

Beyond ATLS, Patient Transfer and Ventilation

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ABSTRACT

This study focuses on the interest of the surgical patient after providing primary care according to ATLS. And thus focus on the topic of automated ventilation and transfer of the patient. I hope this topic is compliantly to ATLS book, so i called it beyond ATLS. Meta-analysis research was done, which revealed multi factors were responsible of patient complications during transfer, like insufficient ambulance equipment's, unqualified staff, anaesthesia tube slippage, inefficiency of automated ventilator, wrong ventilator setting and others. Patient transfer intrahospitals is an important factor in follow up and rescue the surgical patient. Automated ventilation is an important factor in the transport of high risk patients, so i made this two chapters and i hope to be added to ATLS book.

INTRADUCTION

This study focuses on the interest of the surgical patient after providing primary care according to ATLS, thus focused on the topic of automated ventilation and transfer of trauma patient and i hope this topic is complimentary to the book of ATLS and there for i called it beyond ATLS.

METHODES

Transfer intrahospitals is associated with serious pathological complications, some of it related to the severity of disease like polytrauma patients, and some were related to the team, especially the control of ventilator and ventilator settings. In my study i focused in this two subject hoping to decrease the complications related to those factors.

OBGECTIVES

1. To get safe transfer inter or intrahospitals.
2. Maintaining the continuity of medical care.
3. To make audit in causes of deterioration during transfer.
4. To put hospital policy in patient transportation.
5. To put new observational papers like consent paper for transfer and transfer report, also receiving report.
6. To make staff qualified by automated mechanical ventilatin and know its risks as it not mentioned in ATLS books.

METHODES

Meta-analysis: Research's on patient transfer between hospitals has been reviewed and i studied the causes of transfer complications and risk factors for complications.

Also i review my referral cases intrahospitals trying to put policy to avoid complications.

FIRSTLY

Why i transfer the patient?

The decision to transfer the patient is based on the benefits of care available to another facility against the potential risks involved. The

need to transfer a patient should take into account the benefit of providing extra care on the management or outcome.

Examples

1. Presence of few centres which provide super speciality.
2. Non availability of speciality beds.
3. For special investigation like MRI OR CT.

SECONDLY

Why transfer is danger process?

Because it is poorly organised and can significantly contribute morbidity and mortality.

THIRDLY

Whose people responsible for transfer?

1. Physician who order the transfer.
2. Physician who will accompany the patient in ambulance.
3. Accompany nurses.
4. Drivers.
5. physician who will receive the patient.

FOURTHLY

How can i organize transfer?

1. The decision to transfer the patient is taken by a senior consultant or specialist after through discussion with patient relative about the benefits and the risks involved. So a written and informed consent of patient relatives along with the reasons to transfer is mandatory before transfer.
2. A direct communication between the transferring and receiving facility should be undertaken with sharing of complete information on patient clinical condition, treatment being given, reasons for transfer, mode of transfer and time of transfer in written document.
3. Pre -transfer stabilization and preparation.

The patient should be adequately resuscitate and stabilized to the maximum extent possible without wasting time. Better Reference IS (Patient Transportation) for Terri Martin.

But we can mesh some important notes.

Airway: the patient possibility of airway compromised during transfer should be intubated, for more reading we can read ATLS book, airway management.

Breathing: in case of pneumothorax chest tube must be inserted. Apply ATLS primary and secondary survey.

Circulation: the patient should have at least two wide bore intravenous working cannulas, Foley catheter, blood transfusion, also up ATLS management.

Disability: Glasgow come score must be documented before any administration of any sedative. Exposure to document any additional procedure like CAST, NGT, TOMAS splint, and laboratory tests results, x-rays.

Mechanical check of ambulance is necessary

Ambulance equipment's like ventilator, oxygen supply, medications should be ready. Driver must be ready without alcohol drinking or other materials.

FIFTH

MODE OF TRANSFER

Ground transfer

Air transfer

Ground transfer is accomplished by the use of different types of ambulances

1. Basic life support ambulance, for non-life threatening conditions, as it can provide BLS services.
2. Advanced life support ambulance.

These can provide advanced life support services such as endotracheal intubation, cardiac monitoring, defibrillator, IVF. These are adequately staffed and equipped for transporting patients with life threatening conditions.

3. Micu: Mobile intensive care unite

These are specialised vehicles with all the equipment and staff to transfer critically ill patients and are usually used in conjunction with specialist teams.

SIXTHLY

Accompanying the Patient

It is usually recommended to have at least two competent personal accompanying the patient to be transferred. The care required by each patient during transfer depends on the level of patient's critical care dependency and accordingly are divided into:

Level 0: It includes the patients who can be managed at the level of the ward in a hospital and are usually not required to be accompanied by any specialised personal.

Level 1: It includes those patients who are at risk of deterioration in their condition during the transfer but can be managed in an acute ward setting with support from critical care team. These usually have to be accompanied by a paramedic or trained nurse.

Level 2: It includes patients who require observation or intervention for failure single organ system and must be accompanied by trained and competent personnel.

Level 3: It includes patients with requirement of advanced respiratory care during transfer with support of at least two failing organs systems. These patients have to be accompanied by a doctor along with a nurse and paramedic. These persons should be trained patient transfer and has advanced cardiac life support, airway management and critical care.

SEVENTH

Equipment, Drugs, and Monitoring

A proper monitoring with the provision of all lifesaving drugs is mandatory. The transfer ambulance must be equipped with all drugs and instruments required for airway management, oxygenation, ventilation, haemoid Dynamic monitoring and resuscitation. All the monitoring needs to be established before transfer, the drugs needed for patient transfer includes muscle relaxant, sedatives, analgesia, inotropes and resuscitation drugs. The minimum standard of monitoring recommended for patient transfer includes continuous electrocardiogram, non-invasive blood pressure, oxygen saturation, end tidal carbon dioxide, temperature, The electrical equipment must be functional on battery power with provision of extra batteries. Patient on ventilation must be transferred on portable transport ventilators with sufficient experience in mode of ventilator.

RESULTS

Several factors responsible for patient deterioration were identified like:

1. Insufficient ambulance supply equipment's.
2. Insufficient oxygen supply
3. Unqualified staff to deal with automated ventilation.
4. Anaesthesia tube slippage.
5. Removal intravenous catheter
6. Inefficiency automated ventilator.
7. Lack of drug administration.
8. We found some times delay in receiving hospital.
9. Medical complications like respiratory, cardiovascular, endocrine, infection.

RISK FACTORS FOR TRANSFER PATIENT COMPLICATION

Patient Related

1. Sever trauma patient.
2. Patient on complex medication.
3. Postoperative patient.
4. History of coronary artery disease.
5. High positive end-expiratory pressure.

Staff Related

1. Inexperienced staff.
2. Unfamiliarity with monitoring equipment.
3. Insufficient preparation of the patient.
4. Poor communication with receiving facility.
5. Inadequate resuscitation.
6. Lack of checklists.
7. Failure to prepare monitors before transfer
8. Interruption therapy.

DUCOMMENTS

Simply it is important to have three reports for every transfer.

1. Physician who refer the case.
2. Team transport report.
3. Receiving physician report.

By this reports we can improve our work and increase patient safety...

SECOND PART MECHANICAL VENTILATION

INTRUDUCTION

Intubation, with subsequent mechanical ventilation, is a common lifesaving intervention in the emergency department. Given the increasing length of stay of ventilated patients in EDs, it is necessary for emergency practitioners to have a good understanding of techniques to optimize mechanical ventilation and minimize complications.

We started by trauma management plan

Triage, ATLS, Damage Control, Mechanical Ventilation Transfer

Indication for definitive airway

1. Need for airway protection

- severe maxillofacial fractures
- Risk for aspiration from bleeding and vomiting

NECK INJURY

- Neck haematoma
- Laryngeal haematoma
- Inhalation injury from burns and facial burns
- Stridor
- Voice damage

HEAD INJURY

- Unconscious
- Combative
- Acute neurological deterioration.

2. Need for Ventilation and Oxygenation

Inadequate respiratory efforts

- Tachypnea
- Hypoxia
- Hypercarbia

- Cyanosis
- Combativeness
- Progressive change
- Accessory muscle use
- Respiratory muscle paralysis
- Abdominal breathing
- Apnea from loss of consciousness or neuromuscular paralysis.

HOW CAN I DO INTUBATION?

By rapid sequence intubation

HOW CAN I DO RSI?

It divided to 3 stages, pre-induction, induction, maintenance.

| | | |
|---------------------|---|--|
| | Hypotensive or shock | Normotensive/ hypertension |
| Pretreatment | O ₂ , 3 minutes, atropine 0.02 mg per kg | O ₂ , 3 minutes fentanyl 3 mcg/kg, atropine |
| Induction | Ketamine 1-2 mg/kg | Etomidate 0.3 mg/kg |
| Paralytic | Succinyl 1.5 mg/kg | Succinyl 1.5 mg/kg |
| Maintenance | Midazolam 1-4 mg iv bolus then 1-12 mg/ hour in pedia 0.1 mg/kg Fentanyl 25-200 mcg/ hour | Propofol 0.3 mg, 3 mg/ kg/hour Fentanyl 25- 200 mcg/hour Remifentanyl 1.5 mg/kg bolus then 0.5 mcg/kg/hr |

Succinyl has dangerous effect in pedia so atropine must to be given, so it is not recommended to use routinely.

Etomidate is now considered the criterion standard of intubation agents in its use in RSI.

When i will not give sedative?

If Glasgow coma scale less than 4

How is ventilation mode selected?

The initial choice of ventilation mode SIMV OR A/C is institution and practitioner dependent. A/C ventilation is a full support mode in that the ventilator performs most, if not all, of the work of breathing. So it reduces oxygen consumption and carbon dioxide production of respiratory muscles. A potential drawback of A/C ventilation in the patient with obstructive airway disease is worsening of air trapping and breath stacking.

VENTILATOR SETTINGS IN GENERAL

1. Tidal volume

Airway disease 5-8 ml /kg Parenchymal lung disease 4-6 ml/kg
Ideal body weight =45.5 +0.91(height-152.4) for female For male =50+0.91(height-152.4)

2. Frequency

Airway disease 8-12RR Parenchymal lung disease RR 15-35
Avoid auto peep

3. Flow rate

Tidal volume =flow rate × T1=40-6 L/Min

Less than this patient will feel dyspnoea

4-I/E 1:2, 1:3

5-FIO₂ 100% O₂

5-Peep =5 cmH₂O

6. Flow Pattern

Sinusoidal or consent square

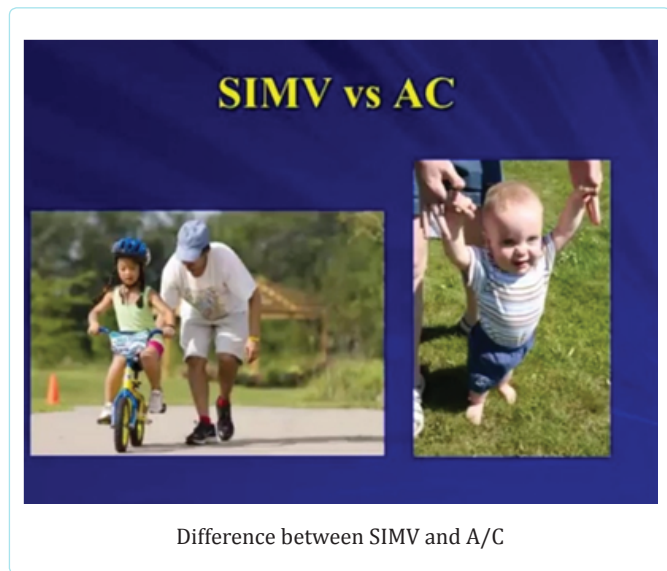
What are the adverse effects of mechanical ventilation?

Sometimes acute lung injury, ARDS, because of increased cytokines and inflammatory mediators.

How can i observe ventilator?

Cardiac monitor, blood pressure, and pulse oximetry are recommended to be observed. ABG, plateau pressure and expiratory volume also.

For example increased pressures because of chest wall stiffness was noted. Check tidal volume by expiratory volume also must be done.



Example of ventilator settings in head trauma and important notes Hyper ventilation is used only as temporary procedure to reduce ICP If you increase tidal volume, venous return to the heart will decrease Propofol will decrease intracranial pressure so its recommended.

In paralytic patient no difference between SIMV and A/C. In pedia, try to avoid Succinyl, try to be non-invasive like use of CBAB Paco2 must be between 35-45 mmHG. Midazolam has one set of 3 minutes while Etomidate 30 seconds so, induction by Etomidate is optimal. Propofol in pedia is safe. Support by IVF is necessary.

This an example of ventilator settings in head trauma

Ventilator Settings

Table 20-3 Initial Mechanical Ventilator Settings With Head Injury

| Setting | Recommendation |
|-------------------------|---|
| Mode | CMV (A/C) |
| Rate | 15-25 breaths/min |
| Volume/pressure control | Volume or pressure |
| Tidal volume | 6-8 mL/kg IBW provided that plateau pressure ≤ 30 cm H ₂ O |
| Inspiratory time | 1 s |
| PEEP | 5 cm H ₂ O provided that PEEP does not increase ICP |
| F _{io2} | 1.0 |

Abbreviations: CMV, continuous mandatory ventilation; ICP, intracranial pressure; IBW, ideal body weight; PEEP, positive end-expiratory pressure.

SUMMARY

Patient transfer is a serious process, but always it is neglected and as a result, a lot of complications were happened. The decision for transfer must follow a policy for organized transfer with aim of decrease the complications as we can by provide trained team with high level of equipment's and continue care of patient during transfer.

Mechanical ventilation play important role in rescue trauma patient and from point of view i hope to be added to ATLS book as a chapter. In my research i summarised the ventilator settings and optimal medications in management trauma patient. My hope was to decrease morbidity and mortality associated with lack information's in mechanical ventilation and hope i succeeded.

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