



ATLS and Trauma Team Training in the Netherlands

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Abstract: At its inception in 1978 the advanced trauma life support (ATLS) course was revolutionary for its contents and its educational format. Its rapid and ongoing dissemination notwithstanding ATLS® has also met with criticism; aimed in particular at the relative lack of opportunity to practice and at the “unrealistic format” of 1 doctor working with 1 non-obstructive nurse. In the Netherlands this issue has led to the development of a new format that was first used for Refresher courses, and later, after the addition of a locally developed extensive e-learning module, as a new standard for the Provider course. Earlier the Dutch ATLS Foundation had already developed an on-site training course for Trauma Teams (doctors, nurses and technicians) with an emphasis on Crew Resource Management (CRM). Elements of the latter were also used, after the introduction of the new provider format, for the development of a new format for the Refresher course. Details of the Provider, Refresher and Trauma Team Training courses that are in use at present in the Netherlands, are given, together with some “results”.

Keywords: Individual training; team training; e-learning; simulation

Received: 13 November 2017; Accepted: 23 January 2018

doi: 10.21037/jeccm.2018.01.16

View this article at: <http://dx.doi.org/10.21037/jeccm.2018.01.16>

Introduction

In 1976 Dr. Jim Styner crashed his General Aviation aircraft in the plains of Nebraska. Because the treatment he and his family received in a small hospital “could be improved upon” he later developed a systematic approach for treating victims “during the first hour post-trauma”; a for-the-time very modern educational format was developed in parallel, resulting in what we now know as the advanced trauma life support (ATLS®) course (1).

Trialed in 1978 in Lincoln, Nebraska, the concept was adopted by the American College of Surgeons (ACS) and promulgated internationally in 1980.

The rest is history: ATLS® has become the standard in 66 countries (and counting); the ABCDE approach is widely accepted not only for trauma, but for acute medical and neurological conditions as well; derivatives have been developed for use outside the hospital, in normal and austere circumstances; the military uses its own version.

A success story; or is it?

From early on there’s also been criticism; both from instructors and from students.

Criticism is important information; it should be listened to very carefully.

Below we describe how ATLS was introduced in the Netherlands; how feed-back was and is collected and how criticism is being reacted to.

ATLS and the Netherlands

When ATLS was introduced in 1995 the 2-day format was chosen for logistical and financial reasons. The Netherlands being a small country (area 16.5 K square miles, pop. 17 M) all courses were and are held in one training centre.

Very quickly the ATLS course became compulsory for residents in Surgery and Anaesthesia; over the last 10 years more and more Hospitals require all junior doctors to be ATLS certified. Because of the latter many students nowadays are very inexperienced when they come on the course. At present some 800 doctors are trained annually.

Criticism

Even though ATLS® has become the standard for trauma care in many countries several authors have their doubts (2-6). Some are for several reasons not in favour (7,8), and alternative courses have been developed (9).

It is interesting to note that in reviews no prospective trials were found assessing outcome of trauma care (10,11); better outcomes have also been reported (12-16).

In the Netherlands, as elsewhere, each course is evaluated by both instructors and students, using the form from the Faculty Manual.

During many years recurring criticisms regarding the course format were: “too many lectures with too little new information when compared to the Manual”; “too little opportunity to practise”; “unrealistic training”.

Comments like these have not been confined to the Netherlands. Several authors (17-20) report comparable opinions: students prefer problem-based learning over classical lectures.

A new format

Over the years several ATLS-based formats have been developed such as the American College of Surgeons (ACS) Trauma Evaluation and Management (TEAM) course that is aimed at medical students (21) but can also be used for educating in low and middle-income countries (22); the Primary Trauma course (16) is used for the same purpose. None of these however, would provide a solution to the first two criticisms mentioned above.

Therefore, Dutch ATLS decided in 2006 to devise a new format, at first only as an intellectual exercise. Since 2006 all “Dutch developments” have been reported during the annual ACS/International ATLS and ATLS Europe meetings.

Knowing that simulation is a very effective way for transferring knowledge and skills (23,24) that is also much liked by students, Dutch ATLS increased in its new format the number of moulage assessments, retaining only a few lectures.

The skills were rearranged in four blocks (A, B, C and D), each consisting of a plenary demonstration and plenary minilecture, followed by a scenario-based practical in small groups, dealing with all relevant psychomotor skills.

Although the program had been devised as a reaction to complaints by provider students, Dutch ATLS decided to run it, starting in 2007, at first as a trial with refresher

candidates; to see whether it was viable and also because many versions of the refresher program that had been tried over the years had not been really satisfactory.

The program was very well received and with some minor modifications it has been used for the Refresher course till 2016. Dutch ATLS is of course very much aware of the fact that even after effective skills teaching, the student needs further practice in order to become proficient (25,26).

The candidates have been asked in their feed-back form whether they thought a comparable program could be used for the Provider course. A majority was of the opinion that provider candidates would need additional coaching because of their inexperience. The question then for Dutch ATLS was how to provide that coaching.

The ACS had announced in 2011 that an e-learning program was under construction and Dutch ATLS opted to wait for its completion, hoping it could be used for giving that extra coaching. The first version of the ACS program that was presented a year later obviously needed improvement.

As little information on that process became available, Dutch ATLS decided in 2014 to develop an e-learning program of its own.

E-learning

The ATLS Manual is very well “constructed” but the system behind that construction is not always easy to understand for a less experienced reader. For that reason, the Dutch e-learning program strives to translate knowledge from the Manual into a system that can be applied in practice; it takes the student, “by the hand”, through the different steps of assessing a trauma victim. In addition, it provides steps 1 and 2 of the 4-step method for teaching psychomotor skills; it teaches how to look at X-rays systematically and it also has a large number of self-assessment questions.

Finally, the student must successfully complete a newly developed MCQ test, before the 2-day face-to-face course can be attended. Extensive feed-back on that MCQ test is immediately provided to the student.

The e-learning program was finalized in June 2015; to follow it completely takes on average 10–12 hours.

A new Provider course

In order to make e-learning and a new face-to-face program fully complementary, Dutch ATLS then took the earlier

Dutch 2-day Provider course

Day 1	
07.45–08.45	Faculty meeting
08.30–09.00	Registration/welcome/coffee/tea
09.00–09.30	Introduction ATLS® and course information
09.30–09.50	PL: preparation & primary survey
09.50–10.20	PD/PL: “A”: airway + neck
10.20–10.35	Coffee
10.35–12.05	GP: airway + neck
12.05–12.50	Lunch
12.50–13.20	PD/PL: “AB”: breathing (anterior neck + chest)
13.20–14.05	GP: breathing
14.05–14.15	Stretch
14.15–14.45	PD/PL: “ABC”: circulation
14.45–15.30	GP: circulation
15.30–15.45	Tea
15.45–17.50	GP: assessment cases 1–5 (single problem)
17.50–18.00	stretch
18.00–18.20	GD: triage scenarios (see: N11_Triage)
18.20–18.40	PL: transport to definitive care (see: N12_Transport)
18.40–18.45	plenary wash up
Day 2	
07.30–07.45	Coffee/tea
07.45–07.55	PL: “any questions?”
07.55–08.25	PD/PL: “ABCD”: disability (head/neck/spine)
08.25–09.10	GP: disability
09.10–11.30	GP: assessment cases 6–10 (10.00–10.15 coffee)
11.30–12.05	PL: musculoskeletal trauma & secondary survey (+ demo)
12.05–12.45	Lunch
12.45–14.25	GP: assessment cases 11–14 (multiple problems)
14.25–14.35	Tea
14.35–14.45	Preparation of students and rooms
14.45–15.30	Practising with moulaged victims
15.30–17.50	Exams
	Initial assessment/MCQs
17.50–18.20	Faculty meeting
18.20–18.30	Results/closure

Figure 1 The typical 2-day Dutch ATLS Provider course. PL, plenary/lecture (“classical lecture”); PD, plenary/demo (scenario based); GP, group practical (4 groups) (scenario based). The exams conform exactly to the ACS ATLS® Program.

mentioned refresher program and adapted it as required. Both were beta-tested 12 times from June to November 2015 and then introduced in its final version in January 2016. *Figure 1* shows the present 2-day face-to-face program.

During the beta-testing period Dutch ATLS found that results (pass-rate and number of practical re-exams) had improved, but only slightly (unpublished data).

When the nearly completed 10th edition of ATLS was presented in June 2017 it was pleasant surprise to see that Dutch ATLS and the American College of Surgeons had been working along the same lines.

When using the refresher format in an adapted version for the new provider program Dutch ATLS had recognized from the start that the Refresher course would need a new program as well.

“Train the Team” training

ATLS® trains its students for performing as an individual (together with an “non-obstructive nurse”) but in real life in trauma care physicians and nurses work as a team. Understandably therefore, the third criticism mentioned above is that ATLS® training is unrealistic.

Apart from the fact that individual training is quite effective for “instilling the basics”, Dutch ATLS was very much aware that in the Netherlands physicians and nurses were being trained separately (ATLS® and TNCC® respectively) for taking care of trauma victims. Up to 2010 several schemes had been tried to train physicians and nurses together. To mention a few: having the lectures with a “mixed audience” but teaching specific skills and performing test initial assessments separately; having ATLS® and TNCC® courses at the same time but separately and organizing a half-day of training together; combining ATLS® and TNCC® and having a course “for all denominations”.

None of these experiments worked out well. Moreover, it became clear that a chance group of participants isn’t ideal for team training: to work as a team much depends on “knowing each other” and on the mutual trust that may develop over time. Clearly, to train for working as a team should also be done with the people who are part of such a team, in surroundings they are familiar with. In other words: team training should be done on-site and not in a training centre with a chance group of people (mark).

In 2009 Dutch ATLS and the Dutch Foundation for

Trauma Nursing decided to develop a program for on-site training of hospital trauma teams. It was run for the first time in 2010.

That program was much indebted to a training scheme of the Netherlands Army Medical Services that had been in place since 2004.

That scheme recognizes that once basic skills are in place, learning is best achieved by doing, or in other words, that a higher level of proficiency is only reached by repeated experiences (27). Also, it takes into account that systematic feed-back by skilled observers enhances the learning experience, and finally it emphasizes that for efficient and effective team work excellent communication is a prerequisite (28-32).

In the Netherlands Army Medical Services this system has been and still is being used, in particular pre-deployment, for making people of varying backgrounds (junior doctors and military nurses with limited experience and medical orderlies with almost non-existent experience) work together in an effective and safe way.

A training session goes through the following phases: a team receives a message about a casualty being on the way. Then, in a simulated environment that is identical to where that team will be working later, all preparations are performed: assigning tasks, checking of equipment and medications, alerting additional personnel.

When the casualty, well-moulaged and well-prepared as to required behaviour, is brought in, the team listens to the hand-over, and then starts the assessment.

Following the c-ABCD approach the team, under a team-leader, does everything that is necessary, in real-time with real resources; either on the casualty or, for invasive procedures, on a manikin. Laboratory tests, X-rays and sonography are simulated but, again, in real-time.

Two instructors/case-managers serve as producers, guiding the scenario depending on the quality of care that is being delivered.

At the end of the assessment, the team leader, when necessary in consultation with medical specialists, decides when the casualty is ready to leave the emergency room, and after a hand-over the assessment phase is concluded. Immediately afterwards the emergency room (ER) is cleaned and consumables are replaced.

The next phase is the feed-back session, where the team itself goes through all steps of preparation and assessment; guided, when necessary, by the instructors. The Pendleton rules ("what went well; what could be improved upon") are followed.

During the session 2 subjects are addressed: medical and communication/teamwork.

Ideally the team itself "discovers" medical shortcomings; in discussing communication and teamwork the instructors have a somewhat more guiding role. They steer the discussion in such a way that the team itself finds where improvements in those respects should be made.

Much attention is paid to the so-called "team conversation": assessment should proceed in an orderly and pre-arranged fashion; all information should be shared; orders should be given by name and never "in the air"; orders should be repeated by the addressee who should report back on the result of that order; every team member is expected to speak up when necessary, but always in a timely and orderly fashion; thereby preventing confusion.

Training sessions as described above are repeated many times; every time with a different casualty (between 2004 and 2010, when the Netherlands were involved in Iraq and Afghanistan, a team had seen on average 120 different cases, before being deployed).

This format was changed for the civilian on-site training sessions because the session is a one-time affair and limited in duration. The instructors begin by visiting the Hospital in question to find out what the size and composition of its trauma team is; what its standard operating procedures (SOP) are, but also to find out what the Hospital expects from the training session. They then develop a scenario that is adapted to the situation in that particular Hospital. For example, if a hospital has no neurosurgeon practicing would include how to stabilize and transport a neurotrauma patient.

On the training day itself a program usually involving 2 cases is run, with 1 team performing and another observing (ideally via a video link). The observing team will perform on the next run, and the performers become the observers (*Figure 2*).

The program consists of simulated trauma team activations: a scenario call from ambulance dispatch is sent to the emergency department, after which the local SOP activating the trauma team is followed.

Once the team has arrived in the ER and has completed its preparations, the casualty is wheeled into the Trauma Room and after the hand-over assessment is begun. One instructor acts as case manager; the other assesses the processes, using a Crew Resource Management (CRM) checklist (*Figure 3*).

The team itself decides when to transfer the patient out of the Trauma Room, thereby ending the simulation; after

Dutch on-site “Train the Team” course

18.45–19.00	Preparation of casualty
19:00–19:30	Introduction
19:30–20:15	1 st scenario
20:15–20:30	Evaluation by instructors
20:30–21:00	Feedback with group
21.00–21.15	Preparation
21:15–22:00	2 nd scenario
22:00–22:15	Evaluation by instructors
22:15–22:45	Feedback with group
22.45–23.00	Conclusions and closure

Figure 2 A Dutch evening “Train the Team” course. The time slots can be moved to the morning or afternoon if so preferred by the Hospital. A checklist evaluating Crew Resources Management aspects can be found in *Figure 3*.

which a de-briefing session is held. Group interaction and (if necessary) medical performance are carefully scrutinized; with comments from not only the instructors but also from the observing team.

This program, which has similarities to the ACS Rural Trauma Team Development course, has been well received and over the years many Hospitals have developed comparable programs of their own.

A new Refresher course

In parallel with the new Provider course Dutch ATLS developed a new refresher course, which was introduced in March 2016.

Based on previous experiences it was recognised that such a program on the one hand should inform the participants, who have at least 4–5 years’ experience in the field, on “What’s new in ATLS” and on the other be attractive by introducing something new.

After much deliberation the following format was agreed upon: the participants begin by reading the most recent edition of the ATLS[®] Manual and by completing the e-learning program (thereby getting an idea of “What’s new in ATLS”).

Then they come to a 1-day face-to-face program which begins with an overview of the developments in ATLS[®], followed by five classic moulages and a written test (again, the “What’s new in ATLS” part). That part is followed by an introduction to CRM, which is then practised during ten

“CRM moulages” (*Figure 4*).

For each of the “CRM moulages” a trauma team is constituted, consisting of a team leader, an “A” physician and a “BC” physician. A 4th student serves as the scribe; the 5th is the casualty. One instructor is the case manager, the other the CRM assessor. Both serve as nurses, when required. Students rotate through the different positions.

Alternatively a manikin is used as the casualty; in that case the 5th student observes.

Having five students in each group has no specific educational consideration (33).

Figure 5 shows the roster for the rotations.

Much attention is paid to the de-briefing session which mainly deals with CRM aspects. Feed-back is provided by the scribe (medical aspects) and the instructors (CRM aspects).

The program was generally speaking well accepted, although several instructors needed some time to get used to it. The fact that for practical reasons the program had to be introduced without a formal instructors’ day will have been of influence there.

As of June 2016, hospitals where several/many physicians are up for recertification can request to have the Refresher course on-site. This option has turned out to be highly successful and appreciated. In the future ATLS NL hopes to run the majority of Refresher courses that way; the contents will undoubtedly be further refined.

Results and feed back

Every Refresher course is assessed afterwards, both by the students and the faculty. *Figure 6* shows the student evaluation form; we use a 5-point Likert scale and an opportunity for open comments.

From its introduction in March 2016 up to July 2017 we’ve run 26 Refresher courses 520 participants; 432 of whom (83%) provided a useable form. The main results are shown in *Figure 7*.

From the open comments the following deserve mention: participants would like to have written information on the differences between the current edition of the ATLS[®] Manual and previous ones. Likewise, as CRM principles are not known to all participants more information on the subject before the course is requested. In general, on-site training is highly appreciated, although there are no differences in scoring results between participants who’ve been trained on-site and those who attended the course in the central training center.

Checklist Crew Resources Management (CRM) aspects

Procedures
Information from dispatch put on whiteboard
Team leader—checks whether all team members are present—assigns tasks (scribe)—checks: (I) preparation (e.g., oxygen, ventilator, IV drips, medication, laboratory test, etc); (II) alerting additional personnel/services #ambient temperature emergency room; (III) personal protection
Handover (systematic, “hands off”)—transfer of patient to guerny
Simultaneous—assessment A, B, C—undressing the patient—attaching the patient to monitors
Team leader—announces time-out for summaries once A, B, C have been concluded—decides on diagnostic/therapeutic steps—hands over after documentation check—concludes assessment—chairs feed-back session
Documentation check
Communication
Findings are reported in orderly fashion
Findings are confirmed by scribe
Requests/“orders”—are given by name—are confirmed by addressee—are reported on by addressee when completed
All remarks (from all team members) are paid attention to; team leader decides

Figure 3 The checklist used for assessing CRM aspects during Dutch “Train the Team” and Refresher courses.

Dutch 1-day Refresher course

07.30–08.00	Registration/welcome/coffee/tea
08.00–08.25	Plenary: introduction/course information
	Info on latest ATLS
08.25–08.50	Plenary: demo
08.50–10.30	Syndicates: 5 cases classic moulage
10.30–10.45	Coffee
10.45–11.45	Plenary written test
11.45–12.15	Plenary lecture: Crew Resources Management in the emergency room
12.15–13.00	Lunch
13.00–15.05	Syndicates: 5 cases team moulage
15.05–15.20	Coffee
15.20–16.35	Syndicates: 3 cases team moulage
16.35–16.50	Snack
16.50–17.40	Syndicates: 2 cases team moulage
17.40–17.50	Faculty meeting
17.50–18.00	Plenary: summarizing and winding up
	Results/closure

Figure 4 The typical 1-day Dutch ATLS Refresher course. The number of cases (5/10) will be changed to 4/8 if the syndicates have fewer students. Given the available time there’s no formal Initial Assessment test.

Rotation schedule Dutch 1-day Refresher course

Roster	Student	Student	Student	Student	Student
	1, 6, 11, 16	2, 7, 12, 17	3, 8, 13, 18	4, 9, 14, 19	5, 10, 15, 20
Pat 1	Doctor	Observer	Nurse	Scribe	Critiquer
Pat 2	Critiquer	Doctor	Observer	Nurse	Scribe
Pat 3	Scribe	Critiquer	Doctor	Observer	Nurse
Pat 4	Nurse	Scribe	Critiquer	Doctor	Observer
Pat 5	Observer	Nurse	Scribe	Critiquer	Doctor
Pat 6	Team leader	Scribe/critiquer	Casualty	Doctor C	Doctor A, B
Pat 7	Doctor A, B	Team leader	Scribe/critiquer	Casualty	Doctor C
Pat 8	Doctor C	Doctor A, B	Team leader	Scribe/critiquer	Casualty
Pat 9	Casualty	Doctor C	Doctor A, B	Team leader	Scribe/critiquer
Pat 10	Scribe/critiquer	Casualty	Doctor C	Doctor A, B	Team leader
Pat 11	Team leader	Doctor C	Doctor A, B	Scribe/critiquer	Casualty
Pat 12	Casualty	Team leader	Doctor C	Doctor A, B	Scribe/critiquer
Pat 13	Scribe/critiquer	Casualty	Team leader	Doctor C	Doctor A, B
Pat 14	Doctor A, B	Scribe/critiquer	Casualty	Team leader	Doctor C
Pat 15	Doctor C	Doctor A, B	Scribe/critiquer	Casualty	Team leader

Figure 5 How student rotate through various functions in the Dutch ATLS Refresher course.

Evaluation form Refresher course
The goals of the refresher course are: to stimulate the update of knowledge and adherence to the ATLS Manual 9th edition; to reinforce the importance of a structural approach of trauma patients ("ABCDE") including CRM based training activities to enhance communication and leadership
Questions
1. To what degree conform the goals above to what you expect from a refresher course?
2. To what degree have these goals been reached?
a. Update on content of the 9th edition
b. ABCDE and CRM
3. To what degree are the course and the instructional methods appropriate for your level of experience?

Figure 6 The form for evaluating the Dutch ATLS 1-day Refresher course. The questions refer to the elements Dutch ATLS wants to emphasize in its Refresher course

Evaluation form Refresher course

Score on average	
Question 1	4.35
Question 2a	4.04
Question 2b	4.39
Question 3	4.33

Figure 7 Results of student evaluation on Refresher course. The data on the Dutch ATLS 1-day Refresher course cover March 2016–July 2017.

Summary

At this moment ATLS NL is running a self-developed hybrid Provider course with e-learning and a face-to-face program with ample opportunity for practising the Initial Assessment.

Trauma Team and CRM training require basic ATLS knowledge and skills on the part of the students.

At present in the Netherlands Trauma Team and CRM training aren't part of the ATLS Provider course; they are an essential part of the Dutch ATLS Refresher course and

of the on-site “Train the Team” training course.

All on-site activities are highly appreciated; both team training for physicians and nurses, and Refresher courses for physicians only.

Acknowledgements

The author would like to thank Dr. James D. Gregory, FACS for his advice.

Footnote

Conflicts of Interest: The author has no conflicts of interest to declare.

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doi: 10.21037/jeccm.2018.01.16

Cite this article as: Henny W. ATLS and Trauma Team Training in the Netherlands. *J Emerg Crit Care Med* 2018;2:25.