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Chapter 6. Lessons learned from Dutch deployed surgeons and anesthesiologists to Afghanistan: 2006- 2010

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ABSTRACT

Introduction: Care for battle casualties demands special skills from surgeons and anesthesiologists. The experiences of Dutch military surgeons and anesthesiologists that deployed to South Afghanistan provided an opportunity to evaluate pre-deployment training and preparation of military medical specialists.

Method: A survey was conducted amongst all surgeons and anesthesiologists (n=40) that deployed to South Afghanistan between February 2006 and November 2010. They were asked about their medical preparedness, deployment experience, and post-deployment impact.

Results: Most (35/40) participants reported high levels of preparedness prior to their deployment. All (40/40) surgeons and anesthesiologists described a positive influence of their deployment on their professional skills and 33/40 described a positive effect on their personal development. Knowledge of maxillofacial, ophthalmic, neurological, urological, gynecological, vascular and thoracic surgery scored below average. Impact on mental health and social support network was reported as negative by 11/40 participants, 24/40 reported a neutral and 5/40 a positive effect.

Conclusion: A standardized pre-deployment training program to prepare Dutch surgeons and anesthesiologists for combat surgery is currently lacking. These results emphasize the need for a standardized pre-deployment medical training, despite high levels of perceived preparedness. Also, the high mental and psychological impact on the deployed surgeons and anesthesiologists warrants further assessment.

INTRODUCTION

Since the global war on terrorism began in 2001, the toll on service members in terms of medical treatment for battle casualties (BCs) has been quite high. Over 10,000 coalition service members have been killed and over 50,000 have been injured in Iraq and Afghanistan¹. In addition, a high number of contractors, host-nationals, foreign national security personnel, and also insurgents have been seriously wounded or were killed. Deployed surgeons and anesthesiologists delivered critical care to many of these casualties. While in the recent armed conflicts improved body armor has reduced the amount of thoraco-abdominal trauma, the proportion of extremity injuries remained high, mostly caused by explosive devices¹⁻³. The medical support organization (MSO) in South Afghanistan during the International Security Assistance Force (ISAF) operations was a multinational joint service holding a wide range of capabilities, delivering care in a hostile austere environment. The Dutch role 2 Enhanced Medical Treatment Facility (role 2 MTF NL) at Multinational Base Tarin Kowt (MBTK) was comprised of approximately 50 multinational medical service members. It was configured with two emergency resuscitation tables (crash room), one operating room, two ICU beds and fourteen regular nursing beds. The role 3 MTF at Kandahar Airfield (KAF) was configured with eight emergency resuscitation tables, three operating rooms, eight ICU beds, twenty regular nursing beds, full laboratory and diagnostic services including a CT scanner. Decisions regarding care and transportation of BCs were often driven by a number of factors. These included e.g. enemy threat, mechanism of injury, patients overall medical condition, evacuation timelines, availability of assets, qualifications/capabilities of medical personnel, and prevailing tactical or weather conditions. Various difficult medical decisions were made during complex military operations and evidence to support or refute current practice was a continually evolving process⁴. Since 2008, the Definitive Surgical Trauma Care Course (DSTC[®]) and Definitive Anesthetic Trauma Care Course (DATC) were introduced as Dutch pre-deployment training for emergency medicine or damage control surgery. Recent discussions about the minimum required skills and mandatory courses for military medical specialists strengthen the need for international standardization⁵⁻⁹. Yet, to date, there is no standardized mandatory medical preparation for the medical specialist that is being deployed. It is important to identify potential improvements on various aspects of the medical care from the perspective of the Dutch deployed surgeons and anesthesiologists at the role 2 MTF NL at MBTK and the Role 3 MTF at KAF. The aim of this study was to assess the medical preparedness, deployment experience, and post-deployment impact of Dutch surgeons and anesthesiologists serving in Afghanistan.

MATERIALS AND METHODS

During the period studied (February 2006 – November 2010), 21 (trauma) surgeons, 2 orthopedic surgeons and 18 anesthesiologists were deployed multiple times (1-3) in 2-3 month periods to the Dutch role 2 MTF NL and/ or the role 3 at KAF. In the role 2 MTF NL the (trauma) surgeon was the sole surgical medical specialist. In higher echelons (role 3 KAF), the initial surgical responsibility is divided in two, over a general and an orthopedic surgeon. Other types of specialist surgery were also available in these higher echelons e.g. maxillofacial, ophthalmic, neurological, urological, gynecological, vascular and thoracic surgery. In the Netherlands the current practice is that both the trauma surgeon and the orthopedic surgeon focus on skeletal aspects of extremity injuries in elective and acute settings. The soft tissue and visceral trauma injuries are the primary domain of the trauma surgeon. All deploying medical specialists followed a one week pre-deployment course provided by the Dutch Ministry of Defense (MOD) with specific (non-)medical information about the Area of Operations (AOR), team introduction and basic military skills training. All Dutch surgeons and anesthesiologists that have been deployed between February 2006 and November 2010 to South Afghanistan were asked to identify self-perceived strengths and weaknesses of the MSO in our AOR in Afghanistan. They were invited to participate in a questionnaire that assessed these factors. The questionnaire was composed based on current literature⁴⁻⁸ and screened for relevance by an expert board of Dutch military medical specialists. The survey was conducted in the first quarter of 2012. The questionnaire (Figure 1) contained 4 main topics: (1) participants general information, (2) medical expertise, (3) perceived quality of care (QOC) in the pre-hospital and damage control surgery phase, and (4) effects on professional skills and social environment. Quality of care was described as the subjective judgment of the Dutch deployed surgeons and anesthesiologists to our AOR. The score was expressed in a numeric variable from 1 (low) to 10 (high), in this study we defined a score of 7 as average.

This study was approved by the MOD and the Institutional Review Board of Leiden University, the Netherlands. The basic categorical variables were expressed as mean, standard deviation (SD), and range. Statistical analyses were performed through a computerized software package, using SPSS (Version 20, IBM Corporation, Armonk, New York).

Figure 1: Questionnaire 'lessons learned of deployed surgeons and anesthesiologists to Afghanistan' (translated from the original on-line Dutch questionnaire).

GENERAL

Name:

Specialism : Surgeon Anesthesiologist

Sub specialization:

Age: 30-40 40-50 > 50

Gender: Male Female

Board registered medical specialist (in years): <5 5-10 10-20 > 20

Date (year) of M.D. degree:

Date (year) of sub specialization:

Number of deployments to Uruzgan or Kandahar:

Total number of deployments:

TRAINING AND PREPARATION

1. Did you feel professionally prepared for your task in Afghanistan?

a. Yes

b. No

Explanation:

2. What additional courses or training have you done prior to your deployment? How would you appreciate the value of that course on the scale (1low-10high)?

a. The mission oriented training

b. Professionally - course name:

c. Professionally - course name:

d. Professionally - course name:

e. Other activity, namely:

Explanation:

3. Did you have the same feeling after the mission, as referred to in Question 1?

a. Yes

b. No

If not, why not?

Figure 1: continued

DEPLOYMENT

4. For surgeons: How do you consider, in retrospect, your own training, knowledge and skills with respect to treatment of injuries from the below mentioned surgical sub specialization on the scale (1low-10high)?

Vascular surgery:

Abdominal surgery:

Soft tissue injuries:

Fractures:

Neurosurgery:

Thoracic Surgery:

Obstetrics/Gynecology:

Urology:

Plastic (reconstructive) surgery:

Maxillofacial Surgery:

Ophthalmics:

Burns:

Pediatric Surgery:

Explanation:

5. What was of most value for you during your preparation for the deployment to Southern Afghanistan?

6. How do you rate the quality of care in the following four phases on the scale (1low-10high)?

a. At the point of injury

Explanation:

b. The transfer of information from point of injury to the role 2/3 hospital (g-liner, ETA*,** MIST, triage)

* ETA = Estimated Time of Arrival

** MIST = Mechanism of injury, Injuries, Vital Signs, Treatment

Explanation:

c. The crash room ("trauma bay")

Explanation:

d. In general, in the role 2/3

Explanation:

7. Did you receive timely and adequate information on a battle casualty (BC) from the point of injury to prepare in the crash room?

a. Always

b. Sometimes

c. Never

Explanation:

Figure 1: continued

8. Did you receive a g-liner and MIST before the entrance of a BC?

- a. Always
- b. Sometimes
- c. Never

Explanation:

9. Were the g-liner and MIST good resources for information transfer from a BC?

- a. Yes
- b. No

Explanation:

10. What should be improved in the transfer of information after an incident/ casualty in order to provide good medical care in a Role 2/3 hospital?

PERSONAL

11. Did you feel the need for an independent “coach” (peer to peer), to talk about your experiences during the deployment?

- a. Always
- b. Sometimes
- c. Never

Explanation:

12. Did you ever felt the need to talk with direct colleagues about your experience during the deployment?

- a. Always
- b. Sometimes
- c. Never

Explanation:

13. Did your deployment to South Afghanistan have impact on your professional knowledge and skills, and on your personal life. What kind of influence?

In the following areas:

- a. Professional skills and competencies?
- b. Personal development?
- c. Impact on the situation at home?

14. What would you especially recommend your colleagues if they prepare (future) deployments?

RESULTS

Participants general information

All but one (40/ 41) of the Dutch deployed surgeons (n=22) and anesthesiologists (n=18) participated in the survey; one surgeon died of disease non battle injuries during his deployment. Most (37/40) specialists were males. Three of the participants were aged between 30-40, 11/40 between 40-50, and 26/40 above 50. Two of the participants were board certified medical specialist less than five years, 8/40 between 5-10 years, 8/40 between 10-15 years, 5/40 between 15-20 years, 17/40 more than 20 years. The median number of earlier deployments of the participants was 3 (1-13). The primary sub specialization of the surgeons was as follows; 10 trauma, 9 general, 2 orthopedic and 1 vascular surgery.

Preparedness and medical expertise

Thirty five (surgeons 18/22, anesthesiologists 17/18) of the participants reported high levels of preparedness prior to their deployment. Most of the participants (surgeons 20/22 and anesthesiologists 16/18) scored their knowledge and skills as more than sufficient for the complexity of the injuries that they were exposed to during their deployment. The participants scored the quality of the pre-deployment course as 5.6 (range 1-9). Most (6/10) of the junior specialists scored the DSTC^(R) or DATC as very useful (mean score >8.5) in their pre-deployment training. The same high score was given to the Polytrauma Rapid Echo/ ultrasound evaluation Program by five surgeons, and to the Battle Advanced Trauma Life Support Course by three anesthesiologists. Nine (surgeons 5/22, anesthesiologists 4/18) of the participants scored their optional residency in the United States (US), United Kingdom or South Africa as most useful during deployment. The surgeons were asked to score their self-perceived (surgical) medical expertise (table 1). Knowledge of maxillofacial, ophthalmic, neurological, urological, gynecological, vascular and thoracic surgery scored below average.

Generally perceived quality of care

The participants were asked to score the QOC at different levels of the MSO (table 2).

Surgical expertise	Mean	Minimum	Maximum	SD
Fracture surgery	8,5	5	10	1,2
Soft tissue surgery	8,2	6	10	0,9
Burn treatment	8,2	7	10	1,2
Gastro intestinal surgery	8,1	7	10	0,9
Pediatrics	7,1	4	10	1,3
Thorax surgery	6,9	4	10	1,6
Vascular surgery	6,7	4	10	1,3
Plastic (reconstructive) surgery	6,5	5	8	0,9
Urology	5,0	1	8	2,0
Neurosurgery	4,5	1	8	2,3
Obstetrics/Gynecology	4,5	1	8	2,4
Ophthalmic surgery	3,7	1	8	2,3
Maxillofacial surgery	3,5	1	7	1,9

Table 1: Self-perceived surgical expertise of deployed surgeons (n=22).

SD indicates standard deviation, scores are expressed on 10 point scale as mean (1=lowest –10=highest).

Quality of care	Surgeon mean (min-max)	Anesthesiologist mean (min-max)
Point of injury ^a	6,8 (3-9)	6,1 (2-9)
Information transfer ^b	6,1 (3-9)	6,1 (3-9)
Crashroom ^c	7,7 (4-10)	7,5 (4-10)
Role 2/3 general ^d	7,4 (5-9)	7,6 (6-9)

Table 2: Quality of care scored by the deployed surgeons (n=22) and anesthesiologists (n=18).

^aSubjective score on 10 point scale of quality of care at the point of injury, ^bsubjective score of information transfer from point of injury to role 2/3, ^csubjective score quality of care in crashroom, ^dsubjective score quality of care at the role 2/3 in general. *Min* indicates minimum, *max*: maximum, scores are expressed as mean values (1=lowest –10=highest).

Information transfer

Nine (surgeons 5/22, anesthesiologists 4/18) of the participants felt they received enough information from the point of injury (POI), 31/40 had the feeling they did not receive enough information in most cases. The 9-liner is a standard NATO document used for a casualty evacuation from the battle scene (CASEVAC). The 9-line medical evacuation message is a series of phonetic letters, numbers, and basic descriptive terminology used to transmit medical evacuation information such as location, wartime, security of pick-up site, number of patients by precedence, special equipment required, patient nationality and status. Nine (surgeons 5/22, anesthesiologists 4/18) of the participants received the 9-liner for every BC, 31/40 did not receive these documents in every case. Thirty five (surgeons 19/22, anesthesiologists 16/18) of the participants considered the 9-liner an effective tool for medical information transfer, 5/40 were negative about the functionality of this document.

Effect on professional skills and social environment

All (40/40) surgeons and anesthesiologists described a positive influence on their professional skills. Thirty three (surgeons 19/22, anesthesiologists 14/18) of the participants described a positive effect on their personal development, 7/40 described a neutral effect on their personal development. Eleven (surgeons 6/22, anesthesiologists 5/18) of the participants described a negative influence on their social support network, 24/40 (surgeons 11/22, anesthesiologists 13/18) a neutral effect, and 5/40 (surgeons 5/22) a positive effect. Eighteen (surgeons 7/22, anesthesiologists 11/18) felt the need to meet an independent professional coach (defined here as peer to peer) to talk about their experiences at some point after deployment, 22/40 did not feel this need at any point in the post deployment phase. All participants reported that they used their direct colleagues for discussion and direct feedback during and/ or after deployment.

DISCUSSION

This study assessed the self-perceived medical preparedness, deployment experiences, and post-deployment impact on the Dutch surgeons and anesthesiologists deployed during the ISAF mission to the role 2 MTF NL and the role 3 at KAF. The surgeons scored their knowledge/ surgical skills of maxillofacial, ophthalmic, neurological, urological, gynecological, vascular and thoracic surgery as below average. The perceived quality of care provided from the POI up to the role 2/3 was scored below average and the care provided at the role 2/3 in the damage control surgery phase above average. The mental and psychological impact of the deployments on the surgeons and anesthesiologists was similar as previously described⁹. The group was heterogeneous, but overall fairly experienced: 80% had more than five year experience and were deployed several times to different military theatres. The general feeling of “lack of readiness” and need for pre-deployment courses was higher with the junior specialists, which most likely can be explained by less general specialist experience. Interestingly we could not find studies describing lack of preparedness for anesthesiologists. This could indicate that the knowledge, skills and preparedness of anesthesiologists for such deployments can be considered as acceptable or good. In the studied period the surgeons were encouraged to complete the DSTC^(R) and anesthesiologists to complete the DATC before deployment. Most of the junior specialists scored the DSTC^(R) or DATC as very useful in their pre-deployment training, apart from a foreign residency. A standardized mandatory “Emergency War Surgery Course” and/ or emergency surgery residency could increase the self-perceived level of medical and surgical preparedness. Although a survey⁶ under US Army orthopedic surgeons showed comparable results in the self-perceived level of medical and surgical preparedness, their mandatory war surgery workup program did not significantly change the self-perceived level of medical and surgical preparedness. Ramasamy et al.⁹ proposed a similar pre-deployment six week Military Operational Surgical Training (MOST) course and trainee/ residency deployment for six weeks to increase medical and surgical preparedness. Willy et al.⁵ described the DUO plus model, which entails a specialization in general surgery plus a second specialization in either visceral surgery or orthopedic/trauma surgery. Our results support the recent discussion about enhancing the basic training and skills of military surgeons. In the role 2 MTF NL the surgeon was the sole surgical medical specialist, responsible for both skeletal and visceral injuries. After the pre-hospital phase, damage control surgery and damage control resuscitation are often the key objectives. Lack of knowledge and basic surgical skills on maxillofacial, ophthalmic, neurological, urological, gynecological, vascular and thoracic surgery can lead to higher morbidity and mortality rates of BCs. The participants scored the generally perceived QOC at the POI and quality of medical information transfer from the POI as below average. Thirty one of the participants had the feeling they did not receive enough information in most cases. Potentially this is an opportunity for improvement, yet we are aware that providing more information can be a time-consuming and distracting task for the on scene commander (OSC) during combat situations. It could be argued that with the current technical possibilities it is feasible to equip the commanding officer and his units with “real time” imaging, for instance via helmet camera’s, and biometric function assessment, thus enhancing medical quality “on site”. Using this real-time imaging, it might be possible to gain situational awareness at the POI for the medical specialist, without using precious time of the OSC during direct combat. This enhanced situational awareness may reduce stress levels for the medical specialist, due to early active involvement in the pre-hospital process. Eastridge et al.¹⁰ concluded that most battlefield casualties die of their injuries before ever reaching a surgeon. As most deaths were classified as non-survivable, mitigation

strategies to impact these outcomes need to be directed toward injury prevention. To impact the outcome of BCs with a potentially survivable injury, strategies must be developed to mitigate hemorrhage on the battlefield, optimize airway management, and decrease the time from POI to surgical intervention. Clarke et al.⁴ suggested that severely wounded BC victims should be retrieved by dedicated pre-hospital critical care teams and triaged to the highest and/or most appropriate level of medical care available within the region. The pre-hospital phase is believed to be the most substantial opportunity to improve the outcome of BCs¹¹⁻¹². A vast minority of the participants experienced a negative influence on their social support network, and almost half felt the need to meet an independent professional coach to talk about their experiences at some point after deployment. The high mental and psychological impact described by the participants indicates that attention should be given to the impact deployments can have on the personal life of deployed medical specialists. Tyler et al.⁹ described a similar negative influence on the social support network. They also described that 27% of the deployed medical specialists had two or more symptoms of posttraumatic stress disorder. Kearney et al.⁶ reported that nearly a third of the surgeons reported low mental preparedness for deployment, many surgeons reported previous military courses or experiences as contributors to their mental readiness for deployment. Surgeons with these previous experiences rated their mental preparedness for deployment significantly higher. These findings suggest that surgeons without previous military courses or experiences may feel mentally underprepared for deployment and, therefore, may benefit from additional pre-deployment counseling or assistance. Good pre-deployment preparation could result in lower stress levels and may lead to a lower negative influence on the social support network of deployed medical specialists. We found no prior reports on the self-perceived preparedness and medical expertise of the Dutch deployed surgeons and anesthesiologists, nor on the self-perceived quality of care from the pre-hospital phase to the higher echelons in a combat environment. There are some factors that need to be taken into account. One of the limitations of this study was that we could not use explicit criteria to assess the appropriateness of care delivered on the battlefield. There are two common methods used to determine “appropriateness of care”: implicit review and explicit review. In implicit review, a reviewing panel determines the “appropriateness of care” for each BC by comparing the actual process of care against his or her own knowledge and opinion of what optimal care is.

Currently, there is no standardized mandatory pre-deployment training to prepare Dutch deploying surgeons and anesthesiologists for war surgery. The recent obligation of the DSTC® and DATC is a sign that standardization for the Dutch military surgeons and anesthesiologists is being implemented. Further research is necessary to compose the contents of a useful mandatory training program for the Dutch military surgeons and anesthesiologists. An emergency surgery/ anesthesiology residency could be a next step in the formation of a robust pre-deployment workup program. The high mental and psychological impact on the deployed surgeons and anesthesiologists indicates that assessment of mental health of the surgeons and anesthesiologists on the short and long term is very important. Availability of flexible, low profile psychological (peer to peer) support could accommodate this. Also an assessment of the whole MSO by medical specialists, tactical commanders, medics and nurses, who have been actively involved in all phases is recommended. We wish to underscore that the conclusions of this study can be implemented without additional risk for the MSO and BCs. Further research is warranted to evaluate the impact of battle injuries in BCs in relation to the initial treatment given.

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