

Circulation & Triage

Cause of exsanguination and death

- The major cause of exsanguination and death is a penetrating wound of the abdomen or central chest
- Access to control hemorrhage is not possible.

Shock

In patients with missile wounds, shock comes from:

- Acute blood loss
- Neurogenic shock is surprisingly unimportant.

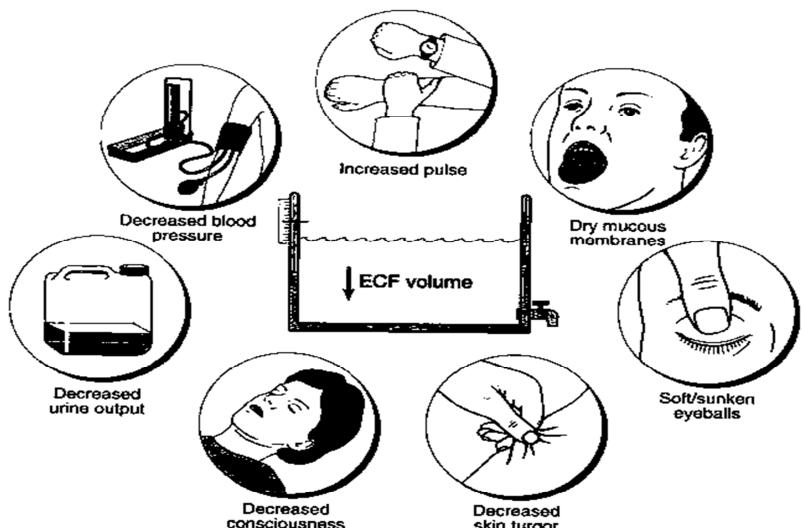


Fig. 2 The clinical features of ECF compartment depletion.

Bleeding

- If a blood vessel can be seen direct control may be obtained manually {A dressing or any available material can be packed into a wound}
- or with artery forceps
- Blind clamping must never be attempted
- Elevation of the wounded part will reduce venous bleeding.

Hemostasis

- Followed by a more bulky dressing and
- Finally a firm elastic bandage, to apply even pressure to effect

Dressing should not be removed

Once a wound has been packed and bleeding has been arrested, the dressing should not be removed until the:

1. patient has been resuscitated
 2. in the operating theatre, with
 3. blood ready for transfusion if available.
- Resultant bleeding can be torrential and difficult to control.

A tourniquet

- is rarely required a tourniquet
- should only be applied as a last resort
- it can save life but it
- also endangers a limb,
- it is correctly applied
- released at regular hourly intervals for several minutes

Failure to respond

- Internal Bleeding: urgent operation to secure the bleeding source is part of the resuscitation process.
- Once bleeding has been controlled, the fluid and blood replacement should improve the patient's condition.

Internal hemorrhage

- Cannot be controlled without surgery,
- Have a top priority for evacuation.

OBJECTIVE OF RESUSCITATION

- To **restore** circulating blood volume and intracellular fluid;
- To restore normal blood flow and tissue **perfusion**;
- To attain a **urinary output** of 30-50 ml/h **without overloading** the lungs.

A urinary catheter

- To monitor the response clinically by observing urinary output.

FLUID REPLACEMENT

- several **widebore** intravenous lines
- **fluid pumped** in rapidly
- Balanced electrolyte solution, such as Hartmann's or Ringer Lactate,
- start with 2,000 ml of Hartmann's in 15-30 mins, together with a plasma expander, either 500 ml of Dextran 70
- or one liter of **Haemaccel** or similar gelatine solution.

Common parenteral fluid therapy

Solutions	Volumes	Na ⁺	K ⁺	Ca ²⁺	Mg ²⁺	Cl ⁻	HCO ₃ ⁻	Dextrose	mOsm/L
ECF		142	4	5		103	27		280-310
Lactated Ringer's		130	4	3		109	28		273
0.9% NaCl		154				154			308
0.45% NaCl		77				77			154
D5W									
D5/0.45% NaCl		77				77		278	406
3% NaCl		513				513			1026
6% Hetastarch	500	154				154			310
5% Albumin	250,500	130-160	<2.5			130-160			330
25% Albumin	20,50,100	130-160	<2.5			130-160			330

In any 24-hour period

- Not more than two liters of Haemaccel
- or one liter of Dextran 70 should be given in any 24-hour period.
- oxygen

Blood for transfusion

- Blood for transfusion is often difficult to obtain because of the religious or cultural restrictions in many countries
- The use of blood should be restricted to vital needs and to patients with a good chance of survival. treated with iron, folic acid and adequate food

BLOOD

- Immediately for grouping and crossmatching.
- moribund exsanguinated patients may rapidly be given group O blood together with Hartmann's solution, as the threat of death outweighs the potential morbidity from transfusion reactions.
- Type-specific whole blood should be available in ten minutes, and crossmatched blood in 30-40 minutes.

Every fourth pack of blood

Ideally, should be supplemented with:

- one bottle of plasma,
- one ampoule of sodium bicarbonate
- and one ampoule of calcium chloride (10 g).

Triage

- French term
- It is the process of categorizing patients according to the degree of severity of injury
- Priorities can be established in order to use the available facilities most efficiently for the evacuation and care of the wounded.
- Triage can take place anywhere along the line of evacuation of the casualty, from the point of wounding to the hospital where definitive treatment is to take place.
- The aim in a mass casualty situation is to do the best for the most.

The aim of triage

Is to categorize the wounded on the basis of:

- The severity of injury,
- The need for treatment,
- The possibility of good quality survival.

EMERGENCY PLAN FOR MASS CASUALTIES

- The sudden arrival of large numbers of casualties
- Prior planning prevents poor performance

The factors which affect the triage

- the number and nature of the wounded,
- their condition,
- the facilities
- personnel available to treat them,
- the lines of evacuation
- Duration of transportation.

Consent of the family

- Amputations and laparotomies can only be performed with the consent of the family of the patient.
- Adaptation to the cultural, social and geographic context is essential.

Most experienced person

- Triage should be done by the most experienced person willing and able to take on the responsibility.
- The person performing the triage should not treat the patients.

This person will decide

- which patients need immediate resuscitation;
- which patients require resuscitation and immediate surgery as part of the resuscitation process;
- which patients will tolerate some delay before receiving surgical attention
- which patients have such small wounds that they can be managed by self-help or simple treatment and dressings

Severe wounds

- Which patients have *such that* death is inevitable (for example, severe head or spinal injuries, severe multiple injuries, and burns of more than 60%)
- Patients should be rapidly segregated from other groups,
- These patients and the dead should be removed from the triage area

Category I – serious wounds resuscitation and immediate surgery

- A good chance of recovery.
- Abdominal or thoracic injuries or wounds of peripheral blood vessels.

Category II – second priority wounds – can wait for surgery

- Those patients who require surgery but not on an urgent basis
- Majority of casualties: most compound fractures and penetrating head injuries for example.

Category III – superficial wounds – ambulatory management

- Those patients who do not require hospitalisation and/or surgery
- wounds are minor
- superficial wounds managed under local anaesthesia in the emergency room.

Category IV – severe wounds – supportive treatment

- So severely injured that they are likely to die
- Very poor quality of survival.
- Multiple major wounds whose management could be considered wasteful of scarce resources including operative time and blood.

Hardest part of triage

- to accept that patients only receive analgesics
- removed to a quiet place where they can die in comfort and with dignity.

Triage decisions must be respected

- Staff members, relatives and commanders might try to influence the triage decisions
- Decisions should be made on purely medical grounds.
- Discussions should wait until after the emergency phase is over.

Security

- is a major concern, and must be ensured for patients and staff
- Security must be ensured by having guards at the gate of the hospital
- All weapons must be left outside