

The Management of Spinal Injuries in Water

By Dr. R. T. Southwood

THE TYPES of spinal injury from water accidents are fairly clear-cut, and fortunately or unfortunately, nearly all of them occur in the mid-cervical region around the fifth and sixth cervical vertebrae of the neck. Dr. David Burke, in Victoria, recently analysed 52 cases seen there over about eight summers and found that 51 of them were in the cervical spine. Hence, for practical purposes we can ignore injuries elsewhere in the spine.

The cause is commonly a dive or fall head-first into shallow water, or into an obstruction. The victim drops head-first on to the floor of the pool, or onto some hidden obstruction which generally causes a crushing of the bone.

The spine is represented diagrammatically in Fig. 1 with vertical lines showing the vital spinal cord and nerve roots situated immediately behind. When force is applied directly to the neck, the bones in the middle part of the spine tend to be crushed and squeezed aside (Fig. 2). Those going forward do very little harm, but those bearing backwards do enormous harm to the spinal cord and its roots. This effect is not infrequently combined with a shearing force at the break which produces similar damage by shearing the top forwards from the bottom.

If we consider the damaging force involved we may understand why this damage is so severe. When our victim is falling on to his head, the force behind him is his body weight—in an adult 100 or 200 lb.—dropping from a height of 10 or 20 feet (equivalent, in the old days of bagging wheat, to dropping a bag on the top of your head from the stack). This is quite a considerable force and it is not surprising that the damage is so severe. The result is a bony injury which is relatively minor when compared to the neurological damage sustained.

Firstly, the most important damage is respiratory paralysis from the cutting of most of the nerves to the important muscles of the respiration. Secondly, paralysis of the limbs, and, in the same context, paralysis of the bladder and bowel. Thirdly, neurological damage must be thought of in relation to the head striking an immovable object—the patient may be severely concussed or completely knocked out. Fortunately, in diving accidents, as opposed to motor accidents, other injuries to the limbs are relatively rare.

RECOGNITION

How do you recognise this damage? It is really a matter of common sense. There is obvious distress and helplessness in the water, and it is most obvious when the patient is unconscious or completely paralysed.

With less severity there would be the inability to move the arms and legs, but the victim is still conscious and talking. Of less severity again, but still of importance, the patient is moving but complaining of severe neck or back pain, or weakness in any of the limbs.

Lastly, in treatment, the guiding principle is, "first to do no harm". If there is no respiratory distress but only the complaint of pain or inability to move, steady the head in line with the trunk until help arrives. Do not try to shift the patient by yourself. Maintain life and do not increase the damage. When help arrives, remove the patient from the water keeping the head in line with the trunk, and maintain a steady pull on the neck.

If there is respiratory distress, or if the patient is unconscious, the situation becomes more urgent and it may be necessary to tackle the rescue alone or with only one helper. It is vital to remove the patient from the water and commence resuscitation as quickly as possible.

I think that the board has some merit but I wonder if the use of the helpers themselves would not be more appropriately directed to giving better control of the head and trunk. Control of the head, as opposed to lifting under the armpits, is essential since the whole principle of transport of a cervical spine injury is to maintain the head in the right relationship to the trunk. Little harm will be done by exerting traction on the head; as you have seen from the diagram, the injury is mainly one of compression. When distracting the spine you are helping the bone to regain their original position and are thus relieving the pressure on the spinal cord.

CANDIAN METHODS

The Candian methods, mentioned briefly, sound to have a great deal of merit and I suggest that they should be looked into carefully.

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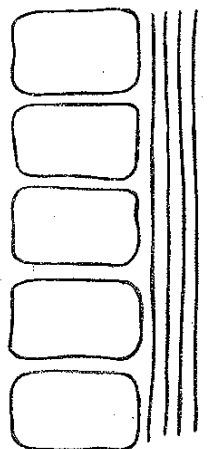


Fig. 1

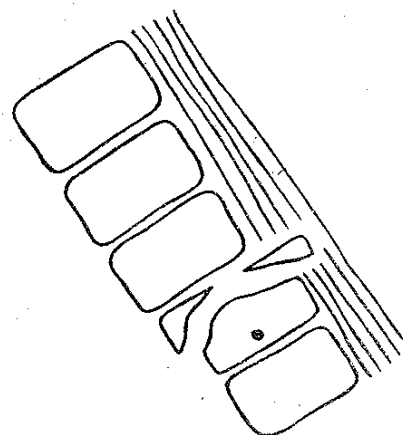


Fig. 2