SYNAPSE
AUSTRALIA'S BRAIN INJURY ORGANISATION

Infections and Diseases

Infections that cause swelling in the brain or the membrane that surrounds the brain and spinal cord (meninges) can result in acquired brain injury (ABI).

In this article

Encephalitis

Encephalitis refers to inflammation of the brain, usually caused by a virus and occasionally through bacteria, fungi or parasites.
Another type of encephalitis known as autoimmune encephalitis occurs when a person's immune system mistakenly attacks the brain. Viruses common to infectious encephalitis include herpes, tick-borne and enteroviruses. Symptoms of encephalitis can be similar to the flu and include headache, high temperature, light sensitivity, neck stiffness, difficulty with speech and movement, sensory changes and changes to behaviour.
The infection can damage and destroy nerve cells, causing injury to various parts of the brain. The effects can include:

• difficulty with memory and concentration
• difficulty with balance and control of bodily function and movement
• difficulty with speech and language
• headaches and fatigue
• sensory changes
• epilepsy
• changes to mood and behaviour.

Meningitis

Meningitis refers to inflammation of the protective membrane that surrounds the brain and spinal cord (meninges). The cause of infection is usually a virus or bacteria, and occasionally fungi, parasites and protozoa. Physical head and spine injuries or medication can also cause meningitis.

Viral and bacterial meningitis both start with flu-like symptoms, but while most people recover easily from viral meningitis with rest and plenty of fluids, bacterial meningitis can be life-threatening and requires urgent medical attention.
Symptoms include headaches, high temperature, light sensitivity, confusion and seizures.
There are many kinds of bacteria that potentially cause meningitis, some of which can be prevented through vaccines. Types of bacteria include:
• meningococcal
• pneumococcal
• heamophilus influenza type b (Hib)
• streptococcal
• E.coli
• listeria
• salmonella
• tuberculosis.
The long-term effects of meningitis can include:
• problems with memory and concentration
• hearing loss
• blurred vision or blindness
• difficulty with speech
• difficulty with balance and coordination
• dizziness
• kidney damage.

Brain abscess

Brain abscesses can develop from infections elsewhere in the body or when bacteria or fungi enter the brain via physical injury or surgery.

They are an immune response to infections or foreign objects, whereby a capsule is formed around infectious pus to prevent it from spreading.

As an abscess develops, it can put pressure on surrounding brain tissue and damage or kill brain cells, causing brain injury. Scarring from surgery to drain and remove abscesses can also lead to localised brain injury.
The three ways infection can spread to the brain are:
• nearby infections (e.g. sinusitis, infected teeth, middle ear infection, infection of the bone behind the ear)
• infections in other parts of the body (e.g. heart, lung, skin, bowel and pelvic infections)
• infection in the brain via physical damage from foreign objects (e.g. bullet, shrapnel) or a wound that penetrates the brain, including surgery.
Brain abscesses are rare and the further likelihood of acquiring a brain injury even rarer. Long-term effects can include changes to brain function, personality and seizures. Although they can be life threatening, most people make a good recovery if treated early. Treatment is usually a combination of surgery and antibiotic or antifungal medication.

Hydrocephalus

Hydrocephalus occurs when the fluid that cushions the brain and spinal cords builds up inside cavities in the brain called ventricles. The ventricles expand, putting pressure on brain tissue and potentially causing brain injury.

Cerebrospinal fluid (CSF) normally protects the brain by acting as a shock absorber, providing nutrients, eliminating waste and regulating the amount of blood in the brain. It is constantly being replenished as it flows through the ventricles and is removed by being absorbed into the bloodstream.

Hydrocephalus can be genetic and present at birth (congenital) or develop after birth (acquired). Neural tube defect (NTD), or spina bifida, is one of several possible causes of congenital hydrocephalus. Acquired hydrocephalus also has many causes, including traumatic brain injury (TBI).

Hydrocephalus is further defined as non-communicating and communicating:
• Non-communicating hydrocephalus occurs when the flow of CSF is blocked by an obstruction as it travels along passages between ventricles. Possible causes include brain tumour, traumatic brain injury and infection (e.g. brain abscess, bacterial meningitis).
• Communicating hydrocephalus occurs when CSF cannot properly reabsorb into the bloodstream after it leaves the ventricles.
The conditions Hydrocephalus Ex-Vacuo and Normal Pressure Hydrocephalus are examples of this.

The effects of hydrocephalus are varied according to the particular type, a person's age and stage of treatment. They can include:
• learning difficulty
• problems with coordination
• difficulty with speech and language
• visual problems
• seizures.

The main form of treatment is to implant a shunt to direct CSF to a part of the body where it can be absorbed in the bloodstream, including a valve to regulate pressure. Early diagnosis and treatment is important to effectively control hydrocephalus.

References and further information

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