DOWNLOAD PDF 5. TREATMENT OF WAR BURNS 93

Chapter 1 : Video News - CNN

The treatment of war wounds is an ancient art, constantly refined to reflect improvements in weapons technology, transportation, antiseptic practices, and surgical techniques. Throughout most of the history of warfare, more soldiers died from disease than combat wounds, and misconceptions regarding the best timing and mode of treatment for.

Image 3 - Sloughy wound on foot This is not dead tissue, but a complex mixture of fibrin, deoxyribonucleo-protein, serous exudate, leucocytes and bacteria. A thick layer of slough can build up rapidly on the surface of a previously clean wound but this should not be confused with the thin pale yellow fibrinous coating which sometimes develops as a normal part of the healing process. It has been shown experimentally that slough and devitalised tissue will predispose a wound to infection by acting as a bacteriological culture medium and inhibiting the action of leucocytes in the wound [6] [7]. For this reason, in order to achieve an acceptable rate of healing, such wounds must first be properly cleansed or debrided. Surgery is by far the quickest method but as this is not always practicable, other techniques must sometimes be adopted. Traditionally, agents such as sodium hypochlorite and hydrogen peroxide have been used in the form of soaks but these are of limited efficacy and may also have an adverse effect upon the healing process [8]. Aserbine, a proprietary solution containing malic acid, benzoic acic and salicylic acid is also available but this is not widely used by wound care specialists. Probably the first modern dressing to be marketed specifically for use as a wound cleansing agent was the polysaccharide bead dressing Debrisan Pharmacia Ltd. When applied to relatively small moist sloughy wounds the beads absorb fluid and progressively move bacteria and cellular debris away from the surface of the wound [9]. Iodosorb Perstorp although similar to Debrisan in appearance, also contains elemental iodine which is liberated to exert an antibacterial effect in the wound when the dressing absorbs liquid. Both Debrisan and Iodosorb are also produced in the form of pastes or ointments. Iodoflex consists of layer of Iodosorb paste which is applied to the wound on a gauze fabric carrier as a treatment for infected wounds such as leg ulcers Shallow sloughy wounds which produce limited amounts of exudate can be treated with a hydrocolloid dressing that facilitates autolysis by the mechanisms described previously. Sloughy wounds which also produce a degree of exudate may be dressed with alginate dressings such as Sorbsan Maersk , Tegagen 3M Health Care Ltd , Kaltostat Convatec Ltd or other gel forming polysaccharide dressings such as Aquacel Convatec Ltd. The gel which is formed as these products absorb exudate forms a moist covering over the slough preventing it from drying out. Because these gel-forming fibrous dressings require moisture to function correctly, there is little point applying them to dry sloughy wounds or those covered with hard necrotic tissue. Other materials which are sometimes used to debride sloughy wounds include enzymatic agents such as Varidase Lederle Laboratories , crab collagenase and krill [10]. Polysaccharides such as honey and sucrose have also been used to facilitate wound cleansing. Although ordinary granulated or icing sugar has been used successfully, [11] [12] recent interest has been focused on the use of a sugar paste containing polyethylene glycol and hydrogen peroxide [13] [14] [15]. A significant development in the area of wound cleansing is the renewed interest in the use of larval therapy maggots for the rapid removal of slough and necrotic tissue from wounds such as leg ulcers, pressure sores and lesions on the feet of diabetic patients [16]. It has also been reported that larvae are of value in burns, [17] and plastic surgery for cleansing wounds prior to grafting [18]. Whichever technique is selected, once the slough has been removed, the formation of granulation tissue can take place unhindered. Granulating wounds red Granulation tissue is composed of collagen and proteoglycans, a complex mixture of proteins and polysaccharides together with salts and other colloidal materials. These produce a gel-like matrix which is contained within the fibrous collagen network. Its highly vascular nature gives it a characteristic deep pink or red colour Image 4. Image 4 - Granulating wound pressure sore. Granulating wounds vary considerably in size, shape, and the amount of exudate that they produce. As a result, no one dressing will be suitable for use in all situations. Cavity wounds, traditionally packed with gauze soaked in saline, hypochlorite, or proflavine, are now more commonly dressed with alginate fibre in the form of ribbon or rope. In the past, larger cavities such as those remaining following the excision of a pilonidal sinus were managed very successfully with a silicone foam dressing formed in situ

from two liquids carefully measured out in the correct proportions and mixed thoroughly before being introduced into the wound [19]. Originally called Silastic foam, this dressing has changed ownership and been completely reformulated as Cavi-Care Smith and Nephew Medical Ltd. Cavi-Care should not be introduced into narrow sinuses or cavities which are partially constricted, or wounds with undermining or tracking as in these situations there is a real danger that a piece of foam will become detached and remain in the wound, leading to a foreign body reaction or the formation of an abscess. The dressing, which is highly absorbent, is produced in a small range of shapes and sizes to fit different sized wounds. For more shallow heavily exuding wounds such as leg ulcers, fibrous sheet dressings made from alginate fibre are commonly used. If exudate production is not a problem, the use of a hydrocolloid dressing may be preferred. Recently launched Combiderm Convatec Ltd , which consists of a self-adhesive absorbent pad containing a superabsorbent in powder form, is also capable of absorbing and retaining large volumes of fluid even under pressure. For more lighly exuding wounds, thin polyurethane foam products are available such as Lyofoam Seton Healthcare , which has limited absorbency but which is highly permeable to moisture vapour. Lyofoam is also used as low-adherent dressing for minor injuries and other wounds in the final stages of healing. Some chronic wounds produce an unpleasant odour as a result of bacterial contamination. Products containing an antibacterial agent may be used in conjunction with systemic antibiotic therapy, to control the infection which causes the problem, and dressings containing activated charcoal such as Actisorb Plus Johnson and Johnson Medical Ltd or Lyofoam C Seton Healthcare Ltd , can be applied to control the odour. One group of wounds that are particularly difficult to heal are sinuses and other lesions which have a narrow opening leading to a flask shaped cavity under the skin. Some form of packing is generally inserted into such wounds to ensure that the entrance does not close over before the main body of the wound is healed. Traditionally, ribbon gauze packs have been used, but a number of the new dressing materials may also be of value. If the wound is moist, it may be lightly packed with alginate ribbon using a suitable probe, but care should be taken to ensure that it is not inserted too tightly. Research has shown that alginate ribbon has advantages over ribbon gauze in these situations [20]. Hydrocolloid granules and pastes can be used for small cavity wounds, alternatively, a hydrogel dressing may be introduced into the cavity or sinus using a syringe and quill if necessary. Such gels are particularly useful if slough is present in the wound. Ribbon gauze impregnated with gel has been used if physical packing of the wound is indicated. It is important to note that it would be unwise to introduce any of these gel forming materials into a sinus which may connect with a body cavity until the wound has been carefully probed or the depth determined by some other means. The production of granulation tissue continues until the base of the original cavity is almost level with the surrounding skin. At this stage, the process of epithelialisation begins around the wound margin or is formed as islands from the remains of hair follicles or sweat glands within the wound itself.

Chapter 2 : Treatment of War Wounds: A Historical Review

The treatment of burns is a major undertaking and involves many components from the initial first aid, assessment of the burn size and depth, fluid resuscitation, wound excision, grafting and coverage, infection control and nutritional support. Progress in each of these areas has contributed.

Andersen , MD4,5 M. Manring Find articles by M. Received Jun 16; Accepted Jan Abstract The treatment of war wounds is an ancient art, constantly refined to reflect improvements in weapons technology, transportation, antiseptic practices, and surgical techniques. Throughout most of the history of warfare, more soldiers died from disease than combat wounds, and misconceptions regarding the best timing and mode of treatment for injuries often resulted in more harm than good. Since the 19th century, mortality from war wounds steadily decreased as surgeons on all sides of conflicts developed systems for rapidly moving the wounded from the battlefield to frontline hospitals where surgical care is delivered. We review the most important trends in US and Western military trauma management over two centuries, including the shift from primary to delayed closure in wound management, refinement of amputation techniques, advances in evacuation philosophy and technology, the development of antiseptic practices, and the use of antibiotics. We also discuss how the lessons of history are reflected in contemporary US practices in Iraq and Afghanistan. Introduction The need for surgical care of survivors of accidents or animal attacks is part of the story of civilization, as is the story of medical care of those wounded in that other peculiarly human endeavor, warfare [41]. The history of military trauma care must be understood in terms of the wounding power of weapons causing the injury and how the surgeon understood the healing process. Improvements in weapons technology forced surgeons to rethink their interventions in their effort to tip the odds of survival in favor of their patient. Our purpose is to review the evolution of military trauma care during the past two and a half centuries in major conflicts in the West. The major areas of emphasis are medical evacuation and organization; wounds and wound management; surgical technique and technology, with a particular focus on amputation; infection and antibiotics; and blood transfusion. Medical Evacuation and Organization Perhaps the most basic problem facing physicians during wartime historically has been whether and how to transport the wounded to care or transport the caregivers to the wounded. A secondary problem historically has been how best to organize the delivery of care as modern nations began to dispatch vast armies and navies to fight across vast distances. For example, Pikoulis et al. These high mortality rates suggest surgeons were unable to get to wounded soldiers during the melee, treating only the higher class or those who survived after the battle had concluded. These Greek surgeons, whether they realized it or not, faced the same issues as all future practitioners engaged in wound care: During the American Revolution â€” , the Continental Congress authorized one surgeon to serve in each regiment. The organization was minimal, and regimental surgeons tended to work for their unit instead of seeing themselves as part of the Hospital Department, which was rendered ineffective by bureaucratic infighting [ ]. The outstanding military surgeon of the Napoleonic Wars â€” , Baron Dominique-Jean Larrey â€” , generally is regarded as the originator of modern military trauma care and what would become known as triage [ ]. Rapid access to care and immediate amputation reduced morbidity and mortality. The Crimean War â€” underscored the importance of methods used by Larrey decades earlier, particularly the importance of organized evacuation and surgical care close to the front line. The war revealed a stark contrast between the battlefield care provided by the French, with their expert organization and system of light ambulances, and the poorly organized British Medical Services. She was an early theorist of sanitation and the design of hospital buildings. Although her efforts created intense resentment in the army bureaucracy, she was one of the founders of the modern nursing profession [48]. She broke the monopoly of health care as the sole providence of the physician, which led to the development of the healthcare team in modern medical practice. Nikolai Pirogoff â€” , who served in the Imperial Russian Army, brought skilled nurses into military hospitals and worked to modernize Russian medical equipment [ ]. He is the namesake for a conservative technique of foot amputation [98]. At the onset of the American Civil War â€” , the US Army and Navy combined had about physicians, many with no experience with battlefield trauma [87], almost 30 of whom resigned to join

the Confederacy [45]. The structure of the Medical Department was decentralized with no clear chain of command and control of supplies. The Regimental Band served as litter bearers. The first Battle of Manassas July 21, was a rout for the federal forces and the soldiers fled back to Washington. Ultimately, men were killed or wounded and the Medical Department could not handle the load. Regimental surgeons, because they worked for their unit only, were either swamped with casualties or idle. Most of the wounded had to walk the mile distance from the battlefield to Washington to reach the hospitals in the rear. Those who could not walk remained on the battlefield for several days until they were picked up by ambulances, captured by Confederate forces, or died [62]. Jonathan Letterman â€" Fig. Wounded soldiers were removed from the battlefield by litter bearer, the predecessor to the medic or corpsman. Regimental Surgeons were responsible for dressing wounds and patients were evacuated in ambulances driven by Medical Corps noncommissioned officers to a division level field hospital for surgical treatment. By the end of the war, the Medical Department expanded this system by creating a national network of hospital trains, hospital ships, and general hospitals that could treat the patient near his hometown if he so desired [62]. The main advance in American medicine during the Civil War was the creation of an effective military medical corps with medical evacuation, hospitals, and surgical specialists. Health care was beginning to become a system. Still missing was a formalized approach to care that recognized the severity of injuries.

Chapter 3 : Maggot therapy - Wikipedia

Extensive and detailed medical record of the treatment of mostly young Royal Air Force airmen suffering from severe burns, fractures and diseases, and some off-duty glimpses of the doctors and nurses who treated them, provides unusually raw evidence of war injuries.

Antimicrobial agents; wound healing; antibiotic resistance; silver; iodine. Key Points The development of antibiotics during the 20th century marked the decline of many former remedies, but the emergence of antibiotic resistant strains of pathogens has led to the need to find alternative treatments. The judicious, prophylactic use of antiseptics may prevent the development of infections that will minimise antibiotic use, as well as promoting healing. The evidence concerning the efficacy of topical antimicrobial agents in the management of wounds is confused. Larger better designed trials to assess clinical efficacy and cost implications are necessary. Although reports of resistance are limited, misuse and abuse of antiseptics must be avoided. Abstract Antibiotics are potent antimicrobial agents with high specificity. However the relentless emergence of antibiotic-resistant strains of pathogens, together with the retarded discovery of novel antibiotics has led to the need to find alternative treatments. The most frequently used topical antimicrobials in modern wound care practice include iodine and silver containing products. In the past acetic acid, chlorhexidine, honey, hydrogen peroxide, sodium hypochlorite, potassium permanganate and proflavine have been used. Some of these products seem to be making a return, and other alternatives are being investigated. This review attempts to provide insight into the controversy that surrounds the use of topical antimicrobials by describing their respective mechanisms of action, reviewing supporting evidence and outlining perceived limitations. Historical background Throughout history man has had to contend with dermal wounds. In primitive societies substances derived from animals, plants and minerals formed the basis of crude remedies [1] needed to staunch bleeding, reduce swelling, minimise pain, remove damaged tissue, treat infections, mask foul smells and promote healing. The earliest documented records of topical wound treatments were found in Mesopotamia; these inscriptions on clay tablets have been dated to approximately BCE. The development and dissemination of later wound treatments can be traced from the ancient Egyptians, via the Greeks to Roman medicine [1] , but the history of progress in wound care during the Middle Ages to the present time is incomplete [2]. Although topical antimicrobial agents were utilised in wound care for thousands of years [3] , during the 19th century the discovery of chemical preservatives and disinfectants [4] , as well as a better understanding of the nature of infection and inflammation, allowed increased control of wound infection. In particular the use of carbolic acid by Joseph Lister in operating theatres from significantly reduced mortality rates associated with surgical procedures. Later, when it was accepted that micro-organisms were the causative agents of infections, it became possible to consider more specific targeting. Paul Ehrlich began the search for chemicals with selective toxicity for infectious agents, rather than non-specific inhibitors, such as antiseptics and disinfectants. The discovery and development of antibiotics during the 20th century provided potent antimicrobial agents with high specificity, which revolutionised clinical therapy and marked the decline of many former remedies. However, the relentless emergence of antibiotic resistant strains of pathogens, often with multiple antibiotic resistance [5] , together with the retarded discovery of novel antibiotics [3] has led to the need to find alternative treatments. Faced with the prospect of increased prevalence of antibiotic-resistant pathogens, and the diminished effectiveness of current therapies, careful consideration of treatment options is now important. Indications for use Antibiotics are indicated in cases of overt wound infection where the classical signs are evident. Yet even in the treatment of the diabetic foot, where infection may precede amputation, assessment of the whole patient and the rational use of antibiotics as part of an integrated treatment plan is recommended [6]. Antibiotics are not indicated simply to limit microbial numbers in uninfected wounds. Many wounds support relatively stable mixed communities of micro-organisms [7] , often without signs of infection [8]. In chronic wounds reduction of certain microbial species, such as anaerobic bacteria in order to limit undesirable odours [9] , or perhaps mixed communities of four or more bacterial species that impede healing [10] may be justified. The eradication of beta-haemolytic streptococci [11] , or

staphylococci and pseudomonads [12] before grafting is essential, and intervention to prevent the development of systemic infection in critically colonised or locally infected wounds is reasonable. Here systemic antibiotics are not always appropriate and topical antimicrobial treatments may be more suitable. In this review generic products, rather than named examples will be considered, and topical antibiotics have been excluded. This re-evaluation of accumulated evidence is intended as a basis to help practitioners make informed decisions. Chlorhexidine Chlorhexidine was discovered in and introduced into clinical practice in [13]. It is widely used as an antiseptic in handwashing, and as a surgical scrub, but in wounds its application has been limited largely to irrigation. The mode of action has been studied extensively. Chlorhexidine is available as diacetate, digluconate and dihydrochloride; the digluconate is most frequently used in wound management. It has rapid, bactericidal activity against a wide spectrum of non-sporing bacteria by damaging outer cell layers and the semi-permeable cytoplasmic membrane to allow leakage of cellular components. It also causes coagulation of intracellular constituents, depending on concentration [14]. Antibacterial activity against Staphylococcus aureus, Pseudomonas aeruginosa and a range of clinical isolates has been documented [15] , however in MRSA, resistance has been observed [16]. Although the efficacy of chlorhexidine as a topical agent in treating wounds is generally not well characterised, a recent evaluation of seven animal studies and three human studies has demonstrated that it is associated with few adverse effects on healing [17]. Despite reports of decreased bacterial counts, increased healing rates, and lack of toxicity, it was concluded that at present there is insufficient data to assess safety and efficacy, and that further clinical trials are required before the use of chlorhexidine on open wounds is either recommended or condemned [17]. Honey Honey is an ancient remedy [18] which has been re-discovered for the treatment of wounds [19]. Many therapeutic properties have been attributed to honey including antibacterial activity and the ability to promote healing [20]. Evidence of antibacterial activity is extensive, with more than 70 microbial species reported to be susceptible [21]. Later in vitro studies have shown that active manuka honey is bactericidal against strains of antibiotic resistant bacteria isolated from infected wounds [22] , [23] , [24] , so adding MRSA, vancomycin-resistant enterococci VRE and Burkholderia cepacia to the list of susceptible bacteria. Osmolarity, acidity, the generation of hydrogen peroxide on dilution and the presence of unidentified phytochemicals have been suggested to contribute to the antimicrobial potency of honey [21] , but geographical location, floral origin, and post-harvesting treatment conditions may also be important. Mechanisms of microbial inhibition and cellular target sites have not yet been fully investigated, but multiple, non-specific sites are predicted. Similarly, in vitro studies with cell lines exposed to honey solutions have demonstrated modulation of monocytic cell activity. It is thought that this is likely to influence the wound healing process [25] , [26] , although this is not yet fully explained. Studies with animal models have provided evidence of the stimulation of healing by honey [27] , [28] , [29] , and there are extensive reports of the clinical efficacy of honey in treating a wide range of wounds [20]. Much of this research is, however, with uncharacterised honeys and has therefore been described as anecdotal evidence. In a small number of case reports, sterilised active manuka honey was used [30] , [31] , [32]. In a review of the clinical evidence, the design of the clinical trials was criticised [33] ; there is therefore a paucity of double-blinded, randomised, controlled trials to date. The development of wound care products containing honey has been limited by the availability of standardised, quality assured preparations, although the situation is changing. Honey can be evaluated in vitro for antibacterial potency [34] , and the production of registered, sterile dressings impregnated with honey, as well as sterilised honey in tubes and innovative dressings honey and alginate will improve reliability and accessibility in the near future. Hydrogen peroxide Hydrogen peroxide has been widely used as an antiseptic and disinfectant. It is a clear, colourless liquid that decomposes in contact with organic matter. It has a broad spectrum of activity against bacteria, with greater effect on Gram positive species than Gram negatives. Hydrogen peroxide functions as an oxidising agent by producing free radicals that react with lipids, proteins and nucleic acids to affect cellular constituents non-specifically. Its use in cleaning superficial trauma wounds has declined since the formation of air emboli was reported [35] , yet analysis of studies in animals and humans [17] failed to find any negative effects on wound healing. At present there seems to be insufficient evidence to base definitive judgements about the merits of hydrogen peroxide on wound healing. Iodine Iodine is an element that was discovered in It is a dark violet solid that

dissolves in alcohol and potassium iodide. Its first reported use in treating wounds was by Davies in [36] , and later it was used in the American Civil War. Early products caused pain, irritation and skin discolouration, but the development of iodophores povidone iodine and cadexomer iodine since yielded safer, less painful formulations. Both release sustained low concentrations of free iodine whose exact mode of action is not known, but involves multiple cellular effects by binding to proteins, nucleotides and fatty acids. Iodine is thought to affect protein structure by oxidizing S-H bonds of cysteine and methionine, reacting with the phenolic groups of tyrosine and reacting with N-H groups in amino acids such as arginine, histidine and lysine to block hydrogen bonding. It has a broad spectrum of activity against bacteria, mycobacteria, fungi, protozoa and viruses. Despite prolonged use of iodine, reports of resistance are limited to one [38]. Many authors have commented that resistance to iodine has not become a problem, and the methodology in the case of iodine resistance cited above has been criticised [39]. Povidone iodine is available commercially in several formulations solution, cream, ointment, dry spray or dressings. There is extensive in vitro evidence of the efficacy of PVP-I as a cidal agent, from varying methodology [15] , [40] , [41] , [42]. Activity at low concentration is affected by the presence of organic matter, but not all in vitro tests incorporate this factor into their design. Clinically, PVP-I has application not only in the management of wounds, but as a skin antiseptic prior to surgery, and in the disinfection of inert surfaces [43]. Whereas its efficacy as a skin disinfectant is undisputed, numerous publications describe the use of iodine in cleansing wounds, and as a topical agent to prevent or treat localised wound infections, but controversy surrounds its safety and efficacy [44]. A report that absorption of PVP-I gave rise to severe metabolic acidosis, which complicated the management of two burns patients who died of renal failure [45] , supported opinion that PVP-I should be restricted to brief topical application on superficial wounds rather than long-term use on large wounds. Two comprehensive reviews of the accumulated evidence for PVP-I derived from in vitro studies, animal models and human clinical use have attempted to analyse the confused picture [46] , [17]. Overall observations from animal models have indicated cytotoxicity against leukocytes, fibroblasts and keratinocytes, but conversely human studies on balance suggest that PVP-I reduces bacterial load, decreases infection rates and promotes healing [17]. In one study healing rates of chronic venous leg ulcers, each treated with one of three topical agents were compared to untreated control ulcers in each respective patient. All agents were seen to reduce bacterial load; silver sulphadiazine and chlorhexidine digluconate caused slight improvements in healing rates and times, but PVP-I yielded statistically significant increases. Furthermore, histological assessment indicated lack of cytotoxicity because PVP-I induced less changes in microvessels and dendrocytes [47]. Additionally, a report of the ability of iodine released from a dressing to modulate the secretion of cytokines by human macrophages in vitro has provided another justification of its role in promoting healing [48]. Cadexomer iodine is available as an ointment, as well as a dressing. Analysis of animal and human studies has shown the emergence of a similar picture to PVP-I, that is reduction of MRSA [49] and Pseudomonas aeruginosa [50] respectively, with evidence from clinical reports of efficacy in stimulating healing [17]. Its lack of toxicity for human fibroblasts in vitro suggests lack of toxicity for chronic wounds in vivo [51]. Proflavine Proflavine is a brightly coloured acridine derivative that was extensively used during the Second World War in the treatment of wounds [52]. Modern use is as a prophylactic agent in surgical wounds packed with gauze soaked in proflavine hemisulphate solution, even though calcium alginate has been reported to promote better results [53]. Although it is effective against sulphonamide-resistant bacteria [52] , strains of MRSA that are resistant to proflavine by possessing efflux pumps mechanisms associated with bacterial membranes that export materials from cells have been isolated [54]. Acridines are photosensitive; it has therefore been proposed that new derivatives should be sought for topical therapy promoted by light [55]. However, the ability to induce mutations in bacterial [56] and cell cultures [57] raises suspicion about the safety of proflavine. Silver Silver has a long history as an antimicrobial agent [58] , [59] , especially in the treatment of burns. An awareness of its role in inhibiting micro-organisms has developed since the late 19th century [60]. Metallic silver is relatively unreactive, but in aqueous environments silver ions are released and antimicrobial activity depends on the intracellular accumulation of low concentrations of silver ions. These avidly bind to negatively charged components in proteins and nucleic acids, thereby effecting structural changes in bacterial cell walls,

membranes and nucleic acids that affect viability. In particular silver ions are thought to interact with thiol groups, carboxylates, phosphates, hydroxyls, imidazoles, indoles and amines either singly or in combination, so that multiple deleterious events rather than specific lesions simultaneously interfere with microbial processes [61]. Hence silver ions that bind to DNA block transcription, and those that bind to cell surface components interrupt bacterial respiration and ATP adenosine triphosphate synthesis [62]. In Candida albicans, but not in Escherichia coli, irreversible binding of silver ions to cysteine residues in phosphomannose isomerase interrupts cell wall synthesis, which in turn leads to loss of essential nutrients [63]. The complex issues concerning the toxicity of silver to mammalian systems, and its effects on the healing process, have been considered by Lansdown [64] , who concluded that further research into this area is required. Skin discolouration and irritation associated with the use of silver nitrate is well documented; absorption of silver, systemic distribution and excretion in urine has also been reported [64].

Chapter 4 : A structured approach to the selection of dressings

Burn injury is a ubiquitous threat in the military environment, and war burns have been described for more than 5, years of written history. Fire was probably utilized as a weapon long before that. With the ever-increasing destructive power and efficiency of modern weapons, casualties, both fatal.

One of the major accomplishments during the Civil War was the establishment of an effective hospital system that threaded the wounded and diseased through a series of continuously improving treatments and rehabilitation. In the decade before the war, American military action consisted of Native American skirmishes and the few wounded were treated at the various forts in small infirmaries. In cities, hospitals were for the indigent and working classes, and had a reputation as places to die. It would not be until the last decade of the nineteenth century that hospitals were looked upon as places of healing. The time-honored military tactic of lining up soldiers a few dozen yards apart to shoot at each other proved catastrophic. The massive casualties of the first battles brought old school medical thinking and preparedness into turmoil. At the first major land battle of the war on July 16, in Virginia at Manassas Bull Run , two unproven green armies met and effectively slaughtered each other. The North suffered 2, casualties, the South 1, It was a Confederate victory. As there was no organized ambulance system to remove the wounded or an organized medical treatment system to treat the wounded, injured soldiers lay as long as three days on the battlefield. Local homes, churches and other structures were quickly turned into field hospitals. Hospitals routinely took both Union and Confederate wounded. In the larger battles of the war the casualties were staggering: Antietam 22,; Shiloh 23,; Spotsylvania 30,; Chickamauga 36,; Gettysburg 51, It became the standard military wounded care delivery system through World War II. It consisted of specific trained personnel in outfitted mobile, field, brigade, general, specialty and rehabilitation hospitals. In conquered towns, buildings were refitted as places to treat and house the diseased and wounded. By the end of , well-ventilated multiple-pavilion style hospitals were being built in major cities, accommodating up to 3, patients each. Tent hospitals by the hundreds were prepared and set up at battlefields, such as Gettysburg and at way stations such as City Point. During the war, over one million soldiers received care in Union military hospitals, and perhaps a similar number in Confederate hospitals. With the surprising massive influx of casualties and no developed hospital system in the first year of the war, local Alexandria establishments were used as hospitals. Many functioned well, and were utilized throughout most of the war. With battles close by in Northern Virginia, Mansion House illustrates a functioning hospital filled with recently wounded, infected, diseased and convalescing soldiers. Surgery and wound care are the routines of the day. More from Behind the Lens: A History in Pictures.

Chapter 5 : 11th June â€“ the Revolutionary Suicide of Thich Quang Duc | Dorian Cope presents On This D

A total of % of the injured servicemen with first-degree burns were in treatment no more than months, % with second-degree burns were in treatment 2 to 3 months, and % with third-degree burns were in treatment 3 to 6 months.

Annals of the MBC - vol. Hydrotherapy means both immersion in a tub and showers in running warm water, provided these procedures contribute to the healing process. In our Department we use bath therapy starting on day post-bum, when patients have overcome initial shock and their general condition has stabilized. In most cases nurses and physicians are present. The tub water is usually not salinized but sterilized, while ordinary tap water is used for showers. This study covering a total of patients, over a period of 2 years , has the purpose of codifying the results of our long experience in this field, and stresses the adavantages and shortcomings of this method compared to other studies in the literature. Introduction The benefits of bath therapy as an adjuvant to the treatment of bums are universally recognized. In our series of moderate and major burns treated in our Department over a period of 2 years, the advantages and shortcomings of hydrotherapy have been evaluated on the basis of the following parameters: Material and methods Hydrotherapy means the use of warm water, both during immersion in a tub, and in showers with running water, provided these procedures contribute to the healing process of bum injury. Our immersion tub is made of stainless steel dimensions: It has valves for sterilized and ordinary water, drain valves, tangential heat pumps and thermostats, a hoist consisting of two rotating electro-mechanical arms, with a control desk, a stretcher and transfer trolley, and special devices for heating the room, water sterilization and ultra-violet radiation. The room is cleaned and sterilized after every bath, and culture specimens from the tub, trolley, hoist straps and other parts are regularly obtained. This means that only one patient daily can be bathed; otherwise the risk of cross-infection would rise considerably. Showers are carried out in an ordinary porcelain tub using ordinary water in another room which is routinely cleaned and sterilised. The bath tub is filled with water, the patient is gently placed in the tub with a transfer trolley and, after initial evaluation, debridement is started, and blisters and wounds are cleaned and cared for. In a water temperature of about 35 V the patient feels comfortable and can relax. When eschar incision or other procedures are performed, bleeding could be considerable. Loose necrotic debris is gently removed and pus evacuated. When the general condition of the burned patient allows it or when the burns involve only the upper part of the body, we prefer shower therapy using the same liquids water and Betadine scrub , but the procedure lasts less than bath therapy 10 min versus 20 min. Our series comprises burned patients hospitalized in our Department over a 2-year period Male to female ratio was 1. The great majority belong to the years age-group The rule in our Department is to employ initially bath therapy, in severe burns, and to shift to shower therapy as the healing process continues. The majority of the patients , The procedures were carried out once daily or every second day. Discussion Hydrotherapy as a mode of treatment for burns has been advocated or criticized by several authors, and undoubtedly it is widely used. We agree with Yang Chih , Carvajal and Craig in considering the purposes of hydrotherapy to be: Participants in the procedure are: Materials used include sterilized warm water and povidone-iodine scrub. As said, no saline water was used Table 2. Our patients suffered when we added salt to the water. Moreover, hyponatraernia due to the procedure was not noted. The duration of the procedure varied considerably from patient to patient. In contrast to the general belief that the bath should not last very long, we feel it can cause no harm, and we usually take our time. In most cases, the patients really enjoy it, and we have work to do in the meantime. Loose debris is gently removed and pus evacuated when it exists. When an intervention procedure is required incisions, removal of eschar we try to be conservative in order to avoid unnecessary blood-loss and pain. In the meantime and under the guidance of the physiotherapist, patients are encouraged to perform movements, and to actively participate in their bath, which is a source of satisfaction. Hair-washing, shaving of axillae and around orifices can be carried out at the same time. Despite scepticism and criticism, the method is still recognized worldwide. Undesired effects, such as pyrexia, chills and fatigue, have been universally observed, but are transient and of no clinical significance. Gordon describes hypothermia and hyponatraemia when the bathing procedure lasts over 20 minutes, and the importance of bathing solutions, especially in children. Since

our hospital does not admit paediatric patients, we can present no concrete data on this. Concerning bacterial dissemination, many authors Yang Chili, ; Kemble, have stressed the possibility of microbial migration from contaminated wounds to healthier parts of the body. Martyn pointed out that the use of tap water comprises a serious risk of infection. We feel that bathing in sterile water, under absolutely sterile conditions, can combat the spread of infection. Moreover, these observations show how imperative it is to shift from one mode of treatment to another, depending on the case and situations. By using the bath only once daily and with sterile water,only, we feel that the risk of contamination, or cross-infection, is minimized.

Chapter 6 : A review of the evidence for the use of topical antimicrobial agents in wound care

They have transformed the strategy for the treatment of war casualties. They have saved the lives of an unprecedented 90 percent of the soldiers wounded in battle.

Summary Burn injury is a ubiquitous threat in the military environment, and war burns have been described for more than 5, years of written history. Fire was probably utilized as a weapon long before that. With the ever-increasing destructive power and efficiency of modern weapons, casualties, both fatal and non-fatal, are reaching new highs, particularly among civilians who are becoming the major wartime targets in recent wars, accounting for most of the killed and wounded. Even though medical personnel usually believe that a knowledge of weaponry has little relevance to their ability to effectively treat injuries and that it may in some way be in conflict with their status, accorded under the Geneva and Hague treaties, it is imperative that they know how weapons are used and understand their effects on the human body. The present review explores various categories of weapons of modern warfare that are unfamiliar to most medical and paramedical personnel responsible for burn treatment. The mechanisms and patterns of injury produced by each class of weapons are examined so that a better understanding of burn management in a warfare situation may be achieved. Introduction Wars and their hardships have plagued humanity since the dawn of time. War burns have been described for more than 5, years of written history, and fire was probably utilized as a weapon long before. The invention of gunpowder and sophisticated explosives turned battlefields into burning infernos and changed for the worse the odds against protective measures. Trauma is the most important public health risk in wartime. Classical conflicts between opposing armies in open fields belong to the past. The use of armoured vehicles since the First World War has created a subset of casualties with a different epidemiology from that of infantry soldier casualties. Explosive devices directed against both civilian and military targets are frequently used in modern wars or acts of terrorism. Understanding these crucial peculiarities is critical to managing such injuries. Burns and injuries from shrapnel fragments or small arms are the most common wounds to be expected in modern conventional conflicts. Unfortunately the surviving victims are often paying a terrible price and are left with serious mutilations and handicaps from burns and shrapnel wounds over body areas not protected by the vest. Though the firepower utilized in modern-day conflicts has increased, lethality has been decreasing gradually owing to changes in the strategies and systems of battle care. As the technology of weaponry advances, the number and severity of burn injuries will certainly increase. Good management of burn injuries during armed conflicts starts with a good understanding of the mechanisms of injury and the properties and characteristics of the offending agents. Various weapons may result in a higher incidence of killed in action than others that may produce a greater incidence of burns and penetrating wounds. Kamikaze attacks for example have yielded significantly more burns than incidents involving bombs, gunfire, torpedoes, mines, and multiple other weapons, whereas mine explosions were responsible for more strains, sprains, and dislocations than the other weapon types. This knowledge will allow the soldier medic and civil rescue worker to accurately assess the nature and extent of injuries. It also enables them to predict more accurately the number and type of casualties that may result from a combat action so that adequate medical support can be arranged and more effective treatment and evacuation decisions may be taken. The end result will certainly be a reduced death rate and morbidity; moreover, countermeasures and protective equipment can be more adequately designed. Weapons of modern conventional and asymmetric terrorist warfare Changing trends in the nature of injuries during war - clearly illustrated in textbooks of military medicine - are the result of weapons development. Likewise, high-kinetic-energy munitions that penetrate armoured vehicles, buildings, and fortifications create a cloud of blown-out fragmentation debris causing similar injuries. The introduction of these new munitions added also more burns to the casualty case mix of warfare. Modern-age weapons can be categorized into explosive munitions and small arms 22 specifically designed to inflict physical harm by wounding with bullets or fragments, by damaging internal organs with blast shock waves, and by burns. Projectiles and small arms Two areas of projectile-tissue injury interaction for small missiles are recognized: The permanent cavity is a localized area of cell necrosis proportional to the size of the projectile as it passes

through the tissues. The temporary cavity on the other hand is transient lateral displacement of tissues which occurs after passage of the projectile. Elastic tissues such as skeletal muscle, blood vessels, and skin may be pushed aside after passage of the projectile, but then rebound. Inelastic tissues, on the other hand, such as bone or liver, may fracture. Anti-personnel exploding munitions, most commonly encountered in the form of grenades, rockets, bombs, and mines and anti-material munitions that have anti-personnel effects, including Kinetic-Energy Anti-material Warheads e. Explosive Anti-material Warheads e. Injury from blast overpressure is pressure- and time-dependent and its severity increases as the pressure or its duration increases. Casualties close to the epicentre of the explosion are likely to suffer from all three wound-causing factors and also usually from mutilating blast injury. The victims are not likely to survive. Casualties farther away from the epicentre are likely to experience a combination of blast from the explosion and penetrating trauma from primary and secondary missiles created by the explosion. Flame, incendiary, and phosphorus-containing munitions Flame, incendiary, and phosphorus-containing munitions are weapons that use a combustible material source to expel people from strongholds or hidden positions and to destroy material. Although flame aerial-delivered, such as napalm bombs, flame-throwers, rocket-launched warheads and incendiary aerial-delivered bombs, grenades munitions theoretically constitute separate classes of weapons, they both use fire as the means to achieve the objectives. Phosphorus munitions will continue to burn until deprived of oxygen or totally consumed. However, most of the cutaneous injuries resulting from phosphorus burns are due to the ignition of clothing and are treated as conventional thermal injuries. Improvised explosive devices and asymmetric warfare - terrorism Terrorist bombings will continue to be a difficult problem into the foreseeable future. On the basis of the speed of the explosion, explosives are categorized as either high-order explosives HE or low-order explosives LE 23 with different thermal effects. HE explosives involve supersonic explosions the explosive detonates more quickly than the speed of sound and blast overpressurized impulse waves. Examples of HE include hand grenades, TNT, military bombs, dynamite, C-4, Semtex a plastic explosive , diesel fuel, fertilizer, nitroglycerine, and ammonium nitrate fuel oil. HEs produce higher temperatures for shorter periods of time, usually resulting in a fireball at the time of detonation. LEs, on the other hand, involve deflagration rapid burning that gives off intense heat and sparks , not detonation. These explosions are subsonic the explosive reaction is slower than the speed of sound and lack the overpressurized waves of HE. Examples include napalm, pipe bombs, gunpowder, Molotov cocktails, and aircraft improvised as guided missiles, plus many petroleum-based explosives. LEs usually cause secondary fires. The latter may be encountered with both HEs and LEs. There are three typical patterns of terrorist attacks: Invariably, blast-related injuries are complex. Explosions can produce classic injury patterns from blunt and penetrating mechanisms to several organ systems, but they can also result in unique injury patterns in specific organs, including the lungs and the central nervous system, seldom seen outside combat. The injury patterns are a product of the composition and type of the bomb as also of the amount of the materials involved, the surrounding environment, the delivery method, the distance between the victim and the blast, and any intervening protective barriers or environmental hazards. Because they are relatively infrequent, they can present unique triage, diagnostic, and management challenges for the health care providers. The mechanisms of injury resulting from explosions include direct exposure to the blast wave, reflective blast waves, acceleration-deceleration forces, penetrating and non-penetrating wounds, burns and inhalation of toxic gases, and building collapse. HE, on the other hand, are generally characterized by four types of injury levels and patterns: Secondary injuries result from flying debris and bomb fragments. Tertiary injuries occur as a result of individuals being thrown by the blast wind, and quaternary blast injuries are defined as any explosion-related injury or illness not due to any of the above, such as burns chemical or thermal and inhalation injuries. Survivors rarely present primary injury patterns, and casualties suffer mostly from secondary, tertiary, and quaternary blast effects. Warfare burn injuries Warfare burn injury was largely ignored. The atomic detonation at Hiroshima in instantaneously generated 59, burn casualties. The potential use of mustard gas in present-day conflicts remains a significant threat that would result in a large number of casualties with severely incapacitating partial-thickness burns characterized by considerably slower wound healing. Combat and non-combat burn injuries of military personnel Military burns result from either combat

or non-combat causes. It grew to 4. Anyway, burns are particularly common during war at sea and combat involving armoured fighting vehicles. One stick of bombs falling on a British ship resulted in burn injuries. Fortunately, serious burns are responsible for relatively few casualties in conventional warfare 20 and the majority of warfare burns among military personnel, probably unlike similar burns in the civilian population, are superficial burns to exposed skin, most often of the face, neck, forearms, and hands. Civilian burn injuries during warfare Civilians are becoming the major targets in recent wars, 2 , 12 , 14 , 46 reflecting the sharp increase observed in civilian mortality and mordity. It is estimated that in modern warfare one injury in four is a burn. Peace-time burn injuries can also occur among civilians during warfare situations. They may be discussed under three main headings: The causative agents may be open flame or flash, scald, chemical, or electrical. Morbidity and mortality of warfare burn injuries Burns sustained in civilian life and those sustained under war conditions are different. Severe burns in a battlefield setting historically had a very low salvage rate. Unfortunately, the field of combined injury is relatively unfamiliar to burn surgeons. As an example, cervical spine injury - uncommon in burn patients, except in those injured in explosions, high-speed vehicular accidents, and falls, or by contact with high-voltage electricity - if unrecognized may result in serious morbidity, if not mortality. Treatment with narcotics of pain secondary to burns may make the clinical diagnosis of associated injuries such as spinal injury rather difficult. Burn and trauma management in warfare situations War wounds, whether inflicted during conventional war or asymmetric warfare, as well as mass casualties, produce in general significant additional burdens and impose a heavy load on existing medical facilities and emergency, trauma, and critical care systems. That is no longer the case. Needless to say, in peacetime it is rare to see the wide spectrum of injury encountered during armed conflicts, hence surgeons can be unaware of optimal management protocols to be followed. The circumstances of any given war and the available medical resources dictate the medical care delivered to war casualties. In the combat setting, the tactical situation, logistical limitations, or limited availability of health care personnel may necessitate reduction in the upper limits of what is considered optimal care. In war, advanced medical care and precarious medicine may work side by side according to two logics which do not exclude one another. The treatment of local burns in the field consists of bandaging, alleviation of pain, and treatment of shock by intravenous administration of fluids. The possibility of overwhelming numbers of patients to be treated by inexperienced personnel dictates the adoption of a safe, simple and effective regimen that is computed in advance and displayed in simple tabular form. Patients with a moderate burn that is all partial-thickness can be treated and then evacuated to the hospital closest to his or her home. Patients with more extensive burns associated with full-thickness skin loss can be further resuscitated and, when stable, safely evacuated. The offending agent must be washed from the body surface as soon as possible with copious water lavage and removal of the identifiable particles, following which the involved areas are covered with a saline-soaked dressing and kept moistened until the patient reaches a definitive treatment installation. If the transfer is going to require more than 12 h, the involved areas should be covered with a liberal application of topical antimicrobial agent to prevent microbial proliferation and the re-ignition of retained phosphorus particles. Conversely, burns in the hands, face, feet, and perineum in patients with lesser TBSA burns will increase the medical care necessary for such patients. Subsequently, an optimal medical-evacuation system during local armed conflicts and wars is essential. Evacuation of battle casualties is a complex operation and should be performed under medical supervision to ensure that appropriate care is given. Undoubtedly, the judicious use of aeromedical evacuation markedly reduces the time lapse from injury to definitive care. Every effort should be made to reduce the workload within the system to the essentials required for good patient care. The flight attendants should not be burdened with unnecessary dressing changes, topical medications, special diets, or other procedures that would distract them from caring for more seriously injured patients.

Chapter 7 : Military and Civilian Burn Injuries During Armed Conflicts

o Burns are a "distracting injury," pain secondary to burns, and the treatment of pain with narcotics may make the clinical diagnosis of spinal injury difficult.

Official recognition[edit] The Atomic Bomb Survivors Relief Law defines hibakusha as people who fall into one or more of the following categories: As of March 31, [update] , , were still alive, mostly in Japan. They receive a certain amount of allowance per month, and the ones certified as suffering from bomb-related diseases receive a special medical allowance. Updated annually on the anniversaries of the bombings, as of August [update] , the memorials record the names of almost , hibakusha; , in Hiroshima [5] and , in Nagasaki. In , the Japanese Parliament passed a law providing for free medical care for hibakusha. During the s, non-Japanese hibakusha who suffered from those atomic attacks began to demand the right for free medical care and the right to stay in Japan for that purpose. In , the Japanese Supreme Court ruled that such persons were entitled to free medical care while staying in Japan. According to recent estimates, about 20, Koreans were killed in Hiroshima and about 2, died in Nagasaki. It is estimated that one in seven of the Hiroshima victims was of Korean ancestry. However, most issues have been addressed in recent years through lawsuits. More Japanese immigrated to the U. Most in this group were born in Japan and migrated to the U. Many were "war brides", or Japanese women who had married American men related to the U. They receive monetary support from the Japanese government and biannual medical checkups with Hiroshima and Nagasaki doctors familiar with the particular concerns of atomic bomb survivors. A documentary called Twice Survived: The producers found people who were victims of both bombings, and the production was screened at the United Nations. He was seriously burnt on his left side and spent the night in Hiroshima. He was the first officially recognized survivor of both bombings. Hibakusha and their children were and still are victims of severe discrimination when it comes to prospects of marriage or work [24] due to public ignorance about the consequences of radiation sickness , with much of the public believing it to be hereditary or even contagious. There is considerable discrimination in Japan against the hibakusha. It is frequently extended toward their children as well: One Atomic Bomb Casualty Commission report discusses 6, people examined in Hiroshima, and 6, people examined in Nagasaki, who were largely within meters from the hypocenter , who suffered injuries from the blast and heat but died from complications frequently compounded by acute radiation syndrome ARS , all within about 20â€”30 days. In 50 or so children who survived the gestational process and were exposed to more than this dose, putting them within about meters from the hypocenter, Microcephaly was observed, this is the only elevated birth defect issue observed in the Hibakusha, occurring in approximately 50 in-utero individuals who were situated less than meters from the bombings. In a strictly dependent manner dependent on their distance from the hypocenter, in the Life Span Study, conducted by the Radiation Effects Research Foundation , a statistical excess of cancers, of undefined lethality, were observed in 79, hibakusha who had still been living between â€” and who took part in the study.

Chapter 8 : Hibakusha - Wikipedia

First-Degree Burns. A first-degree burn refers to a burn injury where the surface of the skin is damaged, but the epidermis (the outermost layer of skin) is still intact, and therefore able to perform its functions (control temperature and protect from infection or injury).

But that characterization would not be correct. Although he has recently singled out Catholics, he has equally targeted traditional Protestant beliefs over the past four years. So since he has attacked Catholics and Protestants, one is tempted to say that he is anti-Christian. But that, too, would be inaccurate. He has been equally disrespectful in his appalling treatment of religious Jews in general and Israel in particular. So perhaps the most accurate description of his antipathy toward Catholics, Protestants, religious Jews, and the Jewish nation would be to characterize him as anti-Biblical. And then when his hostility toward Biblical people of faith is contrasted with his preferential treatment of Muslims and Muslim nations, it further strengthens the accuracy of the anti-Biblical descriptor. In fact, there have been numerous clearly documented times when his pro-Islam positions have been the cause of his anti-Biblical actions. Acts of hostility toward people of Biblical faith: December Present â€" The annual White House Christmas cards, rather than focusing on Christmas or faith, instead highlight things such as the family dogs. Supreme Court ruled that the cross in the memorial could continue to stand, but the Obama administration refused to allow the land to be transferred as required by law, and refused to allow the cross to be re-erected as ordered by the Court. Acts of hostility from the Obama-led military toward people of Biblical faith: October â€" Obama threatens to veto a defense bill over religious protections contained in it. General Jerry Boykin ret was cancelled because Boykin was a traditional value Christian who has voiced his support for natural marriage and his opposition to Islamic extremism. When they offered to freely do Mass for soldiers, without regard to whether or not the chaplains were receiving pay, they are still denied permission to do so. Army directs troops to scratch off and paint over tiny Scripture verse references that for decades had been forged into weapon scopes. Augustine in the third century AD â€" a theory long taught by civilized nations across the world except now, America. Acts of hostility toward Biblical values: October â€" The administration attempts to pick opponents for court cases dealing with Obamacare contraception mandate. Conference of Catholic Bishops for their extensive programs that aid victims of human trafficking because the Catholic Church is anti-abortion. Acts of preferentialism for Islam: April â€" September â€" The administration negotiates a deal to stop economic sanctions of Iran because of nuclear power development, despite the warnings and concern of Israel. The hostility of President Obama toward Biblical faith and values is without equal from any previous American president.

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5 Weapons Effects and War Wounds Explosive injuries (Table). burns in addition to open wounds, which may complicate. the management of soft-tissue injuries.