield amputation rate. **Methods:** The vascular defects were anastomosed with either the modular components or traditional suture method. The anastomosis time, patency rates, vascular leakage and angiostenosis rates were recorded and compared between the two methods. Results: The mean time anastomosis was 15.5±0.55 min in modular components group, significantly shorter than that in the suture group (25.97±0.58 min, P<0.01). The immediate patency rate was 100% in both groups. In modular components group, bleeding was not observed at the time of clamp release, yet blood leakage was found in one case in the suture group. Within 8 weeks after the surgery, pathologic examination, angiogram or ultrasound revealed no obvious angiostenosis at the anastomosis site in either group. **Conclusions:** Modular vascular anastomotic components are feasible for rapid repair of large vascular defects.

PPO7

Serum Aminotransferase as a Component of Metabolic Syndrome among Iranian Army

**SH Iravani,** B Sabayan, S Sedaghat, ST Heydari, P Javad, KB Lankarani, AR Khoshdel
Aja University of Medical Sciences, Department Of Internal Medicine (IRAN)

**Background:** Metabolic syndrome (MetS) is rapidly rising at an alarming rate through all parts of the world. Elevated serum aminotransferase was proposed as a marker for early detection of MetS. In this investigation we primarily aimed to evaluate the prevalence of MetS and its components among army and secondly to explore the association between elevated serum aminotransferase and the components of metabolic syndrome. **Methods:** A total of 380 army personnel from a military camp in Southern Iran participated in this cross-sectional study. Life style related characteristics, anthropometric features, serum aminotransferase and components of MetS, based on National Cholesterol Education Program Adult Treatment Panel III, were measured. Statistical significant was set as p value less than 0.05. Results: The mean age of participants was 35.0±7.5 year-old and the prevalence of metabolic syndrome was 8.1%. The prevalence of the components of MetS including; central obesity, abnormal fasting blood glucose, hypertension, hypertriglycridemia and low HDL cholesterol level was 8.6%, 10.4%, 18.5%, 31%, and 45.5% respectively. MetS had significant relationship with obesity (P<0.001) and abnormal Waist Circumference/Hip Circumference ratio (P<0.001). Twenty-six percent of subjects had ALT ≥ 41 U/L and 4.9% of them had ALT ≥ 81. Elevated serum aminotransferase had significant association with presence of MetS (P=0.007). Conclusion: Although prevalence of metabolic syndrome among the studied army population was not high, life style modification of army
members is recommended. Liver function tests should be included in routine health checkup of military personnel.

**Key Words:** Metabolic Syndrome, Serum Aminotransferase, Central Obesity

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**PPO8**

**Medical Team for Urgent Mass - Casualty Medical Care – Our Experience**

*Romić Predrag*, NOVAKOVIĆ Marjan, DJORDJEVIĆ Dragan.

Military Medical Academy, Belgrade, (SERBIA)

Mass disaster or catastrophe is defined as natural or manmade event in which continuous stream of new patients requiring medical or critical care support overwhelms current health care capacity. Health care system in our country barely covers needs in regular situations and can be easily overwhelmed during mass disasters, especially if infrastructure is lost. Role of efficient medical team in treatment of injured in such events is essential. Dr Safar reported that after earthquake in northern Italy in 1980 up to 25-50% of fatalities could have been saved by urgent and adequate medical assistance. Military medical doctrine is of major importance in taking care of great number of injured in the field during mass disaster. In our country, we have 15 years of experience in medical engagement during mass disasters. Based on that experience, in Military Medical Academy (MMA) in Belgrade special mobile surgical team is on call 24 hours 7 days a week. This team consists of orthopaedic surgeon, anesthesiologist, nurse anesthetist, driver along with adequately equipped ambulance. They are ready for deployment within 60 minutes. In MMA mobile toxicological team is established within National Poison Control Center. This organization is in accordance with Army Medical Corps services in developed countries. For example, US Army had Mobile Army Surgical Hospitals (MASHs) followed by Combat Support Hospitals (CSHs). Since 2004 they were replaced by Forward Surgical Teams (FSTs). Adequate medical care of injured in mass disasters planning should be conducted from single command post which will incorporate all available resources (paramedics, Red Cross, firefighters, and Army Medical Units).

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**PPO9**

**Preclinical Findings and Clinical Experiences with Antidotes/Sodium Bicarbonate Therapy in Acute Organophosphate Poisonings**

*Vucinić S*¹, Jovanovic M¹, Stefanović D², Ercegović G¹, Đorđević D¹, Vukčević-Perković N¹, Potrebnić O¹, Zlatković M¹, Antonijević B², Bokonjić D¹.

¹National Poison Control Centre, Military Medical Academy, Belgrade, ²Institute of Toxicological Chemistry, Faculty of Pharmacy, Belgrade, (SERBIA).

**Introduction:** In experimental poisoning of the rats with dichlorvos, co-administration of sodium bicarbonate significantly increased protective effect of standard antidotes (atropine, trimedoxime/obidoxime). Sodium bicarbonate given along with antidotes produced an increase in blood pH value and correction of acidosis. The good correlation between protection and biochemical
outcome was evident. Results: The efficacy of pralidoxime methylsulphate and sodium bicarbonate therapy in organophosphate (OP) poisoning was also examined by using objective endpoints (survival, AChE activity, need for mechanical ventilation and atropine consumption) in retrospective study of 109 patients with OP poisoning. They were analysed according to the class of OP (96-dimethylphosphoryl, 13-diethylphosphoryl compounds poisoning) and the applied therapy: Group I – atropine and bicarbonate (17); Group II – atropine, oxime and bicarbonate (19); Group III – atropine and oxime (40); Group IV – atropine (42). Oxime (4g/day) and bicarbonate (5mEq/kg/day) were administered as long as OPs were present in biological samples. Majority (59.6%) of patients had severe and fatal poisoning. Reactivation of more than 50% was registered in Group I and Group II, but the difference between class of OP was not significant. Mechanical ventilation was more frequent in patients from Group IV (46%) than in Group II (14%). Atropine consumption was the highest in Group IV (2330 mg), and the lowest in Group II (318 mg). Eighteen (16.5%) patients died, all from dimethylphosphoryl OP poisoning. Conclusion: Assessment of these therapeutic regimens is difficult until stratification of patients according to the level of poisoning, initial AChE, the poisoning load, time to therapy is not possible. Reactivation of AChE and survival were not different between groups, so one might assume that oxime and bicarbonate should not be used together. However, the difference in atropine consumption, and the need for mechanical ventilation between the patients on atropine regimen only and other therapeutic groups was significant.

PPO10

Pathogenesis And Optimization Of The Wound Process

V.A. Popov. Military-Medical Academy, St-Petersburg, (RUSSIA).

Wound surrounding tissues are naturally accompanied by local inflammatory process, metabolic burst and secondary necrosis. Such wounds require not just early initial surgical treatment (and repeated surgical treatment on 3-4 day), but also local administration of bioactive sorbing wound coatings with — antioxidant, antiradical, antienzymic and antiseptic — medications, affecting key parts of wound process pathogenesis. We have developed dressings of multicomponent action based on nanostructured and highly sorptive matrixes with bioactive nanomaterials immobilized on them: — 0.05–1% water solution of fullerene C60/Tween 80 cluster; — ε-aminocapronic acid solution; — nanoantiseptics, effectively suppressing "street" (primary) and hospital microflora and its associations; — 10% urea solution or 4 ml (200 proteolytic units) of terrilytin solution (necrolytic agent). Research we conducted have shown that application of such wound dressings allows to prevent development of complications and to reduce wound healing period by 17.5%.

PPO11

Aspects of Patogenezis Baromereosensitivity at the Military Men Serving in the Conditions of the Far North

Borisova I. Military-Medical Academy, St-Petersburgh, (RUSSIA).

Purpose: to reveal pathogenetic mechanisms of formation barometeosensitivity at the military men serving in military units, deployed in a seaside zone of the Far North. Material and methods: It is
surveyed 112 barometric sensitivity the military men which middle age was 35.8±2.9 years. Inspection was spent by detailed gathering of complaints and the anamnesis, studying of conditions of life and features of service. **Results:** at the analysis of results of multidimensional statistics following pathogenetic mechanisms of formation barometric sensitivity on the Far North are revealed: decrease in adaptive possibilities and functional reserves of an organism; aggravation of displays of a syndrome of polar stress; formation of a vegetative disbalance with prevalence of a tone of sympathetic nervous system; increase of reactance and adaptable pressure cardiovascular, vegetative and endocrinology systems; increase of reactance of cardiovascular system with formation of a hyperkinetic syndrome; strengthening of sensitivity of vessels to effects the internal peptides compressing vessels; sensitivity increase raising pressure reactions of system arterial pressure; haemodynamic indemnification of a polar fabric hypoxemia.

PPO12

**Serial Studies on Military Medical Support at High Altitudes**

**Hai Wang, Chao-Liang Long, Zhao-Yun Yin, Jia-Ying Liu**

Institute of Health and Environmental Medicine, Academy of Military Medical Sciences, Beijing 100850, (CHINA).

To enhance the medical support for the army at high altitudes, the environmental cold intensity instruments were manufactured to evaluate the environmental cold intensity and the altitudes above the sea level and to predict the probability of high altitude illness and frostbite. We clarified the changes in military work capacity and determined the optimal load carriage, walking speed and heart rates for soldiers at different altitudes, and established the standards for work intensity classification at high altitudes. The pathophysiological characteristics of complex injuries induced by hypoxia and coldness at high altitudes were elucidated. We found that the occurrence, development and prognosis of high altitude frostbite were different from those of frostbite at the sea level. We made comprehensive therapeutic projects for high altitude frostbite and clarified the mechanisms of high altitude acclimatization. At high altitudes, complete hypoxic acclimation needed 6 months to evolve, but coldness acclimation needed more than 3 years. During the period from 6 months to 3 years, the cold tolerance decreased after hypoxic acclimation. We found a negative cross-acclimatization between hypoxia and coldness and elucidated its mechanisms. Based on this finding, the training scheme for high altitude acclimation was established. We investigated acute mountain sickness (AMS), high altitude pulmonary edema, cerebral edema, pulmonary hypertension and cardiac disease, established the diagnostic criteria for AMS, and clarified the pathophysiology and mechanisms of high altitude illness. A series of products against high altitude hypoxic injuries were developed, including novel drugs, nutritional preparations, medical equipment, and treatment techniques for high altitude frostbite. New nutritional support promoting high altitude hypoxic acclimation and against de-acclimation to high altitude was also studied.

PPO13

**Wartime Medical Support under Severe Cold Condition**

**Xiaojun Wu, Guangyuan Bi**
Medical Service Teaching and Research Section of Logistic Command Academy
Joint Logistic Department of Shenyang Military Region, PLA, (CHINA)

**Objective:** To study the characteristics of the search, rescue and medical evacuation of the sick and wounded, explore sanitation and disease prevention, medical evacuation organization, medicine and equipment support, and the methods and measures for medical support under severe cold condition.

**Methods:** Tactical drills were simulated under severe cold condition to test the applicability of the medical support and field medical equipment in cold regions. The medical staff available was reorganized and the newly increased field medical equipment of the medical unit was used at the regiment level. **Sampling:** Medical units were extracted from a regiment, a battalion as well as from a company in cold regions. The medical staff and field medical equipments were reorganized according to combat demand in cold regions. **Conclusion** Frostbite and cold syndrome is common among the wounded under severe cold condition, which can aggravate traumatic condition and result in death. The wounded need to be quickly rescued from the cold environment with proper heat preservation during evacuation.

**Key words:** Wartime medical support, severe cold condition

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**Civilian-Military Collaboration and Training for Disaster Relief Operations in Nigeria**

*Babalola David Olumuyiwa*

**Introduction:** Military intervention for the purposes of humanitarian assistance and disaster relief have often been requested by political authorities. Each time the Nigerian Armed Forces is called upon to provide specialised services and medical care in Disaster Relief Operations, (DRO) collaboration with other security and civil organisations become inevitable. These collaborative activities are often plagued with duplication of responsibilities, information hoarding, waste of critical time and clash between the military and civil organisations. The result is often that the disaster relief effort is unorganised, a lot of damage and loss of lives occur due to waste of critical time and poor information sharing. In view of this, a training was conducted for military and civil organizations involved in DRO from 6-18 March 2011. **Objective:** To foster collaboration and cooperation between the military and civil organizations towards effective DRO in Nigeria. **Method:** About 200 participants were drawn from all security agencies in Nigeria including civil organizations. They include; NPF, FFS, NDLEA, NPS, FRSC, NSCDC, NCS, NIS, SSS, ICRC and NEMA. The participants were middle level commanders and officials of the various organizations. The training was a 2-week residential training with a lot of field and practical exercises. Participants were divided into syndicates of between 8 and 12 persons. Demonstration of MEDEVAC of the critically ill and provision of vital first aid services to the wounded were carried out. Furthermore, prevention activities in a mass casualty situation with poor sanitation were conducted. **Result:** The limitations resulting from isolated response to disaster situations became very obvious. In addition, participants appreciated the roles and responsibilities of each agency in DRO. The 2 weeks interaction fostered cooperation and team spirit necessary for effective DRO. The training thus created a pool of highly trained and motivated professionals who...
understands that success in DRO entail integration, information sharing and cooperation of the military with civil organization.

PPO15

Emergency Management of Battle Wound with Hematostatic Powder of Traditional Medicinal Plant in Qinghai-Tibet Plateau

Zhengping Jia, Maoxing Li, Qiang Yin, Quanlong Zhang, Ruxue Zhang
Department of Pharmacy, Lanzhou General Hospital of PLA; Key Laboratory of Prevention and Treatment for Plateau Environment Damage of PLA, Lanzhou 730050, (CHINA).

Objective To develop emergency hematostatic powder for battle wound use the hemostatic ingredients of traditional medicinal plant *Lamiophlomis rotata* (Benth.) Kudo in Qinghai-Tibet Plateau. Methods The hemostatic ingredients of *Lamiophlomis rotata* (Benth.) Kudo were enriched and extracted with the active-screening guided phytochemistry separation technique. The emergency hematostatic powder was prepared with ultramicro-comminution. The hematostatic activities of the powder after topical application were evaluated in several rabbit models. Results In the models of ear central artery and abdominal aorta injuries, the emergency hematostatic powder could shorten the bleeding time and decrease the blood loss. No irritation response was observed on the skin after topical application and no obvious toxicity was observed after oral administration or intraperitoneal injection. Conclusion Emergency hematostatic powder for battle wound extracted from the traditional medicinal plant in Qinghai-Tibet Plateau shows significant hemostatic effect and good safety. Key Words: Battle wound, hematostatis, powder, Qinghai-Tibet Plateau, Lamiophlomis rotata (Benth.) Kudo