MIND your BODY

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Cover Story

Head injuries can range from a minor bump to a fatal blow like what caused the death of actress Natasha Richardson in a skiing incident. Learning to recognise a serious head injury and getting help early can save a person's life

PHOTO: REUTERS

Almost every newspaper and news website had specialist comments and diagrams about fatal brain injuries following Natasha Richardson's death last Wednesday.

The British actress (right), 45, had fallen on a beginners' ski slope in Canada two days earlier. Although she appeared well and was talking after the fall, she complained of a severe headache an hour later, was taken to hospital and died two days later from bleeding near the brain.

It was a shocking case,mainly because it underscores a chilling fact.

Seemingly simple head injuries can kill.

This is because the initial damage from serious head injuries is irreversible, said Dr Tang Kok Kee, a neurosurgeon at Mount Elizabeth Medical Centre.

However, seeking medical help early can help prevent the damage from escalating.

Close monitoring of the patient in the first 24 to 48 hours is crucial in spotting any signs of major damage, said Dr Tang.

Major damage can manifest itself in several ways. Blood vessels rupture. Nerve fibres tear. The skull fractures. The brain is flung against the hard skull, resulting in bruises known as brain contusions.

"What doctors do is to prevent the cascade of life-threatening events from happening as a result of the initial damage," he said.

"For instance, if a brain scan reveals bleeding, we will try to remove the blood clot through surgery before it grows bigger," he said. "Otherwise, blood supply to the brain will be cut off, resulting in brain death."

What happened to Richardson was brain death from bleeding. Neurologists said that hers was a classic case of the "talk and die" syndrome.

Only about 10 to 20% of those who survive severe head injuries recover fully

This is a condition where patients are well and talking after the incident but deteriorate rapidly, resulting in death, said Professor Yeo Tseng Tsai, a senior consultant at the division of neurosurgery at National University Hospital.

The usual causes are delayed bleeding or swelling of the brain due to cerebrospinal fluid accumulation, he said.

Autopsy results confirmed that the actress died of an epidural hematoma, where a torn blood vessel caused blood to gradually pool between the brain and the skull, forming a clot.

Bleeding and swelling increase pressure within the skull and

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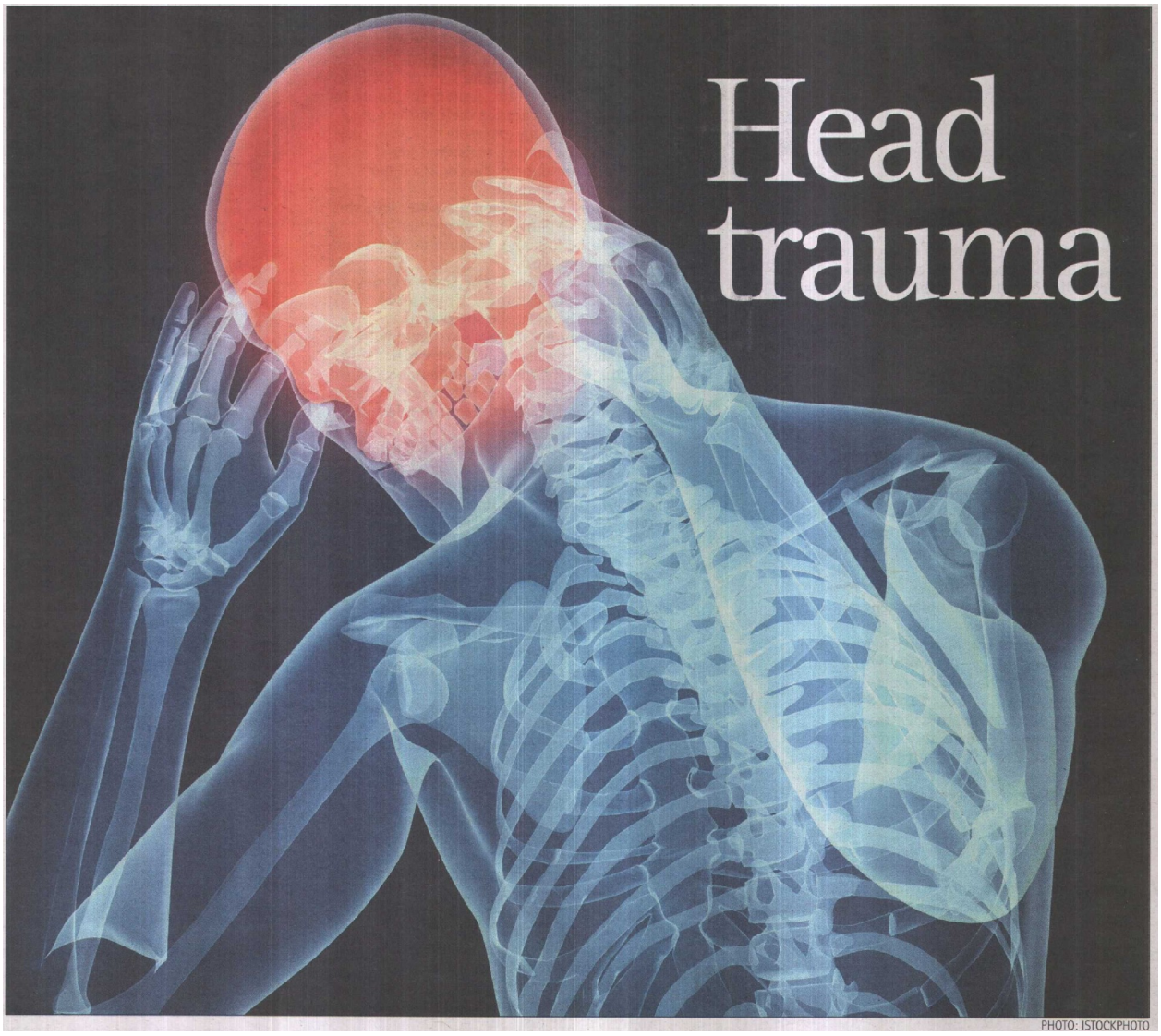

PHOTO: ISTOCKPHOTO

this is potentially fatal, said Prof Yeo. This is because the skull is an enclosed cavity that has little room for excess fluids. When that happens, the brain gets "pushed" against the skull.

In the "talk and die" syndrome, the patient's deterioration can range from several hours to several days, depending on the rate of bleeding or swelling of the brain, said Prof Yeo.

"Most of the time, the patient dies within a few days after sustaining the injury, or goes into a coma," he said. "Only about 10 to 20 per cent of those who survive severe head injuries recover fully."

The rest usually remain in a vegetative state.

However, people above 50 years old may take several months to feel any ill effects from a mild blow caused by, for example, a fall at home.

"As one grows older, brain atrophy occurs," said Dr Tang. "The brain loses volume and there is now more empty space in the skull."

Hence, a longer time is needed for the swelling and bleeding to push the intracranial pressure to breaking point. The bad thing is, the longer the delay, the worse the problem may get, he said. Besides, an atrophic brain is also more susceptible to head injuries.

"Imagine a small ball in a big box," said Dr Tang. "Even if you shake the box gently, the ball hits the wall of the box with significant impact, as compared to a bigger ball, which does not move around as much."

Severe head injuries can therefore occur without direct impact or any visible bruising, said Associate Professor Christopher Ang, a consultant neurosurgeon at the National Neuroscience Institute.

"Severe rotational or translational – side to side – forces caused by violent shaking motions can result in very severe head injury without visible bruising on the scalp," said Prof Ang.

A common scenario is when one brakes suddenly while driving. The head stops moving but the brain is thrown back and forth against the skull, added Dr Tang.

Rotational forces can also result in chronic brain injury known as the "shaken boxer syndrome". It commonly affects boxers, as well as some football and rugby players, as they

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often sustain repeated blows to the head.

"This syndrome is a result of multiple small shocks to the brain and can take years to develop," said Prof Yeo. The blows are not strong enough to cause bleeding and death but long-term damage such as decreased mental abilities are likely. A famous example is boxer Muhammad Ali, who upon retiring was diagnosed with Parkinson's disease, a neurological disorder.

Treatment options vary according to the extent of damage revealed in the CT scan. For severe head injuries, drugs to control brain swelling may be given. If there is a large blood clot or severe brain swelling, surgery is needed to remove the clot and part of the skull bone to relieve pressure.

While most head injuries are harmless, one should seek medical help if there are symptoms such as headaches, nausea, vomiting, changes in consciousness, speech problems and weakness of the limbs.

"These symptoms indicate a build-up of pressure within the skull," said Dr Tang.

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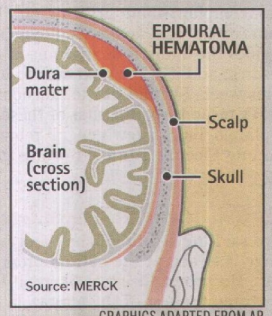
TYPES OF HEAD INJURIES

1 **CONCUSSION:** It is the most common type of head injury. Also known as a mild traumatic brain injury, a concussion is characterised by a temporary loss of brain function, such as memory loss. In severe cases, the effects may be long-term. It is usually caused by significant blunt force trauma. The brain is thus jarred or shaken. However, bleeding in the brain or under the skull does not occur in a concussion.

2 **HEMATOMA:** It is a build-up of blood that later clots to form a bump, either within or outside the skull. An epidural hematoma occurs between the skull and the dura – the outermost layer of the membrane that encloses the brain. Bleeding usually stems from ruptured arteries. In most cases of epidural bleeding, the skull is fractured as well.



GRAPHICS ADAPTED FROM AP

A subdural hematoma is a collection of blood in the space between the dura and the middle layers of the covering of the brain. Often, it is caused by torn, bleeding veins on the inside of the dura.

3 **SKULL FRACTURE:** This is when the skull bone cracks. Broken edges may tear into blood vessels, causing bleeding.

4 **CONTUSION:** This refers to bruising of the brain tissue. It can be caused by sudden acceleration or deceleration – the head stops but the brain continues to move due to inertia. This causes the brain to collide with the inside of the skull, causing injury to the soft brain tissue. Bleeding occurs, which leads to swelling of the brain.

Symptoms

Most of the head injuries people experience every day are not life-threatening. However, you may want to seek medical help if you experience unexplainable headaches or nausea after hitting your head.
Here is what to look out for:

- Persistent and severe headaches that get worse with time.
- Nausea and vomiting that do not go away.
- Unexplained drowsiness.
- Double vision.
- Behavioural changes, like confusion and irritability.
- Numbness in arms or legs.
- Loss of consciousness.
- Seizures.

Source: Various websites