Abstract

The purpose of this paper is to review airbag related injuries of the head and neck. Airbags have changed the pattern of fractures seen in road traffic accidents, reducing morbidity and mortality. However in younger patients and patients of short stature, sitting in the front seat, severe spinal injuries can still occur, even with deployment of airbags. When used in conjunction with seatbelts the incidence of facial fracture decreases from 18% to 4%. Airbag related injuries can occasionally present with unusual presentations and there are reports of submandibular gland rupture, facial nerve palsy and TMJ disk displacement. The majority of airbag associated injuries are minor however. Nevertheless, knowledge of these unusual presentations helps us know what to look for and improves diagnosis and outcomes.

Introduction

Airbags are made of nylon and aimed to provide a cushion to prevent the passenger hitting the steering wheel or other hard structures. During a collision they expand within 0.5 msec at speeds approaching 200mph. This can cause contusions and lacerations. During their rapid inflation alkali gases are released that can caused burns, ocular keratitis and laryngospasm. The deployment of airbags can reach up to 175dB and there have also been reports of noise induced hearing loss, tinnitus, vertigo and perilymphatic fistula.
Airbags have changed the pattern of fractures seen in road traffic accidents, reducing morbidity and mortality. However in younger patients and patients of short stature, sitting in the front seat, severe spinal injuries can still occur, even with deployment of airbags. When used in conjunction with seatbelts the incidence of facial fracture decreases from 18% to 4%.

Airbag related injuries can occasionally present with unusual presentations and there are reports of submandibular gland rupture, facial nerve palsy and TMJ disk displacement. The majority of airbag associated injuries are minor however. Nevertheless, knowledge of these unusual presentations helps us know what to look for and improves diagnosis and outcomes.

In 1983 it became mandatory for drivers to wear a seatbelt in the UK. A list of other countries is provided in table 1. Whilst 161 countries have national seat-belt laws, only 105 countries, (representing 4.8 billion people), meet best practice by including rear-seat occupants as well as front-seat occupants2.

Table 1

Consequently, in these countries, fatal and severe facial injuries have since become minor, with the most common injuries being abrasions, lacerations and contusions3,4,5.

Wearing a seat belt has been shown to reduce the risk of a fatality among

Figure 1 – seat belt laws by country2

<table>
<thead>
<tr>
<th>Country</th>
<th>Required by law for the driver</th>
<th>Compulsory for all passengers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Argentina</td>
<td>1994</td>
<td>1994</td>
</tr>
<tr>
<td>Australia</td>
<td>1973</td>
<td>1986</td>
</tr>
<tr>
<td>Canada</td>
<td>1976</td>
<td></td>
</tr>
<tr>
<td>European union</td>
<td>1993</td>
<td>1993</td>
</tr>
<tr>
<td>France</td>
<td>1979</td>
<td>1990</td>
</tr>
<tr>
<td>Germany</td>
<td>1976</td>
<td>1984</td>
</tr>
<tr>
<td>Hong Kong</td>
<td>1983</td>
<td>1996</td>
</tr>
<tr>
<td>Italy</td>
<td>1989</td>
<td>1990</td>
</tr>
<tr>
<td>Japan</td>
<td>1971</td>
<td>2008</td>
</tr>
<tr>
<td>New Zealand</td>
<td>1972</td>
<td>1989</td>
</tr>
<tr>
<td>Singapore</td>
<td>1973</td>
<td>1993</td>
</tr>
<tr>
<td>Sri Lanka</td>
<td>2011</td>
<td></td>
</tr>
<tr>
<td>Thailand</td>
<td>1996</td>
<td>2009</td>
</tr>
<tr>
<td>United kingdom</td>
<td>1983</td>
<td>1991</td>
</tr>
<tr>
<td>United States</td>
<td>1984</td>
<td></td>
</tr>
</tbody>
</table>
drivers and front-seat occupants by 45–50%, and the risk of minor and serious injuries by 20% and 45% respectively².

Together with seatbelt, airbags are now fitted as standard in many modern cars. In 1998 the United States government amended their safety standard, to require dual front airbags and reduced power second-generation airbags³.

However, in the rest of the world there is no legal requirement for new cars to have airbags. Nevertheless, efforts are being made to address this and independent regulators such as the Euro NCAP (New Car Assessment Programme) publish vehicle safety regulations which now encourage manufactures to reach high standards. A good rating combines airbags and other safety features⁶. Similar regulators include the Latin NCAP and C NCAP for Latin America and China respectively.

In developing countries many of the cars do not meet these standards (fig 2). Cost is the main reason that safety features such as airbags are not standard. Reports suggesting a rise of $2000 to implement these changes ⁷.

Latin Americas are slowly implementing airbags as standard. Brazil, Argentina, Ecuador, Uruguay have airbags as standard and Columbia will as from 2017. Recent reports indicates that basic safety features such as airbags were not made mandatory on all cars in India until 2015⁸

Figure 2 – minimum safety standards²
However, despite increased airbag implementation, these are not without complications. Many reports implicate airbags as the cause of injury. This will be discussed.

**Airbags**

An airbag is an inflatable sac, usually made of nylon or polyester fabric designed to cushion the impact and absorb the force. Airbag deployment occurs in a rapid sequence of, firstly detection by sensors located on the front of the car and of deceleration greater than 10-15mph/second. Inflation then occurs as a result of the propellant, sodium azide igniting. This produces nitrogen, which inflates the bag over a brief period of 35-50msec, at a velocity up to 200mph. This is followed by rapid deflation, the final stage of the cycle.

Timing is crucial with the aim being for the passenger to strike the airbag once it is fully expanded and not during the “zone of deployment”. The zone of deployment is the volume of space that the airbag inflates into (fig 3).

**Types of airbag**

Untethered airbags resulted in more severe facial injuries and a subsequent move to tethered bags has gained favour as it allowed the bag to fill more radially rather than in an anterior–posterior direction. Tethered bags are therefore another reason why facial injuries have been in decline.

A crucial distinction exists between the UK and Europe and the USA. Airbags in the UK and Europe are designed for belted drivers (in contrast to the USA). As a result UK airbags are

**Figure 3 – Zone of deployment**

Countries applying priority UN vehicle safety standards
smaller 30-40 litres and deploy with much less force than USA airbags. It has been suggested that this difference may be a contributing reason as to why there are more injuries in the USA despite airbags being mandatory in all cars and seat belt laws in 49 states. Not all drivers use seatbelts and so the US airbags are larger (70 litres). These require a larger zone of deployment, and deploy with greater velocity, still within the 30-50 msec time frame\textsuperscript{10,12,18}. Whilst these safety features have reduced mortality, patients are now surviving but presenting with head and neck injuries.

**Ocular injuries**

In a comprehensive review of the literature from 1991-1998\textsuperscript{13}, ocular injuries were split into anterior and posterior segments. The most common cause of injury was as a result of blunt force trauma directly attributed to the passenger hitting the airbag during deployment or in fully expanded phase.

Anterior segment injuries were the most common, at 48%. A combination of anterior and posterior injuries occurred in 44% of cases (Table 2).

Posterior injuries occurring in isolation were 6% (Table 3). The authors noted that whilst the mechanism of ocular injury is likely to be caused by the airbag itself, this is far more favourable that the steering wheel. In crashes of all types airbag and seat belt reduced fatalities by 50%, when compared with no restraints\textsuperscript{13}.

**Table 2 Anterior eye injuries\textsuperscript{13}.**
they also found that half of ocular injuries were attributed to airbag deployment. The same study commented that airbags are designed to be used in conjunction with seat belts. This combination of seatbelts and a front-impact airbag reduces accident-related mortality by 45% and severe injury by 50%\textsuperscript{10}.

The literature also contains many case reports (some listed in the references) of airbag related alkali keratitis secondary to sodium hydroxide being released as a by-product of the sodium azide propellant. In these cases, the alkali seeps through the airbag, making contact with the passenger. This has the potential to cause damage to the cornea and conjunctiva. This damage is exacerbated if the airbag tears. Alkali causes saponification of fatty acids and disruption of cell membrane; this amplifies the host response exacerbating corneal damage\textsuperscript{14}. The Roper-Hall grading system classifies the severity of burn\textsuperscript{14}. The severity of the injury, relates to the time the acid or alkali is in contact with limbal/conjunctiva. Newer classifications provide alternative ways to grade burns and predict outcomes\textsuperscript{47}.

<table>
<thead>
<tr>
<th>Anterior Injury</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Corneal Abrasion</td>
<td>49%</td>
</tr>
<tr>
<td>Hyphema</td>
<td>43%</td>
</tr>
<tr>
<td>Dislocated lens</td>
<td>9%</td>
</tr>
<tr>
<td>Subluxated Lens</td>
<td>9%</td>
</tr>
<tr>
<td>Chemical keratitis</td>
<td>9%</td>
</tr>
<tr>
<td>Orbital facture</td>
<td>3%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Posterior Injury</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Retinal / vitreous haemorrhage</td>
<td>26%</td>
</tr>
<tr>
<td>Retinal tear detachment</td>
<td>15%</td>
</tr>
<tr>
<td>Macular hole rupture</td>
<td>4%</td>
</tr>
<tr>
<td>Choroidal rupture</td>
<td>3%</td>
</tr>
</tbody>
</table>

Table 3 Posterior eye injuries\textsuperscript{13}

This study published in Survey of ophthalmology\textsuperscript{10}, reviewed 127 eye injuries in 101 patients with airbag related trauma.

Open globe injuries were invariably unilateral and occurred in 4.2% of cases. Both these studies noted that airbag related ocular injuries were infrequently bilateral, occurring in 12.5% -19% of the total injuries\textsuperscript{10,13}.

The National Accident Sampling System Crash Worthiness Data System from 1990 to 1992 showed that there was a 2.5 times higher risk of eye injury without airbag deployment. However,
Orbital fractures are an increasingly rare occurrence in relation to airbag usage. In one literature review published in Laryngoscope\textsuperscript{15} 150 orbital fractures occurring in 2739 occupants, over an 8-year period were analysed. Of these there were 10 orbital blowouts, solely caused by the airbag. In nine of these the occupant was sitting in the zone of deployment, and 6 of the 10 were of “short stature”. This paper discussed a link between passenger stature and position in relation to the zone of deployment of the airbag. The evidence from this study published in Arch Facial Plastic Surgery\textsuperscript{16} supported the view that orbital fractures were the third most common facial fracture in airbags-only passengers and joint second in airbag and seat belt restrained patients.

**Facial fractures**

Airbags have dramatically changed the presentation of head and neck injuries, which now have more atypical presentations.

In one case report published in the journal of oral and maxillofacial surgery this patient\textsuperscript{20} sustained a fracture of the mandibular condyle, that occurred as a result of airbag deployment. The mechanism of injury was thought to be a blow to the chin causing the fracture of

<table>
<thead>
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</tr>
<tr>
<td>Hyphema</td>
<td>17%</td>
</tr>
<tr>
<td>Vitreous Haemorrhage</td>
<td>10%</td>
</tr>
<tr>
<td>Retinal Haemorrhage</td>
<td>10%</td>
</tr>
<tr>
<td>Retinal tear</td>
<td>6%</td>
</tr>
<tr>
<td>Orbital fracture</td>
<td>1%</td>
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**Table 4 Common ocular injuries\textsuperscript{10}**

Other reports include:

i) Bilateral blindness\textsuperscript{17}, caused by bilateral hyphema and vitreous haemorrhage. There was suspected scleral rupture attributed to horizontal expansile forces at the iris root, equator and vitreous base. The passenger was suspected to have been slumped forward and in the zone of deployment, when the RTA occurred.

ii) Penetrating injuries from a smoking pipe\textsuperscript{19}, thought to be caused by the impact of the expanding airbag that projected the pipe into the face of the driver. The author’s comment that hazards can occur when any rigid object is between the occupant and the expanding airbag.

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Airbags when used in conjunction with seatbelts have helped to reduce the severity of facial fractures, although serious injuries still occur. Nevertheless compared to unrestrained, or seat belt only / airbag only passengers, these injuries are far better than hitting the steering column or windshield. This would inevitably lead to a more serious injury

Using a data set from the National Trauma Data Bank in the USA one review, looked at facial injuries rather than the protective mechanisms. Out of 518,106 patients, 10% had at least 1 facial fracture. Of these injuries nasal fractures were the most common facial fracture. 57% of patients had no protective device. From this it was concluded best protection to reduce incidence of facial fractures was a combination of seat belt and airbag, followed by seat belt alone and finally airbag

In another analysis of maxillofacial injuries, unrestrained drivers most frequently sustained maxillofacial injuries (18.4%), compared to those with seat belt and airbag who were less likely (4.3%). Table 7 shows nasal fractures were the most common maxillofacial injury. However, the data in this study does not clarify which fractures occurred with/without or in combination with vehicle restraints.

### Table 6* Total incidence of facial fractures in road traffic accidents

<table>
<thead>
<tr>
<th>Injury type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal fracture</td>
<td>5.6%</td>
</tr>
<tr>
<td>Midface</td>
<td>3.8%</td>
</tr>
<tr>
<td>Orbital fracture</td>
<td>2.6%</td>
</tr>
<tr>
<td>Mandible fracture</td>
<td>2.2%</td>
</tr>
<tr>
<td>Pan-facial fracture</td>
<td>0.8%</td>
</tr>
</tbody>
</table>

* Data includes no restraints, seatbelt only, airbag only and airbag and seatbelt.

In a series of case reports published by the Royal College of Surgeons. An airbag only restraint case, resulted in a fracture of the ZMC and a penetrating eye injury. In another case, in a fully restrained passenger the force of the airbag deployment on the patient’s hand resulted in her striking her face resulting in both a penetrating ocular injury and a fracture of the right ZMC.

In a separate case from Italy fractures of the ZMC and an occipital condyle occurred. Here, the patient was sitting in the zone of deployment. As the airbag expanded upwards and forwards, deceleration of the car caused hyperextension of the C spine. This is believed to be the cause for the occipital condyle fracture.

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The criteria for patients included in this study (table 8 - at end of paper) published in Arch Facial Plastic Surgery shows a generally higher level of trauma and comorbidities.

Table 7. Incidence of all facial fractures24.

<table>
<thead>
<tr>
<th>Injury type</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nasal fracture</td>
<td>38.5%</td>
</tr>
<tr>
<td>Maxillary fracture</td>
<td>25.6%</td>
</tr>
<tr>
<td>Mandible fractures</td>
<td>17.9%</td>
</tr>
<tr>
<td>Zygomatic fractures</td>
<td>10.3%</td>
</tr>
<tr>
<td>Orbital fractures</td>
<td>7.7%</td>
</tr>
</tbody>
</table>

This study looked at the following facial fractures: Nasal, Mandibular, ZMC and Orbital. They were then grouped into “No restraint”, “Seat belt only”, “Airbag only”, “Airbag and seatbelt”. From this cohort of patients (table 9) it shows that nasal fractures were the most common and mandibular the least. The use of restraining devices was found to affect the pattern of only ZMC fractures they found this to be statistically significant P.001. And concluded that if a crash is severe enough to cause a facial fracture the ZMC is least protected. They discuss changes in the airbag design that would divert forces from the weaker parts of the face (Nasal and ZMC) to more stable areas16.

Noise induced hearing loss

Noise induced hearing loss is a result of acoustic trauma. This can damage the eardrum and damage the bones in the middle ear. The mechanism of this is pressure changes either as a result of direct trauma to the ear or sound waves. The eardrum usually heals in a few weeks, long term complications are tinnitus and progressive hearing loss48,49.

The deployment of an airbag inside a car can reach between 160-175dB11,25. This is sufficient to result in noise-induced hearing loss. To give that perspective a firearm can reach sounds of 140dB to over 175dB.
A hearing shift is defined as temporary loss of hearing after exposure to sound and clinically as asymmetry of more than 10dB\textsuperscript{25}.

One study\textsuperscript{26} conducted a trial on 91 patients to investigate airbag related hearing loss. Subjects were exposed to a peak sound pressure in excess of 168dB. Of these almost half showed a temporary threshold shift in one ear (a difference of more than 10dB per ear lasting three weeks). Only one subject had non-resolution after 6 months.

A subsequent study\textsuperscript{27} done in 1973 concluded that airbags did not pose a threat to hearing. Patients were exposed to volumes of 153-165dB. None sustained permanent shifts.

A study looking into hearing loss and airbag deployment\textsuperscript{11} found that out of 177 interviewers only 1.7% had any hearing loss after airbag deployment.

In another case\textsuperscript{25} 71 cases with otologic symptoms post airbag deployment were reported. The most common complaints were tinnitus 73%, hearing loss 66% and vertigo 18%.

A rare case\textsuperscript{28} of a perilymphatic fistula secondary to airbag deployment is reported. This was attributed to the rapid inflation of the airbag against the patient’s ear. This patient had hearing loss and vertigo. Surgery corrected the fistula and her presenting complaints.

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![Figure 3. Openings in the round window allow perilymph fluid to leak out\textsuperscript{29}](image)

**Life threatening injuries**

Life threatening head and neck injuries resulting solely from airbag deployment are rare. However in children they are more common. Children under 10 sitting in the front seat have a 10% -34% increased risk of fatality when an airbag is deployed\textsuperscript{5,31,32}. They have an 87% increase of non-fatal injures, many of these injuries occurred at low speeds\textsuperscript{32}.

A fully restrained 7-year-old sitting in the front seat, involved in a low speed
collision. He sustained a 21mm atlanto occipital dislocation. Children are more at risk of atlanto-occipital dislocations. During pre crash breaking, the child’s head is flexed forward into the inflating airbag. This combination of hyperextension and lateral flexion and the anatomy of the paediatric atalanto occipital joint lead to increased susceptibility.

A 4 year old sustained fatal injuries as a result of airbag deployment. The inflating airbag impacted the patient’s chin and face leading to hyperextension and complete dislocation of the vertebral body at C2.

Finally, a young 17-year-old patient involved in a low speed collision, who had only airbag protection sustained a fatal basilar skull fracture. Her death is attributed to her height 149 cm tall (equivalent to a 11-12 year old girl), her position in the zone of deployment and not using a seatbelt.

**Miscellaneous airbag induced injuries**

Age: The evidence suggests that the older the driver the higher the risk of severity or injury and fatality. Increased age was associated with worse outcomes, with the greatest risk in drivers over 85. It has also been suggested that airbags are likely to cause a more severe upper extremity injury to an older driver than a younger driver. Older drivers experienced twice as many lacerations, more fracture and were more likely to sustain contusions. Younger drivers were most likely to sustain burns.

Burns: burns are responsible for 5-7.8% of airbag-induced injuries these are a direct result of the high temperatures released during deployment or direct contact with the alkali plume created.

Traumatic neuropraxia of the facial nerve has been reported. Rapid deployment of the airbag is believed to have bruised the nerve, causing transient paralysis.

Laryngospasm followed inhalation of sodium azide and associated alkaline products, which are released during airbag deployment. This patient had no previous history of respiratory illness. In contrast a 46-year-old female with underlying interstitial lung disease, sustained supraglottic and subglottic airway inflammation following airbag deployment, due to the gases released during airbag deployment.

Submandibular gland rupture has also been reported in an unrestrained victim, the rapid deployment is believed to have been the cause of this injury. The patient had no further complications from this injury and no treatment was indicated.
There has also been TMJ injury as a result of deployment of airbags the authors believe contact to the mandible of the forward moving patient and upward deployment of the airbags can cause TMJ disk displacement, and condylar fracture\(^3,43\).

Teeth: Airbags have been implicated in producing atypical abrasion patterns of demineralisation corresponding to the pattern on the airbag. The mechanism of this is scraping of the rough airbag on the enamel surfaces\(^44\). The evidence also suggests tooth loss is a common finding road traffic accidents in this paper it was found to be the third most frequent injury\(^45\). The mechanism for tooth loss was not stipulated.

Whiplash: A literature\(^45\) review found out of 201 patients, 9% sustained neck strains without fracture.

**Summary**

**Ocular injuries**

Most cases involve the anterior segment of the eye and usually have favourable outcomes, posterior segments injuries are usually less favourable.

Airbag induced eye injuries are usually due to blunt force, abrasion, and chemical injury\(^10\)

Suspect alkaline induced keratitis when airbags have been deployed as patients, outcome can be dramatically improved if immediate irrigation with water is carried out promptly. In these instances immediate referral to ophthalmology is required\(^14\)

**Facial fractures**

The combination of seatbelts and airbags dramatically reduce severity of oral and maxillofacial injuries \(^4,18,20,21,22,23,24\)

If an accident is severe enough to cause a facial fracture, airbags have least protection of the ZMC\(^16\).

For most accurate results velocity of impact has to be considered\(^16\)

Short stature patients may be at more risk \(^15,18,20,21\)

Passengers should sit approximately 25cm from the steering wheel and thereby out of the zone of deployment

Nasal fractures are most common \(^16,23,24\)

**Otological injuries**

Of the studies provided it would be safe to assume that permanent shifts are rare \(^11,25,26,27,28\)
Individuals with pre-existing tinnitus or hearing loss are at higher risk of permanent shift. Side airbags increase the potential for hearing loss. The closer proximity to the airbag the higher the risk.

**Life threatening injuries**

Children under the age of 13 should be restrained in the back seat as it reduces their mortality rate. Risk - i) Short stature adults are at risk as they have to sit in the zone of deployment. ii) Age, due to the flexibility of the atlanto occipital joint in addition to height are determining factors. Severe damage can occur even at low speeds. Adults should sit at least 10 inches from the steering wheel.

Passengers who have for medical reasons have to sit in the zone of deployment and are therefore “at risk” may warrant deactivation of their airbags. These include scoliosis, ankylosing spondylitis and Down syndrome patients.

**Conclusion**

Airbags alone have reduced morbidity and mortality by 19 -50%. The literature is resplendent with evidence stating airbags used in conjunction with seat belts are the safest way to reduce injury.

The UK has a different pattern of maxillofacial injuries due to a smaller airbag and passengers wearing seatbelts.

Smart or advanced airbags would appear to be the future; these airbags would work with crash sensors and adjust inflation thresholds depending on velocity of impact, weight and position of the occupant. Additionally airbags that expand with less pressure on the weaker parts of the face may be beneficial.

The majority of injuries are associated with airbags are minor, that does not take away the impact to the patient. Ocular injuries are usually anterior segment injuries with favourable prognosis. Ocular burns should be assessed quickly and appropriately referred, hearing should be measured and loss more than 3 weeks should be investigated, nasal bones and ZMC...
should be assessed and the most managed appropriately in the emergency common injuries such as lacerations, setting.

abrasions and contusions should be

Table 5 Roper Hall Grading system, classifying severity of ocular burns

<table>
<thead>
<tr>
<th>Grade</th>
<th>Prognosis</th>
<th>Cornea</th>
<th>Conjunctiva / Limbus</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Good</td>
<td>Corneal epithelial damage</td>
<td>No limbal ischemia</td>
</tr>
<tr>
<td>II</td>
<td>Good</td>
<td>Corneal haze, iris details visible</td>
<td>&lt;1/3 limbal ischemia</td>
</tr>
<tr>
<td>III</td>
<td>Guarded</td>
<td>Total epithelial loss, stromal haze, iris details obscured</td>
<td>1/3–½ limbal ischemia</td>
</tr>
<tr>
<td>IV</td>
<td>Poor</td>
<td>Cornea opaque, iris and pupil obscured</td>
<td>&gt;½ limbal ischemia</td>
</tr>
</tbody>
</table>

Trauma Surgery Consult Criteria

Physiologic
- Cardiopulmonary arrest
- Shock, systolic blood pressure < 80 mm Hg
- Respiratory distress, failure, intubated; respiratory rate < 10/min or > 29/min
- Major head injury: obtunded, actively seizing, Glasgow Coma Scale score < 8

Anatomical
- Penetrating injury to head, neck, or torso
- Maxillofacial or tracheal trauma with potential for airway compromise
- Flail chest without respiratory compromise
- Spinal cord injury with paralysis
- >2 Proximal long bone fractures
- Penetrating injury of extremities proximal to elbows and knees Amputation proximal to wrist and ankle
- Pelvic fracture
- Burns
  - < 20% Body surface area if > 55 years old
  - > 30% Body surface area if < 55 years old Mechanism
- Fatality of another person in same vehicle

Table 8 Criteria for patients included in study.
References


Accepted March 2017

Comments? - go to Forums to discuss this and any other topics of interest