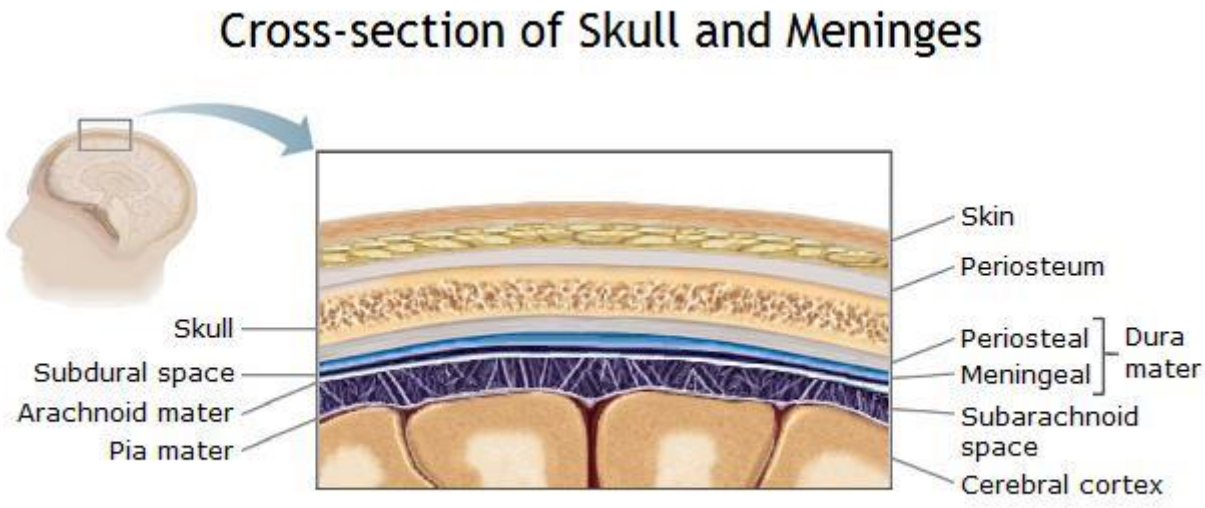
LexiMed
Medicolegal Specialists

Brain Haemorrhages

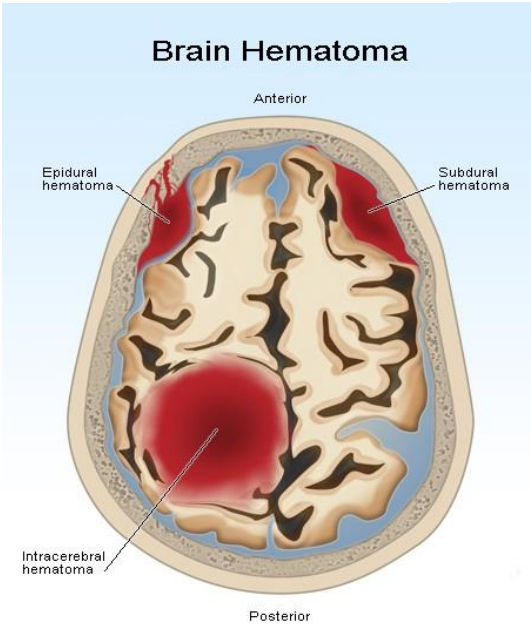
Brain Anatomy

To gain a better understanding of what can go wrong within the brain it is essential to know what occurs and what it looks like when it is functioning normally. This week we are looking at the layers of the brain rather than the areas.

The diagram below shows the layers of the brain from the scalp to the cerebral cortex. Bleeding can occur in any of these layers.



A brain haemorrhage involves bleeding in the brain, resulting in an expanding mass of blood that damages surrounding neural tissue. If left unchecked the haemorrhage will expand causing more widespread brain damage by killing off surrounding brain tissue. The pressure build up caused by blood is also a big problem. The haemorrhage is eventually stopped by one or both of the following factors: the blood clotting, or pressure cutting off the blood supply.



Bleeding can occur in the brain itself or between the layers covering the brain, known as the meninges. Causes of brain haemorrhages include the following:

- hypertension, or high blood pressure induced vascular damage;
- a ruptured aneurysm, this is a weakening in a blood vessel wall that swells. It can burst and bleed into the brain, leading to a stroke;
- head trauma;
- diseases that result in a direct or indirect risk of uncontrolled bleeding;
- an unintended result from the use of anticoagulant, anti clotting or thrombolytic, clot dissolving, drugs for other conditions;

- haemorrhage into brain tumours; and
- long term alcohol abuse.

Intracerebral Haematoma	The cerebrum is the largest and most developmentally advanced portion of the brain. It controls a number of higher functions including speech, emotion, the integration of sensory stimuli, initiation of the final common pathways for movement, and fine control of movement. Due to it being the most diverse part of the brain in terms of function, damage to the cerebrum can have far reaching consequences, and can ultimately be fatal. Cerebral haematomas can occur anywhere in the cerebrum, otherwise known as the grey matter.
Subdural Haematoma	Subdural haematomas are divided into acute, subacute, and chronic, depending on their speed of onset. Acute subdural haematomas that are due to trauma are the most lethal of all head injuries and have a high mortality rate if they are not rapidly treated with surgical decompression. Blood gathers within the outermost meningeal layer, between the dura mater, which adheres to the skull, and the arachnoid mater enveloping the brain.
Epidural Haematoma	An epidural or extradural haematoma is a type of traumatic brain injury in which a build up of blood occurs between the dura mater, which is the tough outer membrane of the central nervous system, and the skull. The dura mater also covers the spine, therefore epidural bleeds may also occur in the spinal column.

Prognosis

The prognosis is not good if the bleed is large in size or if the individual is already in a coma when arriving at the emergency room. For those who survive the initial haemorrhage, consciousness gradually returns as the blood is re-absorbed and neurological function resumes. More than twenty thousand people die of intracerebral haematomas each year. Intracerebral haemorrhages result in a mortality rate of approximately 44% within thirty days, half of those deaths happen within the first forty eight to seventy two hours. The prognosis for intracerebral haemorrhages involving the brainstem is not good, with 75% of individuals dying within twenty four hours of the incident.

The prognosis following an epidural haematoma depends upon the individual's status prior to surgery and ranges from a 0% mortality rate for individuals who are alert and awake to a 20% mortality rate for those that are comatose. Epidural haemorrhages caused by arterial bleeding have a death rate ranging from 5% to 50%.

The outlook following a subdural hematoma varies widely depending on the type and location of the head injury, the size of the blood collection, and how quickly treatment is obtained. Acute subdural haematomas present the greatest challenge, with high rates of death and injury. Chronic subdural haematomas have better outcomes in most cases, with symptoms often going away after the blood collection is drained. A period of rehabilitation is sometimes needed to assist the person back to his or her usual level of functioning.

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