CMScript

Member of a medical scheme?
Know your guaranteed benefits!

Issue 3A of 2014

In this issue of CMScript we focus on exposure to the elements. This is the first part of a two part series focusing on exposure to the elements. Conditions related to exposure to the elements are prescribed minimum benefit or PMB conditions. Medical schemes are required to fund the benefits prescribed in the Medical Schemes Act.

PART ONE:
Life threatening

If you have ever watched the television programme called *"I shouldn't be alive*" that aired on multiple networks in South Africa and around the world, you will know that exposure to the elements of nature can be life threatening.

The PMB regulations protect members against medical costs incurred as a result of such events. The regulations include cover for life-threatening conditions due to exposure to the elements, including hypothermia and hyperthermia. Life-threatening is defined as any condition that is harmful, destructive, or dangerous to human life.

What is included in the category?

The specific PMB category for these life-threatening conditions is very comprehensive and includes all types of exposure to the elements of nature. The conditions discussed in this two part article are, however, most common. The discussion of each element includes the type of pathology and radiology tests that must be funded as PMB level of care. Also included is information on the short- and long-term treatment that is included in the PMB cover.

Hypothermia and frostbite

Hypothermia is a low body temperature. It occurs when the body loses heat faster than it can produce heat. Normal body temperature is around 37°C but during hypothermia the body heat falls below 35°C.

If the body temperature drops your heart, nervous system and other organs cannot work properly. If the condition is not treated it can lead to complete failure of your heart and respiratory system and even to death. Seeking immediate medical attention is therefore critical.

Frostbite occurs when your body tissues freeze. Frostbite is most common in exposed skin such as the nose, ears, cheeks, exposed wrists, hands and feet. After the initial life threating aspects are excluded re-warming is the highest priority.

Hypothermia and frostbite may lead to a lack of oxygen supply to the body tissues that can ultimately result in death of the tissue (gangrene). It can also cause inflammation of the pancreas, fluid build-up in the lungs, pneumonia, dehydration, kidney failure and heart irregularities.

Infection can be another very serious complication of hypothermia and especially frostbite. Serious infection may spread into the blood (sepsis) and result in organ failure.

All degrees of frostbite can cause long-term disease of the nervous system (neuropathy) that may include sensitivity to cold, severe sweating, incorrect nail growth and numbness of the area.

Diagnosis

Pathology tests that will be performed in hypothermia include: arterial blood gasses to check the oxygen levels in the blood and oxygen that is available to the body tissue; electrolyte testing as the patient may be dehydrated; platelet count to check for clotting problems; and full blood count to check for elevated levels of white blood cells that may indicate an infection.

If there is hypoxia (decrease in the oxygen that reaches body tissue) a chest X-ray will be performed. If at any stage the patient lost consciousness or had changes in mental alertness, a CT scan of the head would be necessary. An electrocardiogram (ECG) to check the electrical functioning of the cardiac system should also be performed.

Treatment

Life threatening problems such as breathing difficulties need to be addressed first. Further heat loss should then be prevented and the patient gently warmed. The underlying cause of hypothermia is usually clear straight away (i.e. the individual has been exposed to cold or freezing conditions with inadequate protection from the elements) but there may also be contributing factors that should be considered. For example, people who are intoxicated may have fallen and sustained a head injury or people who suffer from diabetes may have collapsed with low blood sugar.

Rewarming to normal body temperature must be done under supervision of a medical professional because it may result in permanent low blood pressure and cardiac failure, especially in older people. The process of rewarming and thawing is very painful and narcotic pain medication is often given.

After rewarming, post-thaw care is undertaken to prevent infection and a continuing lack of oxygenation to the area. Dead tissue is removed and in cases of great risk plasminogen activator (an enzyme that helps reduce blood clots) may be given. A tetanus vaccine injection should be administered.

When deep frostbite has occurred, daily water therapy in a 40°C whirlpool bath may be given. This will help to remove dead tissue. Dead tissue may then be surgically removed and in very severe cases amputation of the limb may be required. Physical rehabilitation after surgery and amputation is included in the PMB cover.

Heat fatigue, heat exhaustion and heat stroke

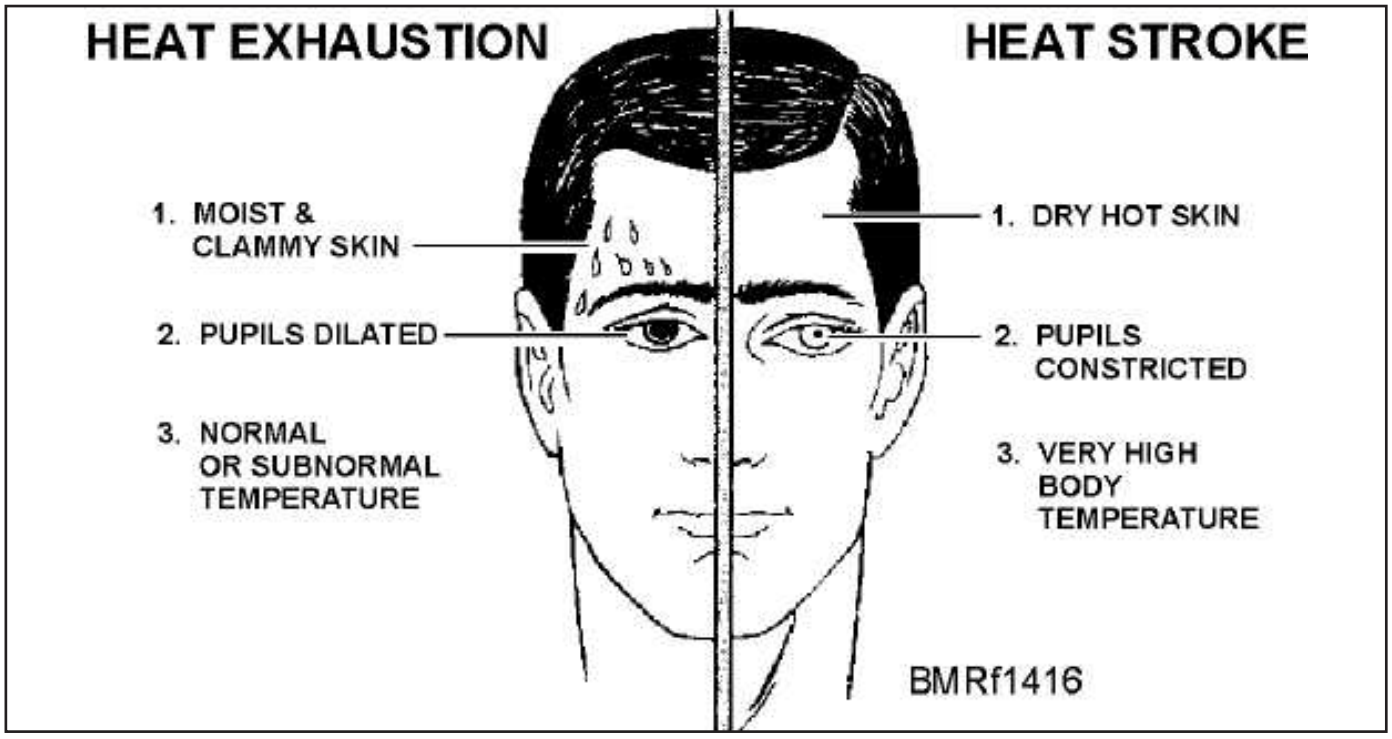
Heat fatigue occurs when your body cannot get rid of heat fast enough. Heat fatigue is a forerunner of the more serious conditions of heat exhaustion and ultimately heat stroke. Heat fatigue and heat exhaustion are not necessarily medical emergencies unless the patient shows signs of dehydration and electrolyte imbalance.

Heat stroke on the other hand is a medical emergency as your body's cooling system completely fails and it can even be fatal if it is not treated quickly and correctly. Your body temperature spirals out of control, sweating stops and you have changes in mental status such as confusion. You may also have seizures and go into a coma. Small children, elderly people, athletes and people who work outdoors are particularly at risk.

Heat stroke can potentially cause brain damage as the inability to sweat can lead to a build-up of fluid in the brain. This will cause increased pressure on the brain and if not treated rapidly it can lead to permanent brain damage. Fluids can also build-up in the lungs (pulmonary oedema) and cause acute respiratory failure. Fluid build-up in other organs may lead to kidney and heart failure.

Diagnoses

Pathology tests that will be performed include: arterial blood gasses and lactic acidosis to check if the patient's pH balance is correct; glucose monitoring to check for low blood sugar (hypoglycaemia); electrolyte testing for dehydration; liver function tests as liver injury commonly occurs in heat stroke; muscle function tests as Creatinine kinase (CK), lactate dehydrogenase (LDH), aldolase, and myoglobin are commonly released from muscles when muscle necrosis occurs; full blood count to check for elevated levels of white blood cells that may indicate an infection; platelet count; kidney function test as kidney failure may occur and



http://navyadvancement.tpub.com/14325/css/14325_407.htm

analysis of the cerebrospinal fluid. A chest X-ray will be performed to check for possible pulmonary oedema (fluid build-up in the lungs) and, if at any stage the patient lost consciousness or had changes in mental alertness, a CT scan of the head must be performed.

Treatment

Treatment is focused on rapid cooling the body as the outcome of heat stroke is directly linked to the duration of increased body temperature. Oxygen support may be provided and body fluid, electrolytes and glucose must be replaced with an intravenous infusion (drip). If there is a build-up of fluid, medication to assist the body in excreting the excessive fluid will be provided. Management of the heart, brain and kidney functions will be done with medicine such as anti-seizure drugs, diuretics and kidney dialysis.

Pressure illness

Air pressure injury

The human body performs best at sea level, where the atmospheric pressure is 101,325 Pa or 1013.25 millibars. The concentration of oxygen (O2) in sea-level air is 20.9% and this saturates the oxygen binding red pigment in the red blood cells (haemoglobin). Atmospheric pressure decreases the higher you go and when you reach altitudes of 2100m and higher the oxygen levels in your blood begin to drop. It is not the actual oxygen levels that decrease at high altitudes but the atmospheric pressure. This causes a decrease in the pressure of inhaled oxygen and subsequently the pressure for gas exchange in our bodies.

Travelling to high altitude regions can lead to medical problems, from the mild symptoms of acute mountain sickness to the potentially fatal high altitude pulmonary oedema (HAPE – a build up of fluid in the lungs) and high altitude cerebral oedema (HACE – a build up of fluid in the brain). The higher the altitude, the greater the risk of developing problems becomes. The highest mountain in Southern Africa stands at 3482m and is situated in Lesotho.

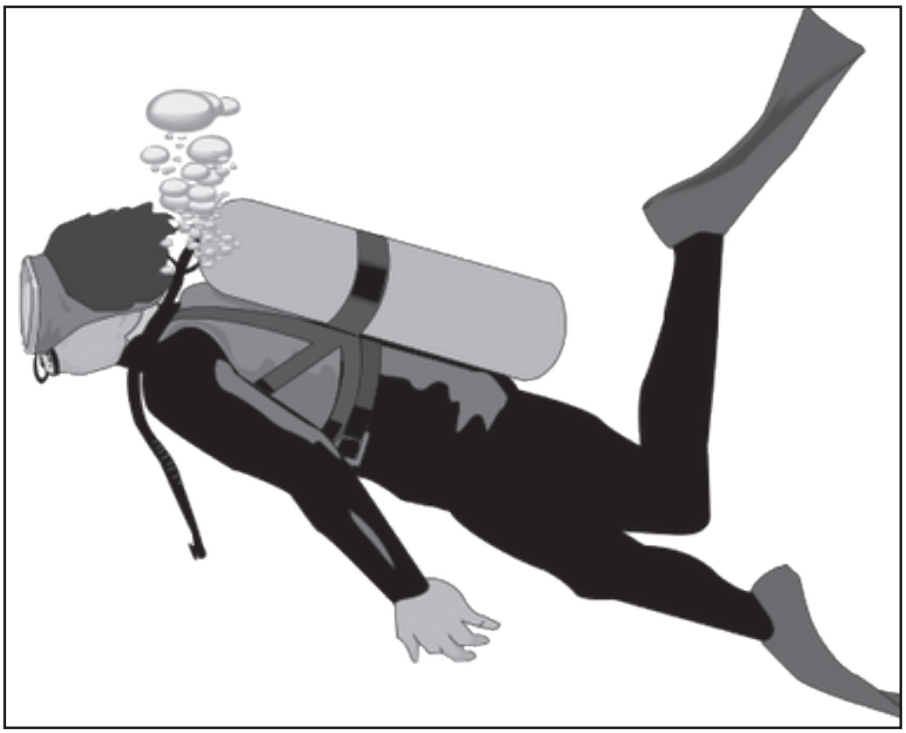
At higher altitudes your body makes adjustments and creates more red blood cells to carry oxygen through the bloodstream. This pushes air into areas of the lungs that are not normally used and produces a special enzyme that helps the oxygen found in haemoglobin make its way into body tissue.

High altitude also triggers an increase in our heartbeat, breathing and urination. Low humidity and air pressure at high altitudes causes moisture from your skin and lungs to evaporate at a faster pace and your body's increased exertion requires even more water to keep it hydrated. The patient may experience symptoms such as headache, dizziness, fatigue, shortness of breath, loss of appetite, nausea, disturbed sleep, and a general feeling of malaise. The main complications of altitude illness are HAPE and HACE. These complications are not common in South Africa and usually affect high altitude mountain climbers. Do take care if you plan on doing high altitude mountain climbing outside the borders of South Africa and remember that it is important to ensure that you have medical cover in case you develop altitude illness or suffer some other mishap.

Water pressure injury

Various activities that are popular in South Africa are associated with water pressure changes. These include scuba diving and cave diving. Ambient pressure is the pressure in the water around the diver. As a diver descends, the ambient pressure increases. At 10m in salt water, it is twice the normal pressure on land at sea level. At 40m (the recommended safety limit for recreational diving) it is five times the pressure at sea level.

Different types of illness result from increases in pressure, for example the descent during a scuba dive or the descent during a plane flight. Decompression sickness is the most well-known complication of scuba diving. It occurs when divers ascend too fast or without doing decompression stops and nitrogen bubbles are consequently formed in the blood and body tissues. These bubbles disrupt tissues in the joints, brain, spinal cord, lungs, and other organs. The con-



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dition may be mild but can also be life threatening in severe cases. It may present dramatically with shortness of breath, unconsciousness, seizures or paralysis. Paraplegia is not uncommon.

Arterial gas embolism (AGE) is a bolus of gas or air in the blood vessels specifically the arteries. It is a major cause of death in diving and can present in similar ways to arterial blockages seen in other medical situations. This may cause the patient to suffer a stroke with paralysis or numbness down one side, a heart attack or a pulmonary embolism with shortness of breath and chest pain.

Barotrauma is an injury caused by pressure effects on air spaces. This may occur during ascent or descent. The ears are the most commonly affected body part but the most serious injury is lung barotraumas, which can result in pneumothorax (presence of air or gas in the cavity between the lungs and the chest wall, causing collapse of the lung), pneumomediastinum (air in the area between the lungs), pneumopericardium (air in the membrane enclosing the heart, consisting of an outer fibrous layer and an inner double layer of serous membrane), subcutaneous emphysema (air gets into tissues under the skin) or arterial gas embolism. At the most extreme, barotrauma can cause ruptured eardrums, bleeding sinuses, exploding tooth cavities, and the lung injuries described above.

Diagnoses

There are not specific diagnostic tests for decompression sickness. Baseline blood tests are however valuable to monitor progress during hyperbaric oxygen therapy. If you are in shock that may lead to organ damage the pathology tests may include blood glucose levels, full blood count, electrolytes, creatinine levels and blood clotting levels.

A chest X-ray may be performed to check for injury to the lungs and heart such as pneumothorax, pneumomediastinum, pneumopericardium, subcutaneous emphysema, and arterial gas embolism. A CT scan of the head will be done if you do not respond to hyperbaric re-pressurisation. If any neurologic injury is suspected an MRI of the brain may be performed.

Treatment

Treatment includes administration of oxygen and intubation if breathing is difficult, intravenous replacement of fluid, treatment to prevent increased platelet forming and blood clots. Hyperbaric oxygen therapy must be provided as soon as possible to ensure re-pressurisation. Symptomatic treatment of nausea, vomiting and pain will be provided.

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PMBs

Prescribed minimum benefits (PMBs) are defined by law. They are the minimum level of diagnosis,treatment, and care that your medical scheme must cover – and it must pay for your PMB condition/s from its risk pool and in full. There are medical interventions available over and above those prescribed for PMB conditions but your scheme may choose not to pay for them. A designated service provider (DSP) is a healthcare provider (e.g. doctor, pharmacist, hospital) that is your medical scheme's first choice when you need treatment or care for a PMB condition. You can use a non-DSP voluntarily or involuntarily but be aware that when you choose to use a non-DSP, you may have to pay a portion of the bill as a co-payment. PMBs include 270 serious health conditions, any emergency condition, and 25 chronic diseases; they can be found on our website by accessing the link provided (www.medicalschemes.com/medical_schemes_pmb/index.htm).

The Communications Unit would like to thank Ronelle Smit for assisting with this edition of CMScript.
information@medicalschemes.com

Hotline: 0861 123 267
Fax: 012 430 7644