

# **Best Practice Protocols** **Clinical Procedures Safety**

## **List of Contents**

1. Ethics- Patient Consent
2. Record keeping
3. Operating Room (O.R.)
4. Hand Washing Techniques
5. Scrubbing and gowning
6. Prevention of Transmission of HIV
7. Infection Prevention and Universal Precautions
8. Waste disposal in clinical procedures at resource limited health care facility
9. Diagnosis of Labour
10. Diagnosis of vaginal bleeding in early pregnancy
11. Severe Pre-Eclampsia and Eclampsia
12. Eclampsia Management
13. Urinary Retention: Emergency Drainage
14. Caesarean Section
15. Check List Prior to inducing anaesthesia
16. Managing unexpected effects of a spinal anaesthetic
17. Postoperative management
18. Postoperative pain relief
19. Cardiac life support
20. Airway Management
21. Surgical Cricothyroidotomy
22. Cast Application
23. Splint application
24. Caring for a cast or splint
25. Removing a cast
26. Hand lacerations
27. Disaster Planning
28. Trauma Team Leader Responsibilities
29. Abdominal Trauma
30. Burns Management: adults and children
31. War-related Trauma
32. Transportation of critically ill patients

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## Ethics- Patient Consent

- Before performing a procedure, it is important to receive consent from the patient:
  - **Ask permission to make an examination**
  - **Explain what you intend to do before doing it**
  - **Ask the patient if he/she has questions & answer them**
  - **Check that the patient has understood**
  - **Obtain permission to proceed**
  - **Be mindful of the comfort and privacy of others.**
  
- With invasive and surgical procedures, it is particularly important to give a full explanation of what you are proposing, your reasons for wishing to undertake the procedure and what you hope to find or accomplish.
  
- Ensure that you use language that can be understood; draw pictures and use an interpreter, if necessary.
  
- Allow the patient and family members to ask questions and to think about what you have said.
  
- It may be necessary to consult with a family member or community elder who may not be

(continued to next page)

## Ethics- Patient Consent *continued*

present; allow for this if the patient's condition permits.

- If a person is too ill to give consent (for example, if unconscious) and their condition will not allow further delay, you should proceed, without formal consent, acting in the best interest of the patient.
- Record your reasoning and plan.
- Informed consent means that the patient and the patient's family understand what is to take place, including the potential risks and complications of both proceeding and not proceeding, and have given permission for a course of action.
- *Be attentive to legal, religious, cultural, linguistic and family norms and differences.*
- Some hospitals require patients to sign a document indicating that the surgical procedure and potential complications have been explained and that permission to proceed has been granted.

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## Ethics- Patient Consent *continued*

- This paper is then included in the patient's record.
- If this is not a formal requirement in your hospital, document the conversation in which consent was given and include the names of people present at the discussion.
- Informed consent means that the patient and the patient's family understand what is to take place, including the potential risks and complications of both proceeding and not proceeding, and have given permission for a course of action.
- It should be a choice made free from coercion.
- Our duty as professionals to provide service and care can come into conflict with our personal opinions. It is important to be aware of these feelings when they occur and to understand where they are coming from.
- If we are asked to care for someone who is alleged to have committed a crime, it is not our responsibility to administer justice. *(continued to next page)*

## Ethics- Patient Consent *continued*

- However, it *is* our responsibility to provide care. This can be difficult, but it is important to recognize that:
  - **Our job is not to judge, but to provide care to all without regard to social status or any other considerations.**
  - **By acting in this way, we will be seen to be fair and equitable by the community we serve.**

# Record Keeping

- **Admission note/preoperative note**
- **Operating room records usually includes:**
  - Patient identity
  - Procedure performed
  - Persons involved
  - Complications.
- **Delivery book**
- **The operative note**
- **Postoperative notes** can be organized in the “SOAP” format:
  - Subjective** **How** the patient feels
  - Objective** **Findings** on physical examination, vital signs and laboratory results
  - Assessment** **What** the practitioner thinks
  - Plan** Management plan; this may also include directives which can be written in a specific location as “orders”.
- **Discharge note: record:**
  - Admitting and definitive diagnoses
  - Summary of patient’s course in hospital
  - Instructions about further management as an outpatient, including any medication and the length of administration and planned follow-up.

## Hand Washing Techniques

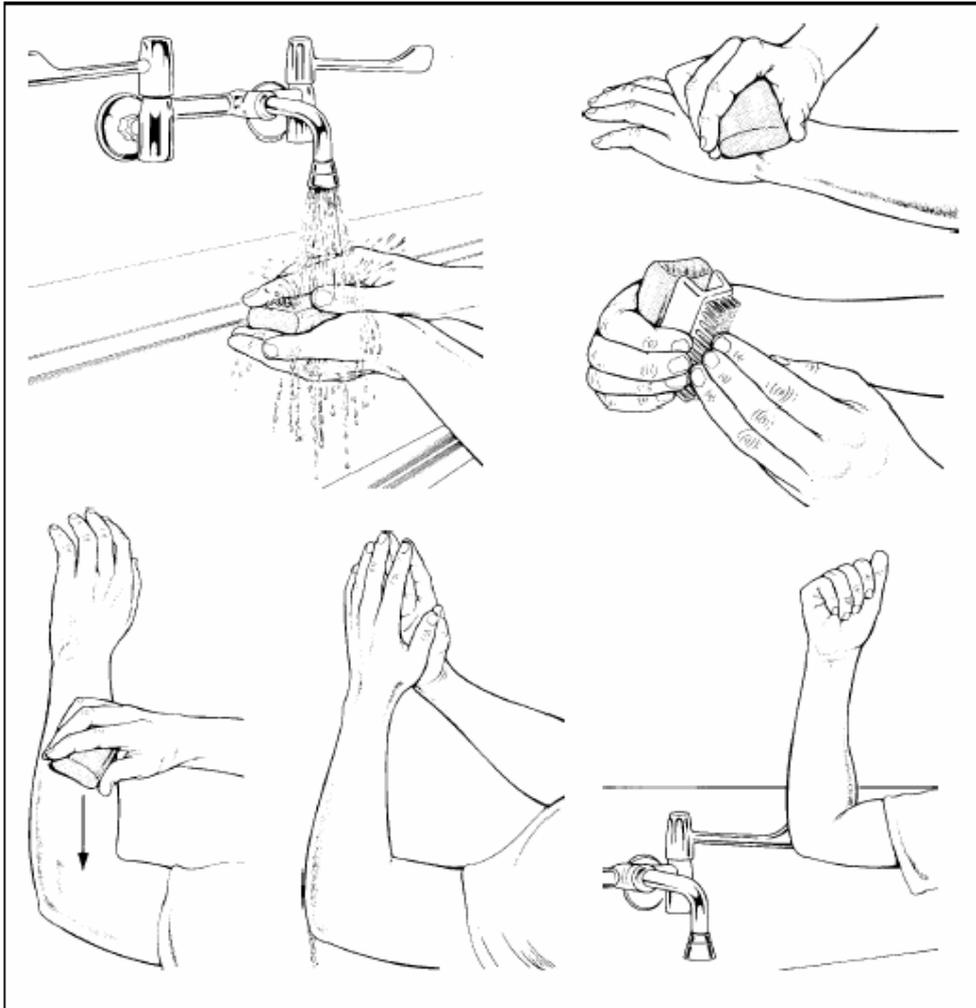


Figure 2.4

### **When scrubbing** (Figure 2.4):

- **Remove all jewellery and trim the nails**
- **Use soap, a brush (on the nails and finger tips) and running water to clean thoroughly around and underneath the nails**
- **Scrub your hands and arms up to the elbows**
- **After scrubbing, hold up your arms to allow water to drip off your elbows**
- **Turn off the tap with your elbow.**

## **After scrubbing your hands:** (continued to next page)

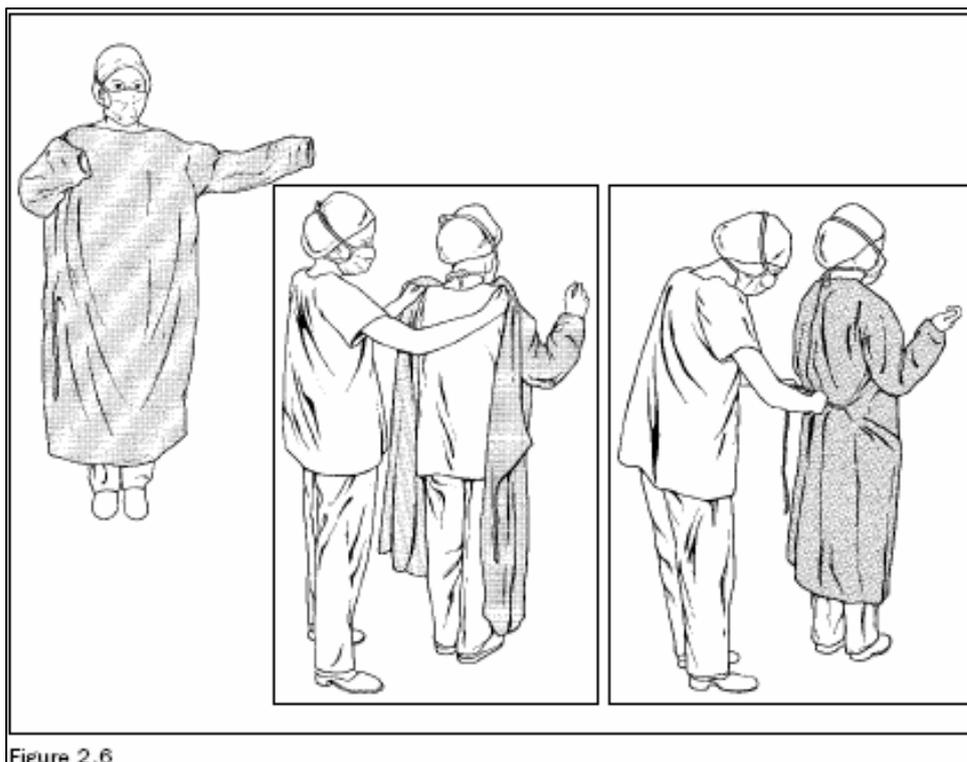
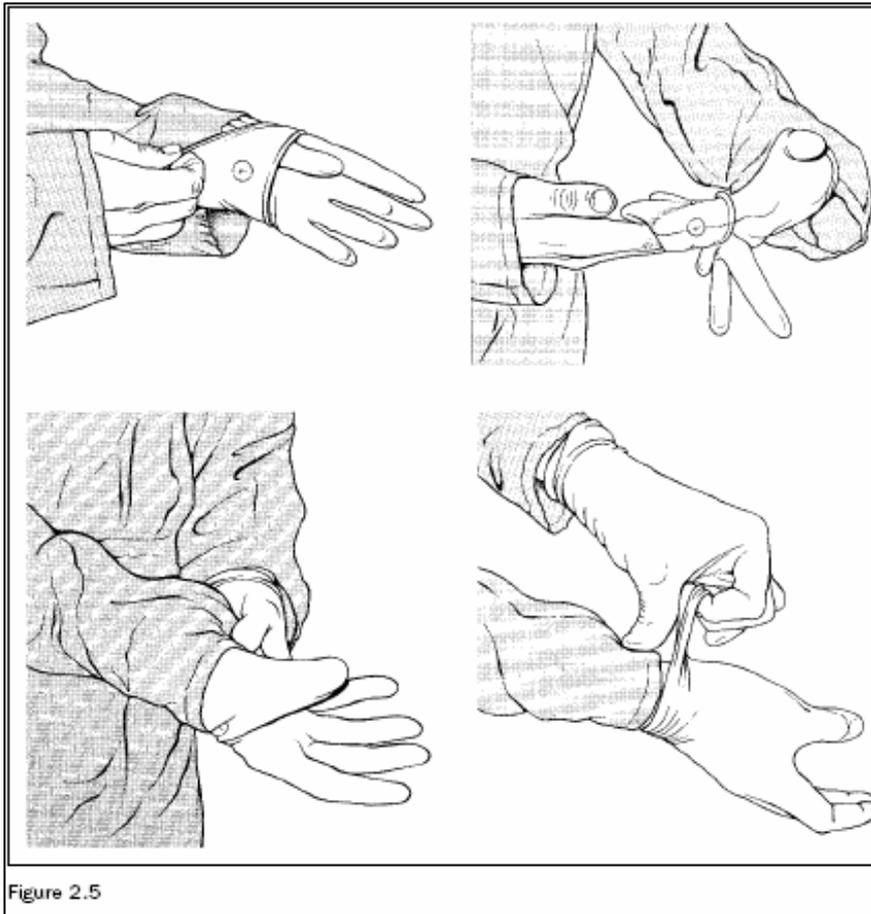
- **Dry them with a sterile towel and make sure the towel does not become contaminated.**
- **Hold your hands and forearms away from your body and higher than your elbows until you put on a sterile gown and sterile gloves.**

***Always wash your hands after removing your gloves***

## Scrubbing and gowning

- **Before each operation, all members of the surgical team – that is, those who will touch the sterile surgical field, surgical instruments or the wound – should scrub their hands and arms to the elbows.**
- **Scrubbing cannot completely sterilize the skin, but will decrease the bacterial load and risk of wound contamination from the hands.**
- **Every hospital should develop a written procedure for scrubbing that specifies the length and type of scrub to be undertaken.**
- **It is usual that the first scrub of the day is longer (minimum 5 minutes) than any subsequent scrubs between consecutive clean operations (minimum 3 minutes).**
- **Surgical gloves prevent transmission of HIV through contact with blood, but there is always the possibility of accidental injury and of a glove being punctured.**
- **Promptly change a glove punctured during an operation and rinse your hand with antiseptic or re-scrub if the glove has leaked during the puncture.**

- *Patient safety is of primary concern; do not compromise it. Change your gloves only when it is safe for the patient*



## **Operating Room (O.R.)**

**The operating theatre is a room specifically for use by the anaesthesia and surgical teams and must not be used for other purposes. Both rooms require:**

- Good lighting and ventilation
- Dedicated equipment for procedures
- Equipment to monitor patients, as required for the procedure
- Drugs and other consumables for routine and emergency use.

**Ensure that procedures are established for the correct use of the O.R. and all staff is trained to follow them:**

- Keep all doors to the O.R. closed, except as needed for the passage of equipment, personnel and the patient
- Store some sutures and extra equipment in the O.R. to decrease the need for people to enter and leave the O.R. during a case
- Keep to a minimum the number of people allowed to enter the O.R. , especially after an operation has started
- Keep O.R. uncluttered and easy to clean

- Between cases, clean and disinfect the table and instrument surfaces
- At the end of each day, clean the O.R.: start at the top and continue to the floor, including all furniture, overhead equipment and lights, use a liquid disinfectant at a dilution recommended by the manufacturer
- Sterilize all surgical instruments and supplies after use and store them protected and ready for the next use

***Leave the O.R. ready for use in case of emergency.***

## **Prevention of Transmission of HIV**

***Take care of your patients, your co-workers and yourself:***

- Do not recap needles
- Set up sharps containers in the places where you use sharps; the further you have to move to dispose of a sharp the greater the chance of an accident
- Do not use the same injection set on more than one patient
- Dispose of your own sharps
- Pass needles, scalpels and scissors with care and consideration.

***Several points of aseptic routine applicable to members of the surgical team are also particularly relevant to the prevention of transmission of HIV:***

- Protect areas of broken skin and open wounds with watertight dressings
- Wear gloves during exposure to blood or body fluids and wash your hands with soap and water afterwards
- Wash immediately with soap and water in case of skin exposure or contamination, whether from a splash, glove puncture or non-gloved contact
- Wear protective glasses where blood splashes may occur, such as during major surgery; wash out your eyes with water as soon as possible if they are splashed
- Wear a protective gown or apron if splash potential exists.
- Clean blood spills immediately and safely.

# Infection Prevention And Universal Precautions

***Hand washing is the single most important measure  
for prevention of infection***

Hand washing, the use of barrier protection such as gloves and aprons, the safe handling and disposal of "sharps" and medical waste and proper disinfection, cleaning and sterilization are all a part of creating a safe hospital.

## Key Points

1. A safe injection does not harm the recipient, does not expose the provider to any avoidable risk and does not result in any waste that is dangerous for other people
2. Use a sterile syringe and needle for each injection and to reconstitute each unit of medication
3. Ideally, use new, quality controlled disposable syringes and needles
4. If single-use syringes and needles are unavailable, use equipment designed for steam sterilization
5. Prepare each injection in a clean, designated area where blood or body fluid contamination is unlikely
6. Use single-dose vials rather than multi-dose vials
7. If multi-dose vials must be used, always pierce the septum with a sterile needle; avoid leaving a needle in place in the stopper of the vial. Once opened, store multi-dose vials in a refrigerator.

## WASTE DISPOSAL IN CLINICAL PROCEDURES AT RESOURCE LIMITED HEALTH CARE FACILITY

*It is essential for the hospital to have protocols to deal with biological waste and contaminated materials. All staff must be familiar with them and follow them.*

- All **biological waste** must be carefully stored and disposed of safely.
- **Contaminated materials** such as blood bags, dirty dressings and disposable needles are potentially hazardous and must be treated accordingly.
- If biological waste and contaminated materials are not disposed of properly, staff and members of the community could be exposed to infectious material and become infected.
- Disposal of **bio hazardous materials** is time consuming and expensive, so it is important to separate non-contaminated material such as waste paper, packaging and non-sterile but not biologically contaminated materials. (**Only 15% to 20% of medical wastes are considered infectious.**)
- Make **separate disposal containers** available where waste is created so that staff can sort the waste as it is being discarded. **A three colour coding system** with **black** for non infectious waste, **red or yellow** for infectious and **yellow** for sharps is recommended. (continued next page)

## WASTE DISPOSAL continued

- **Organize things** in a way to discourage the need for people to be in contact with contaminated waste.
- All infected waste should then be treated of by **steam sterilization or high temperature incineration** equipped with emission control devices. Whenever feasible plastic material such as syringes or blood bags should not be incinerated.
- Burying waste is the only option in some areas where not controlled landfill exists. If this is the case, you should do as much as possible to protect the burying site to prevent access and to avoid environmental pollution, especially for underground water sources.
- Prior to burying, for safety **infected waste can be disinfected** by soaking in a 0.5% hypochlorite solution for at least 30 minutes.
- Do not mix waste **chemicals**, unless you are certain that a chemical reaction will not take place. This is essential to prevent any unwanted or dangerous reactions between the chemicals, which could endanger laboratory staff.
- Always follow local guidelines on the disposal of waste chemicals to avoid any chemical contamination of the surrounding land or water supply.

## WASTE DISPOSAL continued

- Provide a **safe system for getting rid of disposable items** such as scalpel blades or needles. The risk of injury with sharp objects increases with the distance they are carried and the amount they are manipulated.
- A container for the **safe disposal of sharp objects** should be:
  - Well labelled
  - Puncture proof, Watertight
  - Break resistant (a glass container could break and provide a serious hazard to the person cleaning up)
  - Opening large enough to pass needles and scalpel blades, but never large enough for someone to reach in
  - Secured to a surface, such as a wall or counter, to ensure stability during use
  - Removable for disposal.
- These containers must then be disposed of safely. *(They can be steam sterilized, then shredded and disposed of to a controlled land fill with municipal waste, encapsulated in a pit or any other options according to national protocols approved by the public health department and ministry of environment.)*
- Health-care workers and waste handlers should wear protective equipment such as gloves, apron, mask and be immunized against HBV.
- A budget line for a safe waste management should be systematically included when planning a medical activity.

### References

1. WHO Surgical Care at the District Hospital Manual 2003
2. WHO Management of Solid Health-Care Waste at Primary Health-Care Centres : a decision-making guide 2005

# Disaster Planning

It involves the following steps:

- Designating a senior person to be team leader
- Defining the roles and responsibilities of each staff member
- Establishing disaster management protocols
- Setting up systems for:
  - Identification of key personnel
  - Communication within the hospital
  - Calling in extra staff, if required
  - Obtaining additional supplies, if required
  - Triage
  - Communicating patients' triage level and medical need
  - Transportation of patients to other hospitals, if possible
- Mapping evacuation priorities and designating evacuation facilities
- Identifying training needs, including disaster management and trauma triage, and training staff
- Practising the management of disaster scenarios, including handling the arrival of a large number of patients at the same time
- Establishing a system for communication with other services, authorities and agencies and the media.

# Trauma Team Leader Responsibilities

- Perform the primary survey and coordinate the management of airway, breathing and circulation
- Ensure that a good history has been taken from the patient, family and/or bystanders
- Perform the secondary survey to assess the extent of other injuries
- Consider tetanus prophylaxis and the use of prophylactic or treatment doses of antibiotics
- Reassess the patient and the efforts of the team
- Ensure patient documentation is completed, including diagnosis, procedure, medications, allergies, last meal and events leading up to the injury
- Communicate with other areas of the hospital and staff members
- Communicate with other people and institutions outside the hospital
- Prepare the patient for transfer
- Liaise with relatives.
- Information should flow to and through the leader:
- Know and use the names of the other members of the team and ensure that they have heard and understood directions
- Check back with members of the team to make sure designated tasks have been completed: for example:
  - “How is the airway?”
  - “Are you having any trouble bagging?”
  - “Have you had to suction much?”
  - “Is the second IV started?”
- Ask for input from the team, but ensure that all directions come from only one person.

## War-related Trauma

### Low velocity injuries

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*For minor wounds caused by a missile speed less than 1500 feet/second:*

1. Debride the wounds superficially. This is usually done in the outpatient department.
2. Lavage the wound with fluid.
3. Do *not* close the skin.
4. Administer intravenous antibiotics for 1–3 days.
5. Give tetanus prophylaxis.
6. Treat fractures by closed means with a cast, traction or external fixation.
7. If bullet fragments remain in a joint cavity, arrange to have them removed within a few weeks.

### High velocity injuries

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*For major wounds caused by missile speeds greater than 1500 feet/second:*

1. Debride the wounds in the operating theatre, using adequate anaesthesia.
2. Lavage each wound after removing all dead tissue and foreign material as outlined in the section on open fractures (refer WHO manual " *Surgical Care At district Hospital*"- pages 5–10 to 5–11 for details).
3. Lavage between the entrance and exit wounds, passing gauze through the tract if necessary.
4. Do *not* close the wound. Re-debride in 2–5 days and close or skin graft when clean.
5. Administer antibiotics and tetanus prophylaxis as above.
6. Treat fractures with a cast or, preferably, external fixation or traction.

# Urinary Retention: Emergency Drainage

Emergency drainage of the bladder in acute retention may be undertaken by:

1. Urethral catheterization
2. Suprapubic puncture
3. Suprapubic cystostomy

## Key Points

1. Acute retention of urine is an indication for emergency drainage of the bladder.
2. Common causes of acute retention in the male are urethral stricture and benign prostatic hypertrophy. Other causes are urethral trauma and prostatic cancer.
3. If the bladder cannot be drained through the urethra, it requires suprapubic drainage.
4. In chronic retention of urine, because the obstruction develops slowly, the bladder is distended (stretched) very gradually over weeks, so pain is not a feature.
5. Bladder often overfills and the patient with chronic retention presents with dribbling of urine, referred to as “retention with overflow”.
6. Treatment of chronic retention is not urgent, but drainage of the bladder will help you to determine the volume of residual urine and prevent renal failure, which is associated with retention.
7. Arrange to refer patients with chronic urinary retention for definitive management.

# Abdominal Trauma

When a patient presents with abdominal injuries, give priority to the primary survey:

1. Establish a clear airway.
2. Assure ventilation.
3. Arrest external bleeding.
4. Set up an intravenous infusion of normal saline or Ringer's lactate.
5. Insert a nasogastric tube and begin suction and monitor output.
6. Send a blood sample for haemoglobin measurement and type and cross-match.
7. Insert a urinary catheter, examine the urine for blood and monitor the urine output.
8. Perform the secondary survey: a complete physical examination to evaluate the abdomen and to establish the extent of other injury.
9. Examine the abdomen for bowel sounds, tenderness, rigidity and contusions or open wounds.
10. Administer small doses of intravenous analgesics, prophylactic antibiotics and tetanus prophylaxis.

# Diagnosis of Labour

## First stage:

### *Latent phase*

- Cervix less than 4 cm dilated.

### *Active phase*

- Cervix between 4 cm and 10 cm dilated
- Rate of cervical dilatation at least 1 cm/hour
- Effacement is usually complete
- Fetal descent through birth canal begins.

## Second stage:

### *Early phase (non-expulsive)*

- Cervix fully dilated (10 cm)
- Fetal descent continues
- No urge to push.

### *Late phase (expulsive)*

- Fetal presenting part reaches the pelvic floor and the woman has the urge to push
- Typically lasts <1 hour in primigravida and <30 minutes in multigravida.

- Carry out vaginal examinations at least once every 4 hours in the first stage of labour and plot the findings on the partograph.
- The partograph is very helpful in monitoring the progress of labour and in the early detection of abnormal labour patterns.

## Diagnosis of vaginal bleeding in early pregnancy

Presenting symptoms and other symptoms and signs typically present	Symptoms and signs sometimes present	Probable diagnosis
<ul style="list-style-type: none"> <li>• Light<sup>1</sup> bleeding</li> <li>• Closed cervix</li> <li>• Uterus corresponds to dates</li> </ul>	<ul style="list-style-type: none"> <li>• Cramping/lower abdominal pain</li> <li>• Uterus softer than normal</li> </ul>	<ul style="list-style-type: none"> <li>• Threatened abortion</li> </ul>
<ul style="list-style-type: none"> <li>• Light bleeding</li> <li>• Abdominal pain</li> <li>• Closed cervix</li> <li>• Uterus slightly larger than normal</li> <li>• Uterus softer than normal</li> </ul>	<ul style="list-style-type: none"> <li>• Fainting</li> <li>• Tender adnexal mass</li> <li>• Amenorrhoea</li> <li>• Cervical motion tenderness</li> </ul>	<ul style="list-style-type: none"> <li>• Ectopic pregnancy</li> </ul>
<ul style="list-style-type: none"> <li>• Light bleeding</li> <li>• Closed cervix</li> <li>• Uterus smaller than dates</li> <li>• Uterus softer than normal</li> </ul>	<ul style="list-style-type: none"> <li>• Light cramping/lower abdominal pain</li> <li>• History of expulsion of products of conception</li> </ul>	<ul style="list-style-type: none"> <li>• Complete abortion</li> </ul>
<ul style="list-style-type: none"> <li>• Heavy<sup>2</sup> bleeding</li> <li>• Dilated cervix</li> <li>• Uterus corresponds to dates</li> </ul>	<ul style="list-style-type: none"> <li>• Cramping/lower abdominal pain</li> <li>• Tender uterus</li> <li>• No expulsion of products of conception</li> </ul>	<ul style="list-style-type: none"> <li>• Inevitable abortion</li> </ul>
<ul style="list-style-type: none"> <li>• Heavy bleeding</li> <li>• Dilated cervix</li> <li>• Uterus smaller than dates</li> </ul>	<ul style="list-style-type: none"> <li>• Cramping/lower abdominal pain</li> <li>• Partial expulsion of products of conception</li> </ul>	<ul style="list-style-type: none"> <li>• Incomplete abortion</li> </ul>
<ul style="list-style-type: none"> <li>• Heavy bleeding</li> <li>• Dilated cervix</li> <li>• Uterus larger than dates</li> <li>• Uterus softer than normal</li> <li>• Partial expulsion of products of conception which resemble grapes</li> </ul>	<ul style="list-style-type: none"> <li>• Nausea/vomiting</li> <li>• Spontaneous abortion</li> <li>• Cramping/lower abdominal pain</li> <li>• Ovarian cysts (easily ruptured)</li> <li>• Early onset pre-eclampsia</li> <li>• No evidence of a fetus</li> </ul>	<ul style="list-style-type: none"> <li>• Molar pregnancy</li> </ul>

<sup>1</sup> Light bleeding: takes longer than 5 minutes for a clean pad or cloth to be soaked

<sup>2</sup> Heavy bleeding: takes less than 5 minutes for a clean pad or cloth to be soaked

## Severe Pre-Eclampsia and Eclampsia

	Mild pre-eclampsia	Severe pre-eclampsia
Diastolic blood pressure	<110	110
Proteinuria	Up to 2+	3+ or more
Headache	No	One or more of these conditions may be present
Visual disturbances	No	
Hyperreflexia	No	
Urine output <400 ml	No	
Epigastric or right upper quadrant pain	No	
Pulmonary oedema	No	

Severe pre-eclampsia and eclampsia are managed similarly, with the exception that delivery must occur within 12 hours of the onset of convulsions in eclampsia.

**All cases of severe pre-eclampsia should be managed actively. Symptoms and signs of “impending eclampsia” (blurred vision, hyperreflexia) are unreliable and expectant management is not recommended.**

## Eclampsia Management

Immediate management of a pregnant woman or a recently delivered woman who complains of severe headache or blurred vision, or if a pregnant woman or a recently delivered woman is found unconscious or having convulsions:

### SHOUT FOR HELP

1. Make a quick assessment of the general condition of the woman, including vital signs (pulse, blood pressure, respiration) while simultaneously finding out the history of her present and past illnesses from her or her relatives:
  - Check airway and breathing
  - Position her on her side
  - Check for neck rigidity and temperature. (Continued next page)

# Eclampsia Management (continued)

2. If she is not breathing or her breathing is shallow:
  - Open airway and intubate, if required
  - Assist ventilation using an Ambu bag and mask
  - Give oxygen at 4–6 litres per minute.
3. If she is breathing, give oxygen at 4–6 litres per minute by mask or nasal cannulae.
4. If she is convulsing:
  - Protect her from injury, but do not actively restrain her
  - Position her on her side to reduce the risk of aspiration of secretions, vomit and blood
  - After the convulsion, aspirate the mouth and throat as necessary. Look in the mouth for a bitten tongue: it may swell.
5. Give magnesium sulfate. If a convulsion continues in spite of magnesium sulfate, consider diazepam 10 mg IV.
6. If diastolic blood pressure remains above 110 mmHg, give antihypertensive drugs. Reduce the diastolic pressure to less than 100 mmHg, but not below 90 mmHg.
7. Fluids:
  - Start an IV infusion
  - Maintain a strict fluid balance chart and monitor the volume of fluids administered and urine output to ensure that there is no fluid overload
  - Catheterize the bladder to monitor urine output and proteinuria

**If urine output is less than 30 ml per hour:**

  - Withhold magnesium sulfate until urine output improves
  - Infuse a maintenance dose of IV fluids (normal saline or Ringer's lactate) at 1 litres in 8 hours
  - Monitor for the development of pulmonary oedema.
    - Never leave the woman alone. A convulsion followed by aspiration of vomit may cause death of the woman and fetus.
8. Observe vital signs, reflexes and fetal heart rate hourly.
9. Auscultate the lung bases hourly for rales indicating pulmonary oedema. If rales are heard, withhold fluids and give frusemide 40 mg IV once.
10. Assess clotting status.

Continued next page

# Eclampsia Management (continued)

## Anticonvulsant drugs

- Adequate administration of anticonvulsive drugs is a key factor in anticonvulsive therapy.
- Magnesium sulfate is the drug of first choice for preventing and treating convulsions in severe pre-eclampsia and eclampsia.

## Magnesium sulfate schedules for severe pre-eclampsia and eclampsia

### Loading dose

- Magnesium sulfate 20% solution 4 g IV over 5 minutes
- Follow promptly with 10 g of 50% magnesium sulfate solution, 5 g in each buttock, as deep IM injection with 1.0 ml of 2% lidocaine in the same syringe
- Ensure that aseptic technique is practiced when giving magnesium sulfate deep IM injection; warn the woman that a feeling of warmth will be felt when magnesium sulfate is given
- If convulsions recur after 15 minutes, give 2 g magnesium sulfate (50% solution) IV over 5 minutes

### Maintenance dose

- 5 g magnesium sulfate (50% solution) + 1 ml lidocaine 2% IM every 4 hours into alternate buttocks
- Continue treatment with magnesium sulfate for 24 hours after delivery or the last convulsion, whichever occurs last.
- Before repeat administration, ensure that
  - Respiratory rate is at least 16 per minute
  - Patellar reflexes are present
  - Urinary output is at least 30 ml per hour over the last 4 hours
- Withhold or delay drug if:
  - Respiratory rate falls below 16 per minute
  - Patellar reflexes are absent
  - Urinary output falls below 30 ml per hour over preceding 4 hours
- In case of respiratory arrest:
  - Assist ventilation (mask and bag; anaesthesia apparatus; intubation)
  - Give calcium gluconate 1 gm (10 ml of 10% solution) IV slowly until the drug antagonizes the effects of magnesium sulfate and respiration begins.

(Continued next page)

## Eclampsia Management (continued)

### IV Diazepam schedules for severe pre-eclampsia and eclampsia

#### Loading dose

- Diazepam 10 mg IV (intravenous) slowly over 2 minutes
- If convulsions recur, repeat loading dose

#### Maintenance dose

- Diazepam 40 mg in 500 ml IV fluids (normal saline or Ringer's lactate) titrated to keep the patient sedated but rousable
- Do not give more than 100 mg in 24 hours

***Use diazepam only if magnesium sulfate is not available.***

#### Antihypertensive drugs

- If the diastolic pressure is 110 mmHg or more, give antihypertensive drugs.
- Goal is to keep the diastolic pressure between 90 mmHg and 100 mmHg to prevent cerebral haemorrhage. Avoid hypotension.
- Hydralazine is the drug of choice:
  1. Give hydralazine 5 mg IV slowly every 5 minutes until blood pressure is lowered. Repeat hourly as needed or give hydralazine 12.5 mg IM every 2 hours as needed.
  2. If hydralazine is not available:

Give labetalol 10 mg IV:

    - If response is inadequate (diastolic blood pressure remains above 110 mmHg) after 10 minutes, give labetalol 20 mg IV
    - Increase dose to 40 mg and then 80 mg if satisfactory response is not obtained within 10 minutes of each dose

**Or** Nifedipine 5 mg chewed and swallowed or injected into the oropharynx; may be repeated at 10-minute intervals

**Or** Nicardipine 1–2 mg at one minute intervals until control is obtained, then 1–2 mg every hour.

#### Rectal administration of drugs

1. Give diazepam rectally when IV access is not possible. The loading dose of 20 mg is taken in a 10 ml syringe.
2. Remove the needle, lubricate the barrel and insert the syringe into the rectum to half its length. Discharge the contents and leave the syringe in place, holding the buttocks together for 10 minutes to prevent expulsion of the drug. Alternatively, instill the drug in the rectum through a urinary catheter. If convulsions are not controlled within 10 minutes, inject an additional 10 mg per hour or more, depending on the size of the woman and her clinical response.

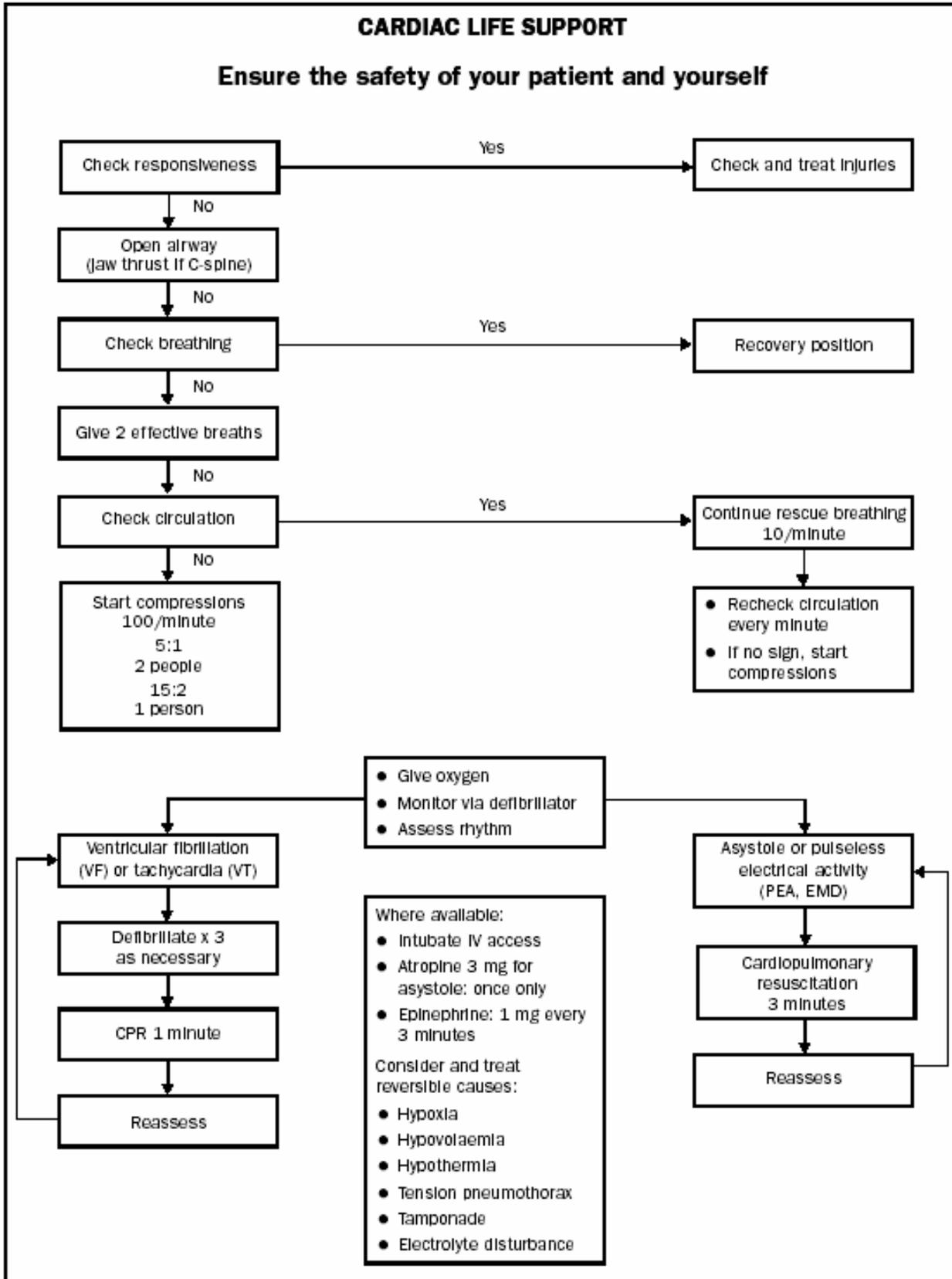
# Caesarean Section

## *Preparation Steps*

1. Review indications. Check fetal presentation and ensure that vaginal delivery is not possible.
2. Obtain consent from the patient after explaining the procedure and the reason for it.
3. Check the patient's haemoglobin concentration, but do not wait for the result if there is fetal or maternal distress or danger. Send the blood sample for type and screen. If the patient is severely anaemic, plan to give two units of blood.
4. Start an IV infusion.
5. Give sodium citrate 30 ml 0.3 molar and/or ranitidine 150 mg orally or 50 mg IV to reduce stomach acidity. Sodium citrate works for 20 minutes only so should be given immediately before induction of anaesthesia if a general anaesthetic is given.
6. Catheterize the bladder and keep a catheter in place during the operation.
7. If the baby's head is deep down into the pelvis, as in obstructed labour, prepare the vagina for assistance at caesarean delivery.
8. Roll the patient 15° to her left or place a pillow under her right hip to decrease supine hypotension.
9. Listen to the fetal heart rate before beginning surgery.

# CARDIAC LIFE SUPPORT

## Prior to Inducing Anesthesia



## Check List before inducing anaesthesia:

- An experienced and trained assistant is available to help you with induction.
- You have the *correct patient* scheduled for the *correct operation* on the *correct side*.
- The patient has been properly prepared for the operation and has had no food or drink for the appropriate period of time.
- The patient's progress through the hospital up to this moment and then check that your actions will be the right ones.
- Adequate intravenous access is obtained
- The patient is lying on a table that can be rapidly tilted into a head-down position in case of sudden hypotension or vomiting.
- Your equipment before you give an anaesthetic:
  - All the apparatus you intend to use, or might need, is available and working
  - If you are using compressed gases, there is enough gas and a reserve oxygen cylinder
  - The anaesthetic vaporizers are connected
  - The breathing system that delivers gas to the patient is securely and correctly assembled
  - Breathing circuits are clean
  - Resuscitation apparatus is present and working
  - Laryngoscope, tracheal tubes and suction apparatus are ready and have been decontaminated
  - Needles and syringes are sterile: never use the same syringe or needle for more than one patient
  - Drugs you intend to use are drawn up into labelled syringes
  - Any other drugs you might need are in the room.

# Managing unexpected effects of a spinal anaesthetic

## To Treat Hypotension

1. Increase the rate of fluid infusion as fast as possible, using a pressure bag, if needed.
2. Tilt the table to the left, if not already tilted.
3. Give a vasopressor: ephedrine 10 mg, repeated as necessary.

## To Treat the Respiratory Difficulty

- Give oxygen and IPPV, using an anaesthetic face mask and self inflating bag or bellows, or the anaesthetic machine patient circuit.
- At this point, it is possible that the situation will resolve itself: the heart rate and blood pressure may rise again, the patient breathes unassisted and you continue with spinal anaesthesia.
- Equally, however, the high spinal may progress further, or even become a “total spinal”. In this condition, there is no detectable cardiopulmonary activity. Start the following emergency measures without delay, as for any cardiopulmonary resuscitation:
  - Intubation
  - Ventilation with oxygen
  - Intravenous epinephrine.
- The question often arises: how should you intubate a mother who is clearly unable to breathe (and when inflation by mask is insufficient) but who is still conscious? Do you need to give thiopental and suxamethonium?

In the presence of hypotension:

- Avoid thiopental: give 10 mg of diazepam instead
  - Judge the need for suxamethonium to intubate on the basis of the patient's the state of relaxation
  - Give 0.2–0.5 mg of epinephrine intravenously if the blood pressure does not respond to ephedrine.
- A high or total spinal is a “pharmacological” cardiopulmonary arrest occurring in a healthy person. Every case should make a complete recovery. Death or cerebral damage from delayed recognition of the signs or poor management is inexcusable.

**A death or complication after spinal anaesthesia is usually due to neglect of vital signs.**

# Postoperative Management

**If the patient is restless, something is wrong.**

Look out for the following in recovery:

- Airway obstruction
- Hypoxia
- Haemorrhage: internal or external
- Hypotension and/or hypertension
- Postoperative pain
- Shivering, hypothermia
- Vomiting, aspiration
- Falling on the floor
- Residual narcosis.

The recovering patient is fit for the ward when:

- Awake, opens eyes
- Extubated
- Blood pressure and pulse are satisfactory
- Can lift head on command
- Not hypoxic
- Breathing quietly and comfortably
- Appropriate analgesia has been prescribed and is safely established.

## Post Operative Pain Relief

- Pain is often the patient's presenting symptom. It can provide useful clinical information and it is your responsibility to use this information to help the patient and alleviate suffering.
- Manage pain wherever you see patients (emergency, operating room and on the ward) and anticipate their needs for pain management after surgery and discharge.
- Do not unnecessarily delay the treatment of pain; for example, do not transport a patient without analgesia simply so that the next practitioner can appreciate how much pain the person is experiencing.
- ***Pain management is our job.***

### Pain Management and Techniques

- Effective analgesia is an essential part of postoperative management.
- Important injectable drugs for pain are the opiate analgesics. Nonsteroidal anti-inflammatory drugs (NSAIDs), such as diclofenac (1 mg/kg) and ibuprofen can also be given orally and rectally, as can paracetamol (15 mg/kg).
- There are three situations where an opiate might be given:
  - Preoperatively
  - Intraoperatively
  - Postoperatively.
- Opiate premedication is rarely indicated, although an injured patient in pain may have been given an opiate before coming to the operating room.
- Opiates given pre- or intraoperatively have important effects in the postoperative period since there may be delayed recovery and respiratory depression, even necessitating mechanical ventilation.

## Post Operative Pain Relief (continued)

- Short acting opiate fentanyl is used intra-operatively to avoid this prolonged effect.
- Naloxone antagonizes (reverses) all opiates, but its effect quickly wears off.
- Commonly available inexpensive opiates are pethidine and morphine.
- Morphine has about ten times the potency and a longer duration of action than pethidine. (continued next page)
- Ideal way to give analgesia postoperatively is to:
  - Give a small intravenous bolus of about a quarter or a third of the maximum dose (e.g. 25 mg pethidine or 2.5 mg morphine for an average adult)
  - Wait for 5–10 minutes to observe the effect: the desired effect is analgesia, but retained consciousness
  - Estimate the correct total dose (e.g. 75 mg pethidine or 7.5 mg morphine) and give the balance intramuscularly.
  - With this method, the patient receives analgesia quickly and the correct dose is given.
- If opiate analgesia is needed on the ward, it is most usual to give an intramuscular regimen:
  - Morphine:
    - Age 1 year to adult: 0.1–0.2 mg/kg
    - Age 3 months to 1 year: 0.05–0.1 mg/kg
  - Pethidine: give 7–10 times the above doses if using pethidine.
- ***Opiate analgesics should be given cautiously if the age is less than 1 year. They are not recommended for babies aged less than 3 months unless very close monitoring in a neonatal intensive care unit is available.***

## Post Operative Pain Relief (continued)

### Anaesthesia & Pain Control in Children

- **Ketamine anaesthesia is widely used for children in rural centres (see pages 14–14 to 14–21), but is also good for pain control.**
- **Children suffer from pain as much as adults, but may show it in different ways.**
- **Make surgical procedures as painless as possible:**
  - **Oral paracetamol can be given several hours prior to operation**
  - **Local anaesthetics (bupivacaine 0.25%, not to exceed 1 ml/kg) administered in the operating room can decrease incisional pain**
  - **Paracetamol (10–15 mg/kg every 4–6 hours) administered by mouth or rectally is a safe and effective method for controlling postoperative pain**
  - **For more severe pain, use intravenous narcotics (morphine sulfate 0.05–0.1 mg/kg IV) every 2–4 hours**
  - **Ibuprofen 10 mg/kg can be administered by mouth every 6–8 hours**
  - **Codeine suspension 0.5–1 mg/kg can be administered by mouth every 6 hours, as needed.**

# Cast Application

To prepare plaster of Paris bandage, use dry cotton gauze (muslin) bandage, 500 cm long and 15 cm wide. Unroll a portion of the bandage on a dry table with a smooth top and apply plaster powder (anhydrous calcium sulfate or gypsum) evenly to the surface (Figure 17.21).

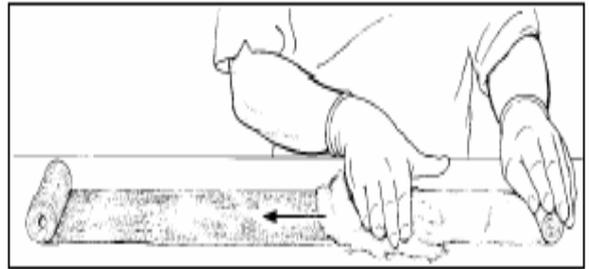


Figure 17.21

1. Clean the skin and apply dressings to any wounds. If available, apply stockinet to the extremity, avoiding wrinkles. Next, apply a uniform thickness of cotton padding over the stockinet and put extra padding over any bony prominence such as the patella, the elbow or the ankle (Figure 17.22).



Figure 17.22

2. Soak the plaster roll in a pail containing water at room temperature. Do not use warm water as the heat given off by the plaster as it sets may burn the patient. Leave the plaster in the water until it is completely soaked and the air bubbles cease to rise.

3. Gently pick up the ends of the bandage with both hands and lightly squeeze it, pushing the ends together without twisting or wringing (Figure 17.23). (continued next page)

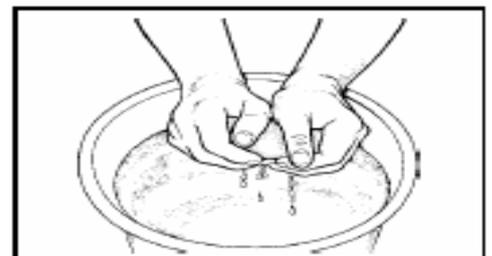


Figure 17.23

## Cast Application (Continued)

4. While applying the plaster, hold the relevant part of the body steady in the correct position. Movement will cause ridges to form on the inside of the plaster. Work rapidly and without interruption, rubbing each layer firmly with the palm so that the plaster forms homogenous mass rather than discrete layers.

5. Apply the plaster by unrolling the bandage as it rests on the limb. Do not lift it up from the patient or apply tension to the roll. Overlap the previous layer of plaster by about half the width of the roll (Figure 17.24).

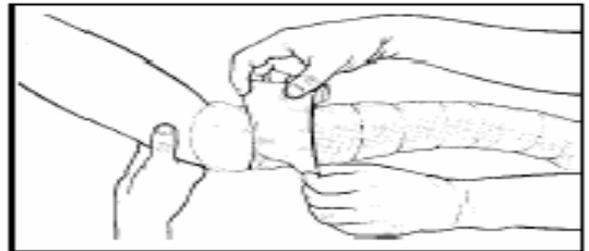


Figure 17.24

6. Mould the plaster evenly around the bony prominences and contours. Leave 3 cm of padding at the upper and lower margins of the cast to protect the skin from irritation by the edge of the cast. This can be folded back over the edge and incorporated in the last layer of plaster to provide a smooth edge (Figure 17.25).

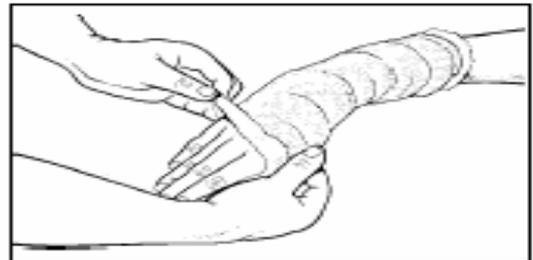


Figure 17.25

7. Mould the cast until the plaster sets and becomes firm. Complete drying takes 24 hours so advise the patient to take care not to dent the cast or apply weight to it during this time.

8. The technique for application of a fibreglass cast is similar, but the fibreglass is slightly elastic and will contour to the body more easily. It sets firmly in about 30 minutes and will not be affected by water after that time.

## SPLINT APPLICATION

1. Measure the length of material needed to secure the limb. Place 3–5 layers of the measured padding on a flat surface and unroll 5–10 layers of plaster on to the padding (Figure 17.26).

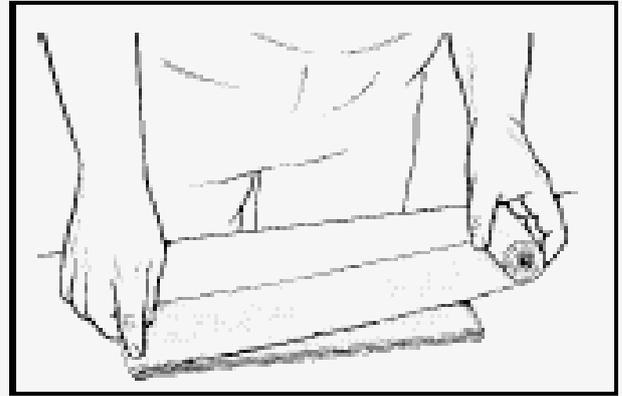


Figure 17.26

2. Grasp the plaster layer at each end, dip into the water and gently squeeze together without twisting. Place the wet plaster on the padding and smooth with the palm into a homogeneous layer.
3. Place the splint on the extremity, with the padding side toward the patient, mould it to the limb contours and secure with an elastic bandage or gauze wrap (Figure 17.27).

4. An alternative method is to split a circular cast lengthwise, remove the anterior half and secure it similarly with an elastic bandage.

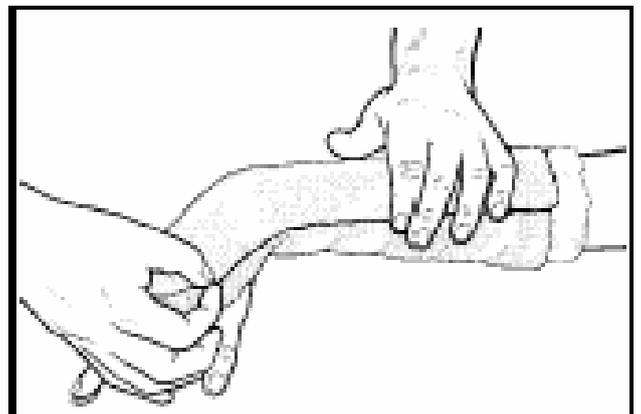


Figure 17.27

## Caring for a cast or splint

- Keep the cast or splint dry at all times
- Do not try to scratch your skin under the cast or splint with a sharp or blunt object
- Allow the cast to dry for 24 hours before putting weight on it or resting it on a hard surface
- For acute injuries, elevate the injured part for 24–48 hours and wiggle your fingers or toes frequently
- Return to the health clinic immediately if:
  - Your cast or splint gets wet or becomes soft or broken
  - You have increasing pain
  - You experience numbness or tingling, or have difficulty moving your fingers or toes
  - You see a change in skin colour of the extremity
  - Your cast or splint has a foul odour.

## REMOVING A CAST

Remove the cast with an oscillating electric cast saw, if available, or with plaster shears (Figure 17.28).

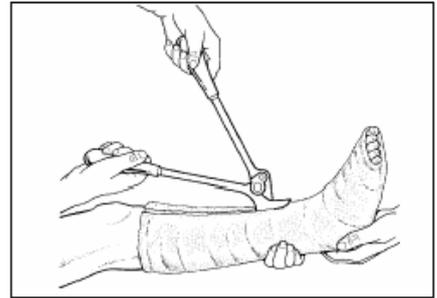


Figure 17.28

1. Make two cuts along opposing surfaces of the cast, avoiding areas where the bone is prominent. Begin cutting at an edge, then loosen the cast with a plaster spreader (Figure 17.29).

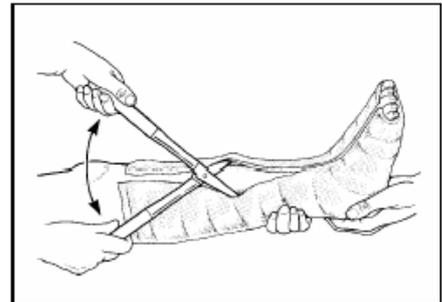


Figure 17.29

2. Complete the division of the plaster and the padding with plaster scissors, being careful not to injure the underlying skin (Figure 17.30).

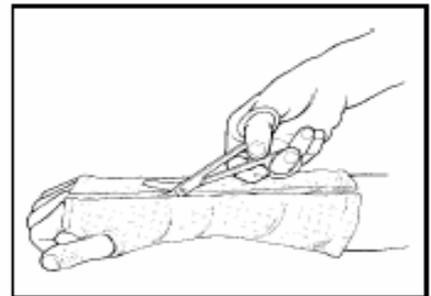


Figure 17.30

3. Under difficult conditions, or if the patient is a child, soften the plaster by soaking it in water, or water with vinegar added, for 10–15 minutes and then remove it like a bandage.

# Hand Lacerations

## Evaluation

- Treat open injuries of the hand promptly. Perform a local examination to check circulation, sensation and motor function.
- Gently examine the wound using aseptic technique to determine if it is clean or contaminated. A contaminated wound contains foreign material and crushed or dead tissue.

## Treatment

1. Debride and lavage all wounds in the operating room or emergency area. If a local anaesthetic is needed, use 1% lidocaine without epinephrine.
2. Administer tetanus toxoid and antibiotics.
3. Obtain X-rays to check underlying bones and joints.
4. Stop bleeding by compression with sterile gauze. If necessary, extend the wound, being careful not to cross skin creases in the palm or digits. Remove all foreign material and devitalized tissue, but *do not excise any skin unless it is dead*.
5. If the wound is clean, repair extensor tendons but not flexor tendons or nerves.
6. Close a clean wound over a drain using interrupted sutures if there is no tension on the skin. If the wound is contaminated, delay closure until after a second debridement. Wounds less than 1 cm square will granulate spontaneously. Use skin grafts for larger wounds, which will not close without skin tension.
7. Cover the hand with sterile gauze and a compression dressing.
8. Apply a plaster splint to hold the wrist in 20 degrees of extension, with the metacarpophalangeal joints in 90 degrees of flexion and the interphalangeal joints in full extension. Keep the fingertips exposed unless they are injured.
9. To control oedema, elevate the limb for the first week, either by attachment to an overhead frame or by the use of a triangular sling
10. Begin active exercises as soon as possible and inspect the wound in 2–3 days to remove drains.

# Airway Management

***First priority is establishment or maintenance of airway patency.***

## 1. Talk to the patient

A patient who can speak clearly must have a clear airway. Airway obstruction by the tongue in the unconscious patient is often a problem. The unconscious patient may require assistance with airway and/or ventilation. If you suspect a head, neck or chest injury, protect the cervical spine during endotracheal intubation.

## 2. Give oxygen

Give oxygen, if available, via self-inflating bag or mask.

## 3. Assess the airway- Signs of airway obstruction include:

- Snoring or gurgling
- Stridor or abnormal breath sounds
- Agitation (hypoxia)
- Using the accessory muscles of ventilation/paradoxical chest movements
- Cyanosis.

Be alert for foreign bodies. Intravenous sedation is **absolutely** contraindicated in this situation.

## 4. Consider the need for advanced airway management

## 5. Indications for advanced airway management techniques include:

- Persisting airway obstruction
- Penetrating neck trauma with haematoma (expanding)
- Apnoea
- Hypoxia
- Severe head injury
- Chest trauma
- Maxillofacial injury.

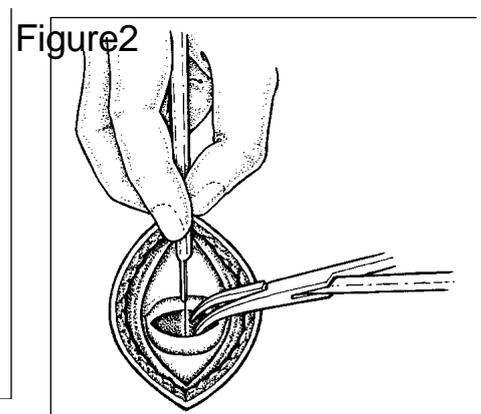
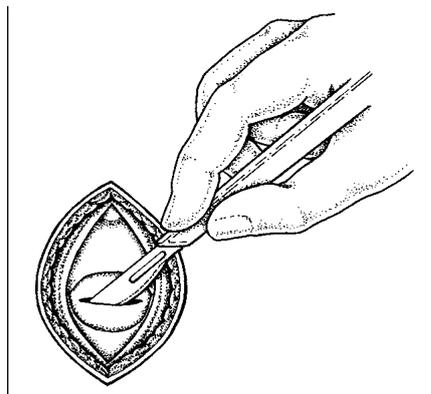
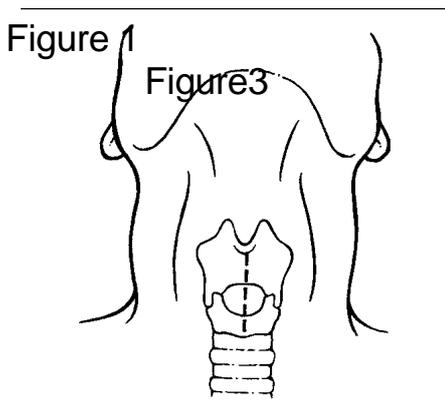
Airway obstruction requires *urgent* treatment.

## Surgical Cricothyroidotomy

Surgical cricothyroidotomy should be conducted in any patient where intubation has been attempted twice and failed and/or the patient cannot be ventilated.

### Technique

1. Hyperextend the neck, making the patient comfortable.
2. Identify the groove between the cricoid and thyroid cartilages just below the “Adam’s apple” (the protruding thyroid).
3. Clean the area and infiltrate with local anaesthetic.
4. Incise through the skin vertically with a 1.5 cm cut and use blunt dissection to ensure that you can see the membrane between the thyroid and cricoid (Figure 1).
5. With a #22 or #23 scalpel blade, stab through the membrane into the hollow trachea.
6. Rotate the blade 90° (Figure 2), insert a curved artery forceps alongside the blade, remove the blade and open the forceps side to side, widening the space between the thyroid and cricoid cartilages (Figure 3).



## Surgical Cricothyroidotomy (continued)

7. Pass a thin introducer or a nasogastric tube into the trachea if very small access (Figure 4) or proceed to step 9.
8. Run a 4–6 endotracheal tube over the introducer and pass it into the trachea (Figure 5).
9. Remove the introducer, if used.

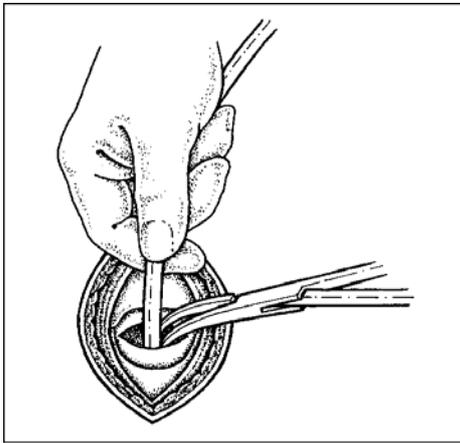


Figure 4

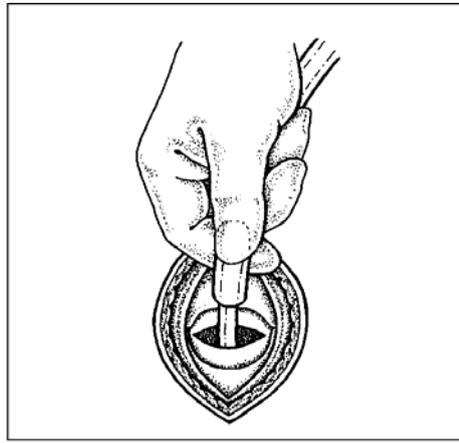


Figure 5

- This tube can stay in place for up to 3 days. Do not attempt this procedure in a child under the age of 10 years; passing several needles through the membrane will give enough air entry.
- This procedure should be performed by an experienced person, with prior knowledge of the anatomy and medical condition of the patient.
- This procedure should not be undertaken lightly, as wrong placement, bleeding and delay can cause death.

# Management of Burns

The burns patient has the same priorities as all other trauma patients.

## **Assess:**

- Airway
- Breathing: beware of inhalation and rapid airway compromise
- Circulation: fluid replacement
- Disability: compartment syndrome
- Exposure: percentage area of burn.

## ● **Essential management points:**

- Stop the burning
- ABCDE
- Determine the percentage area of burn (Rule of 9's)
- Good IV access and early fluid replacement.

The severity of the burn is determined by:

- Burned surface area
- Depth of burn
- Other considerations.

## **The burned surface area**

- Morbidity and mortality rises with increasing burned surface area. It also rises with increasing age so that even small burns may be fatal in elderly people.
- Burns greater than 15% in an adult, greater than 10% in a child, or any burn occurring in the very young or elderly are considered serious.

## Burn Management (continued)

### Burns in Adults

The “Rule of 9’s” is commonly used to estimate the burned surface area in adults.

The body is divided into anatomical regions that represent 9% (or multiples of 9%) of the total body surface (Figure 7). The outstretched palm and fingers approximates to 1% of the body surface area.

If the burned area is small, assess how many times your hand covers the area.

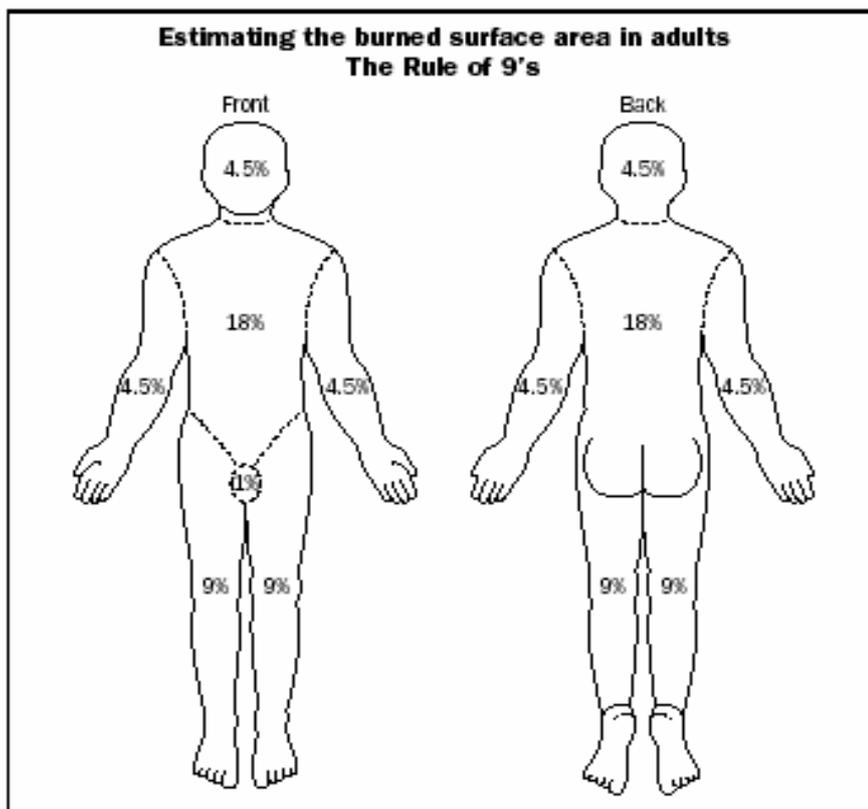


Figure 7

Morbidity and mortality rises with increasing burned surface area. It also rises with increasing age so that even small burns may be fatal in elderly people.

## Burn Management (continued)

### Burns in Children

The 'Rule of 9's' method is too imprecise for estimating the burned surface area in children because the infant or young child's head and lower extremities represent different proportions of surface area than in an adult (see Figure 8).

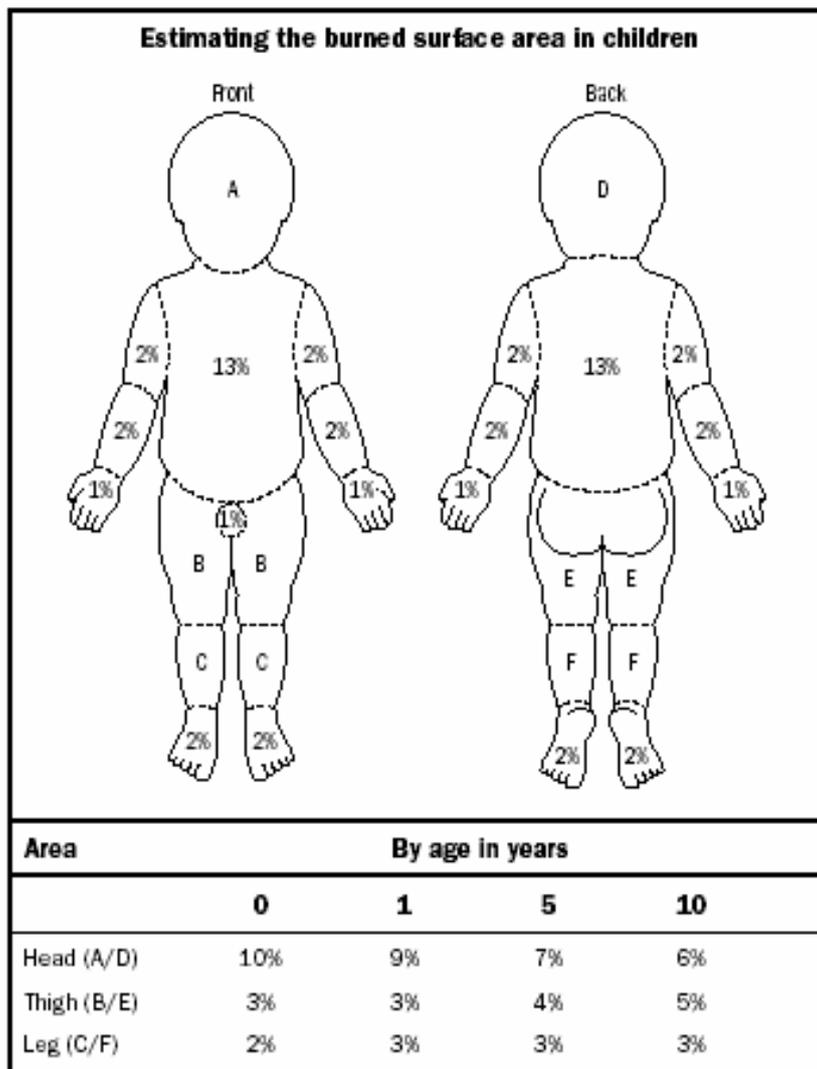


Figure 8

Burns greater than 15% in an adult, greater than 10% in a child, or any burn occurring in the very young or elderly are considered serious.

## Burn Management (continued)

### Depth of burn

It is important to estimate the depth of the burn to assess its severity and to plan future wound care. Burns can be divided into three types, as shown below.

Depth of burn	Characteristics	Cause
First degree burn	<ul style="list-style-type: none"> <li>• Erythema</li> <li>• Pain</li> <li>• Absence of blisters</li> </ul>	<ul style="list-style-type: none"> <li>• Sunburn</li> </ul>
Second degree (Partial thickness)	<ul style="list-style-type: none"> <li>• Red or mottled</li> <li>• Flash burns</li> </ul>	<ul style="list-style-type: none"> <li>• Contact with hot liquids</li> </ul>
Third degree (Full Thickness)	<ul style="list-style-type: none"> <li>• Dark and leathery</li> <li>• Dry</li> </ul>	<ul style="list-style-type: none"> <li>• Fire</li> <li>• Electricity or lightning</li> <li>• Prolonged exposure to hot liquids/ objects</li> </ul>

It is common to find all three types within the same burn wound and the depth may change with time, especially if infection occurs. Any full thickness burn is considered serious.

### Serious burn requiring hospitalization

- Greater than 15% burns in an adult
- Greater than 10% burns in a child
- Any burn in the very young, the elderly or the infirm
- Any full thickness burn
- Burns of special regions: face, hands, feet, perineum
- Circumferential burns
- Inhalation injury
- Associated trauma or significant pre-burn illness: e.g. diabetes

## Burn Management (continued)

### Wound care

#### First aid

- If the patient arrives at the health facility without first aid having been given, drench the burn thoroughly with cool water to prevent further damage and remove all burned clothing.
- If the burn area is limited, immerse the site in cold water for 30 minutes to reduce pain and oedema and to minimize tissue damage.
- If the area of the burn is large, after it has been doused with cool water, apply clean wraps about the burned area (or the whole patient) to prevent systemic heat loss and hypothermia.
- Hypothermia is a particular risk in young children.
- The first 6 hours following injury are critical; transport the patient with severe burns to a hospital as soon as possible.

#### Initial treatment

- Initially, burns are sterile. Focus the treatment on speedy healing and prevention of infection.
- In all cases, administer tetanus prophylaxis.
- Except in very small burns, debride all bullae.
- Excise adherent necrotic (dead) tissue initially and debride all necrotic tissue over the first several days.
- After debridement, gently cleanse the burn with 0.25% (2.5 g/litre) chlorhexidine solution, 0.1% (1 g/litre) cetrimide solution, or another mild water-based antiseptic.
- Do **not** use alcohol-based solutions.
- Gentle scrubbing will remove the loose necrotic tissue. Apply a thin layer of antibiotic cream (silver sulfadiazine).
- Dress the burn with petroleum gauze and dry gauze thick enough to prevent seepage to the outer layers.

## Burn Management (continued)

### Daily treatment

- Change the dressing on the burn daily (twice daily if possible) or as often as necessary to prevent seepage through the dressing.
- On each dressing change, remove any loose tissue.
- Inspect the wounds for discoloration or haemorrhage, which indicate developing infection.
- Fever is not a useful sign as it may persist until the burn wound is closed.
- Cellulitis in the surrounding tissue is a better indicator of infection.
- Give systemic antibiotics in cases of haemolytic streptococcal wound infection or septicaemia.
- ***Pseudomonas aeruginosa*** infection often results in septicaemia and death. Treat with systemic aminoglycosides.
- Administer topical antibiotic chemotherapy daily. Silver nitrate (0.5% aqueous) is the cheapest, is applied with occlusive dressings but does not penetrate eschar. It depletes electrolytes and stains the local environment.
- Use silver sulfadiazine (1% miscible ointment) with a single layer dressing. It has limited eschar penetration and may cause neutropenia.
- Mafenide acetate (11% in a miscible ointment) is used without dressings. It penetrates eschar but causes acidosis.
- Alternating these agents is an appropriate strategy.
- Treat burned hands with special care to preserve function.
  - Cover the hands with silver sulfadiazine and place them in loose polythene gloves or bags secured at the wrist with a crepe bandage.
  - Elevate the hands for the first 48 hours, and then start the patient on hand exercises.
  - At least once a day, remove the gloves, bathe the hands, inspect the burn and then reapply silver sulfadiazine and the gloves.
  - If skin grafting is necessary, consider treatment by a specialist after healthy granulation tissue appears.

## Burn Management (continued)

### Healing phase

- The depth of the burn and the surface involved influence the duration of the healing phase. Without infection, superficial burns heal rapidly.
- Apply split thickness skin grafts to full-thickness burns after wound excision or the appearance of healthy granulation tissue.
- Plan to provide long term care to the patient.
- Burn scars undergo maturation, at first being red, raised and uncomfortable. They frequently become hypertrophic and form keloids. They flatten, soften and fade with time, but the process is unpredictable and can take up to two years.
- In children
  - The scars cannot expand to keep pace with the growth of the child and may lead to contractures.
  - Arrange for early surgical release of contractures before they interfere with growth.
- Burn scars on the face lead to cosmetic deformity, ectropion and contractures about the lips. Ectropion can lead to exposure keratitis and blindness and lip deformity restricts eating and mouth care.
- Consider specialized care for these patients as skin grafting is often not sufficient to correct facial deformity.

### Nutrition

- Patient's energy and protein requirements will be extremely high due to the catabolism of trauma, heat loss, infection and demands of tissue regeneration. If necessary, feed the patient through a nasogastric tube to ensure an adequate energy intake (up to 6000 kcal a day).
- Anaemia and malnutrition prevent burn wound healing and result in failure of skin grafts. Eggs and peanut oil are good, locally available supplements.

## Transportation of critically ill patients

- **Transporting patients is risky. It requires good communication, planning and appropriate staffing.**
- **Any patient who requires transportation must be effectively stabilized before departure.**
- **As a general principle, patients should be transported only if they are going to a facility that can provide a higher level of care.**
- **Planning and preparation include consideration of:**
  - Type of transport (car, lorry, boat, etc.)
  - Personnel to accompany the patient
  - Equipment and supplies required en route for routine and emergency treatment
  - Potential complications
  - Monitoring and final packaging of the patient.
- **Effective communication is essential with:**
  - The receiving centre
  - The transport service
  - Escorting personnel
  - The patient and relatives.
- **Effective stabilization necessitates:**
  - Prompt initial resuscitation
  - Control of hemorrhage and maintenance of the circulation
  - Immobilization of fractures
  - Analgesia.
- **Remember, if the patient deteriorates**
  - Re-evaluate the patient by using the primary survey
  - Check and treat life threatening conditions
  - Make a careful assessment focusing on the affected system.

***Be prepared: if anything can go wrong, it will – and at the worst possible time!***