



Winter 2011

## **Scenario:**

### **The Story** (as told by Mark Woods - Peak Safety):

In September 2007 I was part of the rescue team that extracted William Pike from Dome Shelter on Mt Ruapehu. He was trapped in the hut following an eruption. We travelled on snow grooming machines to site as helicopters would not fly due to the risk of ash in their turbines.

My role in the rescue was medical management.

When the team arrived on site it was around midnight, very cold and clear.

There was a lot of mud and rocks around and a layer of black ash mixed into the snow covered the building but the door opened inwards quite easily.

### **Initially the patient presented with:**

He was sitting up, leaning against the wall with his leg buried to the knee. The mud, rocks and water ejected from the crater had filled the hut and the patient's leg was encased in this material. It had frozen solid and set like concrete.

As soon as the rescuers opened the door he collapsed onto his side. \*1 (see 'Key Learning' below)

We were working in a confined space and assessed the patient as best we could. He made a few mumbling noises but had no detectable pulse. A secondary survey was performed looking for any major injuries. This revealed that the leg that was not trapped in the frozen mud was significantly injured with obvious deformity. Nothing else obvious was noted.

### **What are your initial concerns for this patient?**

### **What do you suspect is happening to the patient now?**

### **What actually happened next?**

Another rescuer squeezed into the small space and began digging around the patient's trapped leg using the crowbar to remove rocks. The patient's airway was managed as best as possible and oxygen was applied via a non-rebreather mask.

After approximately 15 minutes the trapped leg was cleared of debris and the injuries assessed. It was totally shattered. Large chunks of bone fell out of a gaping wound on the lower leg. The leg was massively deformed with the foot dangling at a grotesque angle. Mud and ash packed the wounds. There was no active bleeding at this time, but he had obviously lost a moderate amount of blood. His leg was splinted but not dressed at this stage.

The patient had been doused with water four hours ago and the temperature was about minus 12 degrees at this altitude. He was severely hypothermic.

Outside the hut, the other team members had readied the stretcher and had dug out a trench to slide it in. The patient was put into the stretcher as carefully as possible. Due to the limited space there were only 3 team members to lift so it wasn't as smooth as it could have been.\*2

The stretcher was secured onto the snow cat which then began descending. It was now possible to perform more thorough assessment and treatment. The stretcher had been lined with a down sleeping bag to protect the patient. His wet clothes were cut off to allow a good examination.

The machine was noisy and it was hard to look for signs of life. At this stage none at all that could be found. It appeared that he would not survive the ride down the mountain. He had no pulse. No stimuli roused him. His temperature was taken in his ear (tympanic) it was 24 degrees C. His flesh was waxy and lifeless. His pupils had become fixed and dilated.

He certainly met the criteria to begin CPR. However, the team were acutely aware that he may well still have a heartbeat and not actually need CPR. A lot of time was spent assessing him for any signs of life before committing to CPR.

After about three or four minutes a rapid shallow breathing was detected. We normally breathe at about 12 – 20 breaths per minute but he was breathing at 30 breaths per minute. They were very shallow, barely detectable breaths.\*3

Better airway management was attempted with an OP Airway. The inside of his mouth, normally a nice pink colour, was a deep blue colour and really cold to the touch. His jaw was rigid and couldn't be opened enough to get the airway in.

The only encouraging thing was the breathing. A Bag Valve Mask was used to try and get 100% oxygen into him.

It took around fifteen minutes or so before the snow cat arrived at the base of the ski area where the patient was transferred to an ambulance.

Once in the ambulance the rescue team did a handover to the paramedic. IV access was gained and his leg re-packaged. His wounds were dressed and his other leg splinted. He was wrapped in foil blankets and woollen blankets placed around his head and neck. We also had hot water bottles around his abdomen.

At Whakapapa Village, 6km down the road, heated IV fluids were picked up. These had been warmed in the microwave oven.

The ambulance continued driving to National Park, which was as close as the helicopters were prepared to come. It was around 2am. It had taken four hours from the time of the eruption to getting the patient out of the hut and a further two hours to get him into a helicopter that could get him to a hospital that could provide him with the definitive care that he needed

### **Key Lessons**

\*1. There is a bit of a phenomenon whereby people in need of rescue manage to hold themselves together against all odds, but when the rescue team arrive they relax, and inadvertently succumb to the elements and perish. It appeared this may be the case with this patient.

\*2. The ideal treatment for an unconscious hypothermic patient is to handle them extremely gently. Any vigorous movement can cause the patient's heart to go into ventricular fibrillation. All of this was considered but the only viable option was to just pick him up and place him in a stretcher and get him out of there as quickly as possible.

\*3. The rapid shallow breathing made no sense to the rescue team. When a person is hypothermic all of their vital signs slow down and eventually stop. This was the only sign of life detected once the patient was out of the hut. We later learnt that the rapid breathing was probably caused by acidosis from having his leg trapped for such a long time without blood flow. This in turn caused the bad toxins to develop in the leg. His limb was essentially dying when it was released and some of the toxins would have gone into the rest of his blood stream.