PRIMARY SURVEY

OVERVIEW AND SOME PRACTICAL CONSIDERATIONS

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Presentation at BASICS Scotland webinar
13th May 2021

Competing Interests

- No competing interests.
- I do not work for any company and receive no payment.
- Any equipment that I refer to in this presentation reflects its value by virtue of published experience or its theoretical potential value in the management of hypothermia.

Topics

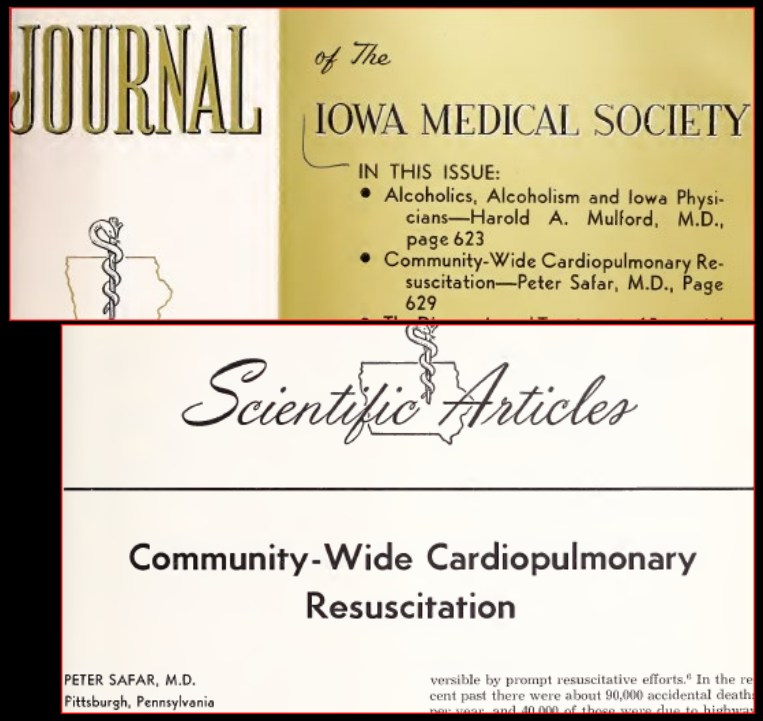
Note: this presentation is not a definitive guide to Primary Survey, but will focus on some important aspects and include some practical examples.

- Brief history of Primary Survey
- Priorities of Primary Survey
- Single rescuer vs group
- Primary Survey in some special circumstances

Some history about the Primary Survey

The birth of ABC. Peter Safar

- Born in Vienna in 1924. Emigrated to the USA in 1949.
- Incredible amount of research. Published >1000 papers.
- Co-inventor of mouth-to-mouth resuscitation in 1956. Tested this on anaesthetised, paralysed volunteers.
- Developed the ABC concept in 1957 in his book 'the ABC of resuscitation'.
- His aim was to make it possible for lay people to do resuscitation so he designed a system: "A" (airway), "B" (breathing) and "C" (circulate) of the now-familiar "ABC" basic life-support system.
- In his system, "D" was for Drugs and Defibrillation, "E" was for ECG and "F" was for fluids.
- First proponent to cool people after myocardial infarction.
- Worked with Asmund Laerdal, the founder of a Norwegian toy company, to produce the first resuscitation dummy for training general public.



JOURNAL of The IOWA MEDICAL SOCIETY

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- Community-Wide Cardiopulmonary Resuscitation—Peter Safar, M.D., Page 629

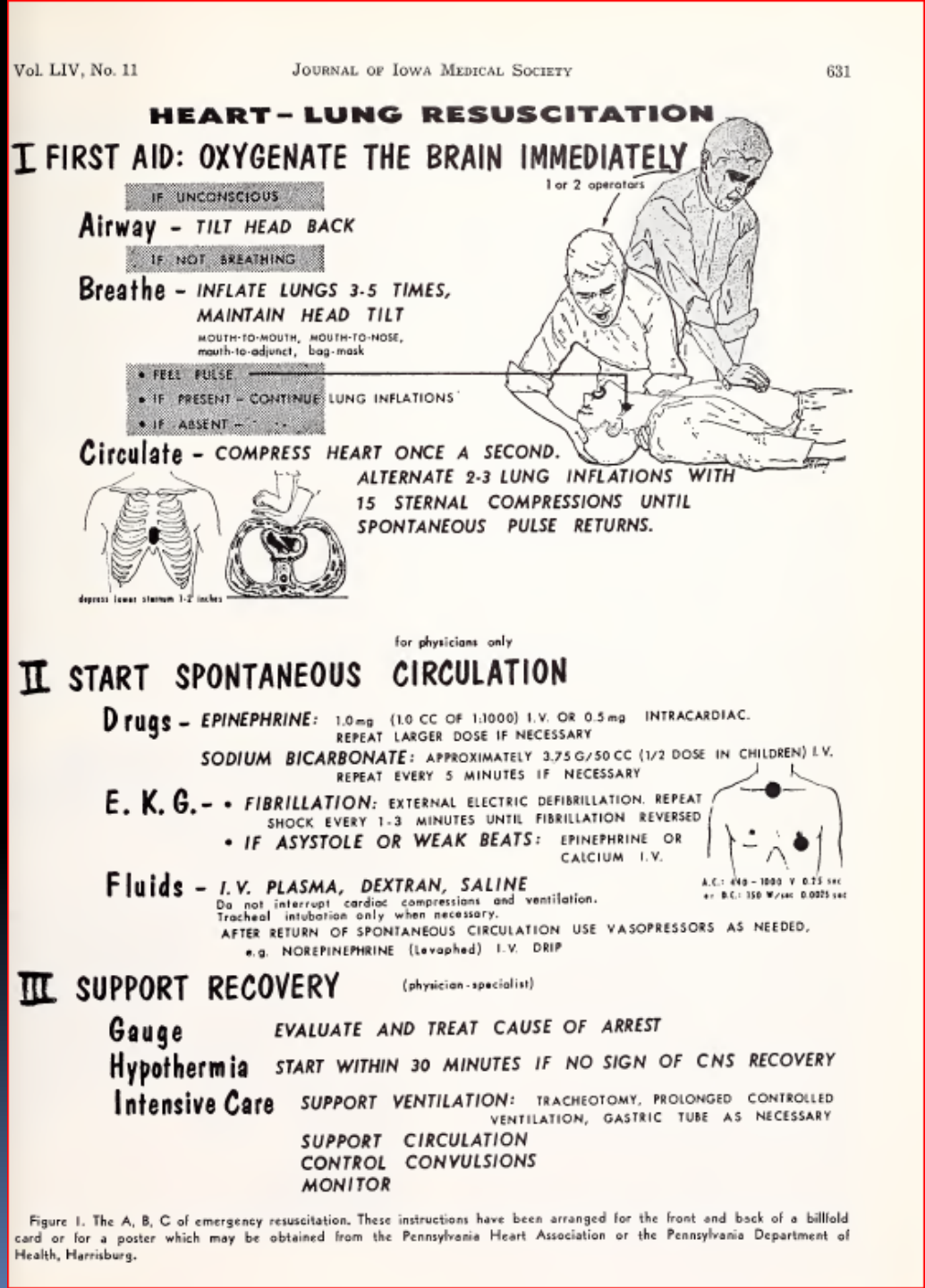
Scientific Articles

Community-Wide Cardiopulmonary Resuscitation

PETER SAFAR, M.D.
Pittsburgh, Pennsylvania

versible by prompt resuscitative efforts.[6] In the re cent past there were about 90,000 accidental death

- Published in 1964.
- Recognised potential public health impact of community-wide CPR
- Proposed special "cardiac monitoring wards" to try to reduce death rate from coronary artery occlusion
- Outlined steps of cardiopulmonary resuscitation (see right)



Vol. LIV, No. 11 JOURNAL OF IOWA MEDICAL SOCIETY 631

HEART – LUNG RESUSCITATION

I FIRST AID: OXYGENATE THE BRAIN IMMEDIATELY

1 or 2 operators

IF UNCONSCIOUS

Airway – TILT HEAD BACK

IF NOT BREATHING

Breathe – INFLATE LUNGS 3-5 TIMES, MAINTAIN HEAD TILT

MOUTH-TO-MOUTH, MOUTH-TO-NOSE, mouth-to-adjunct, bag-mask

- FEEL PULSE
- IF PRESENT – CONTINUE LUNG INFLATIONS
- IF ABSENT –

Circulate – COMPRESS HEART ONCE A SECOND. ALTERNATE 2-3 LUNG INFLATIONS WITH 15 STERNAL COMPRESSIONS UNTIL SPONTANEOUS PULSE RETURNS.

depress lower sternum 1-2 inches

for physicians only

II START SPONTANEOUS CIRCULATION

Drugs – EPINEPHRINE: 1.0 mg (1.0 CC OF 1:1000) I.V. OR 0.5 mg INTRACARDIAC. REPEAT LARGER DOSE IF NECESSARY

SODIUM BICARBONATE: APPROXIMATELY 3.75 G/50 CC (1/2 DOSE IN CHILDREN) I.V. REPEAT EVERY 5 MINUTES IF NECESSARY

E. K. G. – • FIBRILLATION: EXTERNAL ELECTRIC DEFIBRILLATION. REPEAT SHOCK EVERY 1-3 MINUTES UNTIL FIBRILLATION REVERSED

• IF ASYSTOLE OR WEAK BEATS: EPINEPHRINE OR CALCIUM I.V.

A.C.: 640 – 1000 V 0.75 sec
or D.C.: 350 W/sec 0.0025 sec

Fluids – I.V. PLASMA, DEXTRAN, SALINE

Do not interrupt cardiac compressions and ventilation. Tracheal intubation only when necessary.

AFTER RETURN OF SPONTANEOUS CIRCULATION USE VASOPRESSORS AS NEEDED, e.g. NOREPINEPHRINE (Levophed) I.V. DRIP

III SUPPORT RECOVERY (physician-specialist)

Gauge EVALUATE AND TREAT CAUSE OF ARREST

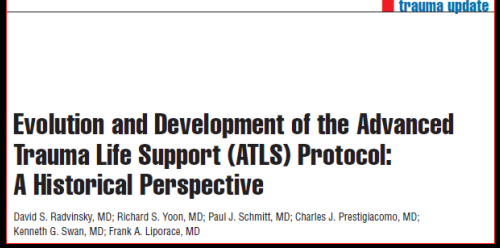
Hypothermia START WITHIN 30 MINUTES IF NO SIGN OF CNS RECOVERY

Intensive Care SUPPORT VENTILATION: TRACHEOTOMY, PROLONGED CONTROLLED VENTILATION, GASTRIC TUBE AS NECESSARY

SUPPORT CIRCULATION
CONTROL CONVULSIONS
MONITOR

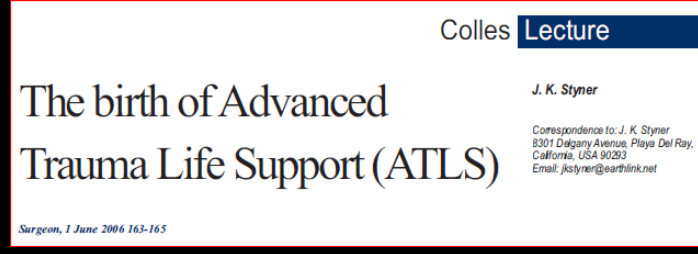
Figure 1. The A, B, C of emergency resuscitation. These instructions have been arranged for the front and back of a billfold card or for a poster which may be obtained from the Pennsylvania Heart Association or the Pennsylvania Department of Health, Harrisburg.

ATLS


trauma update

Evolution and Development of the Advanced Trauma Life Support (ATLS) Protocol: A Historical Perspective

David S. Radvinsky, MD; Richard S. Yoon, MD; Paul J. Schmitt, MD; Charles J. Prestigiacomo, MD; Kenneth G. Swan, MD; Frank A. Liporace, MD


Colles Lecture

The birth of Advanced Trauma Life Support (ATLS)

J. K. Styner

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8301 Delgany Avenue, Playa Del Ray, California, USA 90293
Email: jkstyner@earthlink.net

Surgeon, 1 June 2006 163-165

- Dr James Styner (orthopaedic surgeon), in air crash with his family in February 1976.
- Wife killed.
- He and the four children had significant injuries.
- Got to a small local hospital. Staff there had no training for proper triage and treatment (days before ATLS).
- Ultimately transferred to a larger facility where definitive care was delivered.

ATLS

- With colleagues, Dr Styner aimed to prevent poor care from happening by developing a way to teach rural physicians how to manage trauma.
- He said: "*When I can provide better care in the field with limited resources than my children and I received at the primary facility, there is something wrong with the system and the system has to be changed".*
- Created ATLS, based on ACLS. Developed a trauma syllabus.
- Traditional medical approach is to take a full history and full examination, reach a diagnosis and treat.
- Dr Styner recognised that unstable patients with acute problems need a different approach. He had, what was then, a novel idea of *seeing a problem and fixing it before attacking the next problem*, rather than looking at everything and then going back to treat. Thus, ATLS approaches trauma as a surgical disease and puts focus on treating the greatest threat to life first.

ATLS

- In ATLS, the assumption is that appropriate and timely care can significantly improve outcome of injury.
- Core principles emphasise the rapid initial assessment (triage), and primary management of the trauma patient with a focus on implementing lifesaving interventions, re-evaluation, stabilisation, and transfer when appropriate.
- And so the current ATLS Primary Survey was born.
  - Airway and cervical spine control
  - Breathing and ventilation
  - Circulation and haemorrhage control
  - Disability (neurologic status, especially disturbance of conscious level)
  - Exposure/Environmental control
- After completion of the primary survey and appropriate resuscitation, a head-to-toe examination, the secondary survey of the casualty, is performed, in which each region of the body is examined for signs of additional injury. **But only if there is time. Don't skimp on the Primary Survey!**

Modifications to Primary Survey

- Primary Survey now routinely preceded by assessment of danger (rescuer, rescue team, then patient), and whether the patient responds to a simple alert (usually spoken).
- Over the years, modifications of the basic Primary Survey have been implemented in situations with special needs e.g. military
  - Addition of 'c' (catastrophic haemorrhage) to precede the rest of the PS, as military ballistic injury is different from civilian blunt trauma. However, this principle is now widely used in civilian settings, especially terrorist events.
  - Another was to emphasise surgical airway management in destructive ballistic injuries of the face and de-emphasise cervical spine management in penetrating neck injury (Battlefield Trauma Life Support).

MILITARY MEDICINE, 161, 9:542, 1996

Battlefield Trauma Life Support: Its Use in the Resuscitation Department of 32 Field Hospital during the Gulf War

*Bernard Riley, MBE BSc FRCA** *Peter Mahoney, FRCA FFARCSI†*

EMERGENCY CARE PARADIGM

ABC to <C>ABC: redefining the military trauma paradigm

T J Hodgetts, P F Mahoney, M Q Russell, M Byers

"ABC" has now been replaced by "<C>ABC", where "<C>" stands for "catastrophic haemorrhage"

Emerg Med J 2006;**23**:745–746.
doi: 10.1136/emj.2006.039610

Practical considerations

Primary Survey is Time Critical

Important reminder

- Primary Survey is about looking for life threats and stabilising them, to keep the patient alive to reach definitive care.
- Primary Survey is a recognised structure that ensures everything important is done
- Should be used in trauma and medical cases.
- Rarely is definitive treatment delivered based on a Primary Survey problem. Therefore, a general rule is that if a Primary Survey problem was identified, by definition, this was a life threat, and the patient needs hospitalisation.

Single rescuer or team?

- Single-handed rescuer has to do everything, so must be focused, stick to essentials and not get side-tracked.
- Omit non-essential interventions at the Primary Survey stage
- Priority is to identify life-threats and manage them as quickly as possible
- Examples
  - Mechanism of injury suggests thoracic trauma, give oxygen. Don't waste time trying to get an oxygen saturation first (may not be possible anyway if the patient is moving or has cold extremities).
  - History suggests myocardial infarction, give aspirin immediately. Don't waste time doing an ECG (which may be normal anyway). Although ideally need SpO_2 to guide oxygen use in an MI patient, if the patient appears to be in cardiac failure, give oxygen. There is no evidence that a few minutes of oxygen given initially to a patient, while they are being assessed, worsens outcome.
  - If anaphylaxis could be the cause (e.g. history; rash; breathing difficulty; cardiovascular collapse), give adrenaline *as soon as the possible diagnosis is apparent*.

Single rescuer or team

- If >1 person available, then the luxury of other things are possible e.g.
  - SpO2; BP; ECG; GCS are all time consuming. However, if a second person (or more) is available, they can do these things while the first rescuer attends to priorities.

- If several people are available, appoint one to be a team leader and stand back.
  - Minimises human factor issues e.g. everyone getting sucked in to attempting to manage the airway so no one remembers the bleeding.

Check and re-check

- Expect to check and re-check
- Example. If an intervention is needed to clear the airway, check repeatedly that the airway has remained clear. If a patient cannot maintain their own airway, that is a high-risk situation.

Primary Survey in situations other than the obvious

The principle is very useful in several situations

Example: Transferring a critically ill patient from the scene, between hospital departments, or into theatre, after the interventions have been done:

- Check ABCDE
  - A – ETT placement, cuff, functioning; not endobronchial intubation; etc.
  - B – Adequate ventilation. Capnography; SpO_2.
  - C – IV access; fluids running; inotropes; cardiovascular monitoring; etc.
  - D – Sedation; conscious level.
  - E – Insulation; heat pads, etc.

Practical considerations

Primary Survey in some special circumstances

Primary Survey in some special circumstances

Severe Accidental hypothermia

NB May be minimal signs of life

A
- Manage airway as normal.
- No need to rush to pass a supraglottic airway or intubate if airway maintained, even if respiratory rate is very low.

B
- Give oxygen
- Don't hyperventilate

C
- If signs of life
- Handle carefully to avoid precipitating an arrest
- If cardiac arrest, follow ERC guidelines: max 3 shocks; avoid ALS drugs
- Do NOT terminate resuscitation on scene unless danger to rescue services
- Use mechanical CPR if available

D Check capillary sugar in case hypoglycaemia contributing to clinical picture

E Insulate. Apply external heat if available.

Primary Survey 'Airway' in some special circumstances

- The aim is for every airway to be clear
- How that is best achieved depends on many factors, including physical situation, nature of the patient illness or injury, skills of the practitioners, and available airway equipment.
- Airway devices are just one method of managing the airway
  - Primary function is to ensure a clear airway, particularly during evacuation when it's harder to have hands-on the patient
  - This allows improved oxygenation
  - May protect the airway (endotracheal tube)
  - Facilitate ventilation in patients who are unable to breathe adequately on their own.

Primary Survey ‘Airway’ in some special circumstances

- Theoretically, prehospital intubation can be the ideal.
- However, many studies have not shown superior outcomes over supraglottic airway device (SAD) e.g. i-gel.
- In some cases, outcome was worse because the intubation was not straight forward or was done by inexperienced practitioners.
- Very good evidence that intubation more difficult in the prehospital situation, and that practitioners who cannot maintain skills have a higher failure rate. Therefore, it is very appropriate for such practitioners to use alternatives i.e. oropharyngeal, nasopharyngeal and SAD.

PLOS ONE

RESEARCH ARTICLE

Experience in Prehospital Endotracheal Intubation Significantly Influences Mortality of Patients with Severe Traumatic Brain Injury: A Systematic Review and Meta-Analysis

Sebastiaan M. Bossers[1], Lothar A. Schwarte[1,2], Stephan A. Loer[1], Jos W. R. Twisk[3], Christa Boer[1,4], Patrick Schober[1,2]*

Conclusions

Effects of prehospital endotracheal intubation depend on the experience of prehospital healthcare providers. Intubation by paramedics who are not well skilled to do so markedly increases mortality, suggesting that routine prehospital intubation of TBI patients should be abandoned in emergency medical services in which providers do not have ample training, skill and experience in performing this intervention.

American Journal of Emergency Medicine 33 (2015) 1080–1083

Contents lists available at ScienceDirect

American Journal of Emergency Medicine

journal homepage: www.elsevier.com/locate/ajem

ELSEVIER

Brief Report

Prehospital endotracheal intubation vs extraglottic airway device in blunt trauma ☆,☆☆,★

James Kempema, MD [a], Marc D. Trust, MD [b], Sadia Ali, MPH [b], Jose G. Cabanas, MD [c], Paul R. Hinchey, MD [c], Lawrence H. Brown, PhD, MPH&TM [a,d,*], Carlos V.R. Brown, MD [b]

The Journal of TRAUMA® *Injury, Infection, and Critical Care*

J Trauma. 2005;58:933–939.

The Impact of Prehospital Endotracheal Intubation on Outcome in Moderate to Severe Traumatic Brain Injury

Daniel P. Davis, MD, FACEP, Jeremy Peay, MS4, Michael J. Sise, MD, FACS, Gary M. Vilke, MD, FACEP, Frank Kennedy, MD, A. Brent Eastman, MD, Thomas Velky, MD, and David B. Hoyt, MD, FACS

Critical Care and Trauma

Section Editor: Jukka Takala

Prehospital Intubations and Mortality: A Level 1 Trauma Center Perspective

(Anesth Analg 2009;109:489-93)

Primary Survey ‘Airway’ in some special circumstances

However you manage the airway

- Complicated is not necessarily better
- Keep it simple (manual before devices)
  - If gravity can help to keep the airway clear, use that (see later)
- Know your limitations and the limitations of the device
- Do the basics really well

Primary Survey 'Airway' in some special circumstances

Airway intervention required

Basic technique

- Expect all prehospital airways that need intervention to be potentially difficult, because:
  - Emergency situation and patient critically ill, so under pressure
  - Relative practitioner inexperience in that situation
  - Wide range of pathology that can affect airway management
  - Difficult physical situation which affects access
  - Some patients have difficult anatomy
- Get to know small range of equipment really well. In the case of supraglottic airway devices, the i-gel is particularly popular
- Have clear indications before inserting a device
- Get the patient and yourself in the best position possible
- Have plans A, B and C
- Inform colleagues

Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

The i-gel in severe hypothermia

- I-gels made from a thermoplastic elastomer, so soften on heating
- Study looked at cuff hardness (resistance to indentation) and resilience (rate at which the material recovers its original shape) over temperature range from 10-60°C
- Hardness increases slightly with decreasing temperature
- Resilience increases slightly with decreasing temperature (slightly faster rate of return to the original shape)
- Prehospital scenario. Cold day; i-gel at 10°C. Hardness and resilience would change by <5%, which is not clinically significant.
- In a hypothermic patient, the i-gel would not warm up so would remain slightly harder and slightly more resilient, but this will not impair its use.


Anaesthesia 2018 doi:10.1111/anae.14300

Original Article

Changes in hardness and resilience of i-gel™ cuffs with temperature: a benchtop study

J. Dingley,[1] J. Stephenson,[2] V. Allender,[3] S. Dawson[4] and D. Williams[5]

Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

Cervical spine injury

- Airway takes precedence over C Spine protection, and may be essential if e.g. concomitant traumatic brain injury
- Almost impossible to prevent a little C Spine movement, regardless of motion restriction techniques, including during intubation
- Don't try to place a SAD with cervical collar in place
- Choose technique that is best in your hands and choose the person best qualified to perform the procedure

Primary Survey ‘Airway’ in some special circumstances

Factors if considering airway intervention

Maxillofacial trauma

- Can be immensely difficult because of blood, loss of normal anatomy, etc.
- May only be possible to keep airway clear by positioning the patient so gravity keeps tissues from collapsing e.g. bilateral fractured mandible → patient needs to sit up & forward
- Anticipate and recognise an airway obstruction
- In some injuries, upper airway anatomy may be easy to see due to tissue loss. In others, it can be very difficult.
- If the facial tissues have lost structure, then there may not be enough resilience to support a SAD
- In extreme situations, surgical cricothyroidotomy may be needed


Air Medical Journal 39 (2020) 300–302

Contents lists available at ScienceDirect

Air Medical Journal

journal homepage: http://www.airmedicaljournal.com/

Case Report

Difficult Intubation due to Penetrating Trauma from a Crossbow Bolt

Alex O. Lambert, MD [1,*], Richard B. Utarnachitt, MD [1,2], Suzanne E. Beck, CFRN [2], Rebecca A. Bohlke, CFRN [2], Andrew J. Latimer, MD [1,2]

[1] Department of Emergency Medicine, University of Washington, Seattle, WA
[2] Airlift Northwest, Seattle, WA

Figure 1. Sagittal computed tomography view of the crossbow bolt embedded within the patient. Note the view of the endotracheal tube passing obliquely around the bolt in the oral cavity.

Suicide attempt. The shaft of the bolt traversed the midline of the oral cavity, protruding inferiorly through a laceration in the tongue and entering into the hard palate. The patient’s mouth opening was therefore pinioned in a severely limited semi-open position with a Mallampati IV view.

Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

Penetrating neck injury

- May involve almost every major vital structure
- Findings suggestive are shown in figure
- Early deaths due to asphyxia from airway compromise or haemorrhage.
- Airway may be compressed and obstructed by tissue disruption, oedema, and haematoma
- Airway management can be immensely difficult.
- Choice between definitive airway & other prehospital interventions is guided by triage, expertise and equipment present in prehospital versus hospital settings, and travel time to hospital.

Table 2. Findings Consistent with Major Injury after Penetrating and Blunt Neck Trauma

Active external bleeding from the wound
Dysphagia, hoarseness, stridor
Disruption of larynx or trachea
Bleeding into the tracheobronchial tree
Subcutaneous emphysema
Expanding hematoma
Large or pulsatile hematoma
Oropharyngeal bleeding
Sucking neck wound
Neurologic deficit (spinal cord, brachial plexus)

Jerrold H. Levy, M.D., F.A.H.A., F.C.C.M., Editor

Management of the Traumatized Airway

Uday Jain, M.D., Ph.D., Maureen McCunn, M.D., M.I.P.P., Charles E. Smith, M.D., Jean-Francois Pittet, M.D.

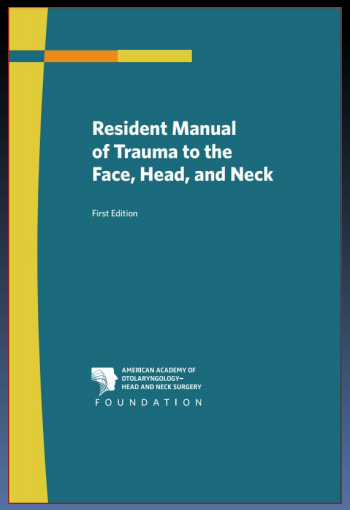
Anesthesiology, V 124 • No 1 199 January 2016

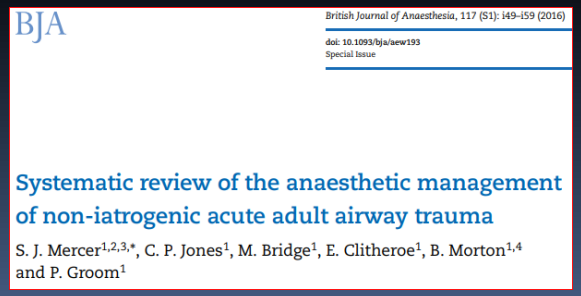
Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

Special case: laryngo-tracheal trauma/ separation

- Aim not to insert large airway devices (SAD or ETT), as moving the glottis or ventilating the patient can cause separation if tracheais only tenuously held to the larynx.
- Disruption of the airway often occurs at level of cricoid cartilage, either at the cricothyroid membrane or cricotracheal junction. Therefore, cricothyroidotomy may not be straight forward.
- Actually safest to accept an imperfect airway if intervention could lead to complete loss of airway. Rapid transfer. Pre-alert hospital.





Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

Upper airway burns

- NB THIS IS A TIME CRITICAL SITUATION
- Airway obstruction due to oedema can develop rapidly
- Patient will tire from hypoxia
- Will eventually need to be intubated. However, the longer intubation is delayed, the worse the obstruction becomes
- Ventilation by bag-valve-mask and i-gel may be virtually impossible because the oedema obstructs the airway
- Because of oedema, may need to use a smaller SAD than normal.
- If things get really bad, surgical cricothyroidotomy may be required
- After securing the airway, use high inspired oxygen because carboxyhaemoglobin levels likely to be high

Primary Survey 'Airway' in some special circumstances

Factors if considering airway intervention

Traumatic brain injury

- Clear airway essential in TBI. Airway obstruction is really bad for the injured brain.
- High risk of regurgitation and aspiration
- May also have facial and C Spine issues
- In extreme cases, Cushing's response may be apparent (increasing BP, falling heart rate)
- Intubation will further increase the BP
- Supraglottic airway device means clear airway, good oxygenation, and can assist ventilation
- Don't hyperventilate routinely unless indications of raised ICP when it can be used as a short-term holding measure

Primary Survey 'Circulation' in some special circumstances

Factors to consider when the circulation is unstable

Hyperkalaemia

- e.g. renal failure patient.
- Time critical.
- Dextrose. Insulin. Calcium. Bicarbonate.
- If last three aren't available and the patient arrests, pre-alert the hospital and expect to do prolonged CPR.

Major haemorrhage from limb

- Direct and indirect pressure
- Pack bleeding cavity e.g. with haemostatic agents e.g. Celox, etc.
- Tourniquet
- TXA indicated, but not primary method of arresting bleeding

High spinal cord injury

- Evident from history and inappropriate vitals e.g. HR 60, BP 85/.
- Heat loss can be immense as these people can't vasoconstrict
- Will need vascular support (fluids; vasopressors)

Primary Survey 'Disability' in some special circumstances

Factors to consider when assessing Disability

Disturbance of conscious level

- AVPU is far quicker than full GCS and sufficient for Primary Survey.
- Check glucose
- Check temperature if patient could be hypothermic
- Check pupils
- FAST

Don't forget 'E'. Assume all patients who have been outside will be hypothermic when you arrive, and also on arrival at hospital

Particularly if:

- Low GCS
- Low air temperature
- Wet
- Trauma

Measured temperature from EMS arrival

- Temperature fell average 1.7°C/h in uninsulated casualty
- Insulation alone reduces this to 1.1°C/h
- Active heat e.g. chemical heat pads

Lapostolle et al. Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine (2017) 25:43
DOI 10.1186/s13049-017-0349-1
Scandinavian Journal of Trauma, Resuscitation and Emergency Medicine

ORIGINAL RESEARCH Open Access

Hypothermia in trauma victims at first arrival of ambulance personnel: an observational study with assessment of risk factors

Frédéric Lapostolle[1,2*], James Couvreur[2], François Xavier Koch[3], Dominique Savary[4], Armelle Alhéritière[1,2], Michel Galinski[1,2], Jean-Luc Sebbah[5], Karim Tazarourte[6] and Frédéric Adnet[1,2]

ORIGINAL ARTICLE

When do trauma patients lose temperature? – a prospective observational study

S. C. Eidstuen[1], O. Uleberg[2,3,4], G. Vangberg[5] and E. Skogvoll[4,6]

[1]Faculty of Medicine, Norwegian University of Science and Technology (NTNU), Trondheim, Norway
[2]Department of Emergency Medicine and Pre-Hospital Services, St. Olav's University Hospital, Trondheim, Norway
[3]Department of Research and Development, Norwegian Air Ambulance Foundation, Drøbak, Norway
[4]Department of Circulation and Medical Imaging, Faculty of Medicine and Health Sciences, NTNU, Norwegian University of Science and Technology, Trondheim, Norway
[5]Medical Services, Norwegian Armed Forces, Sessvollmoen, Norway
[6]Department of Anesthesiology and Intensive Care Medicine, St. Olav's University Hospital, Trondheim, Norway

Acta Anaesthesiologica Scandinavica 2018;**62**:384–93

ARTICLE IN PRESS

WILDERNESS & ENVIRONMENTAL MEDICINE, ▮, ▮▮▮–▮▮▮ (2017)

TACTICAL COMBAT CASUALTY CARE: TRANSITIONING BATTLEFIELD LESSONS LEARNED TO OTHER AUSTERE ENVIRONMENTS

Battlefield Trauma-Induced Hypothermia: Transitioning the Preferred Method of Casualty Rewarming

Brad L. Bennett, PhD, EMT-P, CAPT, US Navy (Ret.); John B. Holcomb, MD, COL, US Army (Ret.)

From the Military & Emergency Medicine Department, F. Edward Hébert School of Medicine, Uniformed Services University of the Health Sciences, Bethesda, Maryland (Bennett); and the Department of Surgery, Center for Translational Injury Research, University of Texas Health Science Center, Houston, Texas (Holcomb).

Injury, Int. J. Care Injured 50 (2019) 308–317
Contents lists available at ScienceDirect
Injury
journal homepage: www.elsevier.com/locate/injury

Incidence and strategies for preventing sustained hypothermia of crash victims during prolonged vehicle extrication

R. Stroop[a,b,*], Ch. Schöne[c,d], Th. Grau[e]

PREDICTORS OF HYPOTHERMIA UPON TRAUMA CENTER ARRIVAL IN SEVERE TRAUMA PATIENTS TRANSPORTED TO HOSPITAL VIA EMS

Chantal Forristal, MD, Kristine Van Aarsen, MSc, Melanie Columbus, PhD, James Wei, MD, Kelly Vogt, MD, MSc, Sameer Mal, MD

Summary: Key practice points

- Don't allow yourself to get side-tracked into non-urgent issues e.g. focusing on the broken leg rather than checking the chest
- Expect to have to repeat the Primary Survey at least once, and possibly several times, in unstable patients or when your 'fix' cannot be permanent (most cases)
- Can do most of the Primary Survey with your hands, eyes and ears, which is the fastest way. Only need technology for three things linked to conscious level: pupils, temperature and capillary glucose.
- Practice Primary Survey to become slick with it

Final thoughts

- Thorough documentation is your friend
  - Helpful for the receiving hospital
  - May be needed by police and coroner
  - In the unlikely event that there is any medicolegal follow-up, a good record made at the time is invaluable
  - If you think you could need to refer to your prehospital documentation n the future, photograph it. Prehospital records have a habit of getting lost from hospital case notes.

- You have to play the hand you have been dealt
  - You're in a prehospital situation with limited resources
  - That means that sometimes, it's not possible to deliver perfect care
  - You can only do your best


Thank you