Paraplegia

The Spinal Cord Injuries Center Hamburg

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The Spinal Cord Injuries Center (SCIC) Hamburg, opened in 1981, is part of Workmen's Compensation Accident Hospital, Hamburg and comprises 100 beds. The hospital contains all the departments necessary for the care of patients with recent injuries whilst the acute SCIC provides all facilities for new admissions transferred directly from the scene of the accident through to comprehensive medical, psychological and social rehabilitation. Intensive care and the operating theatres are shared with the main hospital. Thirty-nine per cent of the traumatic cases are admitted within the first 24 hours following the accident.

The centre is divided into 5 wards. The acute admission ward provides 6 twin-bedded rooms fully equipped with appropriate monitors. All other wards have 2 twin-bedded rooms in the middle and a total of 4 4-bedded rooms. In addition there is a single room for emergency use on each ward. In the acute ward this is equipped as an emergency room for resuscitation. The space for 1 bed is 12 m² excluding the general circulation area. Compressed air, oxygen and suction facilities are available for every bed and a bedside telephone for 2 beds in each room. Corridors are 3 m wide.

The physiotherapy department for the SCIC includes 2 swimming pools, indoor archery, and basketball areas. The occupational therapy department serves the entire hospital. A school and a driving school for the disabled are within easy access.

Relatives of patients at high risk or those to be trained to care for the patient after discharge are accommodated in 4 special apartments. When a patient cannot be discharged for lack of housing or insufficient care, 8 twin-bedded wheelchair-adapted flats are available for a maximum period of 12 months.

Organisation

Recent cases may arrive by helicopter or rescue ambulance and are admitted to the hospital's emergency room prior to transfer to the intensive care unit, the operating theatre for necessary surgery, or to the acute ward of the SCIC. After mobilisation in a wheelchair patients are then transferred to 1 of the 2 wards on

the first floor for continuing physical training and urological treatment, and remain there throughout their hospitalisation.

The second floor is mainly used for readmissions. One ward is strictly separated for patients with pressure sores or other septic conditions whilst a second ward deals with urological problems, medical reviews and consultation. There is no special ward for females or for children.

All patients receive intensive physiotherapy, sports therapy and occupational therapy for ADL. The nursing staff, physiotherapists and occupational therapists work in close co-operation to train those responsible for the care of the patients at home.

Staffing

Staffing consists of: Medical doctors—1 Medical Director and 1 Medical Deputy Director (both Surgeons); 2 senior registrars (urologists); 6 registrars; 1 psychologist; 120 nursing staff (85 registered, 35 auxiliary); 26 physiotherapists; 2 sports teachers; 13 occupational therapists; 2 social workers and 6 secretaries.

Clinical data

Since 1981, 1069 recent cases have been admitted, 80% of these were traumatic in origin. The main cause of trauma was a road traffic accident (46%) (Fig. 1). The proportion of non-traumatic cases has steadily increased to 31% in 1987. Tumours were the principle cause of non-traumatic origin (Fig. 2). Throughout the period the ratio of tetraplegia to paraplegia was 37% to 63%.

Male patients represented 73% of the total and 2% were children. The mean age of the recent trauma patients was 34 years. There has been an increasing number of patients over 60 years of age (Fig. 3). Up to 1983 the treatment of spinal injuries was completely conservative, but with the clarification of indications for surgery and the improvement in techniques, operative treatment began in 1984. Patients have also been admitted after operative spinal stabilisation had been carried out elsewhere in a non-specialised hospital, often with a delay of more than 2 or 3 weeks and with avoidable complications. Internal fixation over a short distance (1 or 2 segments) with 'fixateur interne' of different types (Dick, Kluger, Wolter) or plates (Roy-Camille) are preferred. No other devices are used. Braces are not used post-operatively. For the cervical spine, halo-vest traction is used as a conservative method of treatment.

The time of immobilisation has decreased to give only a difference of 15 days between surgical (average 38 days) and conservative (average 53 days) treatment. Neurological improvement has not differed significantly according to the choice of method of treatment (Fig. 4). Limb injuries occurred in 53% of patients with polytrauma. Internal fixation of fractured limbs was carried out when indicated whilst open fractures were stabilised by the use of the 'fixateur externe' method. Plaster of Paris was not used in the paralysed area (Meinecke *et al.*).

Urological treatment usually starts with suprapubic drainage (Cystofix®) followed by intermittent catheterisation and bladder training with an increasing number of patients undertaking self-catheterisation. When indicated sphincterotomy was done early in order to avoid the development of severe trabeculation. The treatment

Figure 1 Cause of traumatic injury, n=828.

was formulated on the result of urodynamic and X-ray examinations.

The average time for hospitalisation was 199 days for tetraplegic and 156 days for paraplegic patients. Delay in discharge was usually related to one of the following factors:

1. Polytrauma in particular head and pulmonary injuries.
2. Complications such as pressure sores, deep vein thrombosis, spasticity, para-articular osteoarthropathy, psychological abnormalities.
3. Lack of availability of necessary equipment.
4. Lack of a suitable living area available at the time of possible discharge.
5. Lack of suitable nursing facilities elsewhere at the time of possible discharge.

Figure 2 Cause of non-traumatic injury, $n=160$.

Transfer to the SCIC of non-traumatic cord injured patients is often delayed for many months. The mean age of these patients was 42 years but the general treatment programme did not differ from the system described for trauma. When the physical state of the patient did not preclude the full use of the facilities available in the centre, patients were returned to the referring hospital since they tended to get worse psychologically, recognising their decline in physical and mental powers compared with their injured fellow sufferers.

Deep vein thrombosis was recognised in 6% of recent traumatic cases whilst pulmonary embolism occurred in 5% of patients in spite of treatment with low dose heparin from admission.

The mortality rate in the traumatic cases was 6.49% mainly from cardiopulmonary causes. The mortality in traumatic and non-traumatic cases of patients of 65 years of age and over was 19%. Ninety-five per cent of all patients were discharged

Figure 3 Patients admitted over 60 years of age, n=80.

home but the remainder had to be transferred to a nursing home.

Since 1981 the unit has treated 2450 readmissions with a mean age of 42 years. Twenty-five per cent of these patients were tetraplegic and 18% were females.

Twenty-nine per cent of patients were readmitted for further training but 18% had pressure sores and 15% required urological treatment (Fig. 5).

The aim of the service has been to provide a lifetime follow-up at regular intervals for all patients. The increasing number of survivors creates a problem in demand which will require to be solved in future years. In Hamburg the entire system is linked with an intensive social services system which assists patients in solving financial problems whilst the labour office will prepare the patient for return to work. A specialist architect and the occupational therapy department

Figure 4 Neurological recovery, treatment-dependent, n = 560.

provide advice on home adaptations and the nursing staff advise on the provision of adequate nursing at home.

Provision of facilities may often be dependent on the patient's insurance status at the time of injury, with the best scenario being provided by the workmen's legal accident insurance since this institution operates as a liability insurance and is responsible for comprehensive rehabilitation. This applies to 23% of all trauma patients admitted. The system of compulsory insurance in the FRG has been described elsewhere (Meinecke, 1964, 1969).

In order to assess the workload of the unit and to provide appropriate staffing levels it should be noted that from 1981 to 1987 the ratio of recent admissions to readmissions was 29% to 71% but at the same time the ratio of patients under treatment daily in the centre was reversed to 62% recent cases to 38% readmissions. In order to provide adequate staffing it is necessary to recognise the importance of an assessment of the distribution of patients such as recent cases, readmissions, tetraplegia v. paraplegia, multiple injuries, psychopathic or psychotic problems and the age distribution of patients.

This centre is part of a system of 17 specialised units of different sizes in the Federal Republic of Germany (Fig. 6). A Bed Procurement Bureau for patients with spinal cord lesions is part of the Industrial Injuries Insurance Association (Workmen's Compensation) and provides round the clock information for other hospitals on where to find vacancies in a spinal centre for a patient with a recent injury. A working group meets every 6 months to provide a realistic report about the ongoing situation in the FRG.

In the 7 years from establishment the unit has attained a steady development of

Figure 5 Readmissions. Aetiology, $n=2,450$.

new methods or improvement of approved methods of diagnosis and treatment for spinal cord injuries and other related problems. New concepts such as electrical stimulation of muscle (FES), bladder and paralysed diaphragm are being introduced. This opens the door to many possible advantages to combat the serious social and psychological problems of patients and relatives. These problems remain to be solved in the years to come following the traditions begun by the late Sir Ludwig Guttman.

Figure 6 Spinal Cord Injury Centres in the FRG.

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