ABC of Spinal Cord Injury

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NURSING

Nursing aims

- Prevent complications
- Maximise functional recovery
- Support patients and relatives
- Educate patients and relatives

The major objectives in caring for people with spinal cord injuries are to: (a) prevent secondary complications; (b) facilitate maximal functional recovery for each individual; (c) support the individual and his family while they adjust to his changed physical status and in doing so to maintain his self esteem; (d) educate the patient and his relatives in all aspects of the care needed to maintain his well being.

The organisation of nursing in a spinal injuries unit must recognise that the patient will spend a long time in hospital—probably 4-12 months, that most patients are aged 15-35, and that most are men (4:1 men to women). Patients will initially be highly dependent on others and in those with high lesions this dependence will continue; they will suffer considerably, and many will have a disappointing level of neurological recovery.

These factors contribute to the establishing of very close and supportive relationships between staff and patients, with blurring of the professional-personal roles and consequent increase in stress for staff. Therefore there must be good team work and adequate staffing levels.

The psychological trauma of spinal cord injury is profound, prolonged, and individual. Fear, worsened by sensory deprivation, may initially be considerable and may continue in some degree for many months. During the acute phase, when the patient is confined to bed, he may experience a wide variety of swings in mood, including anger, depression, and euphoria. He will suffer from a sense of frustration and sometimes be withdrawn. Patients tend to accept a prognosis of non-recovery only gradually, but lack of information causes more distress than honest information gently given. Relatives often progress to acceptance much more quickly than the patients themselves, and this may complicate planning for the future. Long term decisions must not be taken before the patient is able and willing to participate.

There are landmarks in rehabilitation that are especially stressful. Being mobilised from bed to wheelchair is one, with its combination of blood pressure instability, physical exhaustion, and the shock of coming to terms with a new body image.

The first public outing after injury and visits to home and friends are all major psychological and physical hurdles. Patients must be prepared for these events and supported through them—initially by staff from the unit with whom they feel safe, and later by their family and friends. Discharge from hospital is a considerable challenge, with the patient and his family having to cope with tiredness, loneliness and isolation, and the changed relationships caused by the injury.

Continuing support will be needed for at least two to three years while the patient adjusts to his or her changed lifestyle and learns to accept it.

Nursing management

Pressure relief in the accident and emergency department

- Remove all clothing
- Thick firm mattress
- Lift half hourly

In the accident and emergency department

The spine must be kept straight and well supported, never flexed. If a cervical spine injury is suspected the neck should be immobilised using a soft collar with sandbags on each side of the head. All clothing is removed to allow full examination and prevent damage to skin. A patient with major trauma is normally placed on a trauma trolley with a hard board under the mattress in case resuscitation is necessary, but once a spinal cord injury has been diagnosed care of the pressure areas is extremely important. If delay in admission to the ward is expected the patient should ideally be transferred to a thicker mattress (at least 7 inches thick) and straight lifting performed for one minute every half hour.

Posturing

- Support injured spine
- Maintain limbs and joints in functional position
- Relieve pressure

In the ward

Posturing—Regular position changing, skin inspection, and posturing of limbs are essential for a patient with spinal cord injury. The aims are simple: (a) to support the injured spine in a good healing position; (b) to maintain limbs and joints in a functional position, thus avoiding deformity and contractures and reducing the incidence of spasticity; and (c) relieve pressure.

There are many ways of achieving these aims so the method chosen should suit the patient and the availability and skill of the nursing staff.

Choice of bed—The standard King's Fund bed or a profiling bed with a 7" mattress is suitable for most patients and is probably the bed of choice for tetraplegic patients, enabling good positioning of the shoulders and arms. It needs a trained turning team of nurses. The Egerton-Stoke Mandeville electric turning bed is particularly suitable for heavy patients, paraplegic patients, and those with multiple injuries; it allows easier nursing but still requires a trained team and frequent inspection of pressure points and natal cleft. A Stryker frame, in which turning can be managed with fewer staff, is useful for patients undergoing spinal surgery and for the transfer of patients between hospitals.

Pillow packs are useful for the patient with marked skin or a pressure sore, but their use requires a generous supply of good quality pillows and a skilled lifting team, since it is difficult to maintain a good posture on pillows in the acutely injured patient.

Lifts and turns

(1) Neck hold with nurse's wrists supporting the head and her hands the neck.

Straight lifting is used for transferring patients and lifting them to the side of the bed for nursing care. (1) The head nurse holds the neck and head with both hands under the neck and both wrists supporting the patient's head under the ears. (2) The lifters' arms are inserted one at a time, starting at the top of the patient, with counter pressure from the other side to prevent movement of the injured spine. Once the nurses' arms are in position (3) the patient may be lifted (4). After the lift (5) arms are withdrawn in the reverse order, one of the team applying counter traction by placing her/his arms across the patient.

(2) Inserting arms under patient with counterpressure to prevent movement of the spine.

(3) Ready for a straight lift.

(4) Straight lift.

(5) Withdrawing arms from under patient, with countertraction to prevent movement of spine.

(6) Preparing to log roll the patient.

(7) Completed log roll, patient in lateral position.

(8) Preparing for pelvic twist.

(9) Pelvic twist completed.

(10) Pelvic twist completed: side view of patient showing folded pillows to maintain position—sacrum free of pressure.

Note: In all lifts and turns the person holding the head is in charge of the timing and coordination of the team. The frequency of turns is determined by the patient's tolerance, usually two to three hours initially, but with increasing intervals as long as no marking occurs. By the time the patient is discharged it is hoped that turning at night will not be needed.

A *log roll turn* is needed for carrying out nursing care and for lateral positioning of both paraplegic and tetraplegic patients. The illustration shows how the patient should be held (6). Note that the injury site is well supported, with the lumbar pillow remaining in situ. When the log roll is complete (7) the patient remains supported by pillows, particularly in the lumbar curve. Note also the alignment of the shoulder, hip and iliac crest, and upper leg.

The *pelvic twist* is a simple turn, needing only three nurses to perform, and suitable for many tetraplegic patients. It must not be used in thoracolumbar lesions. The nurse at the patient's head holds the shoulders securely on to the bed; another nurse supports the legs and on completion of the turn places two pillows under the upper leg and a folded one in the lumbar region to support the pelvis (8). The movement is a gentle lift and turn of the near hip joint, enough to free the sacrum of any pressure (9 and 10).

Care of the limbs

Heel is free of pressure and ankle dorsiflexed at 90°.

Legs—When the patient is supine: (a) avoid hyperextension of the knees; (b) keep the feet in line with the hips; and (c) hold the foot at 90° using foot boards and pillows, avoiding pressure on the heels. When the patient is on his side (a) the lower leg should be extended and (b) the upper leg should be slightly flexed, lying on a pillow and not over the lower leg.

The arms—When the tetraplegic patient is supine the joints need to be placed in a full range of positions and the hands and arms must always be supported. When the patient is lying on his side both arms should be positioned forward and supported on pillows. The underlying shoulder is protected from pressure by being pulled gently forward or by an axillary pillow, or both.

Skin and pressure

Skin and pressure

- Examine and relieve pressure regularly
- Keep clean
- Avoid damage
- Treat minor abrasions/injuries

Skin cleanliness is fundamental and good long term arrangements for bathing or showering must be made. "Minor" skin infections should be treated and fingernails and toenails cared for. Patients must be taught about the hazards of sensory loss and the need to inspect their skin and extremities regularly. They must be taught to be conscious of pressure, and must understand that the risk of pressure sores is increased during periods of physical or emotional stress, depression, tiredness, and intercurrent illnesses.

Bladder management

Fluid balance

Intermittent catheterisation

Aim: Output not greater than 500 ml over 6 hours

Note If volume more than 600 ml reduce intake or perform more frequent catheterisation

Suprapubic catheterisation

Aim: Output of at least 3 litres/day

Note To maintain capacity clamp catheter daily to achieve a volume of 300 ml

Indwelling catheter

Aim: Output of at least 3 litres/day

Note To maintain capacity clamp catheter daily, to achieve volume of 300 ml

The management of the bladder is concerned, firstly, with preventing urinary tract infection. This is an extreme challenge in the neuropathic bladder, and a strict aseptic technique is vital. Careful handwashing between patients, the use of gloves when emptying drainage bags, the use of a "link up" drainage system are all part of good practice. Perineal toilet using soap and water, particularly after bowel evacuation, will reduce pathogenic skin flora.

Care of the bladder includes performing catheterisations and bladder washouts. These techniques can be ably managed by the nursing staff, but a specific training programme is required. It also includes managing the fluid balance appropriate to the individual—for example, fluid restriction during intermittent catheterisation to prevent overdistension of the bladder, or high fluid intake in the patient with an indwelling catheter to minimise the danger of infection and calculus formation. Finally, nurses can help in educating the patient to understand his bladder, to recognise when something is wrong, and to teach him how to order and care for his appliances. Thus at an early stage through this understanding the patient can begin to manage his own bladder and fluid balance.

Achieving continence in women presents a greater problem. Self intermittent catheterisation is the method of choice, if this is possible and practicable, but careful control of fluids and daily routines will be needed to maintain dryness between catheters.

Bowel care

Bowel

Upper motor neurone lesion

Reflex emptying—after suppositories or digital stimulation

May not need aperients if diet appropriate

Lower motor neurone lesion

Flaccid

Manual evacuation and aperients usually required but may be able to empty, using abdominal muscles

Suppositories ineffective

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During the period of spinal shock the bowel is flaccid, so it must not be allowed to overdistend. From the second or third day after injury a gentle manual evacuation should be performed. Suppositories and aperients will also be needed to achieve a result once bowel sounds are normal. A flatus tube may sometimes be used to relieve distension. Manual bowel evacuation will continue either daily or on alternate days during the period in bed. Evacuations should be performed using plenty of lubricant, and with only one finger inserted into the anus. Trauma, including anal fissure formation, is possible if insufficient care is taken. The training programme depends on whether the bowel empties reflexly or is flaccid, and on what level of self care the patient is likely to achieve. The time and frequency of bowel evacuation should be chosen to suit the patient's previous habit and his predicted lifestyle.

The patient who can care for himself should be taught to use the toilet for bowel care as this is both psychologically and socially more acceptable. The dependent patient's bowel evacuation is more easily performed on the bed. To achieve adequate bowel action at an appropriate time requires careful and painstaking adjustment of diet and aperients until a satisfactory routine is established. When self care is not possible the patient and his family must decide who will perform this part of his care; professional help may occasionally be more appropriate.

In the long term diet is important and most patients will benefit from dietary re-education. Excessive weight gain will inhibit mobility and independence, therefore obesity must be controlled. A high fibre diet will help bowel management and a good nutritional standard is important. A high calcium intake should be avoided to help prevent calculi forming in the urinary tract.

Preparation for discharge includes weekend visits home and education of the patient, his family and friends, and his community carers. Physical dependence need not be accompanied by mental or emotional dependence, and the nursing staff should encourage the patient to gradually assume responsibility for his own life and well being.

A young apparently fit fireman had an asthmatic attack while playing football. He was successfully treated and is now asymptomatic with treatment with Becotide and Ventolin inhalers. What tests should be carried out to assess his continued fitness as a fireman?

Tests for exercise induced asthma are, in general, safe and in an otherwise fit young man no difficulty should be encountered. Any severe discomfort resulting from the test would respond to a bronchodilator aerosol. No medication should be given for eight hours before the test. Exercise may be carried out on a treadmill at three miles an hour on a 10% slope or, more simply, as a step test using a firm box or other convenient device. The pulse rate should increase to about 150 beats a minute during exercise for five to six minutes. Ventilatory function before exercise and at intervals of two to five minutes after exercise may be measured simply with a peak flow gauge or meter or with a dry spirometer. Mental stress is not likely to be of much importance in exercise induced asthma.

The question of psychological suitability for employment as a fireman is a separate issue. Nasal polyps often occur in people who develop intrinsic asthma in adult life and may be present before asthma is manifest. Of themselves, they are not of great importance and may be easily treated. They may occur with chronic rhinitis and although a fairly common accompaniment of asthma they do not, of themselves, precipitate asthma nor are they essentially a contraindication to the use of breathing apparatus. The wider issue whether a young man, otherwise fit, who has had a single attack of exercise induced asthma is fit to continue work as a fireman is more difficult. Although uncomplicated exercise induced asthma can usually be easily prevented by pretreatment with disodium cromoglycate or bronchodilators, it may in this case be the first indication of a more persistent asthmatic condition and of a bronchial hyperactivity which, in a fireman possibly exposed to highly irritating fumes, might prove a serious risk to health despite care and the use of breathing apparatus at the scene of a fire. Continued observation with regular examination and monitoring of ventilatory capacity should lead to a rational decision as to his suitability for

continued employment as a fireman.—J MORRISON SMITH, honorary consultant physician, Birmingham.

Godfrey S. Exercise-induced asthma. In: Clark TJH, Godfrey S, eds. *Asthma*. 2nd ed. London: Chapman and Hall, 1983:57-75.

An accomplished long distance runner complains of violent colic followed by a watery diarrhoea, associated with the passage of blood and mucus, lasting for between 12 and 24 hours after a competition. This is followed by complete recovery. Why should this happen?

Diarrhoea often accompanied by colic and vomiting is a well recognised problem in some runners, commonly coming on any time after the first four or five miles. In previous reports of bloody diarrhoea or positive tests for occult blood investigations showed no abnormality and bleeding recurred.¹⁻³ The explanation for these symptoms is not known. During maximal exercise in well trained subjects the visceral blood flow is reduced to 20-30% of the resting value⁴ and relative ischaemia is suggested as being one possibility. Nevertheless, the apparent infrequency of colic and bloody diarrhoea in participants in other sports—for instance, cycling, where there can be comparable physical stress—suggests that other factors must be present. The repetitive movement of the viscera and possibly resultant trauma during running as opposed to a more stable state of the abdominal contents in cycling or rowing is speculative but could be an additional precipitant. Caecal volvulus has now been described in marathon runners.⁵—J HOWEL JONES, consultant physician, Coventry.

1 Fogoros RN. Runners' trots: gastrointestinal disturbances in runners. *JAMA* 1980;243:1743-4.

2 Sharman IM. Gastrointestinal disturbances in runners. *Br J Sports Med* 1982;16:179.

3 Porter AMW. Do some marathon runners bleed into the gut? *Br Med J* 1983;287:1427.

4 Clausen JP. Effect of physical training or cardiovascular adjustment to exercise in man. *Physiol Rev* 1977;57:779-815.

5 Pruett TL, Wilkins ME, Gamble WG. Cecal volvulus: a different twist for the serious runner. *N Engl J Med* 1985;312:1262-3.