

12 ASSESSMENT OF THE INJURED OR ILL PATIENT

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This chapter aims to cover the assessment of the injured or ill patient in a way that is easily understood by non-medical people. It can also be used as basic revision for people who are medically qualified. When reading this chapter please refer to the Medical Assessment Questionnaire (MAQ) in Appendix 3.

The assessment of a patient involves establishing what the problem is and monitoring the patient's progress. There are four components to assessment:

- History – the patient's account of events
- Examination of the patient
- Investigations
- Monitoring the patient's condition.

INITIAL ASSESSMENT OF THE INJURED CASUALTY

In the injured casualty the initial priorities are:

- Airway
- Breathing
- Circulation
- Head-to-toe assessment.

Airway, breathing and circulatory (ABC) assessment is covered in Chapter 13.

Head-to-toe assessment

The objective of the head-to-toe assessment is to make a quick, thorough examination of the casualty to gain an overview and plan the priorities for treatment. Mentally reconstruct the sequence of events to alert yourself to possible injuries. Start your examination at the head and work down to the toes. The three basic tenets of

examination are *look, feel* and *listen*. You may need to remove clothing, but do not move the casualty unless it is absolutely necessary. Comparison of each side of the body will help you to decide what is abnormal. While making the examination talk to the casualty, explaining what you are doing and giving reassurance, even if the person is unconscious.

The head

Observe the colour, temperature and state of the face for signs of shock. Look at the face and head for deformity or bruising. Bruising just behind and below the ears may indicate a skull fracture, as does blood or clear fluid draining from the ears or nose. Blood in the whites of the eyes (subconjunctival haemorrhage) suggests a significant head injury. Check the pupils are equal in size and that there are no foreign bodies in the eyes. Run your fingers through the hair feeling the skull for blood, swellings, depressions or areas of tenderness.

The neck

Loosen any tight clothing around the neck. Look for bruising, bleeding or swelling and feel the back of the neck for swelling or steps between the spinal vertebrae. The line of the neck should be straight; any deviation from this should arouse suspicion of an injury such as a dislocation or fracture.

The chest

Look for regular chest movements and whether both sides are moving equally. Firmly feel the chest for wetness (blood), swelling, deformity, tenderness and chest movement. Remember to feel around the sides and back of the chest as far as possible without moving the patient. Listen to the breathing.

The abdomen

Feel the abdomen (Figure 12.5, page 123) for muscle tensing (guarding) or tenderness. With a hand on either side of the pelvis gently rock it (Figure 12.1). You are feeling for any movement or grating that would indicate a fracture. Place your hand in the small of the back and feel along the spine, as far as possible, for any irregularities.

The limbs

Lastly, examine the legs and arms; these are your lowest priority. Injuries to the head, spine, chest and abdomen can kill. Limb injuries, with the exception of severe bleeding, are rarely life threatening. Look for deformity and bleeding. Feel each leg and arm and compare, starting at the top and working down. If the patient is conscious ask if he can feel you touching him and ask him to move the limbs. Any inability may indicate a spinal injury.

You now have a good idea of the patient's state and are in a position to plan his or



Figure 12.1 *Examination for a pelvic fracture*

her further treatment. Once the casualty's life-threatening injuries have been dealt with, a full assessment needs to be made.

ASSESSMENT OF AN INJURED OR ILL PATIENT USING THE MEDICAL ASSESSMENT QUESTIONNAIRE (MAQ) FOR NON-MEDICAL PERSONNEL

The degree of assessment required depends on the circumstances. A sore throat with no other features requires little attention. A sore throat accompanied by fever, cough, breathlessness and chest pain requires more detailed assessment. Making an accurate diagnosis is not essential. Many medical conditions have similar features, especially early on, and it is not until later that specific features emerge.

An accurate and thorough description of a medical disorder is necessary to establish a comprehensive care plan. The MAQ was developed to help non-medical personnel achieve this. The MAQ leads you through a history and examination, ensuring that relevant information is not missed. It was originally developed to transfer information to a remote doctor via radio or fax so that medical advice could be given. For expeditions with medical back-up the MAQ may be a valuable additional tool for communication when the doctor and patient are separated. For expeditions without medical back-up the MAQ will help ensure that a full history and examination are performed.

This section guides you through an assessment using the MAQ. Remember that symptoms are the patient's description of how he or she feels; a sign is what you observe during the examination.

It is important to explain to the patient what you are about to do during the assessment.

The history

The history must give a clear picture of events. Time taken to gain an accurate history is always time well spent. The history is about the events that led up to the illness and what the *patient* feels. It is not about what the examiner observes. *Listen to the patient and other eyewitnesses.*

To make full sense of this chapter, please refer to the Medical Assessment Questionnaire in Appendix 3. The alphabetical sections that follow correspond to the alphabetical subsections in the MAQ.

(A) PATIENT DETAILS

Make a note of the patient's personal details, including name, address, date of birth, age, sex, occupation plus time, date and location of where the form was completed.

(B) PATIENT'S MAIN COMPLAINT/COMPLAINTS

This identifies the central problems. Later components of the history build upon this

initial description. For example, a patient's main complaint might be:

- 1 abdominal pain
- 2 vomiting.

(C) A SHORT DESCRIPTIVE HISTORY

Describe briefly the main features of the illness or injury. It is often useful to start with the question "When were you last completely well?", followed by "What was the first thing that you noticed was wrong?" and "What happened next?" Specify the nature, location and duration of symptoms. Identify changes or additional symptoms that occur and factors that worsen or improve the symptoms. The information should be related to time. Do not use technical medical terms, as they cause confusion unless their precise definition is known to the users; statements should be in the patient's own words. For example: "Last completely well 2 days ago. Yesterday had no appetite, ate nothing and only small amount to drink. Woke at 4.00am today with pain in centre of abdomen, gripping in nature. Unable to sleep. About 8.00am pain more in the right, lower side of abdomen. Vomited twice at 9.00am and 9.40am."

SECTIONS (D) TO (K)

Apparently unrelated symptoms can help you to reach a diagnosis. It is therefore necessary to ask the patient all the questions from Section D onwards. The questions systematically cover the systems of the body and ensure that relevant information is not missed.

The examination

The examination questions need to be answered from your own observations. They are not questions to ask the patient. For example, "Is there pain on moving?" requires the patient to move and for the examiner to decide if this causes pain. Information is gained in three ways during the examination.

1. Look

Start by taking a good look at the patient and observing his or her general well-being and attitude. It may seem subjective to ask whether the patient looks well or unwell, but your gut feelings are valuable. When examining a part of the body it should be fully exposed. Stand back and look. Remember to compare both sides.

2. Feel

A number of questions ask whether an area is tender and to answer you need to feel that area. You must watch the patient's face when examining as even small twinges of pain are usually registered on the face. Similarly, if an area is painful the patient usually tenses when it is touched.

To minimise discomfort be *gentle but firm* with your hands. Do not prod and poke, or be so cautious that you tickle the patient. Firmly apply pressure; you will learn nothing from prodding, poking and tickling.

3. Listen

Listen to the breath or bowel sounds either with a stethoscope or by putting your ear to the part you are examining.

SECTION (N)

The thirteen questions in section N are important because they provide a lot of information about the patient's overall condition. Each one must be answered.

Taking the temperature

The temperature can be taken from three places.

1. The mouth

Place the thermometer under the tongue and close the mouth. Leave for 3 minutes before reading. This method is unreliable if the patient has recently eaten, drunk or been exposed to cold, or is breathing heavily through an open mouth.

2. The armpit

The thermometer is placed in the armpit and held in position for 3 minutes. This temperature is usually about 1°C lower than the oral temperature.

3. The rectum

This is the most accurate place to record the temperature and, despite its obvious disadvantages, is the best site. In a patient suspected of being hypothermic, the temperature must be taken with a low-reading thermometer in the rectum.

Lie the patient on his or her or her side and gently insert a lubricated thermometer no more than 6cm into the rectum. Hold it in position for 3 minutes and do not let go. After taking the reading, clean the thermometer with gauze and an alcohol swab and identify it for rectal use only.

A normal temperature ranges between 36.5°C and 37.5°C

Hypothermia is defined as 35°C or less

A temperature greater than 37.5°C is elevated

Taking the pulse

Blood is pumped from the heart to the arteries. The arteries transport the blood to the cells of the body. With each heart beat blood is ejected into the arteries causing them to expand. This expansion is transmitted along the arteries, and can be felt as the

pulse. The pulse rate is the number of pulses (or number of heart beats) per minute.

Normal adult pulse rate at rest is 60–90 per minute

The pulse is easily felt, but it requires practice. Feel for it with the pulp at the end of your middle finger. The pulse can be felt at one of four sites.

1. The wrist

Press gently in the groove that runs between the lump on the thumb side of the wrist and the tendons.

2. The neck

The neck (carotid) pulse is sometimes the only pulse that can be felt in a very ill patient. Locate the Adam's apple (larynx) with two fingertips. (The Adam's apple is the lump at the front of the windpipe that moves up and down when swallowing.) Run the fingers down the side of the neck towards you, until you reach an easily felt



Figure 12.2 *Examination for a carotid pulse*

groove. This is the junction between the windpipe and the neck muscles. The carotid pulse can be felt with the fingertips in this groove (Figure 12.2). Press gently into the groove. Do not press hard as this will compress the artery, and do not press both sides simultaneously as this will reduce the circulation to the brain.

3. *The groin*

Press firmly into the skin crease at the top of the leg, at a point half-way between the mid-line and the prominent bony lump of the pelvis.

4. *The antecubital fossa*

This is the hollow in the bend of the arm, in front of the elbow where blood is usually taken by venepuncture. Straighten the arm at the elbow and feel the brachial pulse in the hollow between the muscles.

Once you have located a pulse, count the number of beats during a timed minute. This is the pulse rate. Exertion, fever, shock, pain, excitement and anxiety raise the pulse rate; it is slowed by hypothermia and fainting. You may also be able to evaluate the pulse strength and whether it is regular or irregular.

Taking the blood pressure

The blood pressure is the measurement of two pressures. The systolic pressure is the pressure of blood in the artery caused by the heart contracting. The diastolic pressure, which is lower, is the resting pressure in the artery when the heart is relaxed.

Blood pressure varies enormously between individuals. Interpretation needs to be made in conjunction with the clinical situation and other measurements such as pulse and breathing rate. Because of the wide variability, a normal range for blood pressure is not given. The blood pressure is extremely important in monitoring, as much can be learnt from whether it is stable, falling or rising.

- Take the blood pressure with a sphygmomanometer.
- Ease any constricting clothing from the upper arm and firmly wrap the cuff above the elbow.
- With the palm upwards, straighten the patient's arm and locate the brachial pulse which lies just below the elbow, about one third of the way across from the inner side. Continue to press gently on the pulse.
- Inflate the cuff and note the reading when the pulse disappears. Inflate the cuff a further 20–30mm of mercury.
- Place the diaphragm of the stethoscope over the pulse and press gently to ensure good contact (Figure 12.3).
- Release the pressure in the cuff at a rate of 3–5mm of mercury per second by easing open the screw valve.



Figure 12.3 *Taking the blood pressure*

- Listen for the first pulse beat while watching the pressure fall. The pressure at which you hear the first thumping sound is the systolic pressure. (This is about the same level at which the pulse was felt to disappear during inflation.)
- Continue to listen. The sounds will suddenly muffle and then disappear. The disappearance marks the diastolic pressure.

Mercury thermometers and sphygmomanometers should not be carried on aircraft as spilled mercury can form an amalgam and weaken the integrity of the aircraft fuselage

The blanching test (capillary refill time)

This can be a useful additional test of the circulation. It is unreliable if the patient is cold and needs to be interpreted in the context of other findings. There are two sites to perform the test:

1. Press your thumb on a fingernail or toenail for 5 seconds. The nail bed will blanch immediately and the colour should return as soon as the thumb is removed. If the nail does not begin to return to normal after 2 seconds, then circulation is poor.
2. Press your thumb on the patient's chest or any bony prominence for 5 seconds. This causes a white (blanched) area where the blood has been squeezed out of the capillaries. The colour should begin to return in 2 seconds. If the circulation is poor it will take longer.

Measuring the breathing rate

Do this while pretending to count the pulse as the breathing may alter when the patient becomes aware of what you are doing.

Normal adult breathing rate at rest is 12–18 per minute. The breaths should be quiet, regular, effortless and painless

Use of the stethoscope

There are two points about using the stethoscope:

1. The earpieces are angled and should be placed in your ears angled forwards – the ear canal runs downwards and forwards
2. Most stethoscopes have a bell and diaphragm. They can be switched by spinning the end piece of the stethoscope. You should use the diaphragm.

(O) EXAMINATION OF THE CHEST

Much can be gained from looking at the chest as the patient breathes normally, but

remember that the chest has a front and a back. When examining the back, get the patient to sit forward with the arms crossed to pull the shoulder blades apart.

If one of the lungs collapses, the windpipe (trachea) may either be pulled towards or pushed away from the collapsed lung (tension pneumothorax). The position of the windpipe can be assessed by feeling with two fingers in the mid-line at the base of the neck. You will feel a notch immediately above the breast bone, and by pushing your fingers gently into it you will feel the windpipe as it disappears into the chest cavity (Figure 12.4). It should be positioned centrally. Listen under the collarbones and just outside the nipples. Breath sounds may be normal, absent or there may be added sounds. (If you are unsure what is normal listen to your own chest with a stethoscope first and compare this with your patient.)

(P) EXAMINATION OF THE ABDOMEN

The patient should be as relaxed as possible, lying on the back, head supported by one or two pillows. The whole of the abdomen needs to be exposed. The male genitals are considered part of the abdomen, including the groin, but keep the genitalia covered (to minimise embarrassment) except when you examine them.

Look

Look at the abdomen and separately at the male genitals. If there is any suggestion of a genital disorder, gently feel for the abnormality.

Feel

Ensure your hands are warm before touching the patient. Ask first if there is pain or tenderness and start feeling the abdomen away from the region of maximum pain, gradually working towards it. The following technique for feeling the abdomen is simple but essential to follow.

The flat of the hand is placed on the abdomen (Figure 12.5). Gentle pressure is then applied with the whole of the flat of the whole hand. Repeat this process over the entire abdomen. The abdomen is normally quite soft.

You are feeling for tenderness or resistance (guarding) to your hand, caused by contraction of the abdominal wall muscles. You need to know whether guarding is local or over the entire abdomen. At its most extreme the whole abdominal wall will be rigid, like a board. This results from peritonitis, general inflammation in the abdomen. An additional and useful sign is the “rebound sign”, whereby gentle pressure from the flat of the fingers into the abdomen, followed by quick release of the fingers, causes more severe pain *on release* than on pressure. This procedure should be performed only once. This again is used to detect peritonitis or evidence of abdominal irritation, for example from a perforated bowel or blood in the abdominal cavity.

The signs of guarding and tenderness are important. The technique described is the only way they can be elicited accurately. Some patients have a sensitive abdomen

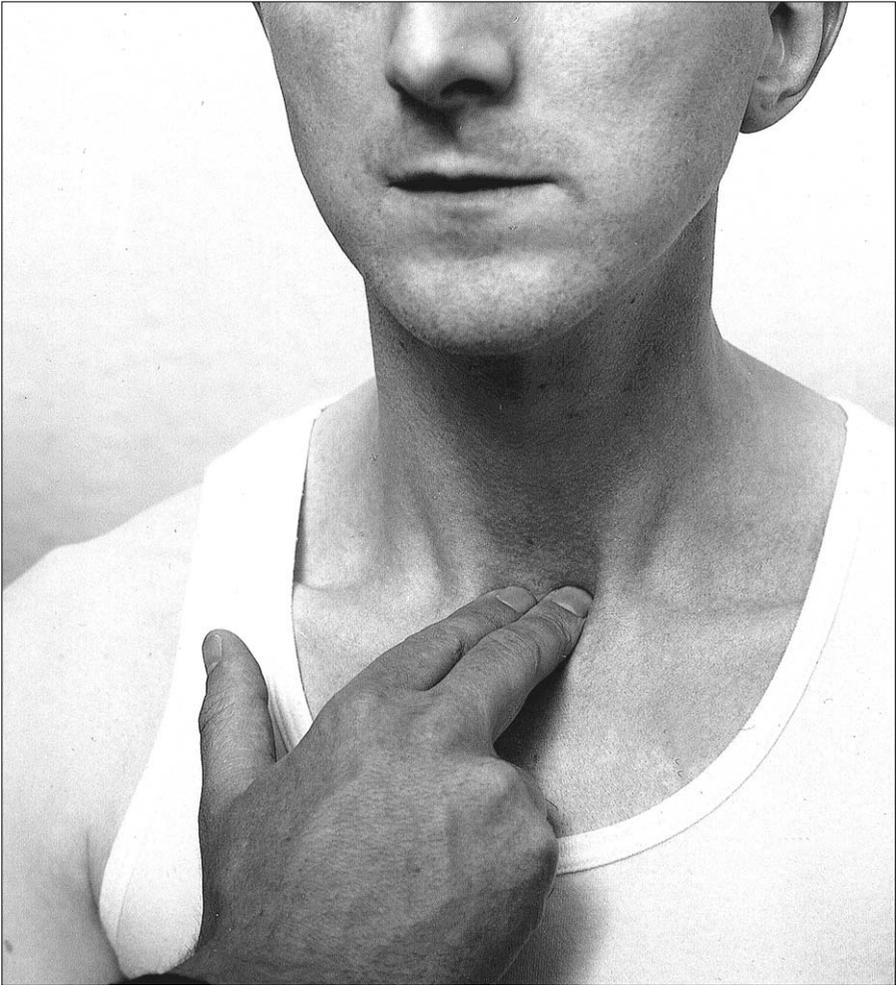


Figure 12.4 *Examining for the position of the trachea*

which demonstrates guarding at the first touch, especially if your hand is cold. Under these circumstances your examination can be helped by asking the patient to bend the knees and rest the heels on the ground. This helps relax the abdomen.

Listen for bowel sounds by placing the ear on the abdomen or placing a stethoscope firmly an inch below the belly button. The normal gut is moving all the time, which is heard as quiet gurgles, a few times a minute. Sounds are increased when the bowel is overactive, as in diarrhoea, or if the bowel is obstructed. Bowel sounds are absent in peritonitis, when the bowel is paralysed due to inflammation.



Figure 12.5 *Abdominal examination*

(Q) GENERAL EXAMINATION

Lymph glands are found in the neck, the armpits and the groin. The patient can often direct you to enlarged tender glands. If there is an infection in the area that the glands serve, they will become enlarged. They will also be tender and can be felt with the fingertips. Normally glands cannot be felt (except in the groin) and they are not tender. The tonsils can be seen at the back of the throat and are an example of a lymph gland. It is worth looking at the back of a friend's throat with a torch so that you are familiar with what a normal throat looks like.

In order to perform a good examination it is necessary to know what a normal body

looks, feels and sounds like. To gain this knowledge you need to practise examining fit individuals and yourself. The skills are readily learnt and guidance from a doctor will be a great advantage

Investigations

One useful investigation is the testing of urine using a Dipstix, a multicoloured strip. The strip is dipped into the urine and examined for colour changes against a range of standard colours on the side of the container. Changes indicate the presence of substances in the urine such as blood, sugar and protein.

Monitoring of progress

It is important that you should be able to determine whether a patient is getting better, deteriorating or remaining much the same. This information is gained by relating the initial assessment to ongoing assessments.

Always monitor the patient and record your findings

Take notes on the patient's condition, remembering to include the date and time. If the patient is seriously unwell monitor them every 15 minutes. Use a vital signs chart (Figure 12.6) to record the pulse rate, temperature, breathing rate and blood pressure. The trends in these measurements are more important than isolated readings in determining how the patient is progressing.

THE ASSESSMENT OF THE UNCONSCIOUS PATIENT

Hourly head injury observations are needed if the patient:

- is unconscious, even for a short time;
- develops headache, vomiting, dizziness or visual disturbance.

Observations should be made for a minimum of 24 hours after regaining consciousness or from the resolution of all symptoms and signs.

Head injury observations

The depth of unconsciousness can quickly be determined using the mnemonic AVPU:

- **A**wake and alert
- **V**erbal – responds to voice
- **P**ain – responds to pain
- **U**nresponsive – no response to a painful stimulus

A more sensitive assessment can be made by examining three areas of basic brain function: eye opening, speech and movement. This is the basis of the **Glasgow Coma Scale (GCS)**.

- **Eye opening** is assessed by the question: “When does the patient open his eyes?” Scores are: spontaneously (4), when spoken to (3), when pain is applied (2) or not at all (1).
- **Speech** is assessed by how the patient responds to the stimulus. Scores are: orientated speech (5), confused speech (4), use of inappropriate words (3), incomprehensible sounds (2) and no vocalisation (1).
- **Movement** is assessed by the patient’s response to an external stimulus. Scores are: patient obeys commands to move limb (6), attempts to push away a

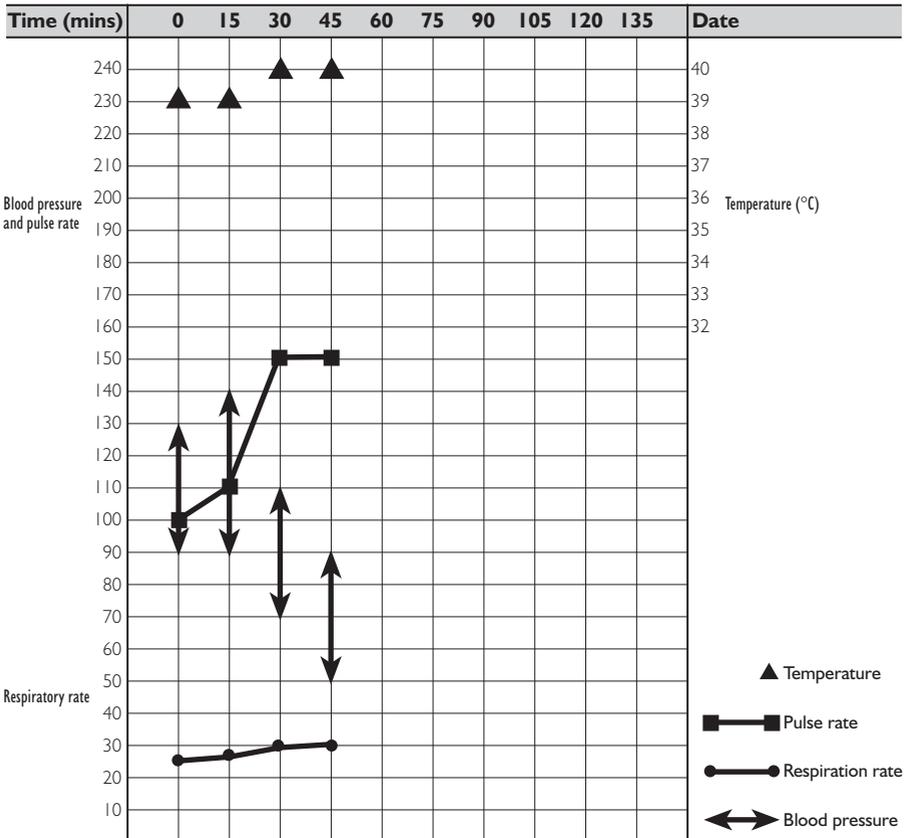


Figure 12.6 Vital signs chart (with example data)

Basic brain function	Level of response		Time (min)											
			0	15	30	45	60							
Eyes opening	4	Spontaneous												
	3	To speech												
	2	To pain	✓	✓										
	1	None												
Verbal response	5	Orientated												
	4	Confused		✓										
	3	Inappropriate words												
	2	Incomprehensible sounds	✓											
	1	None												
Motor response	6	Obeys commands												
	5	Localises to pain		✓										
	4	Flexion	✓											
	3	Abnormal flexion												
	2	Extension												
	1	None												
GCS SCORE			8	11										

Figure 12.7 *The Glasgow Coma Scale (GCS) chart*

painful stimulus (localises) (5), moves away from pain (withdraws) (4), the arms flex and the back bends forward in response to pain (flexion) (3), limbs straighten and the back arches to pain (extension) (2), no movement to pain (1).

Each response is given a number and the total score (out of 15) reflects the patient’s conscious level. Figure 12.7 shows a chart for recording these responses.

When assessing these basic brain functions increase the stimulus until a response is elicited. If there is no response to speaking, squeeze the shoulder. If this gets no response apply pain in one of the following ways, taking care not to aggravate any injury:

- Press the flat of a pencil firmly against a fingernail.
- Pinch the ear lobe between finger and thumb.
- Grind the knuckles on the breast bone.
- Squeeze the tendon at the back of the heel.

Deterioration is caused by bleeding, swelling or infection of the brain, and it will be picked up early only if regular observations are made. Deterioration is indicated by the following:

1. Deepening level of unconsciousness (a decreasing total score) on the Glasgow Coma Scale.
2. One pupil, possibly followed by the other, may become large and non-reactive to light (does not constrict). Fixed, dilated pupils are a characteristic and serious sign of the brain under pressure. The pupils should be round, equal in size and react with a brisk contraction when light is shone into the eye.
3. A slowing of the pulse rate, which follows a deepening unconscious level.
4. There is little change in the breathing pattern or blood pressure until very late. Deep rattling breathing and elevation of blood pressure are grave signs.
5. Rarely the temperature may become raised above 40°C.

Any decrease in the GCS (Glasgow Coma Scale) requires rapid evacuation and medical attention

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