Surgical and anesthetic challenges aboard non hospital ships in the Pacific during WWII

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Introduction: World War II brought new challenges to anesthetic and surgical care, such as limited and inexperienced clinicians, a new level of traumatic injuries, and extensive transport of life-saving clinical care. The US Army in the European Theatre of Operations approached these problems by training and developing a system to rapidly set forward field hospitals that could perform urgent life-saving surgery. A key element to this approach included supplying field hospitals with physicians trained in anesthesia.

The US Navy was faced with different challenges in the Pacific Theatre of Operations: performing surgeries aboard non-hospital ships with limited trained personnel and limited means.

Methods: PubMed, Index Medicus, government sources and the internet were searched for articles and other information related to this topic.

Results: Separating the wounded from normal ship operations and evacuating the wounded required complex accommodations and patient movement. Triage of the wounded with color or letter coded tags was a necessary first step in patient care aboard non hospital ships. Hospital ships or shore medical facilities were not immediately functional after the initial beach landing. Sickbay of battleships, LSTs (Tank Landing Ship) or transport ships suffered from casualty overload. Doctrines emphasized the need to deliver definitive surgery within 12 hours of injury, therefore casualties received surgery onboard war vessels. Surgeries performed on board varied from simple wound debridement to complex laparotomies, chest explorations or even craniotomies.

Having a functional operating room required solving lighting issues, makeshift operating room beds and managing the movements of the ship during the operation. Aboard light destroyers, surgeons and corpsmen would strap themselves to the operating table with a canvas belt to provide stability while operating. The patient had to be securely attached to the table and special attention was paid to prevent surgical instruments from falling on the deck: a suspended removable table attached to the overhead with a combing preventing the instruments from spilling with the rolling of the ship could be found on certain destroyers.

The extent of anesthesia expertise varied. In the Mediterranean theatre, field hospitals were staffed with physician-anesthetists. In the Pacific theatre, the Navy was confronted with the lack of trained personnel in anesthesia. On non-hospital ships, the surgeon or medical officer was responsible for the delivery of anesthesia. If fortunate, he would be assisted by a pharmacist mate or dental officer who likewise lacked experience in anesthesia. Equipment was limited. Machines for inhalational anesthetia were unavailable. At the most, the anesthetics available were drop ether, sodium
penthotal, pontocain crystals, oxygen and nitrous. Without official navy guidelines, spinal or local anesthesia was the preferred method of delivering anesthesia in the hands of in-experienced corpsmen and surgeons. If general anaesthesia was necessary, intravenous sodium pentothal was the preferred agent; it did not require cumbersome apparatus, did not vary in temperature, permitted rapid anesthesia and recovery, and its effect could be prolonged without harmful effects. Due to lack of training and unavailability of intubation equipment, patients were kept under general anaesthesia spontaneously breathing, occasionally with an oral airway. Corpsmen relied on their eyes, ears and hand to check the patient’s color, and feel for breath sounds or pulse. Oxygen tanks were a luxury not available on board smaller crafts.

The development of Morphine Syrettes, containing 0.5 grain of morphine tartrate, was a big breakthrough in analgesia during WWII. They were routinely administered by corpsmen as soon as they reached a wounded soldier. To minimise the risk of overdose, the Syrettes came with a specific adhesive tape. It was placed around the patients arm after injection to notify other corpsmen or medical officers that the patient had already received a dose. With this potent analgesic on board, some surgeries could be performed without any other anesthetic.

Storage space and medical supplies onboard war vessels were sparse. Sulfa drugs, Morphine Syrettes, wound dressings, plasma and plaster-of-paris for cast were the basics available. Because of ship movements and the discontinuous supply line, it could take months before the ships would receive their supplies in time of need. To prepare for battle some crews improvised their own blood bank. They kept a list of universal donors with their location on board the ship. With custom made transfusion sets to accommodate for the specific environment of each vessel, blood could be collected and transfused in as little as 20 to 40 minutes.

Conclusion: The Navy’s medical department in the Pacific theatre was confronted with major challenges during WWII. War ships were overcrowded by wounded soldiers needing immediate surgical and anesthetic care. Due to the lack of adequate medical facilities, medical officers and corpsmen improvised operating room conditions with custom made operating tables and lamps. Inexperienced providers delivered anesthesia without monitors, anesthesia machines nor breathing tubes. The introduction of Morphine Syrettes served as a breakthrough analgesic in patient care. Despite these disadvantageous conditions, mortality rates in wounded soldiers making it to the operating room were as low as 2%. Anticipation, meticulous planning and improvisation allowed corpsmen and medical officers to overcome these obstacles and provide quality care during WWII in the Pacific.

Picture legends:

Fig 1. Morphine Syrette used during WWII. The collapsable tube containing 1/2 gr. of morphine tartrate is attached to a hypodermic needle, making it easy to administer by any corpsmen in battle.

Fig 2. Canvas belt used on board a small destroyer. The surgeons can strap themselves to the operating table in moving waters, allowing for stability and avoiding falls.