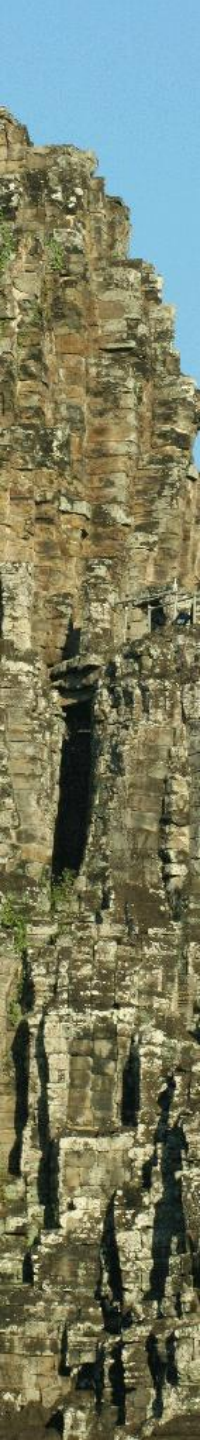

Treatment Overview

Lecture 7: Snake Bite Management Course

Introduction (1)

- Snake bite is a significant Public Health & Medical problem in Cambodia
- All **health care workers** involved in assessing & treating acutely unwell patients (Emergency Departments & Intensive Care Units) should know how to assess & treat snake bite patients
- **Knowledge** could include the content of this course
- **Teamwork & good communication** with patients, relatives & other staff is essential

Introduction (2)

- **Health facilities** receiving snake bite patients must make sure they are in the position to provide the best possible management by:
  - replacing used stocks of important **consumable items**
  - maintaining vital **equipment**
  - doing their best to ensure adequate stocks of **effective antivenoms**
  - ensuring the **knowledge & skills** of staff are kept at a high level
- **Effective antivenoms**, data collection & ongoing research are also critical to improvement of outcomes for these patients

Treatment Outline

- **Treatment includes**:
  - Resuscitation (L 4)
  - Administration of selected antivenom & treating any complications (L 8)
  - Treatment of complications of envenoming:
    - Systemic - neurotoxicity, bleeding, renal failure (L9-11)
    - Local - wound care, infection control, appropriate debridement, monitoring for compartment syndrome (L12)
  - Ongoing monitoring & supportive care
  - Appropriate referral & transport (L13)
  - Physiotherapy & rehabilitation
  - Education & outpatient follow-up

Objectives: Assessment & Treatment (1)

- **Identify** the critically-ill patient, & those likely to deteriorate, & resuscitation when required (L 4)
- **Assess** thoroughly - history, examination, investigations (L 5)
- **Form** & institute a clear, appropriate management **plan**
- **Identify** envenomation & the type of antivenom required, aiming to give this **as soon as possible** (L 3)
- **Identify & treat** complications of traditional treatments & of envenomation
- **Anticipate** complications of envenomation & treatments
- Follow up **test results** & act on them

Objectives: Assessment & Treatment (2)

- **Monitor** patient closely, reassess frequently
- Promptly act on & treat **deterioration & complications**
- Provide **specific & supportive** care, even after discharge
- **Communicate** well with colleagues (keep full & accurate medical notes)
- **Document** all interventions & communication
- Aim to provide **thorough, quality care** to all patients

Unsuccessful Management

- **Why do snake bite patients die?**
  - late presentation to medical care (ignorance, fear, lack of transport)
  - reliance on unhelpful traditional methods
  - lack of antivenom
  - unsuitable antivenoms
  - very delayed antivenom administration
  - failure to identify & correctly treat those needing resuscitation
  - poor assessment
  - errors of judgement
  - lack of correct knowledge about management of snake bite patients
  - failure to monitor & reassess patients regularly

Treatment Strategy (1)

- **“4 Cs”:**
  - Case - resuscitation/treat immediate problems
  - Cause - identify likely snake, give antivenom
  - Complications - look for & treat
  - Communication (& documentation):
    - with patient & family
    - with other staff
    - with referral hospital
- **Concurrent**:
  - Start **monitoring** of
    - RR, SpO2, HR, BP, ECG, T, U/O (urine output)
    - frequently recording & acting on these vital signs
  - **resuscitation** of the patient’s ABCDEF
  - **pressure-immobilisation bandaging**, where indicated

Treatment Strategy (2)

- Specific treatments, including:
  - airway management & intubation if required, oxygen
  - use of atropine to dry secretions if unable to intubate, or wish to delay this (0.01-0.02mg/kg Q4-6H)
  - correct antivenom
  - treatment of coagulopathy
  - treatment of shock
  - treatment of the complications of rhabdomyolysis
  - treatment of cardiac effects of envenomation
  - antibiotic treatment, tetanus vaccination, when indicated
  - wound care, managing pain +/- surgical care
  - treatment of complications of traditional treatments

Treatment Strategy (3)

- Supportive care, including:
  - proper patient positioning
  - regular gentle suctioning if pooling saliva (whether the patient is intubated or not)
  - oxygen as required
  - maintenance IV fluids
  - **do not** give oral fluids (or food!) if vomiting or neurotoxicity
  - an indwelling urinary catheter, in the patient with respiratory muscle weakness or paralysis, to
    - prevent urinary retention
    - monitor urine output (renal function & effect of IV fluids)
    - note changes in urine colour (suggesting haematuria or myoglobinuria)
  - care of potential pressure areas - regular turning
  - reassurance of patient and relatives (often neglected)

Treatment Strategy (4)

- Ongoing **monitoring and recording** (hourly) of:
  - vital signs
  - oral secretions
  - respiratory effort
  - urine output (volume & colour)
- Frequent (at least **hourly** at first) **reassessments** of clinical status (re-examination), **recording** the results on Snakebite Observation sheets
- **Act** on any abnormalities, any deterioration
- With **every intervention**:
  - Know why you are doing it
  - Look for the expected effect
  - Look out for adverse effects

Controversial or Unsupported Treatments

- Distract staff from appropriate actions
- Delay the administration of antivenom
- Waste time & physical resources
- Risk adverse effects
- They include:
  - Traditional treatments
  - Premedication with adrenaline prior to administering currently available antivenoms
  - Antihistamines, Hydrocortisone (see L 8)
  - Stat doses of antibiotics
  - Blood products (before circulating venom is neutralised) - FFP, RBC, WB

Supported Treatments

- Basic & advanced airway management
- Oxygen & breathing support
- IV fluids for shock
- Efficacious antivenoms
- Adrenaline & IV fluids for antivenom reactions
- Accepted treatments for hyperkalemia & pulmonary oedema associated with acute renal failure
- Dialysis for acute severe oliguric renal failure
- Surgical management in **appropriate** cases

Antivenom

- Lecture 8
- **Correct, efficacious antivenoms, given as soon as indicated, in the correct dose are the definitive treatment for snake bite with envenomation**
- Other issues dealt with in that lecture include:
  - Use of premedication
  - Treatment of antivenom reactions
  - Minimisation/treatment of serum sickness

Oxygen, Airway & Breathing Management

- Lecture 9
- Oxygen:
  - For **all** patients with neurotoxicity, shock or major bleeding or anaemia
  - Chose suitable delivery method & flow rate
- Prevention of airway obstruction, aspiration
- Anticipation of respiratory failure
- Basic airway management
- Advanced airway management
- Ensure adequate oxygenation & ventilation

Treatment of Bleeding

- Lecture 10
- **ANTIVENOM**
- Vitamin K (10mg IV):
  - may help recovery from consumption coagulopathy
  - may be useful if prolonged coagulopathy, poor clotting after adequate AV, liver disease, malnutrition
- Blood products - only use if:
  - severe uncontrollable bleeding
  - adequate antivenom has been given (or none is available)
  - with pressure & elevation, where possible
  - ? role for haemostatic agents, fibrinolytic inhibitors

Treatment of Cardiovascular Effects

- Lecture 11
- Treat shock:
  - manage airway & breathing to ensure adequate oxygenation
  - then use IV fluids (crystalloid to begin with - 20ml/kg crystalloid, then re-assess)
- Maintain hydration
- Treat fluid overload & hyperkalaemia in renal failure
- IV fluids used for:
  - treatment of shock
  - treatment of dehydration: nil by mouth (NBM), vomiting, fever
  - maintenance of hydration, if NBM (patients with neurotoxicity)
  - administration of antivenom
  - treatment of antivenom reactions associated with hypotension

Treatment of Renal Effects

- Lecture 11
- Prevention of renal failure is the key:
  - avoid hypoxia & shock (appropriately manage airway, breathing and circulation)
  - give appropriate antivenom as soon as possible
  - treat dehydration in the NBM or vomiting patient
  - maintain good urine output in the presence of myolysis
  - insert urinary catheter

Treatment of Myotoxicity

- **ANTIVENOM**
- Maintain good urine output
- Alkalinise IV fluids to reduce precipitation of myoglobin (30ml/l of 8.4% $NaHCO_3$)
- Monitor closely for signs of renal failure
- Physiotherapy upon recovery of motor nerve function & after antivenom therapy

Treatment of Local Effects

- Lecture 12
- **ANTIVENOM**, as soon as possible
- Prevent rupture of bullae; aspirate aseptically if large
- Cleanse skin gently daily with soap & water
- Elevate limbs to reduce swelling & bleeding
- Treat obvious infection with IV antibiotics
- Use objective measures to identify compartment syndrome rather than external appearance; avoid surgery where possible
- Monitor limb with ultrasound for deep vein thrombosis & muscle oedema, haemorrhage & ischaemia
- Surgical debridement of necrotic tissues, once antivenom given & coagulopathy, if present, has resolved; differentiate from subcutaneous bruising

Treatment of Infections

- (Aspiration) pneumonia - clindamycin or penicillin + metronidazole
- Wound infections - incisions, sites of skin necrosis (L 12)
- Infected venepuncture & IV sites
- Urinary tract infection from IDC
- Tetanus vaccination essential - once coagulopathy has resolved (<3/7); ensure completion of full course as an outpatient - further doses at 6/52, 6/12

Patient Reassessment & Monitoring (1)

- Critical part of care; visibility of patient essential
- Vital signs - HR, BP, RR, SpO2, urine output & fluid balance
- Re-examination, looking for:
  - coagulation: bleeding
  - neurological: cranial nerves, respiratory function, objective measures
  - after antivenom, other treatments
  - hourly for 1st 24 hours after bite & act on findings!
- Rapid deterioration can be seen in children
- 6-hourly 20WBCT after antivenom
- Chase blood results

Patient Reassessment & Monitoring (2)

- Monitor all equipment - ventilator & oxygen supply
- Sedation & analgesia important
- Remember that a paralysed snake bite patient can hear everything that is said at their bedside!
- Turns:
  - Prevent pressure areas
  - Reduce lung atelectasis, pneumonia
- Physiotherapy - limb muscles & chest
- Relatives & friends should not be relied upon to alert staff to deterioration in clinical state of their relative
- Unventilated patients should be kept in a central place in the department & not be left to quietly “sleep” in the corner

Management: Other Issues (1)

- Remember that GCS is not valid in neurotoxic snake bite
- However, sudden changes in apparent conscious state should lead to an urgent immediate reassessment of the patient by someone with appropriate knowledge & skills
- A fall in REAL conscious level may be due to
  - severe hypoxia from any cause
  - severe hypotension from any cause
  - hypoglycemia (especially infants & small children)
  - intracerebral bleeding
- Any deterioration must be managed by
  - Reassessment & Resuscitation of **A B C D E F**
  - Closer monitoring

Management: Other Issues (2)

- IM injections, eg. tetanus toxoid, should be given ONLY once any coagulopathy has resolved
- Every snakebite patient should be kept under medical observation until at least 24 hrs after a suspected bite
- Do not send home ANY snakebite patient who has ANY specific or non-specific symptoms or signs of envenomation!
- Give education about what to do if they do develop symptoms, at the time of discharge, to EVERY asymptomatic patient

Nursing Care

- Nurses
  - spend more time with patients
  - opportunities to communicate with, reassure & educate patients & relatives
  - act as patient advocate
  - remind doctors of their responsibilities & hospital protocols
  - chase important results, perform 20WBCT
  - responsible for most supportive care:
    - measure & record vital signs, fluid balance
    - proper patient positioning - prevent pressure areas, atelectasis
    - regular gentle suctioning (patient intubated or not)
    - IV fluids, sedation, analgesia

Physiotherapy & Rehabilitation

- Already: very important for ventilated patients
- Will speed up patient recovery
- Not performed on patient's bitten limb until adequate antivenom given
- Essential for patients who have
  - spent long periods in bed
  - had any surgery, especially an amputation

Referral & Transport

- Discussed in Lecture 13

Education & Outpatient Follow-up

- Take every opportunity to educate patient & relatives about snakebite avoidance & first aid
- Advise what to expect wrt recovery
- Advise about exercises & activity
- See again at 6/52 for 2nd tetanus toxoid dose & to check on recovery
- See again at 6/12 for 3rd tetanus toxoid dose & to check on recovery

Management Summary

- Rapid assessment & resuscitation of ABCDEF problems
- Institution of first aid on arrival
- Thorough clinical assessment
- Identify likely species
- Appropriate antivenom, when/as soon as this is indicated
- Watch for antivenom reactions
- Continue airway management, oxygen, respiratory support,
- Dealing appropriately with bleeding, coagulopathy, shock
- Dealing with cardiac & renal effects, myolysis
- Treatment of local effects, wound care, possible surgery
- Supportive care of all vital functions, including:
  - hydration, urine output monitoring, **fluid balance**
- Close monitoring of vital signs, frequent physical reassessment
- Act on any abnormalities, any deterioration
- Physiotherapy & rehabilitation
- Appropriate referral & transport
- Education & outpatient follow-up

Summary - Key points

- Acute health care workers should be familiar with the venomous snakes in their area & the effects expected from a bite by these snakes
- Acute care health care workers have a duty to make the effort to become proficient in the management of snake bite patients
- Good management will lead, in most cases, to good outcomes
- Poor outcomes can be minimised by prompt & appropriate treatment of patients presenting late
- With every intervention:
  - Know why you are doing it
  - Look for the expected effect of it
  - Look out for adverse effects