Special Feature
Emergency Medicine in Role 2 Afloat
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Abstract
The Emergency Medicine aspects of care are described from recent experience of exercising a Role 2 Afloat team on board RFA CARDIGAN BAY. Lessons learned specific to this platform are outlined, as well as the more general issues of delivering Emergency Medicine in the maritime environment.

Introduction
The standard of care provided by Defence Medical Services (DMS) in the Role 3 (UK) medical treatment facility in Camp Bastion is widely regarded as outstanding, as recognized by the Care Quality Commission (1) and when compared to the NHS (2). With increasing emphasis on contingency operations, the adaptation of that gold standard to a more mobile and responsive organization is vital. Such an organization is built upon the foundation of Clinical Guidelines for Operations (JSP 999) but must be able and willing to adapt those guidelines to a less familiar and not necessarily bespoke environment. Role 2 Afloat (R2A) is not Role 3; whilst this may seem obvious, it is a phrase that helps to rebut any statement made at sea which begins “On HERRICK, I do it like this.”

Accommodation
RFA CARDIGAN BAY has a relatively spacious hospital complex, which has been fitted with several prerequisites such as dedicated air conditioning and drainage. The area designated as the female ward is the natural choice for the location of the Emergency Department (ED) due to the relative lack of fixed furniture. There is space for 2 resuscitation trolleys, although it is not possible to accommodate 2 full trauma teams and a radiographer with a portable digital system simultaneously. This is one of the main challenges of delivering emergency medicine (EM) in an R2A environment.

Personnel
The ED team comprises a consultant emergency physician and 2 registered nurses who have completed a specialist emergency nursing course. Two lines exist for Maritime In-Transit Care (MITC) (one nurse, one medical branch rating) and they form part of the ED team when not performing their primary role. These numbers are sufficient for managing normal ED presentations but are augmented by other R2A staff for trauma calls or significant medical emergencies. The fact that, specifically, other R2A medical officers have their own role as well as being a trauma team member is another challenge of R2A EM.

Equipment
Module 370-5 is the Role 2 Damage Control Resuscitation (DCR) module, which, at time of writing, is undergoing the final stages of revision. This revised module should supply the ED with sufficient equipment and consumables to provide DCR to the required standard, including provision for rapid transfusion of blood products.

Limitations
The two limitations of any maritime platform are relatively constant: space (Figure 1) and the ability to secure items for sea. A compromise always has to be made between having equipment available for use and ensuring it does not become airborne during ship movement. Fortunately CARDIGAN BAY is a relatively stable platform, but provision has to be made for items to be secured to bulkheads or other immobile fixtures.

Space is often more of an issue, as the medical lay-down doesn’t always feature heavily in the mind of naval architects: however, CARDIGAN BAY may be the exception that proves that rule. The R2A facility is on 1 Deck, meaning that transfer of casualties from the flight deck to the ED involves only one hatch and does not involve ladders or lifts. In addition, the passageway outside the hospital is relatively wide, permitting its use as a triage area in a mass casualty situation.

Whilst the paucity of fixed furniture provides flexibility, it is a limitation from a storage point of view. POMS™ bags, which are secured to a bulkhead but can be moved at short notice, are useful as they hold significant volumes of
segregated equipment.

**Population at risk**
CARDIGAN BAY is the command platform for the UK Mine Countermeasures Force (UKMCMFOR). It is a Landing Platform Dock (Auxiliary) which provides logistical support to Mine Countermeasure Vessels (MCMV) in its area of operations. Other than isolated incidents (such as falls) the R2A must be prepared to receive multiple casualties resulting from an MCMV incurring a mine-strike. Such a situation would produce many casualties with a combination of blunt force and penetrating trauma. There should also be awareness of the fact that retrieval of casualties from an actively mined area is not a fast process and it is unlikely that the doctrinal evacuation timelines would be met. Role 1 care is variable and this will impact on the number of casualties reaching the R2A and the acuteness of their injury.

**Casualty reception**
Casualties arrive in CARDIGAN BAY either by sea or by air. The latter is logistically easier as the casualties are collected by stretcher-bearers provided by the ship and delivered into the R2A facility. Casualties arriving by sea are brought to the facility in a variety of ways, depending on the sea state and the nature of the vessel. MCMVs can raft with CARDIGAN BAY and a gangway is placed between the two ships. The casualty will then arrive at 2 Deck level and will be brought to the R2A using the relatively wide staircases. Seaboats can be winched to the 1 Deck level, but can also enter via the dock on 4 Deck. This then requires either a manually-intensive journey to R2A using 2 separate staircases, or the use of a vehicle lift. This lift is not designed to transport personnel and, as such, its use is at the discretion of the Chief Engineer Officer of the Ship.

If the facility is expecting 2 casualties then, somewhat counter-intuitively, the less sick must be the first to enter. This is due to the layout of the facility: one bay is directly opposite the doors to the operating theatre and is therefore more appropriate for the more unstable casualty. However, if that bed is occupied, then it would be very difficult to get the other casualty past them into the other bay.

**Trauma resuscitation**
R2A comprises 5 medical officers: an emergency physician, 2 anaesthetists, a general surgeon and an orthopaedic surgeon. In a single trauma resuscitation one of the anaesthetists manages the airway and large-bore vascular access (assisted by an operating department practitioner, ODP) and one of the surgeons acts as primary survey doctor. The 2 emergency nurses act as nurses 1 and 2 and the emergency physician leads the team. The role of scribe can be performed either by an intensive care nurse or the MDSS technician (following appropriate training).
Two trauma casualties arriving simultaneously pose more of a challenge. Both anaesthetists and both surgeons are required to act as airway and primary survey doctors respectively and the emergency physician has to co-ordinate the management of 2 patients simultaneously. Each bay has an ODP and 2 nurses (one emergency, one intensive care). Plain imaging is another challenge as there is insufficient space for 2 casualties, 2 teams and 1 digital radiology system (currently the Dragon™). One trolley has to be pushed towards a bulkhead to allow radiology machine access, meaning that imaging does not form part of the primary survey but is an adjunct. This is suboptimal compared to R3(UK) standards, but is a necessary deviation due to the limitations of the environment.

Once primary resuscitation is complete, a Command Huddle (Figure 2) between the medical officers and the senior nursing officer allows a summary of the injuries of each casualty and the formulation of a plan for further care, including theatre priority. Whilst one casualty may proceed to the operating theatre (usually with both surgeons), the other will remain in ED for completion of imaging, dressing of wounds and other care under the direction of the emergency physician, and will be nursed there with necessary resuscitation continuing until the operating theatre is available. If surgery is not required, then the casualty can be transferred to one of the intensive care beds without having to pass through the operating theatre.

Mass casualty situation
R2A has 4 beds (2 ED, 2 ICU), each of which can be manned with a doctor and a nurse with the emergency physician acting as an overall coordinator. There is a surgeon and anaesthetist in each area (ED and ICU). The ED bays are preferentially used as T1 bays and are each supplemented with an ODP. Triage is performed by the UKMCMFOR MO (a GDMO), the RFA Medical Technician and his first aid team. This process is overseen by the emergency physician who will decide on the resuscitation priorities and which bay the casualty will go into. The Command Huddle is vital here to ensure all clinicians are aware of the injuries sustained.

Nursing aspects of the Emergency Department
Working within a Role 2 environment is very different from both Afghanistan and the NHS due to the size and capability of the R2A facility. During a trauma resuscitation the nurses are allocated roles such as gaining circulatory access, the preparation of emergency drugs, and initiation of monitoring. These tasks may be undertaken by an ODP if there is one available. In the case of more than two casualties presenting simultaneously, patients may need transfer directly to the Intensive Care Unit (ICU) for initial evaluation.

Conclusion
The biggest challenge of delivering care in the R2A environment is expectation management of those experienced in Role 3 care. Not every patient will receive primary survey imaging within minutes of arrival, and not every patient requires surgery at Role 2. Space is tight, and there is a limited supply of doctors and nurses to assist. However, an excellent standard of care can still be provided in a clean, well-equipped environment, with a holding capability before onward transfer to either Role 3 or 4.

References

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