

CARE OF SPINAL CORD INJURY VICTIMS

Dr THIERRY ALBERT

Centre de Rééducation et de Réadaptation
pour Adulte de COUBERT

Route de Liverdy, Coubert

77257 Brie comte robert, cedex

talbert@ugecamif.fr

Spinal cord injury (SCI)

- Traumatic insult to the spinal cord (fracture and luxation of the spine)
- Alterations of normal **motor, sensory and viscerals** functions.
- **Paraplegia** involves the lower extremities.
- **Tetraplegia** involves all extremities
- Autonomics functions problems (bowel, bladder, sexual ...)
- Associated injuries (brain, extremities ...)

Epidemiology of SCI

- **Incidence and prevalence:**
 - USA: 30 to 40 millions/year; 183000 to 230000.
 - France: 900/year
- **Young adults, 16 to 30 year of age.**
- **Males: 70 to 80 %**
- **Motor vehicles crashes: 50 % of SCI causes**
- **July and saturday**

Neurologic Medical examination

- **Sensory-motor examination:** voluntary contraction of key muscles, sensibility of the body.
- **Determination of paralysis level**
 - cervical segment \Rightarrow tetraplegia (C1 to C8)
 - thoracic segment \Rightarrow paraplegia (T1 to T12)
 - lombo-sacral segment \Rightarrow paraplegia(L1 to L5) and /or perineal paralysis
- **Determination of completeness degree**
 - complete or incomplete para-tetraplegia
- **Standards from ASIA:** American spinal injury association
- **Reflex movements, balance control, standing and walking capacities**

Acute medical management

- **Prevent or minimize any resulting neurologic deficit**
 - Immobilization of the spine with maintenance of straight spinal alignment in the field with a spine board.
 - Pharmacotherapy : corticosteroid before 8 hours of injury
- **Attend to associated injuries and vitals problems :** fractures, brain injury, thoracic and abdominal injury, haemorrhage, asphyxia.
- **Medical transport to an intensive care and spinal surgery unit.**

SPINE SURGERY MANAGEMENT

- Assessment of the **spine stability and spinal cord compression** : imaging study +++
- **Spinal surgery or external spinal stabilization** indication.
- Goals of surgery :
 - properly **aligned and stable** spine: reduction of the fracture or luxation, metal fixation and bone graft.
 - **removal of any bone fragments** that might be compressing the cord and increase the paralysis.
- **The precocity of the spine surgery** seems to be important when it is possible

Physical medicine and rehabilitation care

- Evaluation and treatment of
 - **1 Impairment and medical complications or *health status* (from different etiologies):** manifestations of a problem at the tissue or organ: infection, ulcers, paralysis and balance control, pain, depression...
 - **2 Disability or *functional abilities* in activities of daily life (from different impairments):** manifestations of a problem at the whole person: locomotion and transfers, personal hygiene and dressing, alimentation and elimination...
 - **3 Handicap, social disadvantage or *social participation*:** manifestations of a problem at the societal levels: accessibility of environment and employment...

Postoperative and early rehabilitation care

- Regular **neurologic examination**
- Spinal **orthosis**
- Movement and mobility restrictions
- Medical management of complications
- Beginning of physical therapy and readaptation

Impairment and medical complications medical treatment and physical therapy

- **Pulmonary complications** (infection=pneumonia):
primary cause of death, postural drainage, systematic infection treatment
- **Cardiac complications**
 - **orthostatic hypotension**, syncope, cardiac arrest, **deep venous thrombosis and pulmonary embolus (mortality+++)**
 - autonomic dysreflexia
 - endurance training in wheelchair or in walk

Impairment and medical complications medical treatment and physical therapy 2

- **Orthopedic complications:**
 - Heterotopic ossification and muscle retractions, loss of joint range \Rightarrow loss of mobility and difficulties in activities of daily life.
 - Osteoporosis and **fractures**
 - Proper positioning and mobility in the bed and wheelchair (rotating, rising in sitting position)
 - **Range of motion exercises**

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- Cutaneous complications
 - **Decubitus ulcers**: common sites, associated factors ++, most common morbidity
 - Proper positioning and mobility in the bed and wheelchair (rotating, rising in sitting position)
 - Education of patient about this frequent and dangerous complication, **prevention by the patient himself** +++

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- Urinary complications
 - **Urinary incontinence and/or retention:** drugs and self catheterization of the bladder
 - Urinary infections and calculi, renal deterioration, death, morbidity +++
- Bowel dysfunction
 - **Fecal incontinence and/or chronic constipation:** dietary habits and regular reflex defecation

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- Sexuality complications
 - Men: problems in having erections, ejaculations, orgasm and fertility,
 - Drug and injection
 - Assisted fertility
 - Women: are able to become pregnant, orgasm modification
 - Change in sexual habits. Psychological difficulties are possible.
 - Education
 - Psychological aid

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- Neurologic evolution
 - Uncontrolled muscle activity: **spasm (extension or flexion) and spasticity** ⇒ difficulties in personal care and functional mobility, decubitus ulcers, pain.
 - Drugs and surgery treatment.
 - Physical inhibition of abnormal reflexes movement
 - **Loose of voluntary movement control**
 - Strengthening incompletely paralysed muscle
 - Improving muscle substitution to realize movements and actions impossible under ordinary and « normal » way
 - Control of balance and limbs coordination in different positions (sitting, standing, walking)
 - Upper extremity reconstructive surgery for tetraplegia

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– Pain

- **Neurogenic pain** in lower extremities and arms
- Articular and muscular pain

- ⇒ Difficulties in personal care and functional mobility.
- Drugs, surgery, physical therapy for articular and muscular pain

DISABILITY IN ACTIVITIES OF DAILY LIVING (ADL) FUNCTIONNAL REHABILITATION

- **Typical functional outcomes** for patient are known, many **factors** interfere
- Evaluation: **functional independence measurement: FIM**
- **Training in all ADL** : the maximum independence in ADL
 - facility, rapidity, reality in future life +++
- **Ergotherapie (occupational therapy), Kinesitherapie (physical therapy)**, sport education
- **Adaptative equipment and orthoses**
- **Wheelchair use and transfert** from wheelchair to another place is one of the most important point of this ADL independence:
- For the incomplete para-tetraplegia, **walking** is often the most important

Functionnal issues after SCI

Factors

- neurologic impairment:
 - Motor level (para or tetraplegia)
 - complete/incomplete
 - spasticity
- age and weight
- associated injuries: brain injury+++
- learning capacities in patient education
- psychologic status, motivation and patient 's goals
- support of family
- living arrangements and life-style
- financial support

DISABILITY IN ACTIVITIES OF DAILY LIVING (ADL) FUNCTIONAL REHABILITATION

Activities

- Feeding
- Bathing
- Dressing
- Self hygiene
- Management of bladder and bowel
- Functional mobility
 - bed mobility
 - transferts (wheelchair, bed, floor, car, toilet, bath and shower)
- Ambulation and wheelchair use
 - indoor
 - outdoor
 - stairs
 - different terrain
 - therapeutic or functional in life

DISABILITY IN ACTIVITIES OF DAILY LIVING (ADL) FUNCTIONNAL REHABILITATION

- Rehabilitation:
 - objectives are defined with all the team and the patient: **multudisciplinary working**
 - training a **specific activity in real situation**
 - transfert to a bed
 - **ADL independance is encouraged** during the hospitalization in the hospital and at home during the **therapeutic week end**
 - the **patient is educated** in all problems

REHABILITATION

- **Home visit, modification and environmental access**
 - evaluate **accessibility and safety**
 - recommend **modifications of home** for the weelchair and transferts
 - test functional **autonomy in the home environment**
 - patient and family's **need and acceptance**
 - **financials resources** for the program
 - tetraplegia: **environmental control system** = domotic: control of lights, telephone, sound, television, doors...
- Evaluation and utilization of **technicals devices and orthosis** to compensate the hand or legs function

REHABILITATION

- **Motor vehicle transportation**
 - adapted vehicle
 - specific test to know the problems: reflex, attention...
 - specific training
- **Recreation and sport**
 - enhance social interaction, psychological status, physical status and quality of life
- **Professional rehabilitation and insertion**
 - evaluation of interest and motivation, intellectuals (knowledge and learning), physical capacities
 - education for a new job
 - recruitment policy of the employer

Psychologic issues after SCI

- Personnel and family impact
- Announcement of handicap prognosis to the patient and the family
- Rebuilding a different life with a « **adjustement** » to **disability**,
 - **cognitive, emotional, behavioral components** of « adjustment »
 - each component needs attention
 - **explanations** about pathology, disabilities, prognosis
 - **positive support** from all the team
 - clear objective and program build with the patient and the family:
the real difficulty
 - facilities in ADL
 - positive image of himself is very important (psychologic status before injury, familial and social support quality, sport and occupational activities, work...)

Psychologic issues after SCI

- Depression is not obligatory but anxiety is always present, drug and psychological treatment
- Suicide and « indirect suicide » (ulcer, decrease of independence) are a real risk after discharge
- **Quality of life** is often rated as « good » but **life satisfaction** is lower than in general population
- Quality of life is influenced by « accessibility » and social treatment of handicap, and by familial and social status
- Satisfaction in life is probably more complex

Psychologic issues after SCI

- for me:
 - honest and precise information
 - positive support and valorisation
 - time for listening and speaking
 - win the patient confidence
 - be a good rehabilitation professional (knowledge and practices)
 - attention and treatment of depression and anxiety