

↙ Advance trauma life support

ATLS Protocol & Orthopedic History Taking

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The History of the ATLS

In February 1976, a tragedy occurred that would change the first hour of trauma care for patients. Dr. Jim Styner, an orthopedic surgeon, crashed his small plane into a cornfield in rural Nebraska

Nebraska. Dr. Styner sustained serious injuries, three of his children sustained critical injuries, his wife was killed instantly. The care that he and his family received was less than adequate. There was an obvious lack of training for proper triage and injury treatment. The surgeon, recognizing how inadequate his treatment was stated, "when I can provide better care in the field with limited resources than what my children and I received at the primary care facility, there is something wrong with the system and the system must be changed.

He started the course in Nebraska in 1978 which was taken up by American College of surgeons and given nationally 1979.

- ❖ It is a training program for doctors
- ❖ Its goal is to teach a simplified and standardized approach for trauma patients
- ❖ The philosophy of the ATLS program is to treat the greatest threat to life first then assess and treat again.

ATLS Protocol : The ABCs

The underlying principle of ATLS is to identify the most immediately life-threatening injuries first and start resuscitation. As a general rule, airway obstruction kills in a matter of minutes, followed by respiratory failure, circulatory failure and expanding intracranial mass lesions. This likely sequence of deterioration has led to the development of the trauma 'ABCs', a planned sequence of management predicated on treating the most lethal and time-critical injuries first.

Throughout this sequence, the assumption is made (until proven otherwise) **that there may be an unrecognized and unstable cervical spine injury.**

Hence, the sequence is:

- A- Airway with cervical spine protection
- B- Breathing and ventilation
- C- Circulation with hemorrhage control
- D- Disability or neurological status
- E- Exposure and Environment – remove clothing, keep warm.

fracture femur or
stab wound in chest?
? *قيد* *الرجل* *في*
chest stab wound
it's urgent or immediate

ATLS Protocol : Triage

→ massive RTA

Triage, is medical sorting to prioritize multiple casualties for resuscitation, and is used when the number of casualties outstrips the available resources.

The initial two phases of triage, usually pre-hospital, are the **sieve and the sort**, to group casualties into the four priority groups of

Immediate, urgent, Delayed or Dead.

Within the ATLS system, multiple casualties are triaged systemically by rapidly assessing each patient's ABCs. Those with the most immediately life-threatening injuries are treated first these are injuries of the:

1. Airway: Actual or impending obstruction >>> Priority 1
2. Breathing: Hypoxia or ventilatory failure >>> Priority 2
3. Circulation: External hemorrhage or shock >>> Priority 3

→ tension pneumothorax
is → Immediate

ATLS Protocol: Primary survey and resuscitation

During the primary survey, life-threatening conditions are identified and resuscitation started immediately , following the **ABCDE** sequence.

As each stage in the ABCs is completed, the casualty is re-evaluated for deterioration or improvement; on completion of the breathing assessment, the airway is re-examined and the airway and breathing reassessed before moving on to the circulation, etc.

1) AIRWAY AND CERVICAL SPINE CONTROL :

The cervical spine is stabilized immediately on the basis that an unstable injury cannot initially be ruled out. There are two techniques for this:

- manual, in-line immobilization
- rigid cervical collar, head supports and strapping.

The airway is examined for obstruction by **looking, listening and feeling** for signs such as respiratory distress, use of accessory muscles of respiration, decreased conscious level.

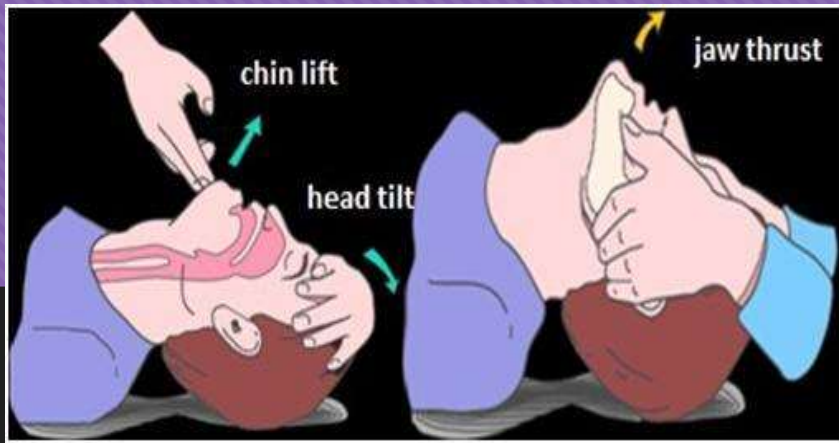
-Head tilt chin left / jaw thrust

-Secretions and blood are carefully suctioned

-OP or NP airways used to hold the tongue forward

-tracheal intubation

-Cricothyroidotomy –the definitive airway



2) BREATHING:

A clear airway does not mean the casualty is breathing adequately to enable peripheral tissue oxygenation. The chest must be exposed and examined **by looking and listening** if there is bruising, open wounds and tachypnoea or absent breath sounds (indicate a pneumothorax or hemothorax).also, **palpate** the suprasternal notch to detect the deviation trachea, surgical emphysema (is recognized on palpation by its characteristic crackling and popping) and hyperresonance caused by (a tension pneumothorax).

Life-threatening conditions:

Tension pneumothorax must be treated immediately if the diagnostic signs of absent breath sounds, hyper-resonance, surgical emphysema and deviated trachea are found.

Thoracentesis (**needle thoracostomy** placed in the 2nd intercostal space in the midclavicular line) followed by **tube thoracostomy** in the 4th intercostal space anterior to the midaxillary line are the immediate management.

Open pneumothorax treated immediately by +/- intubation with positive pressure ventilation ,chest tube ,occlusive dressing over chest wall defect.

Massive hemothorax treated by volume replacement, chest tube, use of cell saver;if available , removal of blood.

3) CIRCULATION WITH HAEMORRHAGE CONTROL:

The circulation is assessed by looking for external bleeding and the visible signs of shock such as pallor, prolonged capillary refill and decreased conscious level.

The heart is auscultated to detect the muffled sounds of cardiac tamponade, and poor perfusion assessed by feeling for clammy and cool skin.

The peripheral and central pulses are palpated to detect tachycardia and diminished or absent pulse pressure. External bleeding is controlled by pressure, and two large-bore (14-16 gauge) cannulae sited for administration of IV fluids and blood.

Blood samples can be drawn from the cannulae for baseline diagnostic tests and transfusion cross-matching.

Beck's triad of cardiac tamponade: muffled heart sounds, hypotension, jugular vein distension.

Cardiac tamponade is managed once suspected by pericardiocentesis with IV fluid bolus.

4) DISABILITY:

The key element of assessing a patient's neurological status is the Glasgow Coma Score (GCS).

Glasgow Coma Scale		
Response	Scale	Score
Eye Opening Response	Eyes open spontaneously	4 Points
	Eyes open to verbal command, speech, or shout	3 Points
	Eyes open to pain (not applied to face)	2 Points
	No eye opening	1 Point
Verbal Response	Oriented	5 Points
	Confused conversation, but able to answer questions	4 Points
	Inappropriate responses, words discernible	3 Points
	Incomprehensible sounds or speech	2 Points
	No verbal response	1 Point
Motor Response	Obeys commands for movement	6 Points
	Purposeful movement to painful stimulus	5 Points
	Withdraws from pain	4 Points
	Abnormal (spastic) flexion, decorticate posture	3 Points
	Extensor (rigid) response, decerebrate posture	2 Points
	No motor response	1 Point

Minor Brain Injury = 13-15 points; Moderate Brain Injury = 9-12 points; Severe Brain Injury = 3-8 points

- The classic pitfall of intoxication should be considered, but a lowered GCS is assumed to be secondary to a cerebral injury until proven otherwise.
- The pupils are examined for any difference in size indicating possible raised, intracerebral pressure (ICP), and unresponsive pupils, fixed at midpoint, which can indicate serious brain damage, a blown pupil suggests ipsilateral brain mass as brain herniation compresses CN III.
- Motor/sensory : screening exam for lateralizing extremity movement, sensory deficits.

5) EXPOSURE AND ENVIRONMENT:

The patient should have all clothing removed to enable a full examination of the entire body surface area to take place. This will require log-rolling to examine the posterior aspects and allow removal of any glass or debris.

The casualty should be kept warm to maintain body temperature as close to 37 °C as possible, and all fluids and ventilated gases should be warmed. A hypothermic patient becomes peripherally shut down and acidotic and, if shivering, has greatly increased oxygen demands. Severe hypothermia (<32 C) accompanying trauma is associated with a mortality incidence approaching 100%.

ADJUNCTS TO PRIMARY SURVEY:

Vital Signs, ECG, Pulse oximetry, End-tidal carbon dioxide, Arterial blood gases , Urinary output Urethral catheter (unless contraindicated), Nasogastric tube (unless contraindicated), Chest X-ray, Pelvic X-ray.

ATLS Protocol : Secondary Survey

The secondary survey is a detailed, head-to-toe evaluation to identify all injuries not recognized in the primary survey. It takes place after the primary survey has been completed, if the patient is stable enough and not in immediate need of definitive care; it may, in fact, take place after surgery, or on the intensive care unit (ICU).

The importance of the secondary survey is that relatively minor injuries (e.g. small joint dislocations and fractures) can be missed during the primary survey and resuscitation but can cause long-term morbidity if overlooked.

The components of the secondary survey are:

- the history
- physical examination
- 'tubes and fingers in every orifice (ears, nose, mouth, vagina, rectum)'
- neurological examination
- further diagnostic tests
- re-evaluation.

Tertiary survey: -repeat of 2ry survey. -look for missed injuries. -may occur many times over hours or days.

History Taking

- The patient's account of their trauma and their past medical history should be recorded.
- A useful mnemonic is AMPLE for history taking in emergency cases: allergies; medications; past illnesses; last meal; events and environment.
- For detailed history taking of orthopedic patient:
 - 1) Patient profile
 - 2) Chief complaint
 - 3) History of presenting illness
 - 4) Past medical history
 - 5) Drug history
 - 6) Family history
 - 7) Social history

1) Patient Profile:

- Name
- Age
 - Primary bone tumours occur mostly in children and adolescents/ in elderly → metastatic bone tumours are most common)
- Gender (ex. RA and osteoporosis are more common in females)
- Occupation
- Who takes care of the patient at home?
- Marital status
- Residency *Which floor? Is there an elevator? Nearest health care center
- Right or left-handed? To give the dominant hand priority if the patient was unstable and we can't treat both hands

2) Chief Complaint and location

Duration of pain

- Bone Fractures: Minutes - hours
- ligaments: Hours - days
- inflammation: Days -weeks
- osteoarthritis: Years

Most common complaints in orthopedics are:

Pain
Swelling
Stiffness
Deformity
Weakness
Instability
Altered sensation
Loss of function

**for any complaint we should ask if
there is a history of trauma
and the mechanism of injury**

Then for these complaints :

3) History of presenting complaint and associated symptoms

Pain: SOCRATES

Site (diseased area/ referred site: shoulder ,neck to arm. Lumbar spine to groin and gluteal area, hip to thigh and knee)

Onset

Character

Radiation

Associated symptoms (swelling sweating fever vomiting)

Timing

Exacerbating and relieving factors

Severity

- Onset: Sudden/Insidious, What triggered? What was patient doing?
- Progression: Constant? Worsened? Improved? On and off?
 - Neoplasia: Constant pain
 - Trauma: Increases up to 4-6 hours and then decreases
 - Acute Inflammation: Sudden increase and then subsides
 - Chronic inflammation: Remissions and exacerbation of disease
 - New origin pain in painless disease: Malignant change, Pathologic fracture
- Quality:
 - Aching: Chronic arthritis
 - Stabbing: Ruptured tendon
 - Burning: Neuralgia
 - Throbbing: Abscess
- Radiation/Referred:
 - Shoulder pain from heart or diaphragm
 - Arm pain from neck
 - Leg pain from back (sciatica)
 - Back pain from kidney, aortic aneurysm, duodenal ulcer
 - Pain may radiate to adjacent sites
- Relieving and aggravating factors:
 - Direct questions
 - Indirect questions: what happens on joint movements, walking, standing, body posture and exercises
 - Related to any food intake: gout
 - Relief with analgesics, fomentation or other means?

Swelling

May be in soft tissue, joint or bone

Onset: If appears rapidly following injury is hematoma or haemarthrosis.
If appears slowly is tissue inflammation, joint effusion, infection or tumor

Pain: If it is painful, acute inflammation, infection, malignancy
If it is painless, benign growth, low grade malignancy

Progression: constant or increasing size: neoplastic
remission: inflammatory
hardens in months: myositis ossificans

Site: Hand/wrist: Ganglia
Foot: Synovial sarcoma
Knee: Osteochondroma
Greater toe: Gout

If it is associated with injury or reactive

Stiffness:

- Patients complain of loss of/ altered function not stiffness
- A difficulty through all range of movement + pain
(cannot comb hair, bend forward, sit cross legged or in a prayer)
- Cause : * real stiffness of joint /mechanical block or *protective mechanism (muscle spasm to avoid pain in movement of joint)
- Joint involved * generalized in systemic disease as RA, Ankylosing spondylitis or * localized to a specific joint
- Ask when does it occur as *early morning stiffness of many joints in RA or * transient stiffness of one or two joints after a period of inactivity in osteoarthritis
- If there is locking : sudden inability to complete a movement suggest mechanical block
- Locking and give way

Stiffness: A difficulty through all range of movement + pain

Locking: normal range of movement with sudden stop at certain point, it is painful and cause falling down recurrent hemorrhage and joint effusion

Causes of locking: presence of loose bodies (osteophytes, fractures)
Meniscal tear between femur and tibia

Giving way: the knee suddenly "gives out"

The cause is usually ligamentous injury, most commonly through ACL causing instability and giving way. It can be caused by fractures and patellar dislocation.

Deformity:

when did you notice it ?

If it is associated with pain, stiffness or metabolic diseases

If there is impairing function?

Weakness: if it is generalized (part of systemic illness) or localized to a certain limb

* affecting single of muscles suggest neurologic disorder (brain > stroke, spinal cord > poliomyelitis, neuromuscular junction > myasthenia gravis)

Weakness occur from prolonged joint dysfunction or disuse muscle atrophy

Instability: due to ligamentous deficiency or subluxation.

Altered sensation: tingling or numbness

Loss of function: how does it affect patient life (daily activities, work, sport)

Red flags:

Weight loss
Fever
Loss of sensation
Loss of motor function
Sudden difficulty with urination
or defecation

Risk factors:

Age (extremities)
Gender
Obesity
Lack of physical activity
Inadequate dietary Ca or vit D
Smoking and alcohol
Occupation and sport
family history (as SCA)
Infections
medications (as steroids)
PHx of MSK condition or Cancer

History of presenting complaint and associated symptoms

- SOCRATES for pain
- Is there any bleeding? (open fractures)
- Is there any numbness or loss of sensation (nerve injury)?
- Is there any swelling/progressive pain/pain all over the limb or cyanosis (arterial injury)
- Mechanism of injury and the details of RTA/falling down

4) Past medical and surgical history

5) **Drug history** : Steroids: Avascular necrosis, Problems in wound healing
Phenytoin: Dupuytren's contracture

6) **Family history: genetic as RA, CHD / communicable as TB / social habits**

7) **Social history**: smoking/alcohol consumption increase nonunion rates, Level of care and nutrition in children, Dietary constraints which may cause specific deficiencies

MENSTRUAL HISTORY (In females):

Menarche: Scoliosis

Menopausue: Osteoporosis

8) Systemic review