Stay and play vs. scoop and run in trauma care: a systematic review

Ruben Van den Brande, Florence Reith, Anneliese Synnot

Background

Description of condition

Trauma is a wound or injury to the body resulted from violence, an accident, a fall …

Description of the method

Stay and play is the approach of pre-hospital trauma care in which the patient receives treatment and/or stabilization on scene before being transported to the hospital. Following medical interventions are distinctive for the stay and play approach: intubation on scene in order to secure the airway, thoracostomy, placement of intravenous lines and starting the fluid resuscitation therapy, administration of medications on scene.
Scoop and run is the approach of pre-hospital trauma care in which the patient is transported as fast as possible to the hospital without trying to stabilize him at the scene. The more advanced methods of pre-hospital care which are used in the stay and play approach aren't used.

Why it is important to do this review

Trauma is a major cause of death and disability in our world. It accounts for 16% of the global burden of disease. (Rapport WHO)
Prevention programs, however well, can never prevent all traumas. Efforts to improve care of the trauma patients are essential, in order to preserve as much quality of life as possible for these patients. Pre-hospital trauma care is the first step in the cascade of this medical treatment. Improvement in this first step of care could provide a major improvement in outcome for trauma patients.

Throughout Europe, different approaches are used in the field of pre hospital trauma care, because there is no conclusive evidence which practice is best practice.
In 1967 ALS (advanced life support) was introduced in the pre-hospital care, in the following years ALS was implemented in many regions although it was never validated as beneficial by a prospective, randomized trial. For years ALS was considered as superior to BLS (basic life support), which was stimulated by the glorification of ALS in the media. However last decade there has risen some doubt if this is true.
Previous reviews, Ryynanen, Bakalos, Isenberg reviewed the use of ALS teams in comparison to BLS response. However, ALS crew could use the same approach on scene like the BLS crews. An ALS crew could use only basic life support methods and transport the patient as fast as possible to the hospital. That is why stay and play or scoop and run are quite similar terms for ALS en BLS but they cannot be seen as equal. In order to get a clear view on which approach is best practice, the policy at the scene must be the point of focus and not the type of response team.
Also, previous reviews searched only for studies which compared ALS and BLS, they have not looked to the different interventions separately and only searched with terms for ALS and BLS. By using search terms on intubation on scene or not, intravenous access and medication or not, thoracostomy on scene or not, more evidence will be found on each specific subject which will lead to a more complete and balanced review of the possible pre hospital trauma care approaches.

Lieberman et all also looked specifically to intubation and intravenous medication, however this group used the more general search terms of ALS and BLS, instead of searching specifically for

studies about intubation, intravenous access ... separately. Hence he extracted this information if it was mentioned in the relevant articles he found.
This review was published in 2000, since then multiple other researches have been carried out. The Last review regarding the ALS and BLS approach was published in 2011, which included studies that have been published up until July 2010. The results of these reviews where inconclusive. In the last four years new studies are published and by searching for subtopics more relevant evidence from before 2010 will be found so a new review could give more conclusive information. By conducting the sub analyses a balanced conclusion can be made about each part of the stay and play approach in order to form a complete view if stay and play can improve outcome for trauma patients in comparison to the scoop and run approach.

Objectives

What is the effect of the 'stay and play' approach in pre hospital care versus the 'scoop and run' approach in patients with trauma in terms of survival and functional outcome?

Secondary objective
As a secondary objective we will be looking at the difference in outcome with regard to

- Early intubation on the field versus intubation at the ED
- Early placement of central venous lines versus placement at the ED
- Thoracostomy on the scene versus thoracostomy at the ED
- Drug administration on the scene versus introduction of drugs at the ED
    - Adrenaline/Epinephrine

Methods

Criteria for considering studies for the review

Type of study

We will include:

- Prospective observational studies
- Retrospective observational studies
- Controlled before after studies
- Case control studies
- randomized controlled trials where possible, however RCTs will most likely not be widely available

Type of participants

We will include all trauma patients which are taken care of by an ambulance or other pre-hospital trauma care modalities.

Type of intervention

The intervention is the stay and play approach of trauma care. In this approach, more advanced methods are used to stabilize the patients on scene. This approach will include:

1. Intubation on scene
2. Placement of a central venous line
3. Thoracostomy on scene
4. Drug administration on scene

These components will be looked at separately as well, as a subgroup analysis, in order to obtain a more detailed view on the stay and play approach.

Type of comparison

The comparison is the scoop and run approach of trauma care. In this approach the patient is transported as fast as possible to the hospital. Only basic methods are used, like a cervical collar to protect the patient for further injury during transport. Characteristic for this approach is:

1. No intubation on scene
2. No placement of central venous line
3. No thoracostomy on scene
4. No drug administration on scene

These components will be looked at separately as well, as a subgroup analysis, in order to obtain a more detailed view on the scoop and run approach.

Type of outcome measures

1. Deterioration before or at arrival at the emergency department: worsening of GCS or ISS
2. Functional outcome: Glasgow outcome scale, GOSE, quality of life, other functional outcomes
3. 1 month, 1 year survival rate, survival at discharge from hospital, 6 months survival
4. admission gas profile (pH, base deficit, and pCO2, pO2 on admission blood gases)
5. Length of stay (ICU, hospital)
6. Time on the scene and transfer time

Search methods

We will search:

- Cochrane central register of controlled trials
- MEDLINE
- EMBASE
- Cumulative index of nursing and allied health literature (CINAHL)
- Proquest dissertations, theses, Google Scholar
- Cross referencing for relevant studies

Search terms:

Trauma Search

1. Wounds and injuries (MeSH)
2. Wound* (tiab)
3. Injur* (tiab)
4. Trauma* (tiab)
5. TBI* (tiab)
6. Traumatic brain injur*
7. Brain injuries (MeSH)
8. Craniocerebral trauma (MeSH)
9. 1 – 8 linked by OR

Pre-hospital search

1. Emergency medical service (MeSH)
2. Pre hospital (tiab)
3. Prehospital (tiab)
4. Out of hospital (tiab)
5. On scene (tiab)
6. Ambulance* (tiab)
7. Paramedic* (tiab)
8. emergency medical technician* (tiab)
9. Emergency Treatment (MeSH)
10. Traumatology (MeSH)

11. 1 – 10 linked by OR

Intervention search

1. Intratracheal intubation* (MeSH)
2. Intratracheal intubation* (tiab)
3. Endotracheal intubation* (tiab)
4. Tracheal intubation* (tiab)
5. Thoracostomy (MeSH)
6. Thoracostom* (tiab)
7. Decompression, Surgical/instrumentation (MeSH)
8. Chest tubes (MeSH)
9. Chest tubes (Tiab)
10. Central venous catheterization (MeSH)
11. Central venous catheterization* (tiab)
12. Adrenaline (tiab)
13. Noradrenaline (tiab)
14. Epinephrine
15. norepinephrine
16. Stay and Play (tiab)
17. Scoop and run (tiab)
18. ALS (tiab)
19. Advanced life support (tiab)
20. BLS (tiab)
21. Basic life support (tiab)
22. 1-21 linked by OR

Combining trauma search 9 AND pre hospital search 11 AND intervention search 22 and adding the filter 'humans' forms the definitive search for this systematic review

Data collection and analysis

Selection of studies

Two separate reviewers (R. Van den Brande and F. Reith) will review all titles and abstract retrieved to assess eligibility against the inclusion criteria. Disagreements will be resolved by discussion between the author team. Potentially eligible articles will then be obtained and examined independently.

Data extraction and management

Data extraction will be performed independently by the two reviewers with a standard data extraction form.
Patient characteristics: age, sex, GCS, ISS, PaO2, O2 saturation
Outcome parameters: survival, GOS(E), Quality of life, …

Assessment of quality and risk of bias

The methodological quality and risk of bias of each included study will be assessed, using the CASP tools checklist. This will be used to describe the quality of the available research.

- CASP Cohort Study Checklist
- CASP Case Control Checklist
- CASP RCT Checklist (for CBA studies)
- Checklist can be found at: http://www.casp-uk.net/#!casp-tools-checklists/c18f8

Strategy for data synthesis and reporting

The analysis will include a structured narrative synthesis. We will group the results based on categories that best explore the heterogeneity of studies and makes most sense to the reader (i.e. by populations, interventions or outcomes). We will use structured tables, describing study characteristics, key results and risk of bias ratings. For dichotomous outcomes we will present results as relative risks (RR) with 95% confidence intervals (CI). For continuous outcomes we will present results as mean differences (MD) or standardardised mean differences (SMD) with 95% CI.

We will conduct meta-analyses where there are sufficient data and studies are sufficiently homogenous (in terms of population, interventions and outcomes) to draw meaningful conclusions from a statistically pooled result. Anticipating some heterogeneity, a random effects model will be used.

Assessment of heterogeneity

Statistical heterogeneity will be assessed using a visual inspection of any forest plots generated and by the Chi^2 test. Heterogeneity will be quantified using the I^2 statistic.

Sub-group analysis

If there are sufficient studies, we will conduct the following sub-group analyses

- Traumatic brain injury (severe, moderate and mild GCS)
- Injury severity score (severe, moderate and mild ISS)
- Intubation on scene (compared with intubation at the ED))
- Central venous line placement on scene(compared with placement at the ED)
- Thoracostomy on scene (compared with no thoracostomy at the ED)
- Drug administration(adrenaline/epinephrine) on scene (compared with introduction of drugs at the ED)

For further details about these possible sub-group analyses, see appendices.

Appendices

Patients

Traumatic Brain Injury

Included patients will be divided in subgroups according to GCS

No GCS mentioned: patients will not be included in the subgroup analysis
GCS 3 – 8: severe TBI
GCS 9-12: moderate TBI
GCS 13-15: mild TBI

Analyses will be conducted for each subgroup in order to detect any differences between responses on approach.

Injury severity score

Included patients will be divided in subgroups according to ISS

No ISS mentioned: patients will not be included in the subgroup analysis
Severe ISS
Modereate ISS
Mild ISS

Interventions

Intubation on scene

Patients: all trauma patients, subgroup analyses as mentioned above.
Intervention: Intubation on scene
Comparison: no intubation, intubation at emergency department.
Outcome: Deterioration before or at arrival at the emergency department: worsening of GCS or ISS
Functional outcome: Glasgow outcome scale, GOSE, quality of life, other functional outcomes
1 month, 1 year survival rate, survival at discharge from hospital, 6 months survival
admission gas profile (pH, base deficit, and pCO2, pO2 on admission blood gases)
Length of stay (ICU, hospital)

Placement of a central venous line

Patients: all trauma patients, subgroup analyses as mentioned above.
Intervention: Placement of a central venous line on scene
Comparison: no placement of a central venous line on scene, Placement of a central venous line at emergency department.
Outcome: Deterioration before or at arrival at the emergency department: worsening of GCS or ISS
Functional outcome: Glasgow outcome scale, GOSE, quality of life, other functional outcomes
1 month, 1 year survival rate, survival at discharge from hospital, 6 months survival
Admission gas profile (pH, base deficit, and pCO2, pO2 on admission blood gases)
Length of stay (ICU, hospital)

Thoracostomy on scene

Patients: all trauma patients, subgroup analyses as mentioned above.
Intervention: thoracostomy on scene (Needle or tube)
Comparison: no thoracostomy on scene (Needle or tube), thoracostomy (Needle or tube)at emergency department.
Outcome: Deterioration before or at arrival at the emergency department: worsening of GCS or ISS

Functional outcome: Glasgow outcome scale, GOSE, quality of life, other functional outcomes
1 month, 1 year survival rate, survival at discharge from hospital, 6 months survival
Admission gas profile (pH, base deficit, and pCO_2, pO_2 on admission blood gases)
Length of stay (ICU, hospital)