Book of scientific abstracts

4th ICMM - Pan European Congress of Military Medicine
Tuesday, May the 24th

• 11h15 - 12h15 - Extraordinary Lectures

Médecin chef des services (BG) Franck de Montleau (France), «Global management for rehabilitation of french casualties »

Surgeon Commander (Lt Col) Simon Leigh-Smith (Great Britain), « Innovation in military medicine »

History has show cyclical regression between conflicts that must be regained at the start of every new conflict. To prevent this regression we must continually innovate in military medicine both during and between conflicts. This talk firstly examines how we innovate by adopting the ideas of others and by the creation of our own ideas. It then looks at how we share these innovations with our military allies and civilian partners to ensure survival of the latest techniques. Finally it considers some of the obstacles to innovation and the different challenges between military and civilian organisations in overcoming these. The talk uses examples of recent innovations and looks briefly at some potential future innovations.

• 14h00 - 15h30 - Scientific Sessions

Session Ethical dilemmas during operations N°1 (amphitheater Rouvillois)

Chairmen: Lieutenant Colonel David Winkler, MD, PhD (Switzerland) and Major Dirk Fischer MD (Germany)

Lieutenant Colonel Col David Winkler (Switzerland), « Military Medical Ethics - Current Issues and Guidelines»

The ICMM Center of Reference (CRef) for Education on IHL and Ethics is collecting and analyzing current cases and challenges in Military Medical Ethics (MME). Based on a request for scientific advice, the CRef has recently analyzed MME aspects of age estimation in minors, and published recommendations.

In a joint workshop with the MILMED CoE held in September 2015 in Munich, attended by participants from 14 nations, predominant recent ethical issues were collected and assessed. Scarce resources and mixed obligations were identified as the main sources of MME dilemma, together with a lack of knowledge about the ethical duties and obligations of medical personnel. Other issues include the misuse of medical knowledge, the illtreatment of detainees, and questions of the use of the protective emblem.

It was concluded that, on an individual level, the current ethical challenges endanger the professional integrity of health care personnel and may cause posttraumatic stress. On an operational level, ethical misbehavior puts at risk the success of missions in times of globalized communication. Ethical challenges related to modern missions with close contact to civil population and infrastructure, thus require specific education and training.
on ethics. Hence, there is need for ethical guidelines and guideline-based training in the field of MME. The ICMM CRef has therefore promoting the “ETHICAL PRINCIPLES OF HEALTH CARE IN TIMES OF ARMED CONFLICT AND OTHER EMERGENCIES” that have been shaped by the ICRC in collaboration with other organizations and the CRef, and endorsed by the ICMM general assembly in Indonesia in 2015. Another conclusion of the joint workshop with the MILMED CoE was that the ethical principles should be included into the medical doctrine and also that training opportunities in MME should be strengthened.

Médecin chef des services (BG) Gilbert Poulquen (France), « Ethical reflections for a military intensivist on war theaters »

As intensivist and anaesthesiologist of the French Army, we are frequently requested to be engaged on war theaters (Chad, Mali, Ivory Coast, Kosovo, Afghanistan, Central African Republic...). During these missions, our first and main purpose with the surgical team is to offer the best medical aid to the NATO military troops engaged in the conflict, but also, in the limit of our capacities offering medical care to local populations. Indeed, if fortunately only a few soldiers wounded in action are treated in the NATO hospital, taking care of civilian populations maintains all the hospital team in action, doctors, nurses and assistant nurses on duty with all their reflexes. It is easier to include an emergency in a regular surgical schedule rather than an emergency once a week with staff demobilized. It is one of the two missions of the French Military Medical Service on war theaters.

In spite of difficult material conditions, we must offer the best medical aid just like we would offer in France. Nevertheless and because of our necessary limited resources, we can be confronted with complex medical decisions with ethical consequences.

Before analysing such decisions on war theaters, we must explain how an intensivist decides in France with a complex patient to begin an extra renal epuration or not, to increase the dosage of norepinephrine or not, to increase the inspired fraction of oxygen or not...

Obviously deciding in emergency to take care of a small baby (3 weeks old with a cardiac disease threatening immediately his life) in the military hospital on war theater, or a very old diabetic patient with heart and kidney failure for an urgent surgery (two patients I had in charge) influences the normal working of the hospital team and could interpellate the doctors or the nurses especially if the patient dies because of the lack of possibilities of investigation or treatment.

These situations are not so rare, every NATO medical member could be confronted with these medical difficulties once a time, and it’s better to have discussion and earring many divergent opinions. This international congress with several different nations and different doctrines is one of the best place to compare different attitudes before facing up to the reality of war.

Major Dirk Fischer, MD (Germany): «The threat to humanitas in asymmetric conflicts »

Not disclosed
Session Physical and mental rehabilitation N°1 (amphitheater Baudens)

Chairmen: Brigadier general Norwell V Coots MD (USA), Médecin général Rémi Macarez (France)

Médecin chef des services (BG) Eric Lapeyre (France), «Physical rehabilitation»

Not disclosed

Médecin en chef (Col) Marion Trousselard (France), «The role of an animal-mascot in the psychological adjustment of soldiers exposed to combat stress»

Co-authors: Aurelie Jean, François Beiger, Florent Marchandot, Bernard Davoust, Frédéric Canini.

For many soldiers confronted with exposure to stressful situations, an animal-mascot bond is considered effective help for dealing with the stress. While most studies carried out on animals’ needs concentrate on the care of civilian individuals, our focus was on determining the reliability of an instrument to measure emotional, rational and psychosocial needs of the military engaged in numerous conflicts around the world; and to analyze its external validation.

Methods: In an anonymous cross-sectional retrospective survey, we applied the animal-mascot bond questionnaire (AMBS) associated with Coping Inventory Stressful Scale (CISS), Post-Traumatic Stress Disorder (PTSD) and Check List Scale (PCL-S) assessments to 168 soldiers after their deployment in theatre.

Results: Factor analyses of the 23-item construct (Cronbach’s alpha = 0.962) pointed to a 3-factor solution, which revealed 77.03% of variance: (1) Animal-group bond, (2) Individual-animal emotional bond, and (3) Individual-animal rational bond. All these factors were positively correlated with the emotional-centred coping style. Human-animal bonds were greater for soldiers with the provisional diagnosis of PTSD. Limited responsibility was the strongest predictor for animal-mascot bonds. Both individual animal bonds were also predicted by the PTSD status and emotional coping.

Conclusions: The evaluation of the AMBS revealed that the instrument has good psychometric properties. Soldiers with less responsibility, PTSD and emotional-coping scored the highest on the AMBS suggesting that they expressed the highest needs for a bond with an animal-mascot. One may assume that the animal-mascot bonds will trend to a therapeutic coping process for mitigating distress for soldiers.

Médecin en chef (Lt Col) Marie-Hélène Ferrer (France), «Cognitive rehabilitation for TBI patients: research of vulnerability indicators and optimization factors of brain repair mechanisms»

Co-authors: Claire Deshayes, Caroline Chambon, Véronique Paban, Frédéric Canini, Béatrice Alescio-Lautier

The heterogeneity of cognitive injuries and disorders in TBI patients makes difficult the management of these patients and the search for effective therapies. The challenge of this research field is to
improve our understanding of cerebral mechanisms underlying the improvement of cognitive functioning following holistic rehabilitation and then to identify targets on which we can act to maintain or restore optimal mental functioning. Our study CREADAP-TC is a work in progress. Based on some of our unpublished data, we developed a holistic rehabilitation program which trained some cognitive domains such as memory, attention, executive functions based on problem solving and customized scenarios and relaxation. We used also selected aspect of cognitive behavioral therapy to increase coping behaviors and to reduce stress and emotional distress. We compared within a population of TBI patients the impact on cognitive functions of our holistic rehabilitation program (developed between LNIA and IRBA) versus standard cognitive rehabilitation. Each subject will be asked for an extensive initial assessment, 40 sessions of training and an extensive final assessment. Our aims are to study the relevant factors involving better cognitive functioning through three axes: 1- identification of cognitive processes involved 2- characterization of anatomical and physiological substrates (EEG, ECG, MRI and fMRI ) 3- Influence on the state of stress and fatigue. In TBI patients, we expect a positive effect on their cognitive functioning and a better transfer of the benefits of our holistic rehabilitation on the acquisition of new skills. We also hypothesize that our rehabilitation involves sufficient reorganization allowing better adaptability of TBI patients to their environment despite their disability.

Workshop pharmacists (hall Laveran)

Chairmen: Pharmacien général Pascal BURNAT (France), Senior Colonel Pharmacist Arne Krappitz (Germany)

Pharmacien en chef (Col) Jacques Mathieu (France), «Involvement of pharmacists in military biomedical research»

Colonel Pharm Dr. Roger Müller-Pfaff (Germany): «Drug manufacturing and pharmaceutical services under one roof - contradiction or challenge? »

Pharmacien en chef (Col) François Caire-Maurisier (France): « Medicines from the Military Central Pharmacy to face terrorism»

Pharmacien en chef (Col) Franck Ceppa (France), « Activities of military pharmacists in France»

Pharmacien (Cpt) Alexandra Thépault (France), « The role of the French military pharmacists during OPEX»
Session Ethical dilemmas during operations N°2 (amphitheater Rouvillois)

Chairmen: Lieutenant Colonel David Winkler, MD, PhD (Switzerland) and Major Dirk Fischer MD (Germany)

Commissaire de 1ère classe (Cpt) Eléonore Carrot (France), « Healthcare and the law of armed conflicts: the special role of military medical personnel »

The implementation of the law of armed conflicts (LOAC) by military medical services is a very important and specific issue. The LOAC and military medical services both aim at limiting people’s throes in times of armed conflicts. Historically, they have often been developed together (Solférino, WWI, WWII, colonization...). The LOAC protects military medical personnel but it also imposes specific duties on them. This special role is neither a punishment nor a privilege; it is a natural consequence or a “subsidiary protection” granted to them to ensure that protection is given to the persons primarily concerned, namely, the wounded and sick. As a consequence, although they are members of the armed forces, they are not considered as combatants. Their right to kill is strictly limited to their own protection and the protection of the wounded and sick.

Yet, as a member of the armed forces, not being a combatant within contemporary conflicts can be very challenging. In hybrid warfare and asymmetric conflicts, the opponents do not aim at destroying the power of the states directly but rather at convincing the population. The enemy plays the disparity of means and methods. Medical services are thus once again at the heart of conflicts and military strategy. Military medical personnel encounter difficult situations where they face the “grey areas” of the LOAC, the effect of war (stress, fear, revenge...), the pressure of the commandment, the pressure of the group (particularly where they are isolated within a combat group), the trespass of the LOAC by its enemies or its allies.

However, implementing the LOAC within contemporary conflicts must show appeal to the forces and particularly to medical services. Indeed, it is a legal obligation: individual responsibility and the responsibility of the superior can be engaged in front of national and international courts. The diffusion of the LOAC is essential for the credibility and the legitimacy of the forces and the medical services. Beyond this legitimacy, the respect of LOAC is fundamental to preserve the philosophy of action of the military medical services. Values shared by the medical services for centuries and LOAC trespass are discordant. The integration of the LOAC is also a duty for the medical services toward their personnel. They cannot leave their personnel destitute in front of very complex and serious ethical choices. This type of painful choices has caused psychological disorders in the past. Moreover, the LOAC is a vital vehicle for interoperability between armed forces and between armed forces and other actors contributing to healthcare abroad.

To conclude, it is very important to recognize the special role of military medical personnel and promote within our forces the statute of non-combatants. This special role calls for a special training.
Médecin en chef Didier (Col) Didier Fourel, MD, and Médecin principal (Major) Marc Danguy Des Deserts, MD, (France), «Time constraints during care in external operations – an ethical reflection»

This presentation is the first part of a largest study concerning the problematic of time in care. "We miss time" is the expression that best illustrates experience of caregivers today. Reason is the place given to technical care that erases time of listening, empathy, solicitude, or attention. Controlling time is necessary to preserve one of the bases of the relation care called confidence. We commonly understand time of care as the idea of a number given by care planning. Accelerating time reduces care as emergency, a technical way which forgets the diversity of patient rhythm. In fact, temporality of care is at the crossroad of different concepts that include social, religious, philosophical views... We suggest difficulties for agents to recognize their ability to structure the relation care in order to access the confidence and the possibility of sharing. We support the hypothesis that tension is denial of recognition of some temporalities between caregiver and patient and we propose a phenomenological analysis to argue with theories of recognition and some examples from experience in the field. The first argument is a tension in recognition of social and legal temporality of care that identifies the notion of consideration between agents. The second argument is a tension in recognition of shared decision and debate that leads to the important question of GOOD. The last argument is a tension in recognition of perception time and emotions that leads to develop an ethics of life.

Lieutenant Colonel Lizzy Bernthal (Great Britain), «Military medical ethical dilemma in recent conflicts »

The ethical issues that arise for Armed Forces medical personnel on deployment can be extremely complex. The ‘four quadrant approach’ (4QA) is the tool directed in Clinical Guidelines for Operations to be used by the British Defence Medical Services to aid their ethical decision making. In 2 recent qualitative studies Bernthal et al have identified that clinicians found it helpful to use this tool to aid their decision-making. The 1st study established that the 4QA provides a valuable check list within an operational setting to ensuring that relevant information has been included to aid ethical decision-making, although amending its diagrammatic presentation could improve its effectiveness. Also, pre-deployment training should include practising using the quadrant. The 2nd study explored ethical dilemmas that senior clinicians had faced when deployed to the British Field Hospital in Afghanistan to elicit the features of an ethical dilemma. It identified the most straightforward and challenging ethical decisions to make. The most challenging dilemmas included working with international clinicians, not knowing team members’ ways of working, caring for children, working with limited resources as well the dual conflict of adhering to clinical and military obligations. An ethical dilemma was created when clinicians had to choose between two or more alternatives, each with less than optimal moral outcomes. This study has drawn together examples of anonymous cases to form a depository to aid future training. Recommendations for training included undertaking ethics training together as a team before, during and after deployment which should include all nationalities that
are deploying together. A workshop package has been developed to support clinicians to make ethical decisions that arise in a variety of austere environments on deployment.

Session Combat life survey N°1 (amphitheater Baudens)

Chairmen: Surgeon captain Royal Navy Andy Burgess (Great Britain) Médecin général Rémi Macarez (France)

ISG2 (Sgt Mjr) Yves Fressancourt (France), « Integration and activities of a nurse in Special Forces »

Co-authors: Eric Quémeneur, Pierre Potel, Olivier Dubourg

Deployed on all modern operation theaters, special forces units are usually engaged in complex and often unconventional missions. They have to manage with short staff and hostile area, far from the traditional medical facilities.

Based on surprise and speed of action, the special forces operations require specific actions and methods. The multiplicity and dangerous missions require an adapted and integrated medical support. Engaged repeatedly in recent years, medical teams of special forces demonstrated their adaptation to the missions providing medical support to the extreme front even in direct contact of the shares of fire. Based on the concept of reducing "avoidable deaths" medical support is seen as an element contributing to the success of special operations.

This medical organization is mainly based on the complementarity of a doctor-nurse pairs, selected and trained, and their interactions with operational combat-trained rescue."

Médecin en chef Col) Olivier Dubourg (France), « Medical support of specialized interventions »

Co-authors: Romain Roffi, Damien Commeau, Fabien Ramon, Kilian Bertho

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**Médecin en chef (Lt Col) Romain Roffi (France), « Plan of immediate assault: medical aspects »**

*Co-authors: Kilian Bertho, Fabien Ramon, Damien Commeau, Olivier Dubourg*

Deployed on all modern operation theaters, special forces units are usually engaged in complex and often unconventional missions. They have to manage with short staff and hostile area, far from the traditional medical facilities.

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**Workshop veterinarians (hall Laveran)**

*Chairmen: Colonel Leander Buchner (Germany), Colonel Jean-Lou MARIÉ (France)*

*Dr Franz Edler von Rennenkampff (Germany), « Pack animals in modern warfare? Lessons identified – lessons learned»*

*Vétérinaire en chef (Lt Col) Olivier Cabre (France): «Role of military veterinarians in a global approach of biologic threat reduction in field operations »*

*Vétérinaire principal (Mjr) Grégory Trombini (France): « Risk factors and clinical features of canine post-traumatic stress disorder in French army dogs»*

*Vétérinaire en chef (Col) Daniel Chal (France), « Diversity of veterinary missions in operation: example of SANGARIS, Central African Republic»*
The experience of the “school of the back” in Tunisian military environment. **Allani R.**

*Co-authors: Bouomrani S², Béji M², Yedeas M².*

**Introduction:** The common chronic lumbar pains constitute a frequent problem of society; they drag a raised cost of cares, inabilities, invalidities and socio-professional reverberation. The “school of the back” represents one of the structures that takes common chronic lumbar pains in a multidisciplinary way associating a medical visit, adapted physiotherapy, dietary consultation, a psychological interview and sittings of adapted and simplified teaching.

**Study:** We return a balance of 6 months of working of this fashion of hold in charge of 200 patient with common chronic lumbar pains of which 94 are military having frequented the “school of the back”. The middle age was of 36,34 years and the sex ratio of 1,1. The chronic lumbar pains evolved since on average 20,3 months. The scale of Dallas has been used to value the reverberation of the pain of the back on the daily activities.

**Results:** The score of Dallas passed from 42,8% initially, to 8,71% at 6 weeks and 5,68% at 24 weeks. So our school of the back permitted to improve the symptoms, to reduce the functional hindrance and the score of Dallas.

**Conclusion:** The prevention of this pathology remains the best treatment and requires in a first time the identification of its risk factors. The multi disciplinary approach is very useful. Our experience with the “school of the back” proves to be very interesting in this domain.

Cutaneous zoonotic Leishmaniasis in military environment in the Tunisian south. **Allani R.**

*Co-authors: Bouomrani S², Béji M², Yedeas M².*

**Introduction:** Cutaneous leishmaniasis (CL) is a protozoal disease which is endemic in developing countries. It is usually caused by Leishmaniasis major and Leishmaniasis tropica and transmitted by the bite of a sandfly. The emergence of this illness maintains itself in Tunisia with an elevated impact and an extension of the geographical distribution; it doesn't save the soldiers in particular in this region of the country.

**Study:** Retrospective survey going from 1991 to 2001 and interesting 333 military treated for cutaneous leishmaniasis in the Tunisian south of which 56 cases in 2 epidemics (1991 and 1997). The other 277 cases were sporadic. The soldiers and troop’s men represented 69,7% of all patients.

**Results:** The middle age was 27,3 years. The lesions were often multiple (2,53 lesions/patient on average) and localized essentially to the members (79%). A negative interrelationship has been noted.
between the number of lesions and their chronology. The lesions were variable and infected in 54.65% of cases. The humid ulcerated aspect has been noted in 58.25% of the cases. The direct exam of dermal smear confirmed the diagnosis in only 77% of cases. The majority of the patients have been treated by local Glucantime. The systemic way has been used in 29% of the cases. The geographic distribution corresponds globally to the epidemiological situation of the last 2 decades in the country and according to the site of the units. Conclusion: The environmental changes are to the origin of distresses of distribution and the density of the vector and the respective reservoirs in the south Tunisian encouraging the expansion of the illness thus. The best treatment to fight against this infection remains preventive.

Military obese epidemiological profile in a southern Tunisian armed force cohort. **Allani R.**

*Co-authors: Bouomrani S², KhoufiM.T.¹, Bellaaj R², Béji M², Yedeas M¹.*

Background: Obesity is a public health problem. The data relating to this disease remain scarce in military environment.

Aims: Estimate the prevalence of BMI abnormalities and abdominal obesity and study the epidemiological profile of Tunisian military obese within a cohort of military and civilian personnel practicing in southern Tunisia armed force units during 2008.

Methods: This was a study conducted in 2008 among a representative sample of 709 male subjects, aged 20 years and older, active duty military and civilian personnel operating in southern Tunisia armed forces’ units.

Results: The prevalence of obesity was 12.1%. It varied significantly with age (16% among those aged 35+) and rank category (23% in officers). The prevalence of overweight was 40.3% and that of abdominal obesity was 39.1%. Military obese had higher mean values of blood glucose (5.2 mmol/l vs 4.9 mmol/l in overweight and 4.6 mmol/l in normal BMI group; p<0.0001). Same situation for cholesterol (4.6 mmol/l vs 4.3 mmol/l in overweight and 4.0 mmol/l in normal BMI group; p<0.0001) and triglyceride levels (1.5 mmol/l vs 1.3 mmol/l in overweight and 1.1 mmol/l in normal BMI group; p=0.001). Military obese had lower mean values of HDL cholesterol (0.87 mmol/l vs 1 mmol/l in normal BMI group; p=0.038). The prevalence of metabolic syndrome (NCEP-ATPIII) was 25.1% in obese or overweight groups against 8.4% for the remaining. Logistic regression confirms the results of the bivariate analysis. Obese recorded a risk five times higher than people with a normal BMI (OR Brut [CI], 5.6 [3.0 to 10.3] and Adjusted OR [CI], 4.9 [2.6 - 9.3], p<0.001).

Conclusion: Obesity does not spare the active duty military personnel. It is therefore recommended to implement a program of prevention and fight against this risk factor.

Co-authors: MT Khouri2,4, R. Ahmadi1, M. Ben Moussa3,4, R. Bellaaj3,4, R. Dhaoui3,4

Tunisian military health service (MHS) is mobilized beside others specialized civil partners against Sexually transmitted infections (STI). Epidemiological data on "Military STI/HIV/AIDS Prevention Program" are scares. This paper aims to highlight the encountered difficulties when implementing this program in 2002 and during the execution of its action plan.

The sources of information of our study were the annual steering committee reports and the quarter medical units' reports for the period 2002-2016. Data also included information on soldiers deployed in humanitarian and UN peace keeping operations.

This program considered three areas when established: staff training for STI management by syndrome approach and for youth outreach, raising awareness of young soldiers in situations of vulnerability and the provision of condoms. In parallel, an epidemiological surveillance system for STI and evaluation of health activities tool have been implemented to address the underreporting problems since 2010, screening on Human Papilloma Virus and others agents have been conducted in female personnel and military families.

During the 8 first years, an average of 3 Training seminars per year have been organized to the profit of 20 general practitioners each and 5 training seminars to the profit of 40 unit’s nurses. About 930 health education sessions were annually ensured by unit’s Doctors and touched 40,603 subjects from 64 units including 41 new recruits’ instruction centre. Since the Jasmine revolution in 2011, and due to soldiers’ mobilization to conducted law and order reinforcement, no training sessions have been anymore organized.

Condoms are provided for Free in almost all barrack. More than 250,000 condoms were annually taken starting from the distributors. No case of AIDS was diagnosed since 2002. An average of 631 annual cases of STI were related during the period of the study. The urethral flow at the man and the vaginal flow at the woman constitute the STI most frequent. Military population seems to be much more exposed to STI; specially young recruits. Soldiers designated in external operations were a particularly vulnerable population.

Why are medical and military staff resistance to vaccination? Althaqafy M.

Co-authors: Mark Pearce, Richard McNally, and Shahaduz Zaman

BACKGROUND:
Compliance rates of vaccination among health care workers (HCWs) are historically low and had been coni-acting. Although vaccines are available, prevalence of some of infections not changed and some
increased per year in Saudi Arabia, effectiveness of immunisation programme and the vaccine compliance barriers could be contributing factors and require further depth investigation.

This study aimed to gain an in depth understanding of the reasons why some of HCWs and military soldiers are reluctant to get vaccinated and understand more about their awareness about communicable disease and preventive measures in work sitting.

METHODS:
A qualitative research through focus groups’ discussion with newly recruited employee in 2014-2015 and in depth interviews among immunisation services team were conducted based on topic lists and semi-structured interview guides.

RESULTS:
Data were transcribed verbatim and thematic content analysis techniques with grounded theory approach has been used in identifying, analysing, and reporting on themes and subthemes.

The main themes emerged from the data regarding vaccine non-compliance: vaccine related such as side effects of vaccines and painful vaccination; Personal related such as lack of knowledge and busy schedule; Organisation related such as lack of motivation and no reminder system ; social media related such as vaccine rumours.

CONCLUSIONS:
This study reveals a deeper understanding of the behaviour and decision-making to accept and reject a vaccine. Although numerous challenges are present in the health care and military setting, practice of infection prevention and control should mirror that performed in hospitals outside the combat zone whenever possible.

Humanitarian aid of the Polish Military Health Service in Afghanistan, Central African Republic and Kosovo. Augustynowicz A.

Co-authors: Col. Krzysztof Korzeniewski MD PhD Mrs Alina Augustynowicz MSc,

Background:
Between 2011 and 2015 the Polish Armed Forces (PAF) realized mandatory tasks in Asia, Africa and Europe. One of the elements of military service was humanitarian aid for local patients with infectious diseases. The aim of the study was to present the results of parasitological examination performed among local residents in Afghanistan, Central African Republic and Kosovo in order to establish the prevalence of intestinal infections and implement effective deworming strategies.

Material & Methods:
The study covered three groups of patients:
- **Afghanistan (n=3146):** patients from the Ghazni Provincial Hospital, students attending high schools in Ghazni Province, soldiers of the Afghan National Army
- **Central African Republic (n=3209):** Monassao and Bagandou inhabitants of the Pygmy origin,
Residents of Bangui and Bagandou - Kosovo (n=632): students of primary schools in Kaçanik Province.
Each patient provided 1-3 stool samples, which were fixed in 10% formalin and transported to Poland, where they were pooled and examined using three different diagnostic methods in light microscopy (direct smear, Fülleborne’s flotation and decantation in distilled water).

Results:
- Afghanistan: 1225 infected patients (prevalence 38.9%); most common parasites: *Ascaris lumbricoides* (19.6 %), *Giardia intestinalis* (15.3 %),
- Central African Republic: 2231 infected patients (prevalence 69.5%); most common parasites: *Ancylostoma duodenale/Necator americanus* (40.0 %), *Ascaris lumbricoides* (36.5 %),
- Kosovo: 76 infected patients (prevalence 12.0%); most common parasites: *Giardia intestinalis* (10.0%).

Conclusions:
1. A wide range of intestinal parasites found in Afghanistan and dominance of protozoa in Kosovo requires to verify the WHO preventive deworming procedures for local people (single doses of 400 mg albendazole or 500 mg melbendazole).
2. Before initiating deworming in the Third World countries it would be worthwhile to perform parasitological examination in order to assess the prevalence and identify the most common species of intestinal parasites in local populations.

Cannabinoid hyperemesis syndrome: unknown diagnosis with miraculous shower. **Fabries P.**

*Not disclosed*

Perceived exertion at exercise: stress and inflammation part. About the commando walk. **Fabries P.**

*Not disclosed*

French armed forces e-learning course related to fresh whole blood collection. **Ferrer MH.**

*Co-authors: Roche Céline b, Bay Christian c, Trousselard Marion a, Sailliol Anne b*

Hemorrhagic shock is the first cause of death for wounded soldiers on battlefield and treatment is primarily based on blood transfusion (in addition to emergency first aid and surgical hemostasis). To provide in any circumstances the best healthcare delivery, given the interdisciplinary nature of the work, there is a necessity for cooperation among the health workers who perform it to ensure patient safety and avoid errors. Team trainings are important to improve technical skills and promote the development of shared mental models for team and task processes. The instruction named “blood management in overseas operations” is realized by several kinds of health workers with
geographically distant trainers. The knowledge about this topic is essential since it can save many soldiers' life. In this context, having the right knowledge to act quickly and skillfully is very important. A distance learning module for all professionals involved in fresh whole blood collection was developed with the French military blood transfusion center (CTSA) and the French military health service academy (EVDG) in collaboration with the private company Onlineformapro. This “Blood management Serious Game” project, piloted by the French armed forces biomedical research institute (IRBA) was funded and supported by the mission for the development of participative innovation of the French Department of Defense. Specific situations, such as receipt of blood products in overseas operations, donor selection, collection of fresh whole blood and the biological qualification of blood donation are staged. This tool supplements practical training and can meet the high demand for training "whole blood collected in overseas missions" for physicians and nurses. It evolves regularly and was notably enhanced with a specific part “the lyophilized plasma reconstitution”. It can compensate for the lack of expert trainers in this field and help standardize instruction in the different training centers of the SSA.

Physiotherapy center in a Greek Army Marine Corps’ Brigade. Giannoglou D.

Co-Authors: Pte PIPPAS Christos, Pte ARVANITAKIS Chrysostomos, Pte KOLOKOTRONIS Vasileios, Maj BASAGIANNIS Christos, 1st Lt ZIGRAS Filippos,

Material – Methods:
1) Operating period: Two (2) months (9/7/2015-11/9/2015)
2) Material: Treatment table, electrotherapy equipment, taping equipment, elastic bandages, massage oil, cold therapy packs, treatment gel
3) Treatment methods: Massage, kinesiotherapy, functional restoration, ballistic/continuous/hold-relax stretching, sport rehabilitation, electrotherapy, cryotherapy, mobilization and manipulation of central and peripheral joints, traction, friction technique, ischemic pressure.

Results:
Overall, fifty-five patients were treated (one citizen, forty soldiers, ten NCOs and four officers). Three of them were not subjected to therapy while twenty-two were referred to the hospital. Sessions were held in the physiotherapy centre of 32 Marine Corps Brigade of Volos and patients had either musculoskeletal or neurological problems.

The outcome was very positive, as all of the patients were relieved from at least one of their symptoms. Some of the benefits of the treatment were: functional recovery, range of motion improvement, pain reduction or deletion, reduction of muscle spasm.

Conclusions: Our results indicate that physiotherapy centers in large military units are useful as they prove to be an effective and reliable solution for musculoskeletal and neurological injuries’ restoration, and help to save money and time.

Virtual environment to train medical team leaders. Huguet L.

Not disclosed
Extraction and evacuation of foreign ferrous particle with MADU field method. **Kazic S.**

*Co-author: Dusanka Mandic M.D., M.D., PhD*

**Introduction.** Removal of foreign ferrous particles (FFPs) like bullets, shrapnel or bomb pieces, even needles which enter human body as the result of trauma, at present, requires surgery. Extraction and evacuation of FFPs with utilisation of magnetic deep unipolar oriented field (MADU) is a new medical technology developed by Dusanka Mandic.

**Material and methods.** Extraction and evacuation of FFPs was most commonly performed with magnetic trap. Magnetic trap provides unipolar magnetic field induction of 90 mTesla, but in selected cases lantanoid magnets of 359 mT strenght were used. Their influence is 55-70 cm inside body. Magnetic trap was placed and fixed on place of entrance of FFPs. With the time FFPs were attracted by magnets under the skin they were removed with simple incision. In cases when many FFPs were entrapped close to nerves and blood vessels, FFPs were driven slowly back by magnetic trap to the place in patient’s body where their surgical removal was possible or to the place where they caused no symptoms. More than 800 with weapons wounded people were treated until 2000 year with this method which is still in use.

**Results.** Overall success rate in patients treated with this method was about 46% in six weeks period. No side effects which could be attributed to this therapy were noted.

**Conclusion.** Magnetic trap treatment is non-invasive method for displacement and evacuation of FFPs. Its advantages are that it is non-invasive and can be used combined with surgery in war and in peace.

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**Epigenetic Mechanisms on the Pathogenesis of Lung Damage Caused by Sulfur Mustard Analogue Mechlorethamine.** **Mechlorethamine. Ahmet Korkmaz**

*Co-authors: Fatih Kalkan¹, Turgut Topal¹, Bulent Uysal¹, Kahraman Ates², Sukru Oter¹*

Beside lack of antidote, the popularity of mustard gas comes from its easy production, low cost and long storage time. Mustard gas causes DNA alkylation, nitro-oxidative stress and inflammatory reactions by binding to macromolecular structures on DNA. The most vulnerable organ is lung. “Mustard lung” can occur years after mustard exposure, suggesting that epigenetic modifications may involve damage over the course of years.

In this study 138 male rats were used. Mustard toxicity has been established as a transdermal application of 25mg/kg dose of mechlorethamine to the shaved back of rats. Animals were divided into 5 groups including sham, control (mechlorethamine), mechlorethamine+valproic acid (VA), mechlorethamine+azacitidine (AZ) and mechlorethamine+valproic acid+azacitidine (VA+AZ) by a simple random sampling method.

At the end of the study, the average weights of rats were decreased significantly in all groups compared to the sham group but only average weights in the VA group increased significantly compared to the control group. Also highest survival rate was obtained for VA group (%65). Many
biochemical and histopathological analysis showed that the VA group is superior to other treatment
groups.

We compared VA, a Histone Deacetylase inhibitor and AZ, a DNA Methyltransferase inhibitor. VA
showed an obvious superiority in many parameters. Inhibition of histone deacetylation, probably
paved the way for a group of repair enzymes or pathways. When all the results were evaluated,
inhibition of HDAC with VA, runs an important epigenetic mechanism in mustard damage.

This study was supported by The Scientific and Technological Research Council of Turkey (112S628).

EBOLA: a foodborne illness to prevent?  **Manet G.**

Co-authors: Michel R., Boucherit M., Dubois T., Seite D., Tauveron A., Thioye D., Wilson P., Wachowiak
Q., Meynard J-B.

The risk of introduction of Ebola virus in another country during an outbreak is essentially linked to
incubating travellers. The health workers who care patients infected by Ebola virus are particularly at
risk to be contaminated.

Since a strict quarantine cannot be implemented during the back travel, the detection of infection is
realized by a daily monitoring of body temperature during the 21 days after the return. Precocity of
detection is necessary to prevent excretion and insure the effectiveness of the treatment. The
measure of the body temperature is usually realized twice a day. In France, temperature > 38°C or
presence of one of the symptoms frequently observed in Ebola disease triggers the care of the
subject by specialized teams.

We relate here the experience of the French military medical service (SSA) during the last epidemic in
West Africa.

We have the summary of 42 temperatures for 177 workers without any symptoms, returning to
France from Conakry (Guinea) in 2015. The temperatures were auto-measured, reported on a sheet
sent to the French military center of public health & epidemiology (CESPA) in Marseilles.

The mean temperature was 36.6°C (IQ= 36.3-37.0 °C). The extremes of mean temperature for each
subject during the 21 days were 35.4-37.6°C.

The temperature was 0.1°C higher for women than for men

The temperature was 0.2°C higher in the evening than the morning, the effect being more marked
among women.

No periodicity or trend was observed during the 21 days.

The mean standard deviation for a subject was 0.53°C. After modelisation, it could be reduced to
0.35°C.
Among the 19 subjects who presented symptoms, 7 had hyperthermia sometimes during the 21 days (38-40.2°C). None was contaminated by Ebola virus.

We thank the servicemen, members deployed in Guinea, and the medical teams who supported them.

Usefulness of a Multiplying Factor to Predict the Final Numbers of Victims during a Mass Casualty Incident. **Maurin O.**

**Co-authors :** D. Jost¹, S. Travers¹, M. Bignand¹, C. Derkenne¹, S. de Réglolix², J. Trichereau¹, JP Tourtier¹.

A Mass Casualty Incident implies that the number of rescuers is overwhelmed by the number of victims. In this case, we use rules of catastrophic medicine. In order to take the best care possible of the victims, the goal is to dispatch the right amount of medical teams depending on the number of casualties and their severity. Our predecessors, very experienced, used to multiply by 2 to 4 the initial number of victims upon arrival in order to predict the final number of victims there will be at the end of the intervention and to anticipate on the demand of reinforcement with further ALS teams. This tool is called “multiplying factor” (MF). We aimed to build a statistical model to predict the final number of victims from their initial count.

Methods: We observed retrospectively over 30 years of MCI triggered in a large urban area. We considered three types of events: explosions, fires, and road traffic accidents. We collected the initial and final numbers of victims, with distinction between deaths, critical victims (T1) and delayed or minimal victims (T2–T3). The MF was calculated for each category of victim according to each type of event. Using a Poisson multivariate regression, we calculated the incidence risk ratio (IRR) of the final number of T1 as a function of the initial deaths and initial T2–T3 counts while controlling for potential confounding variables.

Results: Sixty-eight MCIs were included. The final number of T1 increased with the initial presence of deaths (IRR: 1.8[1.4–2.2]), the initial number of T2–T3 > 12 (IRR: 1.6[1.3–2.1]) and the presence of one or more explosions (IRR: 1.4[1.1–1.8]).

Conclusions: The MF seems to be an appealing decision-making tool to anticipate the need for ambulance resources. In explosive MCIs, we recommend multiplying T1s by 1.4 to estimate final count and the need for supplementary ALS teams. This tool can be very useful in the battlefield with Improvised Explosive Devices. By extension, in the current context of terrorism, using explosive belts, this tool could be very interesting to anticipate the required amount of ambulances without overestimating it and so avoiding putting teams at risk needlessly.
Interest of freeze-dried plasma in strategic aeromedical evacuation. **Saboureau S.**

*Co-authors: MC (OF4) MADEC, MP (OF3) BREIL, MED (OF2) POYAT, MG (OF6) SAILLIOL*

The French military health service (FMHS) developed an entire system to threat its casualties from battlefield to French military hospital in Paris. After first line treatment at the point of injury by a nurse or a physician, the wounded is quickly sent to medical treatment facility where the surgeon perform damage control while the anesthesiologist transfuse plasma and red blood cell in 1:1 ratios before early medevac to France. During the flight, a physician continues to manage the fluid resuscitation and transfuse if needed.

Because fresh frozen plasma is very difficult to store and use in the battlefield and also in medical flight, the French Military Blood Bank produced freeze-dried plasma (FDP) and the French Armed Forces used routinely where soldiers are deployed. Early administration of FDP may contribute to hemodynamic stabilization and reduction in trauma-induced coagulopathy and endotheliopathy. FDP perfectly suits medical transport because they can be stored during 2 years at ambient temperatures, it is compatible with all blood types and it can be reconstituted in less than 6 minutes.

Our experience in strategic aeromedical evacuation shows that the FDP is very efficient and adapted for our practice conditions.

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Training military personal in Belarus. **Sviatslav S.**

The main components of a modern system of training of military medical personnel are in the Republic of Belarus: pre-university preparation, undergraduate training and additional education specialists.

The main tasks are preparatory training for junior and medium military and medical personnel, as well as attracting to study at university the best prepared young people.

Pre-diploma training of officers of medical service in the military-medical faculty in the educational establishment "Belarusian State Medical University" (hereinafter - VMedF) - this is a basic 6-year higher medical education, providing training of doctors, capable of carrying out high-quality medical care, both in the military and civilian health care.

The VMedF of Belarusian State Medical University was set up by a joint decree of the Ministry of Defence and the Ministry of Health of the Republic of Belarus in 1995.

The Faculty of Military Medicine has four departments: Department of Organisation of Medical Provision of Troops end Emergency Medicine; Department of Military Epidemiology and Military Hygiene; Department of Military Therapy; Department of Military Surgery.

In the formation of a military doctor (officer m/s) involved 62 departments of the Belarusian State Medical University and 4 departments VMedF.

After the release of military doctors to monitor VMedF conducted postgraduate career development, improvement and graduates career.

The highest form of postgraduate education is a clinical residency. It is carried out by 2 full-time one year's training plan. For teacher training departments VMedF designed adjunction. In 2007, it is open to VMedF in internal medicine, surgery and military medicine.
In some battalions provide a small number of staff in lieu of medical positions entered medical assistant. In connection with this, a system of post-graduate training at the military paramedics VMedF.

The French combat casualty care doctrine. Vial V.

Co-authors: C. Hoffmann², N. Cazes³, A. Puidupin⁴

The French military health service (FMHS) adapted its concept of medical support in military operations to the specificities of the modern asymmetrical conflicts. It established a combat casualty care doctrine based on 3 principles: forward medical support, forward resuscitation and surgery and early and systematic strategic aeromedical evacuation.

The objective of this study is to introduce the French combat casualty care (F3C, sauvetage au combat SC) doctrine, cornerstone of the forward medical support, and to discuss its relevance based on a review of a medical literature.

Training for aeromedical evacuations of intensive care patients, experience of the French Military Health Service. A retrospective 10-years study. Vitiello L.

Co-authors: Boutonnet Mathieu¹, Pasquier Pierre¹, Bancarel Jérôme³, Coste Sébastien⁴, Bay Christian⁴, Raynaud Laurent⁵

French Military Health Service (FMHS) doctrine = Forward medicalization and early strategic medical evacuation (MEDEVAC) to France.

Aero MEDEVAC: tactical MEDEVAC and strategic MEDEVAC (Strat AE).

Strat AE involve medical teams (Anesthesiologists or emergency doctors/flight surgeons and nurse-anesthesiologists or flight nurses) of the FMHS. The Strat AE can be individual (one patients on FALCON 900 or 2000) or collective (6 to 12 patients with the system MoRPHEE on a Boeing C135-FR).

MoRPHEE: The medical team involves 2 anesthesiologists, 3 nurse-anesthesiologists, 2 flight surgeons, 2 flight nurses and 2 nurses. Specialized training is essential to these teams to ensure the Strat Aero MEDEVAC. The FMHS developed a specific MEDEVAC training program. The aim of this study is to describe the basics of the FHMS-MEDEVAC training program and its application in the last 10 years.

Veterinary operational preparation for military deployments. Demoncheaux J-P.

Not disclosed
Zoonoses and operational context. **Girardet C.**

*Not disclosed*

French organization of veterinary support in overseas military deployments. **Demoncheaux J-P.**

*Not disclosed*

Medical evacuation of military working dogs in operation. **Trombini G.**

*Not disclosed*

Food defense: concept and implications for veterinary support. **Watier-Grillot S.**

*Not disclosed*

Current development of SANGARIS operation’s veterinary support in Central African Republic. **Chal D.**

*Not disclosed*

The animal epidemiology of defense in the French armed forces. **Marié J-L.**

*Not disclosed*

**EBOLA:** role of pet dogs in the outbreaks. **Manet G.**

**EBOLA:** monitoring body temperature of potentially contaminated contacts. **Manet G.**

*Co-authors: R. MICHEL, M. BOUCHERIT, T. DUBOIS", D. SEITE, A. TAUVERON, D. THIOYE, P. WILSON, Q. WACHOWIAK, J.B. MEYNARD.*

The risk of introduction of Ebola virus in another country during an outbreak is essentially linked to incubating travellers. The health workers who care patients infected by Ebola virus are particularly at risk to be contaminated.

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We thank the servicemen, members deployed in Guinea, and the medical teams who supported them.

Pitfalls of post-traumatics state disorders support in Malian army working dogs in operation. Trombini G.

Co-authors: Ismaila Macalou, Mamadou S Cissé, Bréhima B Berthé, Assa Badiallo Touré, Ousmane Ly, Soumaila Keita, Gangaly Diallo.

Since independency, Malian army is facing a chronical armed conflict in northern Mali, which will increase with international terrorism development. Soldiers on the battlefield are facing constraints that modify their individual and collective adaptative landmarks. Post-traumatic stress disorder can be prevented and is a crucial stake for soldiers during and after their engagement period.

We report, based on a clinical observation, the diagnostic and therapeutic difficulties related to the ignorance of this condition and the lack of means to take care of the concerned patients.
Wednesday, May the 25th

- 9h00 - 10h30 - Scientific Sessions

Session Physical and mental rehabilitation N°2 (amphitheater Rouvillois)

Chairmen: Brigadier General Norvell V Coots (USA), Médecin en chef Frédéric Canini (France)

Brigadier General Norvell V Coots (USA), « US Rehabilitation during the Afghan and Iraq Wars; the Walter Reed Experience »

The Wars in Iraq and Afghanistan posed a number of unique challenges to the US military and its medical forces, not the least of which is the highest historical rate of survival for Soldiers wounded on the battlefield. Additionally, many of these casualties survived with catastrophic wounds unsurvivable in previous conflicts. By 2007 a new approach to rehabilitation of these catastrophic war wounds developed first at Walter Reed Army Medical Center, along with the realization that they were made more complex by the overlap of chronic pain, Traumatic Brain Injury (TBI), and Post Traumatic Stress disorder (PTSD). This presentation will briefly cover the history of Walter Reed Army Medical Center as a Rehabilitation leader, discuss the capabilities of the Military Advanced Training Center, the concept of the Warrior Transition system of Care, and will conclude with a look at new methods of combined therapy for those individuals still suffering secondary side effects of exposure to combat operations.

Colonel (Prof) Dr Eric Vermetten (Netherlands), « Walk and Talk – Development and Use of a Novel Intensive Psychotherapy for Veterans with PTSD »

There is an urgent need to identify effective treatments for military veterans who do not respond to, or are unable to engage with, current first line treatments. Modular motion-assisted memory desensitisation and reconsolidation (3MDR) is a new treatment that aims to reduce cognitive avoidance and augment engagement with therapy. 3MDR is based on known therapeutic principles of virtual reality exposure therapy and eye movement desensitization and reprocessing (EMDR), embedded in a novel context in which the patient walks on a treadmill whilst interacting with a series of self-selected images that are displayed on a large screen. Exposure by virtual reality, enhanced with walking, music and high affect pictures, eliminates cognitive avoidance during exposure and promotes presence. This is an important distinction between 3MDR and traditional trauma focused techniques; patients learn how to move through their avoidance by, literally, approaching their traumatic memories. Preliminary results from research regarding the effectiveness of 3MDR in veterans with treatment resistant, combat-related PTSD are promising. International collaborations have started.
This lecture intends to present the top five lessons for NATO learned from the military involvement in the Ebola outbreak response in West Africa, 2014-2015. First, Chemical, Biological, Radiological and Nuclear (CBRN) and Medical services provided a response together, removing the artificial borders between CBRN and Medical during this crisis. Second, during an outbreak such as this Ebola crisis, there is a necessity for patients’ triage before entering an Ebola Treatment Unit (ETU). Third, there is an absolute need of an overarching coordination, in order to successfully manage such a medical humanitarian crisis. During this outbreak response, the allocation of military, IO, and NGO treatment facilities (mainly ETU) was uncoordinated. Fourth, existing doctrines and best practices in epidemiology were not applied during this crisis for western patients. New practices dictated by political reasons were implemented. Fifth, there is an identified requirement for a NATO Medical Intelligence capability. NATO medical planning and operations are currently based on a few Nations’ medical intelligence capabilities; NATO does not have any autonomy when it comes to produce medical intelligence. To conclude, NATO’s ability to respond to a crisis of the magnitude of this Ebola outbreak is both positive and negative. NATO has the materiel, knowledge, and trained personnel to cope with managing such a humanitarian crisis, but is still missing an up-to-date doctrinal corpus, a medical intelligence capability and the ability of NATO to take the lead of such a deployment is still an open issue.
What are the results and lessons learned?

Methodology: An evaluative study on knowledge, attitudes and practices related Ebola outbreak was conducted on a stratified sample of 430 soldiers in Abidjan, Yamoussoukro and three military sites on the western border of the country: Man, Guiglo, and Daloa. Data were collected using a self-administered survey and analyzed using Stata software.

Results: 2 kinds of interventions have been realized for national army: improving technical capability and equipment for caregivers and awareness actions for sustainable soldiers’ behavior changing. (I) Awareness actions conducted by the Army Health Service were the preferred way of information for military (41.3%) after television. (II) 79.3% of soldiers reported washing hands more often with soap and water; (III) 67.1% reported stop eating bushmeat and only (IV) 13.2% applied correctly the measure to avoid interpersonal physical contact.

Conclusion: With technical support from National Institute of Public Health and based on the results from this study, a specific social marketing strategy was plan to prevent the threat of Ebola outbreak within national Army.

Médecin en chef (Col) Thierry de Greslan (France), « Ebola virus encephalitis »

Co-authors : M.D., Magali Billhot1,2, M.D., Claire Rousseau1,2, M.D., Christine Mac Nab1,6, M.D., Ludovic Karkowski1,4, M.D., Jean-Marie Courmac1,6, M.D., Julien Bordes1,5, M.D., Nicolas Gagnon1,4, M.D., M.D., Philippe Dubrous1,7, M.D., Sandrine Duron1, M.D., Sophie Moroge1,9, M.D., Benoit Quentin1,10, M.D, Fassou Koulibaly1,11, M.D., Jean-Luc Renard1,2, M.D., Prof Gilles Cellarier1,5, M.D.

Despite approximately twenty Ebola outbreaks in 40 years, the pathophysiology of the Ebola virus remains poorly understood. The effect of the virus on the central nervous system, suspected for a long time, is uncertain. At the Conakry Ebola Virus Disease Treatment Center (EVDTC) for healthworkers, in Guinea, the signs of encephalitis noticed in our confirmed Ebola patients led us to perform three lumbar punctures. Ebola virus was found in all cerebrospinal fluids (CSF). This discovery raises the question of the interaction between this filovirus and the brain and helps discuss the concept of encephalitis caused by the virus.
Workshop paramedics and nurses (hall Laveran)

Chairmen: Major Ham Esmeiran (Jordan), Lieutenant Colonel Lizzy Bernthal (Great Britain)

ISG2G Jean-François Ringeval (France), « MHS pre deployement training. Blended learning subject branch: Military Medical Education Solutions »

Doctor Zahra Farsi (Iran): « Professionalism: experience of health care providers in the Iran-Iraq war »

ISG2 Graziella Drouin (France), « Capability optimization skills »

ISG1 Olivier de Vergnette (France), « Meet the Institutional demand to reinforce and maintain Competencies, within the South Operational Plateform »

MERCA Christophe Dody (France), « Role of Radiology Technicians during Operations »

ISG2 Christelle Treguer (France), « Report about Mission EBOLA for nurses and paramedics »

11h00 - 12h30 - Scientific Sessions

Session Combat Life Survey N°2 (amphitheater Rouvillois)

Chairmen: Surgeon captain Royal Navy Andy Burgess (Great Britain), Médecin en chef (Col) Federico Gonzalez (France)

Médecin principal (Mjr) Jean-Stéphane David (France), « Damage Control Strategies to Face Civilian Trauma? »

Not disclosed

Surgeon captain Royal Navy Andy Burgess (Great Britain), « Improving survival in battle injuries - lessons from Afghanistan »

A decade of dealing with major trauma in Afghanistan has seen the UK military develop a patient pathway that has led to year on year improvements in survivability. This talk explores the reasons for this and expands in particular areas such as buddy care, battlefield extraction by MERT helicopter, Damage Control Resuscitation/Surgery, Blood protocols, collective training and hospital design. Some comparisons with civilian practice are given.

Médecin en chef (Col) Paul Balandraud (France), « Surgical support on the ground »

Surgical support on the ground was created three centuries before, during the napoleonic wars, by D. Larrey, who invented the famous “ambulances”. Since this date, surgical support has continually evolved. Forward surgical teams FST were largely used in French army during independence wars, notably airdrop FST in Indochina, and they became a standard of surgical support on the ground. Surgical support must remain appropriated to missions of our armed forces.
We observe now that military operations are more and more contingency operations, or planned operations but made at a very long distance from forward operations bases. Because of these characteristics, the timing of preoperative phase has raised, and so did the risk of preventable death. So we had to modify our surgical support.

First change was the increase of the number of forward surgical teams, from 5 to 8 FST, of which two are airborne.

Second change was the creation of a new kind of forward surgical team: the *module de chirurgie vitale* (MCV). The MCV is a very small and mobile surgical unity, which is able to provide life-saving surgical operations in special conditions, especially for special forces. Equipment is disposed in unsinkable containers, and can be airdropped on ground or sea. Personnel are five specialists.

We work now for the future, so current considerations aim at more and more flexibility for the whole system, for example we should easily integrate MCV in FST, or enhance the content of a FST in order to increase the capability, on the model of Russian dolls.

**Session Free Communications N°1 (amphitheater Baudens)**

*Chairmen: Surgeon Commander (Lt Col) Simon Leigh-Smith (Great Britain), Médecin en chef (Col) Nicolas Prat (France)*

*Professor Vassili Bohdan (Belarus), « Plastic soft tissue defects vascularized tissue complexes in the treatment of patients with combat damage to a limb »*

*Co-authors: Eskov A.S., Sukharev A.A., Fedorov K.A.*

The problem of recovery of soft tissue defects are not lost its relevance since the beginning of the use of firearms and explosive charges. And if the problem is a temporary and final stabilization of fractures is practically solved, the question is functionally correct and timely closure of soft tissue defects remains open. The study included 32 patients (58.2%), with gunshot wounds and 23 patients (41.8%) with explosive damage. 82% of patients were aged between 18 and 40 years. Isolated damage amounted to 76.4%, injuries affecting several segments - a little more than 9% of the combined injuries were identified in 14.5% of cases, almost 31% of cases accompanied by open fractures. The largest group among the observed cases (about 30%) were the operation to restore the defects of soft tissue area of the foot and the lower leg by the method developed by us. All grafts taken root and provide good functional results reconstructed skin in 94.5% of cases, as well as contribute to the solution of orthopedic problems. The average duration of treatment in patients with soft tissue defect was $30 \pm 6$ days. Thus, in the analysis performed by reducing the spectrum of reconstructive surgery of our operations was tested and proved several findings characteristic of the majority of patients with the presence of soft tissue defect: 1. All combat damage required reconstructive intervention; 2. The main conditions that allow to carry out the operation to close soft tissue defects, combined with damage to the bone structures are the general condition of the patient and the wound; 3. The use of skin-fascial flap should be considered a method of surgical treatment.
carried out in the early stages of treatment, which will speed up and facilitate the further rehabilitation.

Colonel Dr. László Fazekas (Hungary), « MILMED COE coping with current and future military medical challenges»

The NATO Centre of Excellence for Military Medicine (NATO MILMED COE) is an international military organization with the mission to support and assist the Strategic Commands, other NATO bodies, nations, other civil and military bodies by supporting the transformation of the Alliance and thereby improving medical support to operations and to provide subject matter expertise in the following areas:

- Medical training and evaluation leading to certification (Training Branch)
- Medical Lessons Learned focusing on tactical aspects (Lessons Learned Branch)
- Standards development and custodianship (Interoperability Branch)
- Deployment related health surveillance (Deployment Health Surveillance Capability Branch)

Altogether, the COE aims to become the central hub of military-medical knowledge and the main link for the civilian medical disciplines that may benefit NATO. With a project portfolio distributed among the branches and ad-hoc project teams, the COE continues to target the most pressing issues of contemporary military medicine and it enjoys an excellent linkage with the senior decision-making body of NATO’s medical community, the Committee of the Chiefs of Medical Services in NATO (COMEDS) and its extensive Working Group and Expert Panel structure, for which the COE routinely delegates its own Subject Matter Experts (SMEs).

The COE also engages in projects envisioned by such SMEs, most prominently in the multinational medical exercise series in NATO, the Vigorous Warrior (VW). The exercise series so far had 3 iterations and currently in the planning phase of the 2017 event. The exercise is a unique occasion to test major medical concepts, to collect lessons and observations, to offer unprecedented possibility for training in a truly multinational environment and to experiment with scenarios in a controlled setting. This allows the COE for example to take such lessons and observations from the previous iteration and validate them or the corrective/preventive actions resulted from them on the next occasion, providing an extraordinary possibility to feed the medical Lessons Learned process and the COE’s Information Knowledge Management (IKM) system.

The presentation will provide an overview of NATO MILMED COE’s history, structure, mission and main projects and deal with the VW exercise series, the lessons learned process and the COE’s IKM system in greater detail.
**Major (MD) Dimitrios Giannoglou (Greece),** « *Atypical myocardial infarction of a young NCO - a case report* »

**Co-Author(s):** GOLEMIS Adrianos, Pte ZISIS Konstantinos, 1st Lt ZIGRAS Filippos, Maj BASAGIANNIS Christos

**Aim:** To point out the importance of carefully monitoring signs and symptoms of life-threatening diseases.

**Material – Methods:** A 39 year old NCO was presented in the Unit’s First Aid Station with symptoms of dizziness and nausea. His ECG showed 3rd degree AV block with a new onset of LBBB, which was intermittently changed to RBBB.

**Results:** The patient was transferred to the Coronary Care Unit of the General Hospital. His blood test showed increased troponin levels. The ECG was normalized without thrombolysis of the patient. Next day, he was transferred to 424 Military Hospital, where he had an angiogram. The angiogram showed no critical stenoses of the coronary arteries. The differential diagnosis, which included myocardial infarction and myocarditis, was cleared with a cardiac MRI, which showed signs of myocardial infarction.

**Conclusions:** It is important to pay attention to details and use all the appropriate tests to make sure that the right diagnosis is made in order to identify life-threatening conditions.

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**Colonel (MD) James Chambers (USA),** « *Collaborate.org: a novel web platform for international partnerships* »

In recent years, the US Department of Defense (DoD) has accelerated its commitment to optimizing burn care capability in its own personnel as well as partner nations via domestic and international platforms which now include open-source web videoconferencing. In 2013, in response to the worsening crisis in Syria, the DoD began providing burn care mobile training teams to requesting nations in an effort to share best practices and improve interoperability. In 2016, the US Air Force established three portals on Collaborate.org, a free web-based platform for humanitarian partnerships. The first of these, I-BURN, hosts a quarterly military-centric videoteleconference among international burn care professionals. The second is devoted to US Air Force global health professionals working at geographic combatant commands in support of partnerships with other nations. The third supports the collaborative publication of a forthcoming Field Guide to Global Health and Disaster Medicine. Each of these projects enjoys US-European collaboration and offers templates for a wider array of collaborative endeavors in the international military medical community.
Major General Munshi (MD) Mojibur Rahman (Bangladesh), « Uninterrupted patient care system of combined military hospitals: how do we manage at emergency and casualty department? »

Co-authors: Maj Dr. Mohammad Maksudur Rahman MBBS¹; Lt Col Dr. Md Al Amin Salek MBBS, MCPS, FCPS, MRCS²;

Bangladesh Armed Forces Hospitals provide both emergency and routine medical supports to the armed forces personnel and their families together with other patients of national interests. Each Hospital is supported with Emergency and Casualty Department with modern equipment and trained personnel.

Among these hospitals the E&C department of Combined Military Hospital Dhaka is considered as state of the art in patient care management. This department was established on 17 March 2013 replacing the preexisting Medical Inspection Room (MI Room) which is 20 bedded with tertiary level of care. It works as a “One-step Service” in the hospital premises with spl cover round the clock. It comprises of Reception, Specialist Outdoor Unit and Indoor Unit with ICU, HDU, Observation subunits & also an Investigation Unit with imaging & diagnostic tools.

This department works on a Standing Operating Procedure (SOP). A Triage Nurse prioritizes the patients in reception & direct to ICU, HDU or Observation indoor subunits, outdoor unit or Chest pain unit for quick review & disposal. The Indoor unit is capable to provide Resuscitative supports including Mechanical ventilation, advance cardiac life support and Critical Monitoring by Multipara meter Monitor, Oxygen Therapy, ICU profile investigations, bedside investigation of critical biochemical analysis, Blood gas analysis etc. Coexisting specialist outdoor also treat the significant number of surgical, medical & other specialist patients with good outcome. The department also provides initial treatment for a wide range of illnesses and injuries, including Cardiac Arrest by CART Team & some life threatening trauma which requires immediate attention by resuscitation team. So it is considered as a referral center for the nation in the context of Emergency and Casualty Department.

Professor Elizabeth Ristanovic (Serbia), « Dengue virus as a threat to military forces deployed in endemic regions »

Co-authors: Vesna Protic-Djokic, Sonja Atanasievska, Dragutin Jovanovic, Zeljko Jadranin, Sonja Radakovic

Dengue fever is one of the most common mosquito-borne viral diseases in the world. It is endemic in many regions and still spreading so that 2.5 billion people live in risk areas. About 50 to 100 million people get dengue fever every year and 2 million of them develop serious and potentially life-threatening form of disease. Environmental conditions and climate
changes can contribute to the virus spreading, so that many European countries should be carefully monitored in the future. Vaccine development has been also recognized as a priority task. The experience of Spanish-American war, WWII, Vietnam War as well as actual military missions worldwide has shown that disease can have a severe impact for health of the soldiers, their readiness and capabilities. Dengue and Chikungunya virus have been today considered a leading cause of febrile illness in troops deployed in tropical areas although many other mosquito-borne viruses are of special concern (West Nile virus, Rift Valley fever virus, etc.) The aim of our work was to detect the presence of IgM and IgG antibodies against Dengue virus in sera of 90 Serbian soldiers deployed in UN peace-keeping missions in endemic regions of Central African Republic and Congo in comparison to military blood donors in Serbia using ELISA test. Positive sera were tested again after 4 weeks for monitoring of titer dynamics. The epidemiological questionnaire and results of other serological studies for detection of other infective agents were used for interpretation. The obtained results show that Dengue virus poses a real threat for our soldiers in UN missions in tropical Africa, although the risk of disease also exists in our country. So it is necessary to enforce vector-control strategies for military personnel and deployments including education, preventive measures, personal protection, viral detection improvement and medical treatment of infected and ill persons.

Médecin principal (Mjr) Alexandre Alloneau (France) «Practical guidelines and conservation of succinylcholine in unconventional situation »

Co-authors: Hugues Lefort, Alexandre Mendibil, Frank Peduzzi, Michel Bignand, René Bihannic, Karim Tazarourte, Jean-Pierre Tourtier

Introduction: in 2012, The French National Pharmaceuticals Agency (ANSM) recalled the need to store succinylcholine +2 to +8°C until administration, assuming otherwise an increased risk of allergy. If this risk has not been formally demonstrated, a conservation algorithm is yet to be established in unconventional situation.

Material and methods: Review of the literature on stability of succinylcholine studies in different storage requirements and allergic risk depending on the expiry date.

Results: since 2012, SAMU has evolved greatly their conservation modalities of succinylcholine (Lefort, ANNFAR 2014), a key drug in pre-hospital medicine. The recommendations are poorly adapted to resuscitation in exceptional environment. Literature helped providing arguments for the responsible use and security while reducing operational and logistical constraints. Conservation should be done between 2 and 8°C as much as possible. Depending on the undertaking time (<12h between 12h and 24h between 24h and 14days), an isothermal pocket bag with ice packs may be necessary. The practitioner shall choose vials with long expiry date to limit the risk of allergy.
transportation must be made away from light and vibrations. Thus the destruction of the vials is not systematic when back to locals.

Conclusion: succinylcholine is a first-line curare for rapid sequence intubation. Our practical recommendations and the proposed algorithm consider a reasonable alternative to conservation standards/guidelines based on scientific evidence. The use of rocuronium is to be considered a reliable alternative.

Workshop paramedics and nurses (hall Laveran)

Chairmen: Major Ham Esmeiran (Jordan), Lieutenant Colonel Lizzy Bernthal (Great Britain)

ISG1 Olivier de Vergnette (France), «From Man with no Name to Care Giver without ID»

Capitaine (Psychologist) Ludovic Arquillière (France), «Contributions of hippotherapy in the treatment of war casualties»

ISG2 Thierry Julienne (France), «Lessons learned about Military Medical service support during Chammal Operation»

ISG1G Tony Rimbault (France), «Study about cares performed during an assistance mission in Mali of 4 months»

TABLab CN Laurent Rousse (France), «The French military BSL3 deployed laboratory in Guinea: feedback from a lab technician»
Thursday, May the 26th

• 8h00 - 10h00 - Scientific Sessions

Session Military Medical services and disasters N°2 (amphitheater Rouvillois)

Chairmen: Colonel (MD) James Chambers (USA), Médecin en chef (Col) Federico Gonzalez (France)

Major General Munshi (MD) Mojibur Rahman (Bangladesh), « Disaster management: role of Bangladesh armed forces in home and abroad »

Co-author: Lt Col Md Al Amin Salek MBBS, MCPS, FCPS, MRCS

1. Disasters are largely beyond control of human being resulting quick changes in the lives of the victims. The socio-economic consequences of man-made and natural disasters have always been highly alarming and devastating.

2. Like many countries of the world, natural disasters are very common in Bangladesh, because of its geographical, atmospheric, environmental and fast changing ecological reasons. Bangladesh may be described as one of the most disaster prone countries of the world. Almost every year she experiences one or the other type of disaster. The most common disasters that generally occur in Bangladesh are floods, cyclone, storm surge, tornado, nor’wester, drought, earthquake etc. Bangladesh is a developing country having one of the lowest per capita incomes in the world, cannot afford to have a big standing organization with equipment exclusively to meet the requirements of pre, during and post disaster activities.

3. The contribution which the armed forces can make in dealing with such disaster need not be over emphasized. This contribution has usually been made under some form of official arrangement for aid to civil power, as laid down in the standing operating procedures. Experience has shown that military forces are fully effective in counter-disaster role. The flexible organizational structure, capability of sustained operation in all weathers by day and night and well trained management system of the armed forces make them particularly well-suited for effective disaster relief operations. In addition, many of their normal activities parallel to those in public emergency services. Thus armed forces can offer assistance to the victims with invaluable support in engineering, communications, transport, rescue, emergency medical services, field sanitation, water supply and so on.

Médecin principal (MJR) Marilyn Franchin (France), « Role of a military health service to face a terrorist aggression, a French example »

On November 13, 2015, the heart of Paris was struck by terrorism. With 130 dead and 352 wounded, it was the deadliest disaster in France since the Second World War. Emergency medical services were
once again at the front line to evacuate the wounded that were exposed to persistent threat, and to ensure their survival as they were transported to the hospital.

As with every disaster, these events have demonstrated the importance for the prehospital emergency services to have efficient and realistic mass casualty plans, but also to enable field prehospital teams immediately to adapt their response to the specificities of the situation encountered.

Hemostasis and damage control owe a great deal to military medicine, especially during terrorist attacks. This time, lessons from Tactical Combat Casualty Care were also helpful for the rescue teams. The care under Fire was indeed provided by the medical teams of the Police task forces, the tactical field care by the fire brigade medical teams in more or less secure areas, and further damage control was ensured as soon as possible during the evacuation to various trauma-centers in the Paris region.

The experience gained on external military operations has proved to be highly useful, to the fire brigade staffs and the resuscitation or surgical teams of Begin and Percy military hospitals to which more than 50 victims were transported.

On November 13, 2015, the quick action taken by the prehospital teams contributed to the survival of the wounded while the coordination between emergency services and several trauma centers eventually allowed our healthcare system to provide effective treatment to each casualty.

Médecin principal (MJR) Amandine Abriat (France), « Paris terrorist attacks: use of the concepts of tactical combat casualty care (TCCC) in civilian practice. »

The Paris Fire Brigade (PFB) is an army unit, which serves as the primary fire and rescue service for Paris and the 3 surrounding departments. The PFB’s advanced life support (ALS) units are staffed by one emergency physician. Seventy percent of them come from army units, with strong experience in the field in conflict zones around the world. Many physicians use the “MARCH” procedures from TCCC in all types of traumas. A prehospital damage control specific kit had been implemented in each unit since the Charlie Hebdo attack in January 2015. The kit includes military material for bleeding control.

On November the thirteenth, the prehospital teams had to face mobility and persistence of the threat as well as a mass casualty of war-wounded.

Among the success factor of the prehospital emergency response, the presence of military physicians at the scene was highlighted:
- The lessons learnt from the TCCC allowed the medical teams on scene to adapt their treatment and prioritize the evacuation of the victims according to the type of their wounds, the available units, and the nature of the tactical context.
- Inside the Bataclan, Paris Fire Brigade’s physicians within the police intervention units started to provide care under fire and gave information via radio from the forefront.
- At least, with so many war-wounded injuries, the experience gained in military deployments helped the medical teams to adapt their behaviors in hostile environment.

Even if some characteristics that distinguish civilian from military high threat prehospital environments, the translation of military medicine in prehospital trauma care for the civilian victims was particularly helpful the night on November the thirteenth in the streets of Paris. These dramatic events remind us that we have to develop the skills of Tactical Emergency Casualty Care (TECC) in all the civilian rescue services.

**Médecin Général Major Geert Laire (Belgium), « Brussels, March the 22nd »**

Co-author: Erwin Dhondt

On the morning of Tuesday 22 March, 2016, coordinated terrorist attacks occurred in Belgium: two suicide bombings in the departure hall at Brussels Airport in Zaventem, and another in a train carriage at Maalbeek metro station, located near the EU headquarters in the center of Brussels. Responsibility was claimed by Daesh.

Did these attacks come by surprise? Is Belgium a target of opportunity?

32 victims and three suicide bombers were killed; more than 300 injured. The overall medical response, from the immediate lifesaving interventions at the blast scene to surgical stabilization, including patient regulation in addition to the creation of hospital surge capacity, was enabled by the community’s prior efforts to build a combined civil and military emergency preparedness and response system, and to practice that in common exercises and drills.

Lessons identified confirm however that communication remains the Achilles heel of such mass-casualty event management. Dealing with care providers and their psychosocial support is another need that is out there. Finally, the overall socioeconomic disruption puts an overwhelming strain on the society. Discussing these and some other concerns will end the presentation.
Médecin en chef (CR) Valérie Denux (France), « French military health service & French Public health service: An innovative relationship »

At the eighteen century the French Military Health Service (SSA) was created because of the refusal of the Public Health Service (SPS), which was not very developed at that time, to treat soldiers in their facilities. Therefore, the SSA began his implementation on an autonomous and independent process. All along the nineteen and the twentieth centuries, the SSA developed specific skills and capacities, as tropical medicine or disaster medicine, and became for those a national reference. However, at the same time the SPS increased strongly its capacities and technologies and became a very well developed network with high standards of care. Today, the SSA faces to a giant holding a lot of resources and enforcing its own standards. The SSA represents less than one percent of the SPS and is financially partly dependent of it as 35% of its budget is coming from the SPS. Therefore, as a lot of western Military Health Services, the SSA began since 2012 reconciliation with the SPS in order to optimize its resources and to maintain its operational capability. This reconciliation is based on reciprocity. The objective is to make the SSA becoming a full actor of the SPS to give to the military facilities the opportunity to get a sufficient level of activities to maintain and develop competencies, to receive resources to decrease the cost of the SSA for the ministry of Defense and to facilitate innovation. At the same time, the SPS is very interested in developing a strong relationship with the SSA to increase its capacity to manage crisis as EBOLA in 2014 or the stroke attacks in 2015. The two ministers of defense and health declared in December 2015 their willingness to sign an agreement to build this reciprocity in order to guaranty at the same time the operational medical support chain and the national resilience.

Surgeon Commander (Lt Col) Simon Leigh-Smith (Great Britain), « Civilian-military integration: a model for military Health care in the home nation »

An overview of the UK Defence Medical Services concentrating on where and how they interface with civilian organizations. The talk starts with the UK Healthcare cycle and operational medical support from role 1 to role 4 and rehabilitation. It then looks at the recent history of military hospitals with the transition starting in 1995 leading to the current system of Role 4 hospital, four “Defence Medical Group” concentrations of military clinicians and separate placements in many other civilian hospitals. It examines the advantages and challenges to the current system along with offering some potential solutions to the latter.
Commissaire de 1ère classe (Cpt) Patrick Hokayem (France), « Medical information structure »

Whether deployed in combat situations or for humanitarian relief efforts, today’s military forces need reliable access to information technology and communications services. These services need to scale with the size of the force and scope of its mission. Procuring a complex and mission oriented Communication & Information system for the French military health service operations is no easy matter. Too often armies spend substantial time and resources, only to find themselves behind schedule and over budget with a system that does not meet their requirements. Hence, the French military health service has devoted the adequate means & schedule to design the dedicated solution in order to harness the different battlefield levels in one global system gathering medicine telementoring, patients and medical data tracking, and the deployed force health environment monitoring. This presentation deals with ISSAN, the Med C&I digitized solution.

Médecin en chef (Col) Marc Puidupin (France), « Casualty care management: the French approach and lessons learned from recent warfare »

Co-authors: Marc Puidupin¹, Frédéric Caremil², François-Xavier Jean³, Cyril Pernod², Cécile Guth², Anthony Radavidson², Jean-Yves Martinez², Fabrice Petitjeans²,

Management of battle casualties by French Military Health Service is based on forward medical care, forward surgery and early STRATMEDEVAC. Battlefield cares adapted to evolution of operational conditions, taking into account lessons learned from recent wars.

Avoidable deaths are the reason of combat casualty care, involving each comrade in arms in prompt and appropriate care to stabilize casualty without delay until forward surgical unit. Damage control is a global care strategy for trauma bleeding patients, involving minimal rescue surgery associated with perioperative resuscitation including transfusion to avoid the lethal triad. Further intensive care during early strategic medevac warrants the treatment continuum at a high level of care.

Training course in combat casualty care instruction center use simulation based education to develop skills from point of injury to reception for damage control in the MTF.

French Armed Forces are recently involved in different kinds of warfare: Afghanistan, Mali, Center African Republic and education is regularly reassessed according to lessons learned from the Forward Health Registry.
Médecin principal (Mjr) Cazes (France), « Evaluation of epinephrine mixed with colloid solution in the initial treatment of hemorrhagic shock: experimental animal study »

Co-authors: C Pierrou², C Aglioni³, J Mosnier³, W Ménini³, N Taudon⁴, C Hoffmann⁵, J-C Perrochon¹

Introduction: interest of epinephrine mixed with colloid solution (EC) to control the level of blood pressure during hemorrhagic shock in war medicine.

Materials and Methods: experimental study of 12 pigs randomized into 3 groups. One group receives EC infusion (5 mg epinephrine mixed in 500 mL of colloid solution), another colloid solution and epinephrine titration to 0.1 mg (T) and a last group receives colloid solution and epinephrine administered to syringe pump (SP) at 0.5 mg / mL. For each group, the goal is to get and maintain a systolic blood pressure of 85 mmHg during 2 hours.

Results: systolic blood pressure of group EC is closer to 85 mmHg in the first hour than in the group SP with an average of 82 mmHg (p = 0.01). The amount of administered colloid solution is lower in pigs resuscitated by EC (p = 0.02). Serum calcium is higher in the group EC compared to other groups (p <0.01). The tissue oxygen saturation is lower in pigs resuscitated by EC (p = 0.04) with no significant difference in lactate values between the groups.

Conclusion: our results suggest the interest of the use of EC in the initial resuscitation of hemorrhagic shock in forward medicine.

Médecin en chef (Col) Nicolas Prat (France), « Experimental models for trauma and hemostasis preclinical studies »

Co-authors: MC Christophe MARTINAUD, MP Thomas POUGET, MGI Anne SAILLOL

Trauma are often associated with a coagulopathy, especially battlefield related trauma which show a high frequency of hemorrhagic shocks. Generally, this trauma-induced-coagulopathy correspond to an initial hypo-coagulable state but can also include hyper-coagulable state.

Pre-clinical research on TIC is a leading avenue of research in military medicine. This research needs in-vitro and in-vivo models of hemostasis and coagulation. Unfortunately, no perfect preclinical model exists, each of them bearing its own limitations. Also, because numerous models have been described in the literature, inventorying all of them is not feasible. However, it is possible to discuss around the needs of trauma and hemostasis studies, and the specific solutions some general types of experimental models can bring.

We propose to discuss about the different types of preclinical experimental models of trauma-induced-coagulopathy, both in-vitro and in-vivo models, and about the different hemostasis tests available for these models.
Despite various international agreements and conventions, the chemical, biological, radiological and nuclear (CBRN) threats are still very present. These weapons of mass disruption may be acquired produced and used by different state and non-state actors. Chemical warfare agents such as sulfur mustard or the nerve agent sarin have been used several times in the Syrian-Iraqi war zone in the last three years. Terrorists, insurgents or state troops can also be tempted by other chemicals, more easily acquired, such as agrochemicals (e.g. organophosphorus pesticides) or other industrial chemicals (e.g. chlorine). During military operations, our troops can be exposed not only to these toxicants but also to numerous other operational constraints (heat stress, sleep loss, intense physical activity, trauma...) that might change the outcome of poisonings, interactions we know very little about. To face these evolving chemical threats, we need to build a robust and agile defense capability. For NATO, medical countermeasures (MedCM) and casualty care are one of the five enabling components of CBRN defense. In the last 10+ years, despite multiple operations without any real CBRN threats, the French armed forces health service has maintained and developed an expertise in the field of CBRN casualty management. This expertise is paramount not only to face threats during operations but also to help the nation to deal with possible terrorist attacks. Our doctrine and tactics, techniques and procedures, equipment, specific MedCM made up by the military central pharmacy, and trained professionals are certainly assets of high value. Biomedical research efforts should be aimed at facilitating this agility by participating in threat analysis and providing operational advice while building new future MedCM. The decrease of defense budget in many countries certainly favors more intense international cooperation and exchanges of know-hows. In this presentation, we will illustrate these different aspects by using selected examples.

Beside lack of antidote, the popularity of mustard gas comes from its easy production, low cost and long storage time. Mustard gas causes DNA alkylation, nitro-oxidative stress and inflammatory reactions by binding to macromolecular structures on DNA. The most vulnerable organ is lung. “Mustard lung” can occur years after mustard exposure, suggesting that epigenetic modifications may involve damage over the course of years.
In this study 138 male rats were used. Mustard toxicity has been established as a transdermal application of 25mg/kg dose of mechlorethamine to the shaved back of rats. Animals were divided into 5 groups including sham, control (mechlorethamine), mechlorethamine+valproic acid (VA), mechlorethamine+azacitidine (AZ) and mechlorethamine+valproic acid+azacitidine (VA+AZ) by a simple random sampling method.

At the end of the study, the average weights of rats were decreased significantly in all groups compared to the sham group but only average weights in the VA group increased significantly compared to the control group. Also highest survival rate was obtained for VA group (%65). Many biochemical and histopathological analysis showed that the VA group is superior to other treatment groups.

We compared VA, a Histone Deacetylase inhibitor and AZ, a DNA Methyltransferase inhibitor. VA showed an obvious superiority in many parameters. Inhibition of histone deacetylation, probably paved the way for a group of repair enzymes or pathways. When all the results were evaluated, inhibition of HDAC with VA, runs an important epigenetic mechanism in mustard damage.

This study was supported by The Scientific and Technological Research Council of Turkey (112S628).

Doctor Uzeyir Erdem (Turkey), « Treatment of Severe Ocular Surface Burns in a Tertiary Military Hospital: In Vivo Induced »

Purpose:
To explain a new surgical approach and discuss the results for the treatment of severe corneallimbal burn with (or without) very small area of intact epithelium in cornea.

Settings:
Limbal transplantation used for severe limbal stem cell insufficiency, but transplanted tissue is large and recovery time is long, allograft rejection is high. Current exvivo stem cell treatment options takes long time and economic burden. We described a new surgical technique without limbal transplantation and discuss the reasons for success.

Methods:
10 cases with severe corneal and total limbal neovascularization by alkaline burn with small epithelial island, treated with 'corneal stem cell augmentation method'. Neovascular membranes and symblepharons were removed, and smoothened with diamond burr including corneal limbus and MMC for 1 min. Patients were underwent to HBOT therapy ( 2.4 ATA, %100 oxygen saturation, for 90 minutes) for 10 days. 1 case of acute ocular surface burn treated with HBOT, 1mg/kg prednisolone and doxycycline 100 mg po

Results:
8 eyes corneal surface recovered in 14 days, in these eyes, mean BSCVA increase were 4.4 (± 1.5) lines. 2 eyes were recovered in 30 days All neovascularizations disappeared. No
intraoperative complications have seen. Acute alcaline burn eye developed a limbal island at 22th day and resulted with total ocular surface recovery. No patient needed limbal transplantation.

Conclusion:
In vivo stem cell augmentation or induction of puliripotent stem cell is a safe and minimally invasive technique for the treatment of certain cases. These treatment method method are superior to all other treatment options in certain cases and does not need imbal transplantation or ex vivo stem cell interventions. This results also prove that corneal epithelium can be used as induced stem cell source to recover all corneal and limbal area.

Comments:
We have been using a surgical method for severe ocular surface burns with the name of ‘HBOT (Hyperbaric oxygen treatment) and MMC assisted limbal minitransplantation’ for last 14 years . But, in certain cases we don’t perform limbal transplantation. Instead we augment trace amount of corneal epithelial cells as Induced Puliripotent Stem Cells (IPSCs) source.
Best of our knowledge this promising treatment is first in vivo successful treatment method using corneal epithelial cells as a stem cell source and also with fastest recovery of ocular surface and could recommended to military hospitals. This surgical strategy has a potential to be developed for severe skin burns.

**Médecin (Cpt) Maxime Delbarre (France), « Kératocône: what consequences on the capacity to serve? »**

*Co-authors: M Maréchal, S Charpentier, M Berguiga, D Benisty, F Froussart-Maille*

Keratoconus is an idiopathic corneal dystrophy in which structural changes within the cornea cause it to thin and change to a more conical shape than the more normal gradual curve. This bilateral disease usually occurs gradually. Diagnosis is made by the ophthalmologist who found a visual loss uncorrect with eyeglass or contact lenses, an abnormal corneal topography and a corneal irregular astigmatism. Keratoconus usually revealed in the first three decades of life, especially in adolescence. Number of new cases diagnosed per year is about 1/2000, so it is not uncommon to have to rule on the ability of young soldiers with keratoconus. New surgical techniques to arrest progression of the disease (corneal collagen cross-linking) or to improve visual acuity (intra-corneal ring, deep anterior lamellar keratoplasty) have emerged these last years. According to the stage of the disease, and according to the medical care enjoyed by the military personnel, the ability to serve in the army can vary.

**Colonel Dr Ionel Droc (Romania), « Surgery for intramiocardial wall foreign body: case presentation »**

*Co-Authors : Dragos Trandafir, Andreea Teodorescu, Vasile Murgu*

Objective: It’s a very rare case of intramiocardial wall fordeign body (bullet) –resting in the diaphragmatic wall of the right ventricle. It was operated with success three months after the accident.
Material and method: The patient, a 37 years old male, was shot parasternally, in the left third intercostal space, with a high-velocity military AK 47 projectile. The shot was indirect – the bullet hit the patient after two rebounds on the metallic struts of the car he was driving. Shortly thereafter, the patient was examined in a hospital. A diagnosis of antero-inferior mediastinal foreign body (bullet) was established then.

We examined the patient 3 months after the accident. The plain X-Ray confirmed the diagnosis. We performed a thoracic CT scan which showed that the bullet was most probably located above the diaphragm, in the lower anterior mediastinum, 1.5 cm behind the sternum”. The radiologist pointed out that he could not provide a precise location of the bullet due to metallic artefacts. We also performed a fluoroscopy, which showed that the bullet was moving synchronously with the heart and, therefore, we asked for a cardiac echography in order to rule out a cardiac/pericardial location of the bullet. The trans-thoracic cardiac echography did not establish the presence of the bullet in the myocardium or pericardium, nor has it shown indirect signs of cardiac or pericardial wounds.

We therefore performed a subxyfoidian approach. We examined the anterior mediastinum but we failed to find the bullet, although we palpated a structure looking very much alike the bullet. We then opened the pericardium as in a pericardial window and we found the bullet embedded in the lower aspect of the right ventricular wall.

He was operated then under extracorporeal circulation and the bullet was extracted from the right ventricle. The resting orifice was closed with separate sutures on daflon patches using also reinforcement of the tissue with bioglue.

Results: The postoperative evolution was simple. No infection or bleeding were noted.

Conclusion: The intramural ventricular foreign body’s (extremely rare non fatal) can be safe treated surgically under extracorporeal circulation.

Médecin-colonel Damany Keita (Guinea), « Plaie inhabituelle de l’épaule par arme à feu avec migration de la balle dans le canal médullaire de l’humérus: prise en charge dans un milieu précaire»

Not disclosed

Médecin-colonel Damany Keita (Guinea), « E.C.M avec Verrouillage par Ostéo suture au Fil d’Acier»

Not disclosed
Médecin-colonel Riadh Allani (Tunisia), «Tunisian military health support during Libyan crisis: Public health activities. »

Co-authors: Khoufi M.T.¹, Hannachi H¹,² Bellaaj R¹, Bayoudh F¹, Yedeas M¹.

In February 2011, Tunisian Armed Forces (TAF) worked in collaboration with Ministry of Health (MoH) and with the support of UN agencies (UNHCR, IOM, UNFPA, UNICEF…) and several national and international humanitarian NGOs to provide assistance and health support to thousands of migrants and refugees from many nationalities fleeing the ongoing violence and fighting in Libya.

Many refugee camps have been established close to Ras Ajdir border points (Southeast Tunisia) in a Saharan environment. To face this situation, TAF implemented a health plan including. A field military hospital in medico-surgical version in the region of shousha was deployed. Three Aid station settled up at the cross border point of Ras Ajdir. 4 more aid stations were established in the area of Dhehiba, Remada and Tataouine.

More than 18,000 medical consultations were provided and more than 235 war injured were treated by only TAF medical advon teams. Jointly, others Public health activities were ensured in coordination with the various actors on field, as camp hygiene control, mental health promotion and maternal and infantile health promotion...

Daily visits were organized to different parts of the camps. Hygienist took care of accommodation, kitchens and food distribution points, sanitation and latrine, water control, solid waste control and hospitals waste control. TAF has been an active partner since the beginning in implementing the epidemiological survey weekly report, based on morbidity under WHO recommendations control, whose assessment was led by MoH and WHO representatives, and involving the different health actors on the site.

During the mission, TAF faces certain difficulties most of them in connection with the Saharan environment specificities (medevac pulled distances, climate effect on personnel and equipments, medication and blood product supply and cold chain problems, diet adaptation, scorpion and vector fight), refugee cultural and religious diversity, camp status (refugee or transit), immigration and repatriation long waiting list...