

PRIMARY TRAUMA CARE

How to Run a PTC Course

(including PTC Trauma Scenarios)

**Guidance for those preparing to teach
on the 2-day PTC course**

2021 Edition

The Primary Trauma Care Foundation is proud to have worked in association with organisations including:

College of Surgeons of East,
Central and Southern Africa



COSECSA
College of Surgeons of
East, Central and Southern Africa

The World Federation of
Societies of Anaesthesiologists



WFSA
WORLD FEDERATION OF SOCIETIES OF
ANAESTHESIOLOGISTS

The Royal College of
Anaesthetists



The Royal College of Anaesthetists
Educating, Training and Setting Standards in
Anaesthesia, Critical Care and Pain Management

The University of Oxford
Global Surgery Group



The COOL project 2013-14



COSECSA
Oxford
Orthopaedic
Link

Tropical Health and Education
Trust



Australasian College for
Emergency Medicine



King's Global Health
Partnerships



Médecins Sans Frontières



Medical Aid For Palestinians



Ministry of Health of the
People's Republic of China

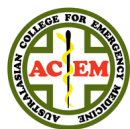
中国卫生部

UK Aid



THE ROYAL COLLEGE
OF SURGEONS OF
EDINBURGH

The PTC Course and PTC Instructor Course are accredited by the Royal College of Surgeons of Edinburgh



The Australasian College for Emergency Medicine endorses PTC as a recommended trauma course for LMICs



**World Health
Organization**

The original version of the PTC manual was an annex to *Surgical Care at the District Hospital*, published by the World Health Organisation in 2003

©The Primary Trauma Care Foundation | www.primarytraumacare.org

Charity Registered in the UK, No. 1116071 | Company registered in England and Wales, No. 5617836

Registered office: 264 Banbury Road, Oxford OX2 7DY, UK | Patron: Sir Terence English KBE, FRCS, FRCP

Mailing address: PO Box 880, Oxford OX1 9PG, UK

Contents

Page

| | |
|--|----------------|
| Introduction | 4 |
| Principles and Planning of PTC Courses | 5 |
| Guide to Paperwork you will need | 8 |
| Recommended equipment list | 13 |
| Advice on teaching the individual sessions in the PTC Course - Lectures | 14 |
| Welcome and Local Trauma Perspective | 14 |
| PTC Overview | 15 |
| The ABCDE of Trauma and Primary Survey | 16 |
| Airway and Breathing | 17 |
| Circulation and Shock | 19 |
| Chest Injuries | 20 |
| Abdominal, Pelvic and Limb Injuries | 22 |
| Head and Spinal Trauma | 23 |
| Trauma in Children and Pregnancy | 25 |
| Burns | 26 |
| Secondary Survey | 27 |
| Disaster Management | 28 |
| Summary at the end of the course | 29 |
| Skill Stations | |
| Basic Airway Management | 30 |
| Advanced Airway Management | 32 |
| Surgical Airway (optional skill) | 32 |
| Spinal Immobilisation | 34 |
| Tension Pneumothorax and Chest Drain Insertion | 35 |
| Intraosseous Needle Insertion (optional skill) | 36 |
| Haemorrhage Control and Pelvic Binder (optional skill) | 37 |
| Workshops | |
| Pain Management in Trauma | 38 |
| Transportation | 39 |
| Paediatrics | 39 |
| Neurological Assessment | 40 |
| Drowning | 41 |
| Burns and Blasts | 41 |
| Modular PTC Training | 42 |
| Teaching PTC for pre-hospital participants | 43 |
| Writing a PTC Report | 46 |
| PTC Trauma Scenarios | 47 - 66 |

Introduction

This manual provides guidance and advice to help Instructors teaching on a PTC Course. First, it gives some background information to help instructors setting up a new PTC course. Second, it provides learning objectives and key points for the lectures, skill stations and workshops in the course.

Whenever an Instructor teaches any of these parts of a PTC course for the first time, these materials will give helpful advice on the main points that the PTC course participants need to learn and understand.

When you did the PTC Instructor Course you learned the importance of using interactive teaching methods as much as possible. Do not feel that you need to use the PTC slides: it is good to teach PTC without slides or with minimal slides, and the suggested outlines and questions will help you to do this.

Disclaimer and health and safety notes

All PTC courses are run by individuals who are expected to take full responsibility for their own action and travel arrangements. The PTC Foundation cannot be held responsible or liable for actions or accidents by any individual either teaching or attending any PTC course or instructor course. The views expressed by individual instructors are not necessarily those of the PTC Foundation.

All individuals undertaking any travel on behalf of the PTC Foundation do so at their own risk and must take appropriate steps to insure themselves against all eventualities. The PTC Foundation cannot be held responsible for any liability arising from any event during a PTC course and instructors need to be aware that PTC courses are often held in dangerous locations.

All PTC material is copyrighted and remains the property of the PTC Foundation. Slides should only be used for PTC courses and with the express permission of the Foundation. The PTC slides are numbered. The text of PTC slides and Instructor slides *must not be changed*. Pictures may be added. If the PTC slide-set is distributed this must be with permission and in the original PTC format with no changes.

Health and Safety

All PTC instructors are expected to take all reasonable care to ensure the health and safety of all course participants and guests. This includes checking that there are no unacceptable risks, for example from electrical systems, appliances, sharp tools, broken glass, trip hazards, road traffic, food provision, sanitation, contagious diseases, or any other cause.

Principles and Planning

This Handbook contains all that you need to set up and run a PTC course, whether it is the first course in a new location or a subsequent course. Guidance for Faculty Trainers on running the one day PTC Instructor Course is included in the *PTC Instructor Course Manual*.

Principles of the PTC Programme

The format of PTC is the same throughout the world. At its heart is the 2-day PTC course, which gives a strong foundation in trauma management. The strength of PTC has been its emphasis on immediate training of local instructors to teach and develop PTC programmes. The usual pattern of introduction is a five-day programme. We refer to this as a 2-1-2 package:

- A 2-day PTC course for around 20 participants, during which up to 12 potential new instructors are chosen
- A one-day instructor course
- A 2-day PTC course, taught by the newly-trained instructors (with support from Faculty Trainers)

Throughout these teaching materials we refer to five groups of people:

| | |
|---------------------|--|
| Trainee Instructors | people attending a PTC instructor course |
| Faculty Trainers | people teaching a PTC instructor training course |
| The Course Director | the person who sets up and leads a PTC course |
| Participants | people who attend a PTC course |
| Instructors | people who teach on a PTC course |

The new instructors need to run further courses within a few months, to increase their confidence and skills.

Planning and preparation for the PTC Course

Factors important for a first course in a new location

If possible, a PTC representative will make a prior visit to the location to discuss the programme with senior staff and sometimes to sign Memoranda of Understanding or agreements with the authorities or institutions where the courses will take place.

The first course is important, both to generate a strong group of new local instructors and to influence local senior doctors and other staff whose support will be essential in establishing a PTC programme.

Plan carefully. Above all, pick a Faculty Team who are good at doing what they promise and pay attention to detail. You also need team members able to liaise with officials and for administration and publicity.

Make every effort to form an effective and enthusiastic local committee who will drive future courses at the end of the first 2:1:2 course.

Course Director / Coordinator

If you are Course Director but do not live near the course venue, identify a local person to be the course coordinator. This will often be a senior doctor living nearby, who may have been involved in the initial invitation to PTC.

With modern telecommunications and VoIP (e.g. Skype), it can be very helpful to have discussions face-to-face rather than by email.

Course Participants

Liaise with the local co-ordinator(s) well in advance to identify appropriate participants for both 2-day courses. 20 participants is the ideal number — more than that makes interactive & small group teaching difficult. Keep a waiting list if more people apply, in case you get last-minute cancellations.

For the first 2-day course aim to recruit participants from a range of specialties involved in trauma care, including surgeons, anaesthetists and emergency medicine staff and senior nurses. Select those who may become influential instructors on future courses. When you invite them, explain that to receive a certificate they must attend the entire 2-day course, and if selected to be an instructor, they will need to be available for the instructor day *and* to teach on the follow-on 2-day course.

For the second 2-day course it is usual to recruit more junior doctors, nurses, medical students or paramedics.

Discuss with the course coordinator that it may be helpful to write an invitation letter to course participants that can help them to request leave from their hospitals.

In some countries candidates/participants may expect a *per diem* payment for attendance on the course. Explain that PTC is not able to make such payments. Equally, many courses similar to PTC charge many hundreds of dollars to allow participants to attend. PTC does not! Courses are normally free of charge, or there may be a small charge to provide refreshments.

The local coordinator may wish to invite one or two observers; more than this can detract from the course itself and distract the participants.

Recruit a local colleague to help with the “Local trauma perspective” and with the “Major disaster” sessions. For your introduction to the course, it often helps to go on the Internet and get some pictures and statistics of local trauma to incorporate into the lecture. Good statistics are often available from the WHO website.

The Visiting Instructor team (especially for first courses)

As a visiting Faculty team it is important to have the right number of people with an appropriate skill mix.

If your team is travelling to the course, plan for:

- Accommodation
- Travel arrangements, travel insurance, immunisations as appropriate.
- Computing facilities and laptops – for registration, lecture delivery, other administration. It is wise to ensure that your computers have good and up to date antivirus software running, especially if you are transferring information onto participants’ USB sticks.
- Power cuts may happen. Keep laptop batteries as fully charged as possible.

- It is useful to provide an electronic copy of the teaching materials. At the time of writing this is usually done on a USB drive (memory stick). Participants are often willing to bring their own USB drive for this. Those who can will be able to download directly from the PTC website (www.primarytraumacare.org).
- Take smart clothes both for teaching and any formal meetings

Administrative assistance for the course

If possible identify and make use of a local secretary or coordinator, who will be familiar with where things are and will, with the local coordinating medical staff, have useful contacts. Make sure that person understands exactly what to print, and if necessary make sure you pay for materials such as paper and toner.

The course venue

Ask the local co-ordinator about a suitable venue for the course. It should have a room large enough for the lectures and for skill stations or discussion groups in the four corners of the room: an alternative is to use secondary rooms close to the main room for group sessions.

Always have a back up teaching method such as a whiteboard/flipchart and pens in case the computer or projector breaks down or there is a power cut. *The first course should not be taught with equipment that will not be available for future courses* — the level of equipment and technological sophistication should reflect the environment in which the course is being given.

It is helpful if one or two printed copies of the slides are available at the venue, both to allow preparation for those without computers at home and also in case there is a power cut.

Arrange for signs to the venue to be put up.

Catering during the course

Refreshments and food should ideally be taken just outside or very close to the course location to avoid losing time, and to keep participants together.

Costs, budget and sponsorship

Establish a budget for the cost of the room and catering well in advance. Ensure that this is put in writing and agreed. It is important for those involved in the course to be aware that PTC is a charity and that our policy is that teaching is given and received without a fee. Make sure your Instructors know they will not be paid for teaching.

Equipment for the Course

A list of suggested medical equipment is shown on page 13 of this document, and is also included in the *Logistics Package* that can be downloaded from the PTC website. Discuss the availability of the items in this list with the local co-ordinator. It is important to stress that PTC courses can be taught with whatever equipment is available and that if items cannot be obtained this should not prevent the course being run.

Arrange for with the local co-ordinator to obtain a goat or similar thorax and (intact) larynx specimens (or suitable artificial alternatives).

Teaching Equipment

- Laptop and projector, if available

- If possible, a second laptop for registration and recording MCQ and other results. A blank Excel spreadsheet template is in the *Logistics Package*. Otherwise, use a paper copy of the spreadsheet or chart for participants' details and scores.
- Flipchart or white/black board and pens/chalk
- Paperwork and printing as discussed below.

Preparation of paperwork and printing

Find out the local availability of printer and paper and toner, and whether MCQs and certificates as well as programmes can be printed locally. If this is not possible then it may be more reliable to take them with you.

If possible, distribute copies of the PTC manual (either as printed or electronic format) to participants before the course to give them a chance to study and prepare.

Guide to the Paperwork you will need for courses

This is the paperwork that you will need to ask the participants to complete and that you will either need to bring back to give to PTC Headquarters or the information from which you can enter into the spreadsheet that you can download from the PTC website at www.primarytraumacare.org and return to the PTC administrator at admin@primarytraumacare.org.

Before the course begins, arrange for the printing of all necessary materials and documents, and the production of electronic copies (on USB memory sticks or CD-ROM's) of those materials needed (for example the instructors need electronic copies of the slides and additional teaching materials). These materials are available to download from the PTC website, www.primarytraumacare.org.

At the beginning of Day 1

- Pre-course participant form (includes MCQ answer sheet)
- PTC manuals for all participants +/- copies for instructors
- Instructor Course Manuals for the Instructors if they do not have copies.
- Printed copies of the scenarios – these are available at the end of this manual or can be downloaded as part of the Logistics Package from the PTC. Since these are used throughout the course it is helpful to plastic laminate these if possible, to protect them.
- Printed copies of the MCQ question paper.
- It is helpful to have a printed set of the PTC slides to help preparation and in case there is a power cut.

You also need to prepare name badges for participants and faculty (these can be hand-written at registration).

At the end of Day 2

- Post course participant form (this includes the MCQ answer sheet)
- Certificates. You will need to print these at the end of day 1 using the names as the participants wrote or typed them at registration.

If you are doing a 2-1-2 programme –

At the beginning of Day 3

- Instructor manual – one copy for each trainee instructor.
- Pre course questionnaire for instructors

- Post course questionnaire for instructors
- Instructor certificates

At the beginning of Day 4

- PTC manuals for participants
- Pre course participant form

At the end of Day 5

- Post course participant form
- Certificates

Publicity.

Interest and enthusiasm from the local clinicians and administrators gives a great boost at the start of a PTC Programme. Try to meet University, other senior staff and Government/ Ministry of Health staff: invite them to see what the course involves.

Encourage the local co-ordinator to arrange publicity for the course, particularly with local government and medical colleagues and groups. Tell local newspapers and broadcasters that a course is happening and invite them to the opening ceremony. Aim to demonstrate how well the course runs and how useful it will be.

Finalisation of the Course Timetable

Well before the course, tell each instructor which parts of the 2-day and Instructor courses they will be teaching, so that they can prepare, but advise them all to be familiar with all the material in case changes have to be made at short notice due to sickness.

Find out what is the normal working day and whether you need to adjust the times to fit in with realistic travel expectations for participants and local faculty.

Reconfirm the course timetable and instructor assignments. Liaise with the local co-ordinator regarding the breaks and any need for timed prayer (particularly in Muslim countries).

Faculty Meeting Before the Course

If possible, visit the venue the day before the course to see the facilities and make plans.

Arrange a meeting of the Faculty, with the local co-ordinator, the day before the course. During this meeting, reconfirm who is going to teach each session and what presentation style they will use. It is helpful to demonstrate different teaching styles on the course so that new instructors will experience them as participants before training to use them when they teach.

Encourage the whole Faculty to attend each others' lectures and to support the course. Discuss and rehearse the demonstration scenarios and assign non-teaching roles:

- Registration, name labels and paperwork during the course
- Marking MCQs
- Timekeeper and ensuring that participants return promptly after meals and breaks, and division of course participants into groups
- Equipment person
- Daily logistics and session set-up
- IT person to check that computers and projectors are working.

The First 2-Day Course

On the first morning

Prepare the room

Get to the venue early – at least an hour before the course is due to start.

Set up the room and make sure that all is ready before the participants arrive. Check that projector and screen or board are available and working, and that all teaching slides are loaded onto one computer.

Throughout the course all Faculty should help to keep the room tidy, chairs and tables arranged for the next session.

Always ensure that the teaching environment is safe.

Paperwork and Registration

Assign two faculty members to register participants as they arrive. You might ask the participants to type their own names and contact details (particularly email addresses) directly into the spreadsheet on a computer to avoid errors. Ensure that the name and spelling are what they would want to be on their course certificates. Give name labels to the participants and Faculty; ask them to keep wearing them throughout the course. It may be helpful to divide the participants into four groups at the start of the course, and either to put a coloured mark on their badge or to use different coloured lanyards. It is a good idea to take a quick photograph of each participant wearing their name badge, which can be helpful in faculty discussions.

A third team member invites each arrival to sit down after registration and to begin completing their forms and the confidence matrix. The Multiple choice question paper (MCQ) can either be done by giving each participant a question paper, asking them not to write on it, or a PowerPoint slide set of the MCQ questions is available in the *Logistics Package* download from the PTC website and this can be used at the beginning and end of the course. However, in case of a power cut and for late arrivals, it is sensible to have a copy of the MCQ paper available for each participant. When running a course for participants with limited understanding of English it can be helpful to have someone read out and translate the questions in their local language. After the MCQ and confidence matrix are marked, the results of these will need to be entered into the course spreadsheet.

Introducing the course

Many of the countries we visit have a strong culture of religion. It is quite common for the PTC course to begin with prayers to bless the endeavours of the next days.

Encourage participants to switch off, or at least silence, their mobile phones. Explain the importance of keeping to time and that they will need to attend the whole course if they want to receive an attendance certificate.

During the course

High Quality Teaching on the course

The way you teach the course will strongly influence how future courses are run, and so it is important for Faculty to demonstrate a good approach to this.

Start sessions on time; strict timekeeping is vital. Bring the participants back promptly after refreshment or meal breaks. For each session it helps to use the timer on a mobile phone and to have a faculty member giving signs at five and one minutes to go before the end of the session.

In some countries it is not the norm for women to critique men, or juniors their seniors.

Faculty meetings

Plan to have a faculty meeting at the end of each day. Discuss and reflect on how the day's teaching went, make plans for the following day, and (at the end of Day 1) select those participants you want to invite on the Instructor course. Pay special attention to the local co-ordinator's recommendations for the latter.

At the end of the first 2 day course

After presentation of certificates and asking participants to complete the end of course paperwork it is common to finish the day by taking a group photograph of the course participants and faculty.

At the end of the course the participants should fill in the PTC Post-course participant form. Ask them to fill in the course feedback questions and confidence matrix first, then they repeat the MCQ either using the paper question papers or by going through the questions as a PowerPoint show. After this is done the results will need to be entered into the course spreadsheet, which is returned to PTC Headquarters with the course report.

Ask those selected to train as instructors to remain for a short briefing about the instructor day.

The Instructor Day

This is discussed in detail in the *"Instructor Course Manual"*.

At the end of the Instructor Day

Ask the trainee instructors to complete the Post-course questionnaire for PTC Instructors. Present the Instructor Certificates.

New instructors will decide in the session at the end of the instructor day what roles they will have in the follow-on course.

The Second 2-Day course

The arrangements for the second PTC course are a repeat of the first 2-day course. New instructors take on administrative as well as teaching roles. Faculty trainers are available for advice and (if requested) feedback.

After the 2-1-2 Course

The Course Director should write a short course report and send a copy of this to PTC Headquarters together with the course spreadsheets, and to influential people locally. This can be done using the [short online form at the PTC website](#), or there is also guidance in the *Logistics Package*. The Course Director should complete any required budget forms.

Setting up a local PTC committee

After the first introduction of PTC to a country (or region in a large country) the new instructors should

aim to set up a local working committee with a nominated leader. This committee will then be responsible for organising further Primary Trauma Care courses (with support from PTC headquarters if requested).

Instructors from the first course under the guidance of an experienced course director should conduct the next course. They can then become subsequent course directors.

Our experience from PTC programmes around the world is that it is important to run the next course within three months of the first 2-1-2 course.

Suggested Equipment list

IMPORTANT NOTE: If some or all of the equipment listed below is not available you can still run a course. PTC's philosophy is that we only teach with what is locally available, to help the sustainability of courses.

Recommended Medical equipment for both PTC and Instructors' courses

Airway equipment

Adult mannequins x 2
Paediatric mannequin x 1
Self inflating bags and masks x 2
Guedel airway x 4
Tracheal tubes x 4 sizes 7 & 8mm.
Tracheal tube size 5 or 6 for cricothyroidotomy
Scalpel for cricothyroidotomy
Paediatric tracheal tubes x 2 size 4mm.
Bougie x 1 or 2
Laryngoscopes x 4 (2 curved blades & 2 paediatric)
Magill's forceps x 2
Yankauer sucker x 2
Oxygen tubing
Hudson oxygen masks x 2
LMA Sizes 2, 3 and 4

Intravenous access

Intravenous cannulae 4x14g & 2x20g
Syringes (2, 5, 10 & 20ml)
Intra osseous needles x 2
19g Spinal needles x 2
IV fluid giving sets with empty or full fluid bags
Bags of intravenous fluid.

Other

Cervical collars either adjustable or a range of sizes. Ideally this should be whatever is used locally.
Sandbags for cervical spine immobilisation. Intravenous fluid bags can be used, or sandbags can be made up from cloth and filled with sand or another filling.
Chest tubes, ideally 32Fg
Clamps x 2, Artery forceps
Scalpel blades and handles
Sutures
Nasogastric tubes x 2
Adhesive Tape

Goat, sheep or pig thorax or artificial substitute
Specimens of sheep or goat larynx and trachea, or corrugated oxygen tubing (to teach cricothyroidotomy)
Four tables or trolleys, strong enough for participants to lie on during scenarios
Tables for skills teaching

Name badges for participants and faculty (these can be hand-written at registration).

Projector
Laptop

Advice on teaching the individual sessions in the PTC Course

The slides and content of most of the PTC lectures and the content of the discussion workshops closely follow the content in the PTC manual, so when you are preparing to teach each session it is important to read that chapter in the manual.

The sections below give additional advice and information on each of the sessions. These start with the lectures, in the order in which they appear in the PTC Course programme and slides, and then cover the skills teaching and the discussion workshops.

It is important to teach the content interactively: you do not have to use the slides.

Welcome and Local Trauma Perspective (approx. 30 minutes)

Many countries have a strong culture of religion. It is quite common therefore for the 2-day PTC course to begin with prayers to bless the endeavours of the next two days. In some countries there may be a formal opening ceremony. In this situation, the Course Director should be prepared to make a short speech about the history and principles of the PTC course.

The visiting Course Director introduces himself or herself, followed by the other instructors. The course participants then introduce themselves briefly. This welcome session sets the scene for the rest of the course, so it is important to create a relaxed and positive atmosphere. Take note of who the participants are, so that you can include their experience or interest in course sessions.

Please remember to tell everyone to turn their mobile phones off, or at least put them on 'silent' mode.

The time allocated for the Welcome, Introductions, Local Trauma Perspective and MCQs is **45 minutes** in total. Within that time frame, there is flexibility for how you structure the sessions, depending on the local context and resources.

If a formal Opening Ceremony is planned, then extra time will probably be required for this.

The **Local Trauma Perspective** is a very successful way of starting a PTC course.

An important hospital leader might speak about the local trauma situation as a way of ensuring high level support for the PTC programme. This gives an indication of the level of available facilities and the key needs for improving the trauma system.

Alternatively a local doctor or other health professional on the course, who has been invited in advance to do so, might speak about the local trauma situation or give a 10-minute presentation of a trauma case that was treated at the hospital where the course is taking place.

It is important for overseas instructors to attend and learn from this opening talk.

PTC Overview

(15 minutes)

Slides 1-12 (12 slides)

The aims of this session are to

- Introduce the PTC concepts and mission statement
- Motivate the course participants by showing that PTC is relevant to their situation
- Outline what the participants will learn from the PTC course

Teaching tips

The Course Director normally delivers this session that introduces the PTC message. Try to make reference to the Local Trauma Perspective presentation to show the relevance of PTC. If you can access some local photographs, insert these into the talk.

If it is the very first course in a new environment, then additional information such as the history of PTC and where it is now taught in the world can be very useful. You are welcoming these participants into a global network!

Questions are used (slide 5) to encourage participant interaction and get them thinking about their local situation. A whiteboard can be used to note down the local challenges. This also sets the tone for interactive teaching and creates an environment where the participants feel comfortable to speak and participate.

Keep the overview concise and avoid detail - that will come later. The most important point in this session is to introduce the PTC concepts and create the right atmosphere for the rest of the course.

The ABCDE of Trauma and Primary Survey

(30 minutes)

Slides 13 – 37

PTC Course Manual pages 7 – 8

Learning objectives

- Understand the concept of Primary Survey
- Understand the structured approach and sequence of the Primary Survey
- Know when to perform the Primary Survey

Teaching tips

If you are teaching Primary survey to a group whose first language is not English and who do not understand enough English to follow ABCDE, then you must find another way of reinforcing this crucial sequence.

This session is the clinical introduction to the PTC Course. The ABCDE of Trauma is a difficult lecture to give well. It is important **not** to try to cover all aspects of ABCDE in this lecture – there are specific lectures on Airway and Breathing, Circulation and Head and Spinal injuries.

Referring to real-life situations and using questions can be an effective technique to highlight the key points. Here is a suggested outline:

1. In real life, history, examination, investigation and treatment all happen at once.
2. How do you assess it?
3. What are you worried about?
4. What might you miss?
5. If you know what you are looking for, you are much more likely to find it.
6. PTC teaches an organised approach to trauma management.
7. There is a Primary Survey and a Secondary Survey.
8. The ABCDE approach is a system of priorities in patient management so that during the Primary Survey:
 - problems relating to the **A**irway are managed first,
 - then **B**reathing,
 - then **C**irculation,
 - then neurological **D**isability and
 - lastly the patient is **E**xposed to ensure that no other life or limb threatening injuries are present.
9. The PTC approach is to manage the patient with regard to the available staff number, expertise and equipment. PTC teaches good principles of patient management in the absence of high technology.

Airway and Breathing

(40 minutes)

Slides 38 – 62

PTC Course Manual pages 9 – 11

Learning objectives

- Understand the structured approach to Airway and Breathing, as part of the PTC system
- Know how to recognise and immediately treat airway and breathing problems

The key points to cover include

- An open and clear airway is the first priority of trauma management
- How to assess an airway clinically
- Signs of airway obstruction
- Basic airway management
- Tracheal intubation - indications
- Tracheal intubation - risks to the cervical spine
- The surgical airway
- Clinical signs of respiratory failure
 - On inspection - rate, accessory muscles, cyanosis
 - On palpation - tracheal shift, rib fractures, subcutaneous air
 - On auscultation - breath sounds, heart sounds, bowel sounds
- Management of a tension pneumothorax

Teaching tips

This session can be run partly as a discussion, using questions and then writing the answers and explaining concepts on a board or sheets of paper. You can use the slides as a reference to reinforce the key points.

Refer to the PTC Manual (pages 7-11, Appendices 2,3,4) as you ask the questions

1. Has anyone managed a difficult airway recently?

2. What makes airway management difficult?

- Patient injuries
 - Blood in the airway
 - The burnt airway
 - Cervical spine injury (known or suspected)
 - Facial injury
 - Airway injury (laryngeal fracture, tracheobronchial injury)
- Patient status prior to injury
 - Body shape and obesity
 - Arthritis with reduced movement of the occiput on C1 vertebra
 - Poor mouth opening
 - Congenital abnormality
 - Respiratory disease e.g. Asthma
 - Children and neonates

- Non-patient factors
 - Personal skill level of the doctor or health worker
 - Quality of assistance
 - Environment
 - Equipment
3. What makes airway management urgent? (Airway management not necessarily intubation)
- Cyanosis
 - Apnoea
 - Partial or complete airway obstruction
4. What are high-risk situations for airway and breathing?
- Coma
 - Maxillo facial trauma
 - Neck trauma
 - Chest injury
 - Full stomach
5. How do you determine an inadequate airway?
- Ask 'What happened'
 - Look, feel and listen
 - Normal speech/Noisy breathing
 - Maxillofacial crepitus
 - Tracheal deviation
 - Haematoma
 - A useful technique can be to ask all the participants to snore as if they are asleep. Point out that they have let their jaw fall back to do this. Then get them to move their jaw forward so that the lower teeth are outside the upper ones (prognathic) and to see that it is much more difficult to snore then. Point out that this movement of the jaw is what a jaw thrust aims to do.
6. What would be a bad outcome?
- Hypoxic brain injury
 - Aspiration
 - Cervical cord injury
 - Airway rupture
7. What can you do to treat an inadequate airway? (Increasing levels of complexity of intervention)
- Chin lift, Jaw thrust
 - Suction, oral airway, other airways
 - Tracheal intubation
 - Surgical airway
8. How do I know that a tracheal tube is correctly placed?
9. Should patients be given drugs to assist in airway management in trauma?
10. How do you protect the cervical spine during airway management?

11. Controversy in airway management in trauma

- Laryngeal masks
- Drugs
- Nasotracheal tubes
- Cervical collar off or on for airway management

Circulation and Shock

(35 minutes)

Slides 63 – 85

PTC Course Manual pages 12 – 16

Learning objectives

- Understand the structured approach to circulation problems as part of the PTC system
- Know how to recognise and treat shock

The key points to cover include

- Shock in trauma should be assumed to be hypovolemic until proven otherwise.
- Other rarer types of shock are cardiogenic, neurogenic, septic and anaphylactic.
- Concepts relating to the preservation of tissue oxygen delivery
- Revealed and concealed haemorrhage
- Clinical signs of shock
- Management
- First priority – stop the bleeding
- Second priority – volume replacement, warming and analgesia
- Issues
 - Vascular access and intraosseous needles
 - When to use blood
 - Response to fluid therapy
 - Controversial areas if time allows
 - Colloid or crystalloid, does it matter?
 - Immediate and delayed resuscitation
 - Setting resuscitation end points in different patient groups

Teaching tips

This is a long lecture with important points to explain about blood volume, blood loss and early shock. Refer to PTC Course Manual (pages 12-16, Appendices 5 and 6):

- How much blood have you got?
- How much blood can you lose?
- How much intravenous fluid should I give? Good, transient and nil responses to treatment
- What type of fluid should I use?
- What other types of shock are there?
- How do I evaluate adequate fluid resuscitation and organ perfusion?

Chest Injuries

(35 minutes)

Slides 86 – 104

PTC Course Manual pages 17 – 20

Learning objectives

- The principles of management of chest injuries in trauma patients
- How to treat common life-threatening chest injuries
- 25% of trauma deaths are attributable to chest trauma
- Chest trauma can result in a number of life threatening conditions
 - Airway obstruction or disruption
 - Tension pneumothorax
 - Massive haemothorax
 - Pericardial tamponade
 - Open pneumothorax
 - Flail chest
- Early appropriate treatment, often with minimal equipment, can be life saving

Teaching tips

This topic is very well suited to interactive teaching.

Note that *Chest Trauma* is the last topic before lunch on Day 1 and people will be tired. It is your job as the instructor to make sure they are interested and engaged. Because you are not going into the detail of pathophysiology (as you have done in *Circulation*), you need only to give them a clear outline that will help them remember the facts, most of which they already know. Here is a sample interactive presentation.

You can do this by asking straightforward questions:

1. Which structures of the thorax can get damaged?
2. What are the mechanisms of injury?
3. What are the consequences of such damage?

How to prepare

Your aim is to get everyone to work things out for themselves.

1. Remind yourself of the key points: read through the topic in the PTC manual and then the slides.
2. Plan a framework
 - Introduction
 - What information you want them to give you
 - How you will record the answers: in lists or diagrammatic form
 - Practise the diagram
 - What needs to be straightforward teaching from you
 - The summary
- The timing – you need to be at Question 7 by 15 minutes into the session and allow 5 minutes for the summary.
- Resources: board/flipchart/pens and slides for summary

How the session might run

Introduction

- Explain the importance of treating chest injuries and that there are only a few life-saving manoeuvres: oxygen, ventilation, open wounds and chest drain (refer to previous skill station).
- On flipchart make a simple line diagram of the thorax (looking like a chest X-ray).

As participants answer your questions

- illustrate these on the diagram (e.g. by showing a pneumothorax, rib fracture, mediastinal shift etc.)
- write the words below the diagram

Questions

1. Which structures can get injured?

Expect answers: clavicle, ribs, spine, diaphragm

Draw or write the responses on diagram/flipchart

Follow-up question: *What are potential consequences of those injuries?*

- pneumothorax (simple, tension & open)
- haemothorax).

Use your diagram to illustrate these consequences.

2. Possible Consequences?

- pain / respiratory difficulty / flail segment / pneumothorax / haemothorax

Having done this process for chest wall structures, move on to chest contents.

3. What are the contents? How can they get injured?

Expect answers: heart, lungs, vessels, oesophagus etc

Add the structures to diagram

Follow-up question: *What are potential consequences of those injuries?*

Now move on to thinking about means of injury

4. What are the most important means of injury for us to consider?

Write up responses:

- Deceleration
- Penetration
- Crush

Now ask the participants to define and differentiate these

5. What sort of injuries are caused by deceleration, penetration, crush?

Expect:

- deceleration in an RTA, lung & heart contusions
- penetration in stab & missile wounds, pericardial tamponade in stab wounds, shock wave in high velocity missile wounds
- crush in flail chest.

Use your diagram and emphasise the key points and give further information.

Summarize and give them a list of life threatening emergencies that can be picked up from Primary Survey.

- Tension pneumothorax
- Simple pneumothorax
- Open pneumothorax
- Flail chest
- Haemothorax
- Penetrating wounds

6. Now ask two questions about each of these:

How are we going to make the diagnosis?

What are we going to do about it?

Summary

One suggestion: show the slides at the end in complete silence.

Give everyone time to read and revise the information they gave you in their answers.

Abdominal, Pelvic and Limb Injuries

(50 minutes)

Abdominal, Pelvic Slides 105 - 124

PTC Course Manual pages 21 – 24

Limb trauma Slides 125 - 141

PTC Course Manual pages 25 – 26

Learning Objectives

- Understand the principles of management of abdominal, pelvic and limb injuries in the trauma patient
- Recognise and know how to treat life-threatening abdominal and pelvic injuries
- Recognise and know how to treat limb and peripheral injuries, and how to prevent further injury

The key points to cover Abdominal and Pelvic injuries

- The surgeon has an important role in stopping the bleeding
- Do airway, breathing and circulation first
- The abdomen extends from the dome of the diaphragm to the floor of the pelvis
- Much of the abdomen is difficult to examine
- A rectal examination is an important part of the physical examination
- Seek early surgical advice
- Pelvic fractures are usually associated with massive haemorrhage. Pelvic binders can stop bleeding and save lives.
- Blood at the urethral meatus is a contra-indication to urethral catheterisation

Key points to cover in Limb injuries

- Peripheral haemorrhage is a preventable cause of early death
- Direct pressure with a finger on a bleeding artery or vein is a much better way to control haemorrhage than the use of a tourniquet
- Open limb wounds are very prone to infection. Give antibiotics.
- Compartment syndrome should be anticipated and treated early
- Aligning fractures and stabilising limbs reduces pain and bleeding.

Head and Spinal Trauma

(45 minutes)

Head trauma slides 142 – 170

PTC Course Manual pages 27 – 30

Spinal trauma slides 171 – 182

PTC Course Manual pages 31 – 32

Learning objectives

- Understand the structured approach to head and spinal injuries
- Recognise and know how to manage serious and life-threatening head and spinal injuries, and to prevent further disability

The key points to cover include

- The most important aspect of the immediate management of a head injured person is the maintenance of airway, breathing and circulation.
- Early surgical/neurosurgical referral is important to manage intracranial haemorrhage.
- Little can be done to directly affect the outcome of a primary brain injury.
- Secondary brain injury should be identified and treated.
- Careful and repeated neurological observations of pupils and Glasgow Coma Scale are vital for good head injury management.
- Cervical spinal injury should be suspected in any unconscious head injured patient.
- Any patient who cannot be cleared of injury to the cervical spine should have their cervical spine immobilised.

Teaching tips

This is a long session that covers some complex concepts. Use your interactive teaching skills to keep the attention of the participants. The Head Trauma lecture is the most complex in the PTC course, and so if you are teaching a group with lower medical knowledge such as some nurses it is reasonable to simplify the concepts and not to use all the slides.

Be aware of the local context, as the availability of medical imaging and CT scans may be very limited. This is not a barrier to the effective management of head injury patients, as prevention of secondary injury (and therefore prevention of further disability) can be done with good Airway, Breathing and Circulation management.

Questions are very helpful to guide participants through the important learning points and ensure everyone understands. Use a whiteboard or blackboard to explain key concepts, such as the Cerebral Perfusion Pressure equation.

Some possible questions

1. Why do patients go unconscious quickly?
 - Discuss brain physiology and cerebral blood flow
2. Why do patients recover badly?
 - Cerebral neurons are very susceptible to ischaemic damage leading to Ischaemic/Reperfusion injury

3. How can we assess the severity of head injury?
 - Pupils
 - AVPU
 - Glasgow Coma Score
 - CT scan

4. What types of head injury are there?
 - Primary brain injury and secondary brain injury. We cannot do much about primary brain injury but we can make a big difference to secondary brain injury through good ABC care.
 - Extradural haemorrhage, subdural haemorrhage, intracerebral and intraventricular haemorrhage and diffuse axonal injury

5. How do we treat these patients?
 - ABC + Neurosurgery

6. When should we suspect a cervical spine injury?
 - Whenever there is significant injury to the head or upper body

7. How do you treat a patient with a suspected cervical spine injury?
 - With immobilisation.

8. How effective is a hard cervical collar alone?

| | No immobilisation | Hard collar alone | Spine board hard collar Sand bags + tape |
|----------------|-------------------|-------------------|--|
| Neck flexion | 30° | 20° | 1° |
| Neck extension | 40° | 15° | 7° |
| Neck rotation | 70° | 35° | 1° |

Trauma in Children and Pregnancy

(30 minutes total)

Slides 183 – 214

PTC Course Manual pages 33 – 37

Learning Objectives

- Understand the structured approach to the injured child using the PTC system
- Recognise physiological, anatomical and psychological differences between children and adults that influence management of an injured child
- Understand the structured approach to the injured pregnant woman
- Recognise the physiological and anatomical changes in pregnancy that influence management of the pregnant trauma patient.

The key points to cover in Trauma in Children include

- Trauma management principles stay the same, the primary survey is still ABCDE
- The airway anatomy of a small child is different to that of an adult
- Hypotension is a very late sign of haemorrhage in children
- Give fluid boluses of 20mls/kg
- Intraosseous access is safe and effective in children
- Most drugs can be given by the intraosseous route
- It is easy for an injured child to become hypothermic.

Key points to cover in Trauma in Pregnancy include

- Trauma management principles remain the same. Pregnant women with trauma require ABCDE
- Resuscitation of the mother resuscitates the foetus
- The mother comes first
- Uterine rupture, placental separation and pelvic fracture can all cause massive haemorrhage
- Remember aorta-caval compression and left lateral tilt
- A mother at term may require the baby to be delivered as part of her resuscitation.

Burns

(30 minutes)

Slides 215 – 235

PTC Course Manual pages 38 – 40

Learning objectives

- Understand the structured approach to the patient with burns using the PTC system
- Recognise and know how to treat the trauma patient with burns, including the consequences and complications of severe burns.

The key points to cover include

- Burns can affect Airway, Breathing, Circulation and Disability. Exposure is important to assess the extent of a burn
- Patients with burns may have other injuries eg. a blast injury may cause a tension pneumothorax
- Burns patients deteriorate during the first few hours after injury
- Consider early intubation for an airway burn

Teaching tips

This session is well suited to interactive teaching. Use the pictures in the slide set to ask questions. Encourage the participants to reflect on their own experience.

Suggested questions

1. Has anyone in the audience been burnt?
 - Invite them to give an account of their experience
2. What will a person who has received 100% full thickness burns and an airway burn be like 5 minutes after the event?
 - Answer – Probably not too bad
 - Message – Burns patients deteriorate
3. What makes a burnt patient unconscious?
 - Trauma
 - Drugs
 - Alcohol
 - Carbon monoxide
4. How can a burn affect the airway and breathing?
 - Demonstrate a hoarse voice – this can be present without actual airway obstruction.
 - See slides on inhalational injury
5. Can hypovolemic shock be due to the burn in the first hour?
 - Probably not, look for evidence of concealed haemorrhage
6. How much fluid should a burnt person get?
 - Discuss rule of 9's and fluid regimes
7. What is an escharotomy? Is it painful?
 - Yes, a general anaesthetic is required

Many health care workers nowadays use smartphones. There are many useful apps (such as the *Mersey Burns app*) that help with the assessment and planning of fluid management of burns. Suggest to the participants that they might look at these.

Secondary Survey

(30 minutes)

Slides 236 – 248

PTC Course Manual pages 41 – 42

Learning Objectives

- Understand how the secondary survey fits into the PTC system
- Know how and when to perform the Secondary Survey

The key points to cover include

- The secondary survey is undertaken when the primary survey is complete and airway, breathing and circulation have been stabilised
- The secondary survey is a thorough head to toe examination looking for life and limb threatening injuries
- If there is any significant deterioration in Airway, Breathing or Circulation, discontinue the secondary survey and attend to the more urgent problems.

Teaching tips

This session is more meaningful for the participants if they see an example of a secondary survey. There are many ways to incorporate a “hands-on” demonstration during this session for example:

1. Use another instructor as the “patient” lying on a trolley or table in front of you. Go through the components of the Secondary Survey showing what this looks like.

This technique is helpful because it emphasises the “hands-on” approach and the “Look, Listen and Feel” message of a thorough clinical assessment.

Ask for volunteers from the audience to help you with the log roll.

2. The session may be covered as a demonstration scenario, using all of the instructors in a rehearsed scenario involving injuries in multiple areas that are ‘discovered’ during a comprehensive Secondary Survey.

A technique which works well is for one instructor to be sent out of the room, and the participants discuss and agree upon 3-4 injuries that another instructor has as the ‘patient’. The ‘doctor’ instructor comes back to the room to perform a thorough Secondary Survey, with a commentary from the instructor running the session.

The slides can be used (or not) to reinforce the key points of the session.

Disaster Management

(50 minutes)

Major disaster session: PTC Programme Day 2. There are no PTC slides for this session as it is best run as a discussion session – see below.

Learning Objectives

- Understand how PTC principles can be used to help prioritise emergency care for multiple trauma victims in a mass disaster situation
- Understand the roles for health workers and all components of effective management in a mass casualty disaster situation
- Be able to take a leadership role at the hospital or clinic in a mass casualty disaster situation

Key Points to cover include

- A mass casualty or disaster situation is any incident that overwhelms the normal capacity of the health clinic or hospital to cope
- The key to effective management in a disaster situation is good planning and preparation beforehand. This means having a disaster plan that everyone knows about, training staff and preparing back-up equipment
- During a disaster, issues to consider include; care at the site, care at the hospital, transferring patients, staffing, equipment, lab and blood bank, communication, security, adequate use of limited space and public relations
- Health workers can take on a leadership role during a disaster
- The PTC system can be applied to multiple patients to help prioritise whom to treat first. This is called Disaster or Mass Casualty trauma triage

Teaching Tips

This session works best as an interactive workshop with the participants divided into groups of two or four.

It is helpful to have an instructor with actual experience of a major disaster if at all possible. This person should know about any major disaster plans at their local hospital. You can begin the session with this instructor giving telling the brief story about the disaster that they were involved in.

Pick a topic that is imaginable in your local situation for example:

- an overcrowded bus comes off the road
- a refinery explosion
- a ferry sinking
- a major shooting incident
- mine injuries or bombing
- a fire in a school or factory
- an earthquake

Make up a brief description of your chosen local disaster and create a scenario for the participants. Each group can take on a major role – such as the site team, the hospital clinicians, the hospital managers etc. Get them to work out their priorities according to the role they are playing. Having plenty of large sheets of paper and pens can help the groups with their brainstorming.

Allow time for each group to report back.

You can also produce a list of 10-20 trauma patients from your local disaster scenario. One or two of the groups can work on prioritising these patients according to the PTC ABCDE principles. During the reporting back, you can get the groups to explain why they chose some patients ahead of others.

This may end up with a brief introduction to Disaster Triage, so it is a good idea to read up on this in order to have some background information available. There are also some notes in the PTC Manual 2015 Edition, Appendices 11 and 12

In each approach course participants should be applying the PTC principles they have been learning.

Leave time at the end for the Instructor to sum up within the 50 minutes emphasising the key points.

Summary at the end of the Course

At the end of the second day, after the second round of Scenarios and a break, the participants come back together for the final components of the PTC course.

Ask the participants to repeat the **Confidence Matrix** and feedback on **how well the learning objectives for the course were fulfilled**. Then they do the **Multiple Choice Questions** again, either using individual question sheets, or by showing the questions as power-point slides and going through the questions as a group. As soon as the MCQ is finished, the instructors should mark this and the confidence matrix and enter the results into the course spreadsheet: while this is done it can be helpful for one instructor to go through the MCQ paper or the slides in case there are any questions from the participants. You will need to keep the post-course participant forms to record the results of the learning objectives feedback and the questions about the course. After the course, the course spreadsheet together with the totals of the learning objectives feedback and comments should be returned to PTC Headquarters with the course director's report.

It is important after this, to provide a final overview and summary of the whole PTC course. There is no new information here, and no slide set. It is an opportunity to re-enforce the powerful PTC message. At the end of this session, the participants should

- Understand the PTC structured approach to any trauma patient
- Feel confident with their knowledge and skills to treat a trauma patient in their own environment, using whatever resources they have
- Feel motivated to share the PTC message with colleagues on a daily basis and learn how to teach on future PTC courses

It can be helpful in this final overview to simply review all of the components and teaching sessions of the PTC course, summarising all of the topics covered. The focus for Day 1 has been on the Primary Survey and ABCDE, whilst on Day 2 we have covered Secondary Survey and tried to put the PTC principles into more complex situations.

Asking the participants to reflect on the change between what they knew about PTC at the start of the course, to what they know now can be a helpful technique to increasing confidence in treating trauma patients. It can be useful to do this, and also get feedback on the course, using a brainstorming approach with a flip-chart to write down the answers.

You want the participants to leave the PTC course feeling positive, confident and motivated in their clinical practice and also to share the PTC message that they have learnt. Stay positive and motivated throughout this final summary!

If you are going on to run an Instructor Training Day the next day, you should ask the participants you selected to take part in this day to stay behind and then tell them what is going to happen, and to give them advice about what they will need to prepare for the teaching workshops.

**** Don't forget to take a group photo after all the certificates have been presented! ****

Skill Stations

The core teaching material must be part of your PTC course, but there is room for some flexibility. You can choose those topics most relevant for your participants.

Therefore we have included more than four topics.

Remember: first decide on your learning objectives and key points, then teach interactively.

Core teaching material

1. Basic Airway Management

(20 minutes)

Equipment

It is important to use the same equipment that is available at the hospital where the course is taking place. If available use:

- An adult intubation mannequin, if available.
- Self-inflating bag and mask
- Guedel oral airways (different sizes if possible)
- Nasopharyngeal airway
- Sucker
- Oxygen tubing
- Hudson mask or oxygen reservoir mask.
- Cervical collar
- 2 Bags of intravenous fluid
- Tape

Learning Objectives

- Be able to demonstrate how to open the airway while protecting the cervical spine, using chin lift and jaw thrust manoeuvres and airway adjuncts.
- Understand the importance of giving oxygen by mask.
- Be able to ventilate a patient using a self-inflating bag and mask.

Technique

Emphasise to the participants the importance of maintenance of cervical immobilisation by an assistant during airway manoeuvres. Do not put on a collar until the airway is opened since it will make manoeuvres more difficult and will prevent safe intubation.

It is helpful to get the participants to try to breathe hard with their mouths and nostrils closed. Let them feel the way they use their accessory breathing muscles and how their chest and diaphragm/abdomen move. Point out that these are the signs of respiratory obstruction they may see in patients. Repeat the way they snored in the airway lecture, if this was done, and demonstrate how making the jaw move forwards (prognathic) makes it much more difficult to snore or obstruct.

Start with simple airway manoeuvres – chin lift (lifting the jaw forward) and jaw thrust (lifting the jaw further forward, pressing behind the angles of the jaw, to slide the temporomandibular joint forward and push the lower teeth in front of the upper teeth). If these manoeuvres do not work well then consider insertion of a Guedel oral or nasopharyngeal airway. The Guedel airway is sized from the front teeth to the angle of the jaw and inserted behind the tongue either with a tongue depressor or laryngoscope blade, or by inserting it upside down and turning it gently round to lie behind the tongue (be careful of delicate teeth and tissues in children. Nasopharyngeal airways may be helpful but should be avoided if there is a possibility of base of skull fracture.

Ventilation using a self-inflating bag and mask uses a similar manoeuvre to the jaw thrust. The participants should think about lifting the jaw into the mask rather than pushing the mask onto the face. Encourage them to use two hands on the mask and get someone else to squeeze the bag unless they are expert.

Potential Complications

- Worsening of injury to the cervical spine.
- Failure to open the airway or ventilate the patient.

Teaching tips

- To introduce the concepts of the chin lift and jaw thrust to lift the tongue off the back of the pharynx, and how to maintain the airway when using a self-inflating bag and mask you might ask participants to demonstrate how they would snore (letting the chin fall backwards) and then to put their lower teeth outside their upper ones and to see how much more difficult it is to snore.
- Ask them to shut their mouths and hold their nose shut and breathe hard, and watch how each others' chests and necks move when breathing is obstructed.
- Discuss how pulse oximetry, if available, can be very helpful during airway management but emphasise that it does not monitor the adequacy of ventilation.

2. Advanced Airway Management

(20 minutes)

Equipment

- Adult / paediatric intubating mannequin if available
- Laryngoscope with different sized blades
- Endotracheal tubes
- Suction
- Self-inflating bag and mask
- Stylet / introducer
- Bougie

Learning Objectives

- Understand the indication for advanced airway management
- Understand that tubes do not save lives – opening the airway and mask ventilation are most important.
- Understand the technique of intubation
- Know what to do if they cannot intubate or ventilate a patient

Technique

- Tracheal intubation technique
- Rapid sequence intubation with in line immobilisation of the cervical spine

Teaching tips

This station is easier to teach with an intubation mannequin; if not you can still talk about the techniques and use pictures or your own downloaded video. In some countries only anaesthetists intubate, so teaching intubation on the course may not be appropriate. Sometimes it is more appropriate to teach surgical cricoidotomy if an intubation mannequin is not available. **Stress that basic airway skills are more important than intubation.**

If devices such as Laryngeal Mask Airways or I-gel airways are available, discuss them. They may be useful if intubation is not possible, but they do not protect against aspiration.

2a. Surgical Airway

(optional skill station)

(20 minutes)

Equipment

- Larynx specimen from sheep, or model. If this is not available, corrugated anaesthetic gas tubing can be used to improvise, with a cut out for the cricothyroid membrane. Using Chamois leather to act as overlying skin, and surgical glove material for the membrane, works well.
- Oxygen tubing
- Scalpel
- Endotracheal tube – 5 or 6mm internal diameter
- Bougie
- Mosquito forceps if bougie not available.

In Muslim countries Halal slaughtering often injures the larynx. It may be helpful to liaise with those slaughtering animals used for teaching to ask them to make the cut avoiding the larynx.

Learning Objectives

- Be aware of the indications for performing a surgical airway
- Identify the surface markings and structures relevant to performing surgical cricothyroidotomy
- Be able and have confidence to perform surgical cricothyroidotomy.

Surgical Airway Technique

Stress to the participants that these techniques are for a “can’t intubate can’t ventilate” situation.

*Surgical Cricothyroidotomy – if you **have** a bougie / tube introducer available.*

Identify the cricothyroid membrane, and stabilise the skin overlying it using the finger and thumb of the non-dominant hand. With a scalpel, make a horizontal incision through the skin overlying the membrane. Then make a transverse stab through the membrane and rotate the scalpel to a vertical position (sharp edge inferiorly) and pass a bougie down into the trachea next to the scalpel. Remove the scalpel and thread a small endotracheal tube over the bougie into the trachea. Begin ventilation using a self-inflating bag with oxygen. Listen over both lungs to ensure that the tube is correctly positioned. Tie the tube securely in place. **Remember stab – twist – bougie – tube.**

*Surgical Cricothyroidotomy – if you **do not have** a bougie / tube introducer available.*

Identify the cricothyroid membrane, and stabilise the skin overlying it using the finger and thumb of the non-dominant hand. With a scalpel, make a horizontal incision through the skin overlying the membrane (do not cut deep enough to damage the cricoid or thyroid cartilages). Use a mosquito forceps, if available, to bluntly dissect down to the cricothyroid membrane. Incise horizontally through the membrane with the scalpel blade. Insert the forceps into the trachea and open and rotate to open the hole into the airway. If forceps are not available, then this can be done with the blade or the handle of the scalpel. Use the forceps or scalpel to hold the hole open and insert a tracheal tube downwards into the trachea. A bougie makes this easier. Begin ventilation using a self-inflating bag with oxygen. Listen over both lungs to ensure that the tube is correctly positioned. Tie the tube securely in place.

Potential Complications

- Bleeding and aspiration of blood
- Creation of a false passage into the tissues
- Air in tissues outside trachea
- Local damage to cartilages, vocal cords or oesophagus

Teaching Tips

- To demonstrate the anatomy of the cricothyroid membrane, ask the participants to feel their own throats from the chin to the laryngeal cartilage, then drop down over the front of this to the dip over the membrane and the cricoid cartilage below. There is a picture of the anatomy on page 48 in the *PTC Manual*.
- Discuss the importance of using the cricothyroid membrane rather than going further down the trachea where the structures are deeper with blood vessels, thyroid etc.

3. Spinal Immobilisation

(20 minutes)

Equipment

- 2 x 1 litre intravenous fluid bags, sand bags or rolls of padding.
- Adhesive tape
- 1 variable size adult cervical collar or locally available equivalent.
- 1 trolley or table for a patient to lie on
- Spine board (optional)

Learning Objectives

- Be able to safely control the spine to prevent further damage after trauma.
- Assess the patient for immobilisation with collar, sandbags and tape.
- Log-roll the patient to examine the back.

Technique

Immobilisation of the cervical spine

Should either be from the top of the table with forearms to either side of the head and hands anchored to the clavicles and trapezius muscle on either side of the neck, or can be from one side of the shoulders from below, with forearms against the shoulders and hands holding the head (this can be better during intubation).

Alternatively, immobilisation should be using a hard cervical collar or locally available substitute, which is appropriately sized for the patient, with padding, intravenous fluid bags or sandbags to either side of the head (sometimes taped on if the patient is very still). A collar alone will still allow head movement, but additional supports on either side improve immobilisation. If the patient is confused and struggling then it may be better to put on a collar and use manual immobilisation.

Log Roll

This needs three people to move the body and legs, one person to control the head and neck and one person to examine the back. The person controlling the head and neck is the most important.

Three people should stand next to the patient's trolley or bed on the side to which the patient will be rolled. The tallest person should support the shoulders. This person should place *hands over* the patient's shoulder and hip (supporting the arm), the next person should place one hand *over* the hip and one *under* the top of the thigh, and the third person should place both hands *under* the patient's lower leg (stress to the participants that this is "three hands over and three hands under". The person controlling the head and neck should give clear commands to the team to start the roll and when lying the patient flat again.

Potential Complications

- Worsening of spinal injury
- Further injury to the neck if three point immobilisation is used while the patient is struggling.
- Difficulty with intubation if the collar is not released and manual immobilisation reapplied

Teaching tips

Check local availability of collars. The collar needs to be the correct size for the patient. Follow instructions to get the fit right.

If you have no collars, teach immobilisation using sandbags and tape.

4. Tension Pneumothorax decompression and Chest Drain Insertion

(20 minutes)

Equipment

- Oxygen mask
- 14 or 16g IV Cannula
- Chest tubes of various sizes 20 FG (Child) and 36 FG (Adult)
- Scalpel handle and blade, tissue forceps, artery clamp, needle holder, suture,
- Local anaesthetic, syringe and needle, dressing tray, iodine or other antiseptic.
- Underwater seal drain bottle/Heimlich valve

Learning Objectives

- Revise understanding of importance and pathophysiology of tension pneumothorax and other chest trauma, and indications for needle decompression and chest drain insertion.
- Be aware of the surface markings and techniques for needle decompression of tension pneumothorax and insertion of chest drain.
- Describe the complications of needle decompression and chest tube insertion.

Technique

Needle decompression

This is the immediate management for a tension pneumothorax. Administer high flow oxygen and ventilate as necessary. Identify the site of insertion: feel down the sternum to the lump of the Angle of Louis, then feel out into the second intercostal space in the mid clavicular line on the side of the tension pneumothorax. Alternatively, use the same point as for chest drain insertion (see below). Clean the skin and insert local anaesthetic if time permits. Insert a 14–16 gauge IV cannula through the skin just above the 3rd rib into the pleural space. You can attach a syringe to the hub of the needle and advance the needle aspirating for air or if a syringe is not available listen for an escape of air. Advance the plastic cannula in position and remove the stylet and leave the cannula in place. Prepare for insertion of a chest tube.

Chest drain insertion

The indications for this are a tension pneumothorax after needle decompression or a haemothorax, and a simple pneumothorax or significant chest injuries in a patient who might develop a tension pneumothorax, such as those undergoing a general anaesthetic for other injuries or being transferred, particularly if by air.

Position the patient – preferably slightly sitting up, monitor ECG and pulse oximetry.

Identify the insertion site – usually 5th intercostal space (approx. nipple level) just anterior to the midaxillary line on the affected side or above this point. Remember that the abdomen extends up to the level of the nipple.

Prepare equipment – choose a large bore chest tube and remove the stylet. Put a clamp on the end that will go into the chest, to guide the tube. Clean and drape the skin and infiltrate the skin and deeper tissues including pleura with local anaesthetic.

Make a 2-3 cm incision in the line of the intercostal space through skin and subcutaneous tissues, and then bluntly dissect through the intercostal muscles just over the top of the rib. Inject local anaesthetic directly onto the pleura. Puncture the parietal pleura with the tip of a clamp and spread it slightly to enlarge a hole.

Insert your gloved little finger to confirm that you are into the chest cavity and to avoid injury to other organs, pleural adhesions etc. Insert the chest tube, supporting it with the clamp, and direct it into the

chest to the desired length (around 15cms. in an adult). Connect the end of the tube to an underwater seal bottle.

Confirm correct placement by observing bubbling in the drain bottle as well as swinging of fluid in the tubing with inspiration. Suture the tube in place, apply dressing and tape the tube to the chest wall. Obtain a chest x-ray to ensure correct placement of the tube and improvement of the haemothorax or pneumothorax.

Potential Complications

- Laceration of lung or other intrathoracic or abdominal organs – minimised by using the blunt dissection technique described above.
- Incorrect position or kinking, clogging or disconnection of the tube
- Persistent pneumothorax due to persistent leak
- Injury to intercostal nerves or vessels causing paraesthesia or haemothorax
- Introduction of infection

Teaching tips

- Try introducing this session with discussion of a scenario to help the participants remember the information they heard in the lectures.
- Discuss the symptoms and signs of the various chest trauma types, especially tension and simple pneumothorax and massive haemothorax.
- Encourage the participants to feel the insertion landmarks on each other.

5. Intraosseous Needle Insertion (optional skill) (20 minutes)

Equipment

- Intraosseous needle or large bore spinal needle with stylet
- Syringe containing saline
- Chicken or turkey bones, or other bones
- Gloves

Learning Objectives

- Understand the indications for intraosseous needle insertion
- Be confident in the landmarks for intraosseous needle insertion
- Able to insert an intraosseous needle

Technique

This is most suitable for children under the age of 6-8, though it can be done for older patients. It should be used if attempts at venous cannulation have not been successful. Select the appropriate site for intraosseous needle insertion. This is most often the about 1cm below the tibial tuberosity on the upper front surface of the tibia, where the bone surface is flat. This is below the bone growth plate. Clean the area of insertion and use local anaesthetic if the child is awake.

Insert the intraosseous needle until it contacts the bone. Once it is embedded in the bone surface, advance the needle facing slightly down towards the foot with a gentle screwing movement until it is felt advancing through the bone cortex and into the marrow. Remove the stylet from the needle and use a syringe to aspirate a small quantity of bone marrow to confirm position. Check that saline can

easily be injected with no swelling of the tissues. Ensure that the needle is kept in position. Use a syringe to infuse fluid.

Potential Complications

- Misplacement of the needle with infusion into the tissues, not the bone marrow cavity
- Tissue swelling or compartment syndrome
- Infection
- Bone growth plate injury

Teaching Tips

- Encourage the participants to find the landmarks on their own legs.
- If chicken bones are not available, insertion through the sides of vertebral bodies also feels realistic.

6. Haemorrhage Control and Pelvic Binder (optional skill)

(20 minutes)

Equipment

- Pelvic binder (if available locally)
- Sheet or 2m piece of fabric

Learning objectives

- Identify important sources of bleeding and how they can be stopped
- Identify indications for application of a pelvic binder
- Demonstrate safe use of a pelvic binder

Technique

Teaching this topic could be combined with intraosseous needle insertion, with introductory discussion on haemorrhage control:

- What are the major causes of bleeding in a trauma scenario?
- What effective methods are there for controlling haemorrhage? (pressure, application of pelvic binder, tourniquet, tranexamic acid, surgery)

Pelvic binder

- Indications (close the circle, reduce catastrophic pelvic venous plexus bleeding). Applying a pelvic binder can be a life saving measure.

Teach this technique with whatever equipment is locally available. Ask one of the participants to volunteer as a model. If a purpose designed binder is not locally available then you can teach using a length of cloth. This should be placed under the body at the level of the knees and then slid up the femurs until it lies at the level of the greater trochanters (not higher). The legs should be internally rotated and the feet fixed together. The cloth should be crossed at the front and the ends pulled between two people to compress the pelvis symmetrically, and then the ends crossed back over each other and tied or fixed with cable ties or clips.

Potential Complications

- Avoid placing the binder too high on the pelvis. Remind the participants of the potential risks of pressure sores. A pelvic binder in a patient with an unstable pelvic ring injury should only have the binder removed in a facility with the skills and equipment able to deal with such an injury.

Discussion Workshops

The workshops are run as discussion groups, using the interactive techniques that you learned on the PTC instructor course.

Pain Management in Trauma

(20 minutes)

Learning Objectives

- Understand the importance of good pain management for trauma patients
- Know what analgesia options are available locally for effective pain relief

Key Discussion Points

- It is helpful to start the session with a scenario such as a patient with femur and rib fractures.
- Ask why it is good to treat the pain in this patient?
 - a. Psychological and ease of patient assessment.
 - b. Rib fractures impede breathing and coughing: chest infections and pneumonias
 - c. Immobility: DVT and PE
 - d. Stress response and physiological harm
- Ask what can we use to treat the pain?
 - a. Non drug measures eg splinting and traction of fractures, covering burns
 - b. Drugs: this will vary locally. Often paracetamol (acetaminophen), non-steroidal anti-inflammatory drugs, tramadol, morphine and pethidine (meperidine), low dose ketamine
 - c. Local anaesthetic nerve blocks eg femoral, fascia iliaca (there are very useful videos on YouTube)
- Ask what problems may occur with these drugs?
 - a. Non-steroidals and renal impairment
 - b. Many countries have fears about addiction after short term acute use of opioids. This is very rare, unlike with chronic pain.
 - c. Intramuscular or subcutaneous injections are often poorly absorbed in the hypovolemic trauma patient
 - d. Many countries have fears about analgesics in pregnancy: commonly used analgesics are safe.
 - e. IM injections are poorly absorbed in hypovolaemic/shocked patients. It is better to titrate intravenously in small incremental doses.
- Remind them about the link to the Essential Pain Management course given on page 56 in the *PTC Manual* which has much useful information.

Teaching Tips

- Try to do some local research before this session, so that you know what is available and what the barriers to effective pain relief are.
- Use the expertise within your participant group for this session.
- Case studies from the local context get participants thinking about what they can use in different situations with the available resources.

Additional information in the *PTC Course Manual*, Appendix 7, pages 55 – 56

Transportation

(20 minutes)

Learning Objectives

- Understand when and how to decide on the need to transport a trauma patient
- Understand the issues involved in transporting a trauma patient and how these relate to local conditions

Key Discussion Points

- Preparation, planning and communication are the key to successful patient transport
- The decision to transport a patient rests on an evaluation that the benefits of transport exceed its risks.
- Each type of patient transport has its own specific advantages and disadvantages — carrying the patient manually, road ambulance, boat, fixed or rotary wing aircraft.
- Quality of care should not deteriorate during transport.
- Do not unnecessarily endanger the lives of the people who will transport the patient.

Teaching Tips

- Every PTC course location will have unique issues around transporting critically injured patients. Delays to expert medical care due to remote locations and poor communication and retrieval systems are common.
- Brainstorm with the group all the issues and barriers to safe and timely transport, then use this information to help the group come up with some possible solutions.
- Take the opportunity to discuss implementation of a local patient transport and retrieval system.

Additional information in the *PTC Course Manual* section 'Transport of Critically Ill patients' page 43

Paediatrics

(20 minutes)

Learning Objectives

- Understand the main anatomical, physiological and psychological differences between children and adults and how this affects trauma care for children
- Understand the challenges of trauma care in children and how these can be met.

Key Discussion Points

- The PTC principles of resuscitating children are the same, but some details differ because children are not “mini-adults”
- A system or some techniques for remembering some important facts and calculations are very important
- Psychological differences can be a challenge to trauma care in children; family involvement can be helpful
- Issues around injuries in children are also important to follow-up (such as prevention, non-accidental injury etc.)

Teaching Tips

Remember: this is a discussion group workshop, not a mini-lecture! Make sure the group are all involved in discussing the issues, rather than you or someone else dominating the talking. Use questions to get everyone involved.

Use this session to reinforce the key points of the *Trauma in Children* lecture

Examples: how to calculate weight, how to choose the right sized equipment, how much fluid to give and how to calculate percentage of body burnt in a child.

- Brainstorm at the start of this session to identify the most important issues for your participants.
- Ask what is easy and what is difficult about resuscitating children in trauma.
- Use this information to help the group discuss the challenges and suggest appropriate solutions for your local context.
- Use clinical scenarios to help the group to share knowledge and insights based on past experience, and reinforce the key learning points.

Information in the *PTC Course Manual* pages 33 – 35 and Appendix 10, pages 59 – 60.

Neurological Assessment

(20 minutes)

Learning Objectives

- Understand and know how to assess a patient for any head or spinal injury
- Understand the issues when caring for the patient with head and spinal injuries

Key Discussion Points

- A good understanding of the AVPU and GCS
- GCS can provide an initial assessment of head injury severity, but repeating it regularly demonstrates deterioration or progress.
- Cervical spine injury should be suspected in all patients with head injury
- Knowledge of dermatome anatomy is helpful when assessing spinal injuries
- Using the PTC system for resuscitation minimises secondary head and spinal injury

Teaching Tips

- The level of participants' training and experience determines the complexity of your teaching
- Present some clinical findings and ask them to work out the GCS or level of spinal injury
- Discuss management of head injured patients when access to some resources (such as CT scan and neurosurgery) and not easily available and come up with a treatment plan

Information in the *PTC Course Manual* pages 27-32 and Appendix 9, page 58

Alternative Workshop suggestions

We encourage you to adapt the workshop topics according to local needs.
Prepare some actual and relevant situations; decide the main learning objectives and the key points: prepare discussion questions.
Here are two possible suggestions:

Drowning

(20 minutes)

Drowning is not covered at all in the current PTC format, however for some communities it can be the most common cause of traumatic injury and death. The workshop session is where you can discuss the key issues.

Learning Objectives

- Understand the structured approach to the drowned patient using the PTC system

Key Discussion Points

- The ABC approach to a drowned patient is the same as any other trauma patient
- Particular issues in drowning include airway foreign bodies, water in the lungs, secondary brain injury and hypothermia
- Always suspect other injuries in drowned patients and especially beware of head and cervical spine injury in shallow water, children or recreational swimming

Burns and Blasts

(20 minutes)

Burn and blast injuries are more common where there has been armed conflict. Use a Workshop session to develop the lecture on *Burns* and talk more about how to manage these injuries.

Learning Objectives

- Understand the issues in the assessment and management of patients with severe burns and blast injuries

Key Discussion Points

- The PTC approach is the same in burn and blast patients, but there are some specific injuries to look for
- Blasts affect particular parts of the body; ear, lungs, abdominal viscera
- Be careful to look for penetrating injuries in blast patients
- Exposure and secondary survey is very important to assess depth and size of burn as well as look for particular blast injuries
- Wounds are often contaminated, so good wound care and consideration of antibiotics is very important

Modular PTC Training

In a small hospital, it can be difficult to run a PTC course when instructors and participants need to be away from their work for two days. This may make it difficult to staff the service.

As an alternative way of teaching the PTC course materials, the PTC course has been divided into ten modules that can be delivered by one instructor at a time (with the exception of the demonstration scenario). This was proposed after consultation with experienced PTC instructors around the world and has been piloted in Madagascar and Kenya.

Modular PTC Training has several advantages:

- It is entirely possible for one instructor to deliver all modules but if there is more than one instructor in a district then the modules can be divided between them.
- Since each module is designed to cover a topic of PTC it could also be used as a stand-alone teaching session for a particular system in PTC, example head and spine injury.
- Another advantage is that costs are greatly reduced as only a very small venue is needed (in hospital and catering costs are minimal)

The modules should involve no more than six candidates. With more than this, the practical experience will be diminished during workshops, skills teaching and scenarios.

The ten modules each take between 90-120 minutes. The modules should be completed within four months and the usual assessments apply, i.e. MCQ confidence matrix, feedback forms (the modular feed back form is available in the Logistics Package that can be downloaded from the PTC website). It is important to keep attendance records, and certification should only be granted when a participant has completed all the modules and the final MCQ has been marked. Future instructors can be identified throughout the course and can attend a group instructor course when there are sufficient numbers.

The content of each module is shown below. Scenarios appropriate to the module content have been suggested from which the instructors can select – as an alternative, local instructors could use scenarios that have happened locally as the basis for scenarios, as they will be most relevant to an individual environment. This could also help local debriefing of problems that have arisen in emergency departments.

| | |
|--|---|
| Module 1 <ul style="list-style-type: none">• Registration• Precourse MCQ• Introduction to PTC• Lecture: local trauma perspective• Lecture: Primary survey | Module 2 <ul style="list-style-type: none">• Lecture: airway and breathing• Skill station: basic and advanced airway |
| Module 3 <ul style="list-style-type: none">• Lecture: circulation and shock• Skill stations: Insertion of chest drain and cervical spine and log roll | Module 4 <ul style="list-style-type: none">• Lecture: secondary survey• Demonstration scenario• Practice scenarios 2,3,5 |

| | |
|---|---|
| Module 5 <ul style="list-style-type: none"> • Lecture: chest injuries • Scenarios :8 • Workshop: Transportation | Module 6 <ul style="list-style-type: none"> • Lecture: head and spine injury • Workshop: Neurological assessment • Scenarios 7,14 |
| Module 7 <ul style="list-style-type: none"> • Lecture: Burns • Scenarios 10,13 • Workshop: Analgesia | Module 8 <ul style="list-style-type: none"> • Lecture: Abdomen, pelvis and limb injury • Scenarios 4,6,9,15 |
| Module 9 <ul style="list-style-type: none"> • Lecture : Trauma in children and pregnancy • Workshop: Paediatrics • Scenarios 11,12,16 | Module 10 <ul style="list-style-type: none"> • Disaster management • MCQ • Summary • Feedback and certificates |

Teaching PTC for pre-hospital participants

PTC has been taught successfully to first responders and pre-hospital health care providers in many parts of the World. The PTC course is well suited for training these groups regardless of discipline or background level of knowledge. An experienced instructor team should adapt their teaching for the participant audience to emphasise the core messages and skill lessons that will save a life and prevent serious disability.

PTC can be taught to pre-hospital participants keeping the same course structure, time-table and core lecture topics with only minor adaptations to lecture content and emphasis. Skills stations, workshop discussions, scenarios and disaster management sections should all be maintained, with some new / altered topics and emphasis on pre-hospital application of the material. 'Hands-on' learning and interactive teaching must be prioritised.

For the less experienced PTC Instructor, the following suggestions might be helpful:

Lectures

- You should cover all the topics.
- Emphasise safety, the key 'ABCDE' message, and a structured approach with 'look, listen and feel' for the primary and secondary survey.
- Consider running some of the topics as facilitated discussions rather than lectures – such as trauma in children, pregnancy and/or burns. Involve the pre-hospital providers and ask them to describe cases in which they may have been involved covering these topics and describing the pre-hospital challenges and how they overcame them.
- Some components of more advanced care can only be performed in a hospital. These include things like laboratory tests, XRays, Ultrasound, CT scans, advanced surgical care. You can reduce emphasis on, or omit, these components.
- Adapt your teaching according to the participants' roles and background knowledge. For example, if you are teaching in areas where transport to a hospital may take hours or days, then it may be appropriate to teach more advanced airway skills/knowledge, fluid resuscitation, pain relief and also about urgent interventions such as an fasciotomy / escharotomy.

- Also remember that it is helpful for pre-hospital providers to know what the next steps in patient care following pre-hospital care will be, even if they do not have the resources to do them. For example, it is good if pre-hospital care providers know some of the details of treatments that patients are likely to need, including more advanced airway management, chest tubes, blood transfusions or urgent surgery, as these things may assist them in their initial management and transport decisions.

Skill stations

- Focus on core skills and consider making these longer sessions to ensure all participants can reach competency and confidence:
 - Basic airway management
 - Log roll and cervical spine care (this may include safe extrication or moving of a trauma patient – and could be a ‘double station’ taking twice the time of the other stations)
 - Chest assessment and needle decompression of tension pneumothorax
- Consider whether IV access, including intraosseous needle insertion is important for the participant group and if so you could add this as a skill station
- If considered useful, advanced airway (intubation and surgical airway) and chest drain insertion could be provided as demonstration stations.

Discussion workshops

- Consider adapting the topics for discussion, and focus the discussion around care delivered in the pre-hospital and very initial stages of trauma care.
- Be mindful that in some areas, ‘pre-hospital’ care might take hours or days and involve several different types of transport and logistics.
- Topics that could be used include:
 - Management and triage of multiple casualties
 - Communication and handover of trauma patients
 - Transportation
- Aim to make the sessions more relevant to the pre-hospital environment by introducing the concepts of kinematics and ‘reading the wreckage’ to predict possible injuries. You may wish to signpost to the Royal College of Surgeons of Edinburgh’s Faculty of Pre-Hospital Care Consensus Statements for those who wish to expand their knowledge after the PTC Course.
<https://fphc.rcsed.ac.uk/education-resources/resources/consensus-statements>

Scenarios

The PTC teaching resources include 20 simple trauma scenarios that aim to engage the participants and embed the ‘ABCDE’ structured approach through interactive practice, reflection and feedback. The scenarios can all be adapted to the pre-hospital provider by presenting the trauma patient at the scene (rather than in the hospital or clinic) and using the types of equipment available to the pre-hospital provider in their local context.

The Instructors should emphasise the primary survey aspect of each scenario and not progress to more advanced care or secondary survey. You are free to introduce new elements to the scenario such as asking the ‘team leader’ to hand over the patient to the receiving team in the hospital or clinic using a system such as ATMIST (*Age of patient, Time of incident, Mechanism of injury, Injuries detected, Treatment given*), or asking them to prepare the patient for transport to the hospital.

Focus on the basics – with plenty of opportunity for each participant to do a thorough ‘look, listen and feel’ assessment of airway, breathing and circulation. Repeating basic airway management, simple chest trauma assessment and management (3-way dressing, tension pneumothorax) and assessment and management of bleeding and haemodynamic shock are the absolute essentials. Every participant should feel confident and competent to do these basics well at the end of the course. Allow plenty of time to check understanding and for questions. It is better to do one scenario well, rather than try to rush through two, if the participants are struggling with the basics.

Disaster Management

This is an open, flexible session with no slides allocated. It therefore enables a complete focus on the pre-hospital aspects of mass casualty and disaster events.

The Participant manual includes some information on Disaster / Trauma Triage and preparing for Mass Casualties. Although the emphasis in the manual is on the facility, rather than the scene, the principles are the same for pre-hospital care.

The Instructor teaching resources include learning objectives and tips for how to run this session that maximise interaction, discussion and small group work. It works well to provide a realistic local disaster scenario and then ask participants to brainstorm their approach. For pre-hospital providers, the discussion can focus on how to set up and manage care at the scene, and how they would communicate and work with all other stakeholders (police, fire, hospital teams, media, etc.). You may wish to consider introducing a format such as METHANE (*Major Incident/Mass Casualty declared; Exact location; Type of Incident; Hazards present; Access to site; Number of casualties; Emergency services (if any) already on scene*) as a method of communication. Similarly, you could produce a list of 10-20 trauma patients with different injuries and vital signs and then ask the group to sort them and prioritise their immediate management and transport decisions, according to the ABCDE structured approach. Ensure time at the end for feedback and to summarise the key learning points.

Writing a PTC Report

The Course Director or appointed person must write a report for every PTC course. This can be done either on the online form linked from the home page of the PTC website www.primarytraumacare.org or using the headings below. Send it to the Primary Trauma Care Head Office at admin@primarytraumacare.org and also to the course co-ordinator and to any organisation(s) funding or supporting the course.

Examples of reports from previous courses can be found on the PTC website.

Here are the recommended contents of a course report:

1. Executive summary
2. Key staff involved in planning and co-ordinating
3. Professional aspects of the visit
4. Course participants
5. Course instructors
6. Media coverage
7. Confirmation that the standard 2-day programme was delivered
8. Summary of MCQ & confidence matrix scores before and after the course
9. Confirmation that the standard 1-day instructor course was delivered,
10. PTC Instructor course participants
11. PTC Faculty Training Team
12. Evaluation of the success and relevance of the visit
13. Observations and recommendations
14. Acknowledgments and thanks

PTC Trauma Scenarios

These are included in this manual and are also available as a separate pdf document in the Logistics Package that can be downloaded from the PTC website.

SCENARIO 1 (used as Demonstration Scenario)

A 35 year-old man has fallen off his motorbike. At the scene he was yelling in pain. On arrival in hospital, he is now having difficulty in breathing.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|--|
| A | Upper airway obstruction signs relieved by simple airway management Respiratory rate 28/min | Cervical spine Oxygen Airway |
| B | Air entry L chest much less than R Percussion note L hyper-resonant Percussion on R is normal Trachea deviated to R Tension pneumothorax | Urgent needle decompression brings some relief |
| C | BP 120/80 Heart rate 100 bpm | IV line x 2 Blood sample Fluid bolus |
| | During the assessment of the circulation, the airway becomes obstructed. The patient is now quiet, not yelling. | bag mask ventilation +/- intubation |

Diagnosis: Tension pneumothorax
 Obstructed airway – possible head injury as a cause

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Recognition of an obstructed airway and a graded approach to treatment (beginning with simple things first)
- Cervical spine and airway management at the same time
- Clinical assessment, correct diagnosis and correct treatment of a tension pneumothorax
- Recognition of shock and appropriate treatment
- Starting the ABC again if the patient deteriorates

SCENARIO 2

A 45 year-old woman is involved in a head-on collision in a car accident. She was not wearing a seatbelt. She arrives in hospital with rapid breathing, difficulty in talking and complaining of right-sided chest pain.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|--|
| A | Obstructed airway (gurgling, snoring) Respiratory rate 30x | Cervical spine care Jaw thrust Suction Oxygen |
| B | No air entry on right side Trachea deviated to left Tension pneumothorax | Needle decompression +/- chest tubes results in RR 16, able to talk again |
| C | BP 100/70 HR 110 bpm | Fluid bolus x2 Blood test IV line x2 Results in BP 120/80, HR90 |

Diagnosis: Obstructed airway
 Fractured ribs + right tension pneumothorax
 Likely Cervical spine injury and head injury
 Shock

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Recognise an obstructed airway and use of simple methods to open and clear it
- Combined management of cervical spine and airway
- Clinical assessment, correct diagnosis and correct treatment of a tension pneumothorax, including recognition of the need for a chest tube
- Recognition of shock and appropriate treatment

SCENARIO 3

A 25 year-old man was hit by a speeding van as he was cycling to the market. He was not wearing a helmet. He arrives in hospital with gurgling, noisy, shallow breathing, and is unconscious. Left thigh is swollen.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|--|
| A | Stops breathing during assessment | Cervical spine care Airway support Bag mask Ventilation or intubate Oxygen |
| B | Chest is clear Air entry equal Percussion equal | No chest injury |
| C | HR 110 BP 120/80 | IV line 2x Blood test Fluid bolus |
| D | Pupils initially fixed + dilated Back to normal with Oxygen | Consult Neurosurgeon |
| E | Closed femur fracture loss | Replace blood Immobilise/splint |

Diagnosis: Obstructed airway, then respiratory arrest
 Shock
 Severe head injury
 (Fractured femur)

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Recognise obstructed airway and respiratory arrest, requiring full airway support with BVM or intubation
- Combined management of cervical spine and airway
- Recognition of shock and appropriate treatment
- Recognition of severe head injury
- Prevention of secondary injury by ABC management
- (Optional: recognition of femoral fracture as site of blood loss and appropriate immediate treatment)

SCENARIO 4

A 19 year-old man has been stabbed in the abdomen. On arrival in hospital, he is clutching his abdomen, complaining of severe abdominal pain.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|--|
| A | Airway clear Cervical spine OK | Oxygen |
| B | Air entry diminished on the right Percussion note dull on the right (Haemothorax) Respiratory rate 30 | Chest drain blood ++ |
| C | BP 80/40, HR 120 Pale and sweaty No response to fluid still hypotensive | IV line 2x Blood test Fluid bolus x2 Transfusion Call surgeon Prepare operating theatre |

Diagnosis: Penetrating chest and abdominal trauma with life threatening haemorrhage:
Haemothorax and Intra-abdominal bleeding

Learning Objectives

- Confident use of ABC in the Primary Survey
- Importance of oxygen even when airway is stable. Sensible approach to Cervical Spine
- Correct clinical assessment, diagnosis and treatment of a large haemothorax
- Recognition of severe shock and appropriate treatment with rapid fluid resuscitation and early blood transfusion
- Importance of re-assessment
- Recognition of “hidden bleeding” and need for urgent surgical referral and operating theatre treatment

SCENARIO 5

A 26 year-old woman has been shot in the neck. She arrives in hospital, conscious but with stridor and respiratory distress.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|---|---|
| A | Stridor Difficulty in talking Hoarse voice | Oxygen Simple airway management |
| B | Air entry equal but soft Chest clear | No chest injury |
| C | BP 120/80 HR 110 | IV x 2 blood test Fluid bolus |
| | During assessment of her circulation you notice the neck has become more swollen. There is increasing stridor and she now is unable to talk | Surgical consultation for tracheostomy Consider cricothyroidotomy Do not attempt intubation |

Diagnosis: Obstructed airway from gunshot wound to larynx

Learning Objectives

- Confident use of the ABC in the primary survey
- Early recognition of airway obstruction and high risk injury
- Anticipation and preparation for advanced airway management / difficult airway.
- Recognition of shock and appropriate treatment. Consideration of other causes for high heart rate
- Importance of re-assessment

Note: this scenario may trigger a discussion about difficult airways and how to manage these when skilled staff and other airway resources are limited.

SCENARIO 6

A 60 year-old woman is involved in a high speed car accident. She was wearing a seatbelt. On arrival in hospital she is groaning in pain.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|--|--|
| A | Soft snoring breathing Spits out oral airway if put in | Cervical spine care Oxygen Basic airway management |
| B | Chest clear Respiratory rate 28 | no chest injuries |
| C | BP 80/60, HR 140 Cold hands and feet After 1 L fluid --> BP 110/70 HR 110 After 2 L - -> BP 120/80 HR 80 Patient responds well to fluid bolus. | Iv line x2 Blood for tests Fluid bolus 2 L: |
| D | Now consciousness becomes normal | |
| Secondary Survey | Tender pelvis with crepitus on palpation | Apply pelvic binder |

Diagnosis: Severe shock from likely abdominal / pelvic injuries

Learning Objectives

- Confident use of the ABC in the primary survey
- Recognition of mild airway obstruction and use of simple methods
- Combined management of cervical spine and airway
- Clinical assessment and recognition of severe shock and appropriate treatment with rapid fluid resuscitation and early blood transfusion
- Importance of re-assessment
- Altered conscious state (and obstructed airway) not always the result of head injury
- Need to look for sites of bleeding and recognition of “hidden bleeding” from abdomen and pelvis

SCENARIO 7

A 15 year-old boy fell to the ground from a tree, landing on his head. According to his family, he was initially conscious and complained of neck pain. Over the next 30 minutes he became unconscious. On arrival in hospital he had a right-side seizure.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|---|
| A | Obstructed breathing (snoring, some distress) | Cervical spine care Oxygen Simple airway management but may need intubation |
| B | Shallow breaths | Patient needs ventilatory assistance with a bag and mask |
| C | BP 130/90 HR 100 | IV access 2x Blood tests |
| D | Left pupil fixed + dilated Flexing to pain only | Call neurosurgeon Prepare burr-hole |

Diagnosis: Obstructed airway
 Severe head injury, (Left extradural hematoma)

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Recognition of an obstructed airway and a graded approach to treatment. Understanding that a completely unconscious patient will require advanced airway management
- Combined management of cervical spine and airway
- Recognition of poor ventilation requiring assistance with bag and mask
- Recognition of severe head injury and prevention of secondary injury by ABC
(optional: recognition of likely intracranial bleeding requiring urgent surgery)

SCENARIO 8

A 45 year-old factory worker is crushed by a container truck at work. He is brought into hospital with severe breathing difficulties.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|---|
| A | Respiratory rate 40 Shallow breathing Cyanosed | Cervical spine care Simple airway management Oxygen |
| B | Bilateral wheeze and crepitation Air entry much reduced on right side Paradoxical movement on right anterior chest (flail chest) Percussion note dull on right side | Needs intubation for flail chest Analgesia Drain blood from the right chest |
| C | BP 100/60 HR 140 Good response to fluid | IV access 2x Blood tests Fluid bolus x2 |

Diagnosis: Respiratory distress with severe chest injuries
 Crush injury with right-sided flail chest and haemothorax
 Shock

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Combined cervical spine and airway management. Importance of oxygen
- Correct clinical assessment, diagnosis and treatment of fractured ribs, a flail segment and large haemothorax
- Understanding that advanced airway management can be required for severe breathing problems
- Recognition of shock and appropriate treatment
- Importance of reassessment
- Understanding that a fast heart rate is not always or only caused by shock.
- Importance of analgesia

SCENARIO 9

A 25 year old woman has been assaulted with a large heavy stick. On arrival in hospital she has extensive facial injuries, stridor and respiratory distress. She is cyanosed and is making groaning sounds.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|--|---|
| A | Basic airway management does not relieve the airway obstruction Bag mask ventilation is difficult | Suction, jaw thrust, Chin lift Bag mask ventilation Must intubate |
| B | Chest: air entry normal Breathing sounds OK | no chest injuries |
| C | BP 130/90 HR 110 | IV line Blood tests Fluid bolus |
| D | Pupils equal and normal response to light Opens eyes to voice Localizes to pain | |
| Secondary Survey | Swollen right femur | Log roll, analgesia |

Diagnosis: Obstructed and difficult airway from facial fractures,
 Moderate blood loss and shock
 Fractured femur

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary surveys
- Early recognition of airway obstruction and high-risk injury. Graded approach to management, moving from basic to advanced airway techniques
- Recognition of shock and appropriate treatment.
- Clinical assessment of neurological state
- Importance of Secondary Survey to detect other injuries, including log roll
- Don't forget analgesia!

SCENARIO 10

A 70 year old man was burnt in a house fire. It took 4 hours for him to reach hospital. On arrival, still dressed, he has a burnt area covering his chest and abdomen. He is groaning in pain, appears to be in respiratory distress and is confused.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|-------------------------|---|---|
| A | No facial or airway burns on inspection Voice not hoarse Respiratory rate 30 SpO2 88% on air | Oxygen Basic airway management |
| B | Air entry normal R = L | SpO2 94% with oxygen |
| C | BP 90/70 HR 130 Cold periphery Good response to fluid bolus | IV access 2x Blood tests Fluid bolus |
| D | Alert, oriented after oxygen | |
| E + Secondary Survey | 30-40% burns front of chest, abdomen, both thighs and some of right arm | Burns care Resuscitation Tetanus prophylaxis Supportive treatment |

Diagnosis: Burns 30-40% with inhalation injury to the lungs.

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys Assessment of airway in burns patients and understanding of airway risks
- Clinical assessment of breathing and consideration of further support
- Recognition of shock and appropriate treatment
- Importance of exposure (including log roll & remove clothes) and secondary survey to detect other injuries,
- Specific burns management; assessment of area burnt, use of formula to calculate fluid requirements and rate of fluid resuscitation, analgesia, temperature control, tetanus prophylaxis

SCENARIO 11

A 26 year-old woman, 30 weeks pregnant, suffers a road accident. On arrival in hospital, she complains of abdominal pain and is very distressed about her baby.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|--|
| A | Respiratory rate 20 Able to talk Complaining of dyspnoea and pain | Oxygen Cervical spine care |
| B | Air entry normal Percussion normal | No chest injuries |
| C | BP 90/60 HR 140 Blood pressure remains low if not resuscitated in left lateral position. Good response to fluid | Left lateral position IV line 2x Blood for tests Fluid bolus 2x |
| D | Normal | |
| Secondary Survey | Tender abdomen Fundal height at xiphisternum (too high) Foetal heart sounds are not heard | |

Diagnosis: Shock and uterine trauma with placental abruption and separation

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary surveys
- Assessment of combined Airway and Cervical Spine management
- Importance of left tilt when supine during resuscitation of pregnant women
- Recognition of shock and appropriate treatment. Understanding of the different physiology and vital signs in pregnant women
- Importance of Secondary Survey to detect other injuries, including log roll
- Specific pregnancy management; assessment of pregnant uterus, assessment of foetus, recognition of severe uterine injuries, analgesia in pregnancy, importance of reassurance

SCENARIO 12

An 8 year-old boy is riding a bicycle and is hit by a car. He is brought to the hospital and is complaining of abdominal pain.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------|--|--|
| A | Airway clear, Respiratory rate 24 | Cervical spine care Oxygen |
| B | Air entry R = L Percussion note R = L Expansion R = L Chest sounds normal | No chest injury |
| C | BP 70/40 HR 140 Periphery cold Capillary return 4 seconds BP 80/60 HR 120 after first 20 ml/kg After next 20ml/kg 100/70 HR 90 | IV line 2x Blood for tests Fluid bolus 20ml/kg |
| | Develops obstructed breathing and becomes drowsy while you are assessing Circulation Obstruction relieved by airway, bag and mask ventilation. | Open airway, bag and mask |
| D | Fixed dilated pupil right side. Not responding to pain | |

Diagnosis: Severe shock. Blood loss from an unknown site
Head injury with deterioration and obstructed airway
Likely right sided intra-cranial haemorrhage

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys Assessment and recognition of severe shock and appropriate treatment.
- Understanding of the different anatomy, physiology and vital signs in children and how this influences treatment
- Importance of re-assessment. Rapid recognition of deterioration and re-starting the ABC structured approach
- Neurological assessment and recognition of severe injury
- Importance of Secondary survey and looking for a site of hidden bleeding

SCENARIO 13

A 25 year-old man has been injured in an explosion and fire at a factory. He is on his way to hospital with facial burns and a chest injury.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|--|--|---|
| A | Hoarse voice Burns around and in his mouth Black sputum No stridor, RR 30 | Cervical spine care Oxygen Prepare for intubation |
| B | Air entry: reduced on right Percussion dull on right Tender to palpation right chest | Chest drain Rib fractures Haemothorax |
| C | BP 90/60 HR 120 | IV access 2x Blood for tests IV Fluid |
| During assessment of circulation, he develops increasing stridor. If he has not been intubated, return to A. | | |
| A | Unable to talk, stridor Respiratory distress | Intubate if not already done |
| Secondary survey | Loss of hearing, swollen and deformed R arm, burns over face and upper chest (around 15%) | |

Diagnosis: Early airway obstruction and high risk threat to airway from burns
Blast injury with possible cervical spine injury
Right rib fractures and right haemothorax.

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys Assessment of Airway in burns patients and understanding of airway risks. Anticipation of advanced airway management and difficult airway
- Clinical assessment and recognition of fractured ribs and haemothorax, and appropriate management
- Recognition of shock and appropriate treatment
- Importance of Secondary Survey to detect other injuries, including log roll
- Specific burns and blast management; assessment of area burnt, fluid resuscitation, analgesia, temperature control, tetanus prophylaxis, recognition of typical blast injuries

SCENARIO 14

A 45 year-old male prisoner is stabbed in the back in a fight. He is unable to move his legs and is having problems breathing. He complains of pain in the right chest.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|---|
| A | Able to talk with difficulty Airway is clear | Oxygen No cervical spine injury |
| B | Air entry absent on R Percussion note hyper-resonant Trachea deviated to left | Decompress right side Tension pneumothorax |
| C | BP 90/60 HR 120 BP remains 90/60 HR 100 | IV access 2x Blood for tests Fluid bolus x2 |
| D | Alert | |
| Secondary survey | Reflexes absent in lower limbs Sensory level loss up to T8 | Must include log roll |

Diagnosis: Spinal injury of T7-T8
 Tension pneumothorax
 Mild spinal shock

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys Clinical assessment and recognition of tension pneumothorax with appropriate management
- Recognition of shock and appropriate treatment
- Importance of Secondary Survey to detect other injuries, including log roll
- Clinical assessment of neurological system and recognition of spinal injury

SCENARIO 15

A 32 year-old woman has fallen from a cliff on a remote island. It has taken 4 days for her to reach hospital. She has an obvious compound fracture of her left femur and a swollen left calf. The leg smells. She appears very confused.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|--|--|
| A | Airway clear. Respiratory rate 30 | Oxygen Cervical spine care |
| B | Chest normal | |
| C | BP 100/40 HR 120 Bounding pulse Temperature 39 Celsius Good response to fluid | IV access Blood tests Fluid bolus x2 |
| D | Confused | |
| Secondary survey | Pulseless, cold left foot | Fasciotomy Antibiotics |

Diagnosis: Septic shock from compound fracture
 Compartment syndrome left calf

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys Care of cervical spine in a high risk injury, even with delayed presentation
- Clinical assessment and recognition of septic shock
- Treatment of septic shock
- Importance of Secondary Survey to detect other injuries, including log roll
- Clinical assessment of limb injury, recognition of compartment syndrome and appropriate treatment

SCENARIO 16

A 4 year-old girl has been run over by a car. She is brought into the Emergency department straight away. She is not breathing.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|--|
| A | No breath sounds No chest movement Unable to ventilate | Cervical spine care Open airway Bag mask ventilation Intubation (ETT size 5) |
| B | After intubation, notice no chest movement on right side Percussion note resonant on right Trachea deviated to left | Urgent needle Decompression Chest drain for haemopneumothorax |
| C | BP 60/50 HR 130 Capillary return slow Good response BP 90/60 HR 100 | Unable to put in IV line on 2 attempts Intraosseous needle Fluid bolus 2x20ml/kg (weight 16kg) |
| D | Now open eyes and biting ETT | |
| Secondary survey | Rigid abdomen Crepitus / unstable pelvis | Pelvic binder |

Diagnosis: Respiratory arrest
 Right tension haemopneumothorax
 Shock with likely intra-abdominal bleeding and fractured pelvis
 Possible head injury

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys
- Recognition of respiratory arrest and immediate treatment with basic, then advanced airway management. Cervical spine care at the same time.
- Clinical assessment, recognition and treatment of tension haemopneumothorax
- Clinical assessment and recognition of shock. Appropriate use of intraosseous needle for urgent fluid resuscitation
- Understanding of the different anatomy, physiology and vital signs in children and how this influences treatment. Correct calculation of weight and ETT size.
- Importance of Secondary survey and looking for sites of hidden bleeding

Extra Scenarios

We have provided some extra scenarios here for you to use if required. Some of them may suit your local context more than the first 16 scenarios.

Also, you may use scenarios based on your own experience.

SCENARIO 17

A 40 year-old man is the driver in a car accident. He was ejected from the car and was found 20 metres away. On arrival in hospital

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|--|
| A | Stridor and respiratory distress Loose teeth and blood on oral suction Airway management is not effective Ventilation with bag mask not effective Attempted intubation failed 2x Now patient is cyanosed | Cervical spine care Oxygen Basic airway management Bag mask ventilation Attempt intubation Cricothyroidotomy (surgical airway) |
| B | Continue Primary Survey (ABCD) | |
| C | Heart rate 120, BP 120/70 Capillary refill 2 seconds | |
| D | Unconscious | |
| Secondary Survey | | |

Plan: Follow with tracheostomy

Learning Objectives

- Confident use of the ABC structure in the Primary Survey
- Recognition of an obstructed airway and using a graded management approach from basic to advanced airway techniques
- Cervical spine and airway management at the same time
- Recognition of need for surgical airway (failed intubation) and knowledge of surgical airway technique

SCENARIO 18

An 18-month child is rushed to hospital after falling off a balcony onto hard ground. He is unconscious in his mother's arms. The parents are crying and distressed.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|---|
| A | Unconscious infant Soft snoring Slight cyanosis Paradoxical chest / abdomen movement | Oxygen Cervical Spine care Basic airway Bag Mask ventilation Possible intubation |
| B | Bruising of chest wall Crepitus over R chest Poor respiratory effort Soft crackles both lung fields | Ventilatory support required: Bag Mask or Intubation (preferred) (ETT size 4, 4.5) |
| C | Heart rate 160 Capillary refill 4 seconds Cold peripheries | IV attempt: only tiny cannula in back of hand Intraosseous access Fluid bolus 20ml/kg (weight 11kg) Reassess, second bolus |
| Secondary Survey | Bruising over chest wall Large swelling over occipital area, bruising around eyes Swollen, deformed R thigh | |

Diagnosis: Obstructed airway and respiratory failure
Severe head injury (possible base of skull fracture), fractured ribs
Right femoral fracture. Possibility of non-accidental injury (NAI)?

Learning Objectives

- Confident use of the ABCDE structure in Primary and Secondary Surveys
- Recognition of an obstructed airway and using a graded management approach from basic to advanced airway techniques
- Clinical assessment and recognition of respiratory failure and appropriate management
- Clinical assessment, recognition and appropriate treatment of shock
- Paediatric specific: understanding anatomical and physiological differences, use of IO access, prevent hypothermia, parental involvement, consideration of Non Accidental Injury

SCENARIO 19

A woman with a 38-week pregnancy is brought in to the clinic by her husband. She has had boiling hot cooking oil tipped over her face, neck and upper body in an argument. She is now screaming in pain, with the oil still all over her clothes, hair and skin.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|--|
| A | Screaming Respiratory rate 28 Oil on lips, face and neck | Stop the burning: remove all clothes and use cold water to cool Oxygen |
| B | Full thickness burns all over front of chest and neck Chest clear Poor respiratory effort (pain) | |
| C | Heart rate 130, BP 110/90 Difficult IV access (arms and hands burnt) | IV access - ?Lower limbs, intraosseous or central access Left tilt, Fluid Bolus |
| Secondary survey | Burns over 25 – 30% body (face, neck, front chest, arms) Abdomen non-tender. Fundal height appropriate Foetal movements active and foetal heart heard | |
| Next steps | Analgesia Referral for urgent Caesarean Section / delivery Depth of burns: consideration of antibiotics? Family violence | |

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys
- Importance of left tilt when supine during resuscitation of pregnant women
- Recognition of shock and appropriate treatment. Understanding of the different physiology and vital signs in pregnant women
- Burns management; first aid, airway risk assessment, depth of burns, size of burns and fluid resuscitation, analgesia
- Specific pregnancy management; assessment of pregnant uterus and foetus, analgesia in pregnancy, importance of reassurance, recognition of risks.

SCENARIO 20

A 25 year-old woman was working in her shop when an explosion occurred in the street (perhaps a land mine, perhaps a bomb – no-one is sure). The window shattered, and shards of glass flew into her body. She has multiple cuts and is covered with blood when a taxi delivers her to your hospital.

| ASSESSMENT | FURTHER INFORMATION | KEY POINTS |
|------------------|---|--|
| A | Speaking softly Respiratory rate 32 Large shard of glass in L neck | Oxygen Care with cervical spine Do not remove glass |
| B | Multiple cuts over chest Large open wound R lateral chest wall. Sucking noise Reduced breath sounds on R | Three way dressing over sucking chest wound R chest tube (blood and air drain out) |
| C | Heart rate 130, BP 80/60 Pale, cool peripheries No improvement after 3 rd bolus | IV line x 2, blood taken Fluid bolus x 2 Fluid bolus, get blood Massive transfusion |
| Secondary Survey | Penetrating wounds over R lateral abdomen (only seen on log roll) Distended, tender abdomen Partially amputated L leg at knee, heavy bleeding | |
| Next steps | Massive transfusion required Urgent Surgical referral (penetrating neck and abdomen injuries) Direct pressure, splinting of leg | |

Learning Objectives

- Confident use of the ABCDE structure in the Primary and Secondary Surveys
- Early recognition of airway risk (penetrating injury) and specific management. Care for cervical spine in complicated injury
- Clinical assessment, recognition and appropriate management of sucking chest wound
- Recognition of severe shock and appropriate treatment. Recognition of ongoing bleeding and need for massive transfusion. Knowledge of massive transfusion.
- Importance of Secondary Survey to detect other injuries, including log roll
- Care of limb threatening injury
- Don't forget analgesia!