Care at the District Hospital 4

"Surgery and additional medical care is required to rehabilitate survivors and make it possible for an amputee to use a prosthesis. Facilities should meet certain basic and minimal requirements, such as clean instruments and water, to be operational. Due to the special nature of mine injuries, care should be given to build a cadre of skilled surgeons and other health personnel. Useful training tools for surgeons include a surgical theater and manual for emergency care and follow-up, including proper amputation procedures and re-constructive surgery."

From: Guidelines for the Care and Rehabilitation of Survivors; ICBL Working Group on Victim Assistance, 1999

A District Hospital in Africa will be usually be staffed by one or more Medical Officers, trained in basic surgery and anaesthesia. They will repeat the Primary Survey, make further assessment (as in the Secondary Survey), and continue resuscitation as required. They will manage the injury with debridement, stabilisation of fractures, and basic surgery for bowel repair, insertion of chest drains and amputation of non-viable limbs. Transfer to major hospitals for specialist care will be necessary for some cases, but every attempt should be made to maintain the patient in as good a condition as possible while awaiting such transfer.

It is assumed that District Hospitals have medical expertise and supplies that meet basic standards. In every situation, however, staff have to do their best with the experience and resources available to them.

The Medical Officer at District Hospital should undertake a new primary survey followed by a secondary survey when the situation has been stabilised.

PRIMARY SURVEY

The elements of Primary Survey are the same as in the rural clinic. Here we focus primarily on A, B, and C:

A/B: Airway and Breathing

If the airway is not adequate, intubation is necessary. Oral insertion of an endo-tracheal tube using a laryngoscope is quick; the nasal route should be used only if the situation is not urgent. Secretions will build up in an endo-tracheal nasal tube and will narrow the lumen. After three days it may need to be replaced by a tracheostomy, though with care it can remain in place longer.

If it proves too difficult to intubate the patient a tube should be inserted through the crico-thyroid membrane.

Crico-thyroid intubation is the best for emergency situations where intubation cannot be achieved via the mouth because of oral injury, swelling of the floor of the mouth, etc. It can be life-saving.

Technique of Crico-thyroid Intubation

1. Identify the groove between the cricoid and thyroid cartilages just below the 'Adam's apple' – the protruding thyroid.
2. Incise through the skin transversely with a 1.5cm cut and make sure that you can see the membrane between thyroid and cricoid.
3. With a 22 or 23 scalpel blade, stab through the membrane into the hollow trachea.
4. Rotate the blade 90°, insert a curved artery forceps alongside the blade, remove the blade and open the forceps forcefully side to side, widening the space between the thyroid and cricoid cartilages.
5. Pass an introducer or a nasogastric tube into the trachea.
6. Run a 6.5-7 cuffed endotracheal tube over the introducer and force it into the trachea.
7. Remove the introducer.

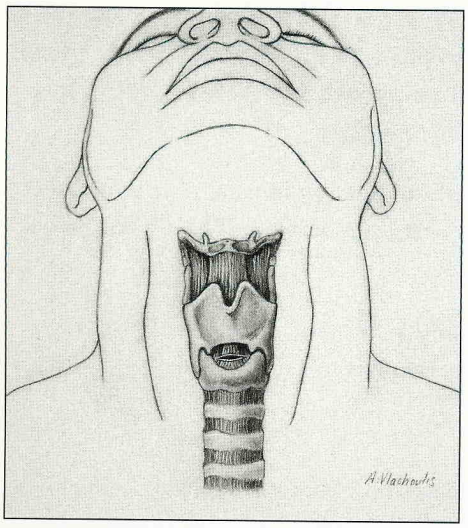

Figure 19a. Through a transverse skin incision expose the Crico-thyroid membrane and incise across it.

This tube can stay in place for up to 3 days. Because it is cuffed, you can assist ventilation and it protects against aspiration.

In a child less than 10 years do not attempt this; for a small person, passing several needles through the membrane will give enough air entry.

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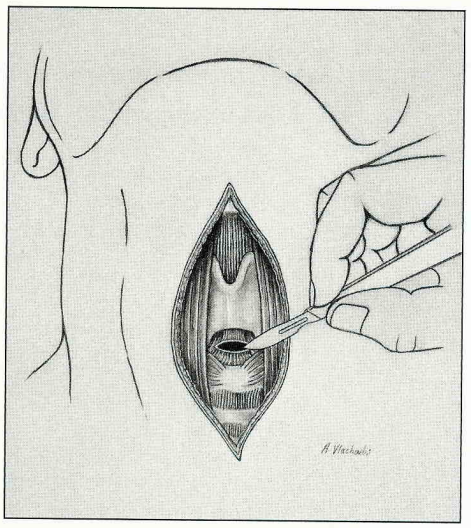

Figure 19b. Turn the scalpel blade to stretch the cut wider.

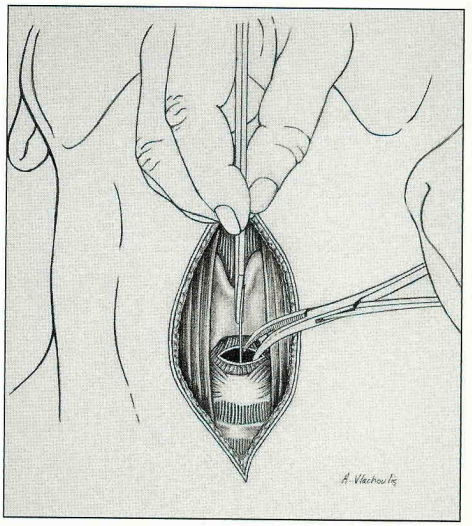

Figure 19c. Insert artery forceps to open up the cut.

Pneumothorax

The medical officer can also diagnose tension pneumothorax accurately, and obtain an X-ray if necessary. Insertion of an underwater seal drain may be necessary.

C: Circulation

Not every patient has an airway or breathing problem, but most landmine injuries will be at risk of shock.

1. Stop the bleeding.

This is usually not difficult if bleeding is external. Local pressure with a well-placed pack will be adequate, and you can always press harder!

There are some sites where pressure cannot be readily applied:

- alongside the clavicle;
- in the popliteal fossa;
- in some parts of the neck; and
- in the inguinal area.

For these sites it may be necessary to insert a finger and try pressing in different directions until the bleeding is controlled.

Sometimes a Foley catheter can be pushed into the wound and inflated to bring pressure directly onto the bleeding point. If fragments have been driven into the neck, bleeding may occur into the pharynx, and this may need to be packed through the mouth once an airway is in place.

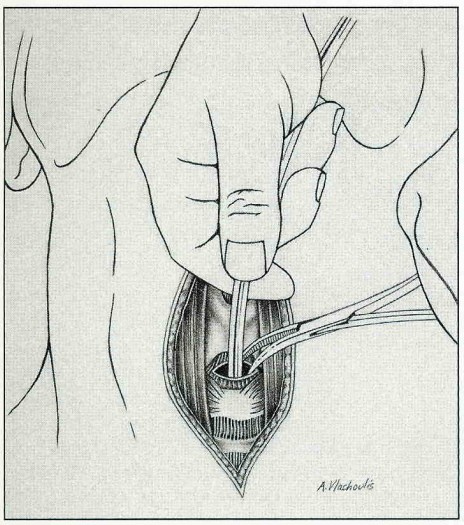

Figure 19d. Pass a thin introducer tube into the trachea (for example, a nasogastric tube).

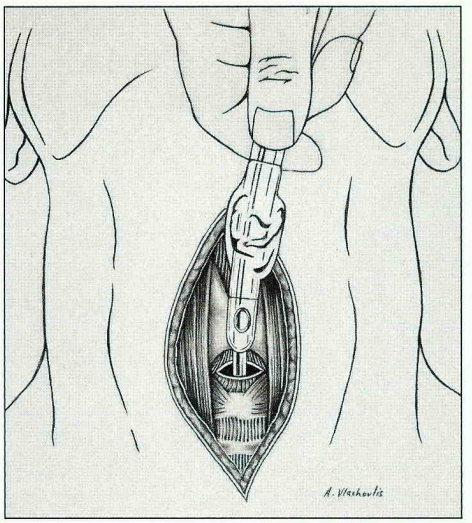

Figure 19e. Run a cuffed endotracheal tube over the smaller tube and inflate the cuff, then remove the introducer tubing.

CAUTION: HIV

Because of the high prevalence of HIV infection in many parts of Africa, a calculated decision may be necessary concerning the risk of transfusion compared with the risk of death from shock.

2. Replace fluid volume.

Establish intravenous access with the biggest available cannula and, if possible, have two drips running at the same time using two sites . Avoid the injured limb, and never insert a drip below an injury (the fluid may run out through the wound).

At the same time that you put in the intravenous line, insert a catheter to measure urinary output accurately, and a naso-gastric tube. Where available, pulse oximetry, CO2, and haemoglobin estimations will be useful.

What fluid?

Blood is difficult to obtain and may be dangerous because of infection. Crystalloids — normal saline or Ringers-lactate solutions are not expensive and are usually adequate. Colloid solutions are expensive and have not been shown to improve survival.

A haemoglobin as low as 7.5g/L will carry 90% of normal oxygen transport. Therefore for any level above 7.5 you do not need to transfuse blood. If the level is less than 7, blood should be given, at least to increase to a reading of 8. Auto-transfusion is sometimes possible (eg using blood collected from inside the patient's chest or abdominal cavity). Filter the blood — there will be bacteria in it, but this will not always cause septicaemia, and without blood the patient is at great risk of dying now.

When a large volume of fluid has to be run in, make sure it is not cold. Use a warming cabinet or a baby incubator (where you can hold 20L ready!)

3. Transfuse blood if needed.

When a patient is shocked and has lost a large amount of blood, giving blood may be life-saving. Cross matching does not matter if you have a pool of persons who are "O" from whom blood can be obtained rapidly. Some soldiers have their blood group recorded, for example, on the shirt. If you use blood of the same group or "O" group blood, there is unlikely to be any reaction.

If the patient's Rh status is known to be +ve, then O+ve blood is perfectly safe. But if the Rh status is not known, O –ve blood should be sought, particularly for women who may have an established Rh incompatibility.

How fast?

Replace blood as quickly as possible.

If no peripheral vein can be found.

1. Use the external jugular (placing the head down to make the large vein stand out).

2. Feel for the femoral pulse just below the inguinal ligament and use the femoral vein which runs just medial to it (called a "femoral push-in"). (See Figure 21?)

If these routes are not possible, it will be necessary to make a venous cut-down.

Performing a Venous Cut Down

Site

A useful site is the saphenous vein, 4 fb below the inguinal ligament.

Another good site is above the ankle, 2cm above and anterior to the medial malleolus.

Technique

1. Make a careful incision over the vein along its line, and just through the skin. Using artery forceps stretch open the incision.

2. Locate a large vein, run sutures under it above and below a small transverse cut in the vein, made with fine scissors or a small scalpel blade, and insert a 14g cannula after removing its stilette.

3. In desperate situations where a shocked patient needs rapid fluid replacement, an I-V cannula may not allow sufficiently rapid transfusion. After cutting down, you can pass the wider tubing of the giving set line directly into the vein and run it along inside the vein for several cm. With such a wide channel, you can easily run 20L of fluid into the vein in a few hours.

When to stop fluids?

When the bleeding has been stopped. Do not "resuscitate to death" if there is no response to transfusion — no improvement in consciousness, pulse, or blood pressure. Internal bleeding may be continuing in the abdomen, for example, filling up with the fluid you are transfusing.

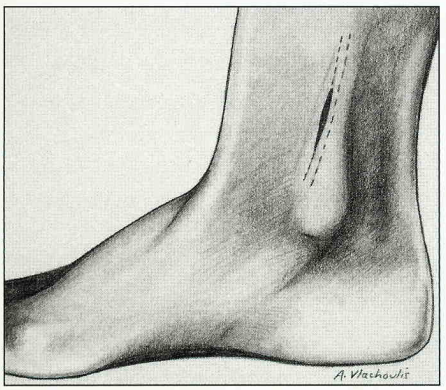

Figure 20a. Locate the vein 2cm above and anterior to the medial malleous and make a vertical incision.

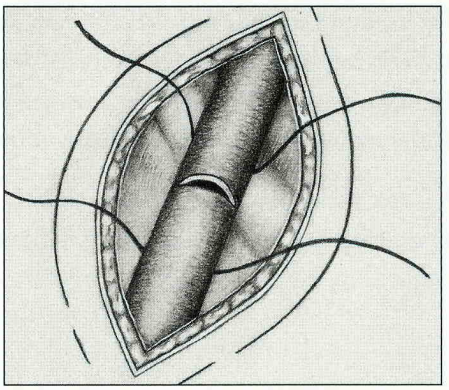

Figure 20b. Expose the vein through an incision along its line and pass 2 sutures behind it. With a small scissors make a tiny cut across the vein.

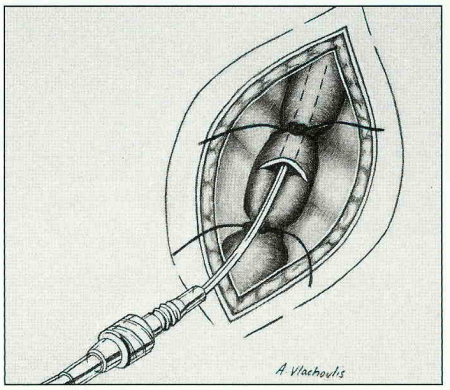

Figure 20c. Pass a 14g cannula up the vein after removing its stilette, then tie the 2 sutures over the cannula.

EMERGENCY SURGERY

Emergency surgery is part of resuscitation

- to expose injured blood vessels and repair them or tie to stop bleeding
- to perform emergency laparotomy and control internal bleeding.

If the liver is injured, at emergency laparotomy pack the liver tight in front and behind with large packs. If there is obvious arterial bleeding, it must be located and tied off. After two days remove the packs — in 80% of cases the bleeding will have stopped; if not pack again and leave for a further period of a day. Do not resect part of the liver.

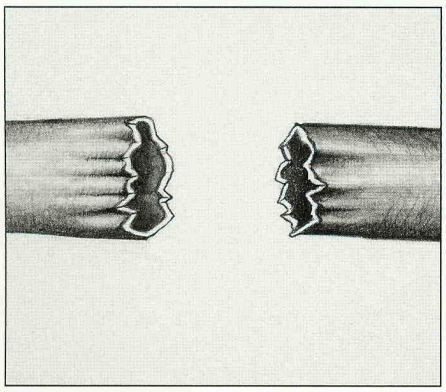

Figure 21a. A severed artery needs a shunt to connect the ends.

Injury to Bowel

If there is obvious injury to the abdomen, the bowel may have been penetrated or torn and blood vessels damaged. The abdomen will need to be explored. If bowel is cold and oozing from several places, tie off that part of the bowel, wash out the abdomen and get out as soon as bleeding is controlled. Repair of bowel can be done later.

A large retro-peritoneal haematoma will cause problems if it is left in place (infection) — open it up and drain out the blood, and control obvious bleeding with ties or packs.

Injury to Arteries

A large artery may be found to be damaged in a leg or in the abdomen. You should not tie it off because it is needed to maintain blood flow to a major part of the body. If there is no suitable graft available make your own temporary shunt and tie it in position. Repair of the artery can be done next day.

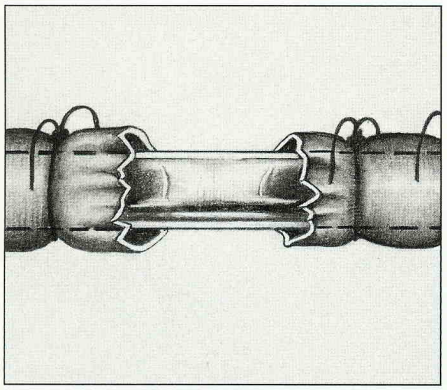

Figure 21b. Using I-V tubing to connect a severed artery.

Use cheap, existing/locally available materials for such a shunt.

For example: The superficial femoral artery may be shunted intra-luminally by using a short length of tubing cut from an IV giving set. The ends are slanted, to avoid damage to, and facilitate entry into the vessel. The shunt is placed into each lumen of the transected vessel. (diagram)

A larger tube such as an intercostal drain can be used in the same way to make an emergency repair to the aorta.