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REFLECTIONS ON THE INTENSIVE CARE OF ACUTE CERVICAL SPINAL CORD INJURIES IN A GENERAL TRAUMATOLOGY CENTRE [1]

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Abstract. Fifty-one cases of cervical spinal cord injury were reviewed. The importance of the immediate comprehensive care after onset may be achieved successfully even in a General Traumatology Centre. The great majority of these patients were treated by orthopaedic methods as far as their vertebral injury was concerned. Mortality related to the spinal cord injury is 7·8 per cent. The methods used and our development are based on principles established by Sir Ludwig Guttmann; they have been shown to be durable and important.

Key words: Spinal cord injury; Tetraplegia; Trauma-resuscitation.

SINCE the opening of the Resuscitation and Intensive Care Unit of the Traumatology Centre of the Hospital L. Pasteur of Colmar in 1970, the management of immediate or early referred acute cases of cervical cord injuries has been studied in detail. One of us (Molé, 1977) analysed 40 cases. Eleven other severe acute cases, also admitted immediately or referred by one of the two Neurosurgical Units, have been included. These cases have been analysed to reveal the significance of the principles originated by Sir Ludwig Guttmann.

It is not our wish (with this comparatively small number) to give all details concerning these patients, but to consider how valuable your teaching has been to all of us concerned in the often difficult assessment and management of these patients with life-threatening conditions associated with multiple injury; 31 (61 per cent) having been admitted within the first 2 hours after injury, 15 (29 per cent) between 2 and 24 hours, and only five (10 per cent) after 24 hours, usually transferred from other regional hospitals. We regret even this delay.

The overall mortality figures are seven patients (13·7 per cent) and, related to the spinal cord injury itself, only four patients which represents 7·8 per cent.

It is our opinion that even the best classification systems cannot account for all the individual parameters of the spinal cord lesions, associated with different life-threatening conditions. We must mention that these figures, taking in account the fact that most of these patients were admitted immediately after the accident, compare favourably with those published elsewhere in the recent literature. In fact, these patients are treated in the same way as if they were admitted in a Specialised Spinal Cord Injury Unit, within the seven-bed intensive care department.

The general principles of management are basically those which were described and discussed by you since 1944 in many publications and during your teaching at Stoke Mandeville.

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Summary of the type of vertebro-articular lesion ranging downwards from C2 (fracture of the dens of the axis) to C7–T1: (*a*) fracture-dislocations: 24 (47 per cent) (by antero-flexion 20, and retro-flexion 4), most of them with knowledge of a rotation mechanism and associated with complex injuries of the articular processes and involvement of the posterior arc; (*b*) fractures of the vertebral body: 15 (29·4 per cent) mostly burst fracture; (*c*) dislocation type: eight (15·7 per cent); and (*d*) S.C.I. lesions without any visible bony lesion: four (7·8 per cent). These figures, in fact, are similar to those of distributions in other publications.

Age and sex were not significantly different in our study.

Most of these patients, 48 (94 per cent), were reduced orthopaedically and immobilised in postural reduction, with or without the use of Cones, sometimes Crutchfield, skull-calipers.

Closed manipulation: six (13·6 per cent) for locked facets were performed but under the following general rules: (i) immobilisation by skull-caliper and traction, gradually applied kilo by kilo up to 3 kilos maximum tension with control X-rays made between each increase of the applied weight; (ii) preceded by active mask-hyperoxygenation anaesthesia is induced, followed by myorelaxants, the facets being unlocked under television control. Artificial respiration is maintained by naso-endotracheal tube until the awakening of the patient. One failure was reduced by skull traction a few hours later. All of them were examined neurologically, before and after, by the paraplegist of the Spinal Cord Injury Unit of Mulhouse on duty. None showed aggravated symptoms neurologically after reduction.

Some remarks on *respiratory mechanical assistance* are of interest: The young patients without a medical history of pulmonary problems or a severe chest lesion, with a lesion below C4, can usually easily overcome their neurogenic respiratory insufficiency with the help of chest-physiotherapy which is done by the specialised intensive care nurses, 24 hours out of 24. Sometimes the help of continuous humidified oxygen (2–3 litres/minute) can be valuable but the study of blood gases must be performed and repeated according to the respiratory condition which can change very quickly into respiration insufficiency in a short lapse of time. Hypoxaemia, with or without hypercapnia, must be, at all costs, avoided in such patients.

On the other hand, patients who are seen in the casualty room with clinical evidence of respiratory distress must be considered for emergency procedures, not only those associated with the level of the lesion, but when extremely severe traumatic-associated chest lesions occur. Artificial ventilation, if needed, may be given by means of naso-endotracheal intubation which is not difficult to place, taking in account the vertebral lesion. Sixteen patients were treated in this way with an average of 16·7 days (2–52 days); only two required tracheostomy. These figures do not take in account all the varied individual emergency situations.

As a rule, all efforts must be made to avoid as much as possible too short or too prolonged artificial ventilation, so as not to inflict other risks such as infection, haemodynamic complications, and increase of incidence of thrombo-embolic conditions. Preventing the amyotrophy of the remaining respiratory muscles must be aggressively tackled. The same rule applies to the so-called 'systematic tracheostomy' solution which must be avoided. Special training of the staff and counselling by the consulting spinal cord injury advisor on spinal cord injury management is of great importance. This teaching and that of all the other aspects of this specialised treatment has always been welcomed by all members of the staff, resulting in a comprehensive teamwork.

The classical cardio-vascular disturbances in these patients have rarely given us any particular difficulty with our knowledge of the special physio-pathological aspects you have continuously described in your teaching; neither have we had any so-called 'nursing difficulties' (positioning is of the utmost importance, turning with a Stoke Mandeville Egerton bed and intermittent catheterisation), which are so often evoked by others as reasons for open reduction and fixation, and urinary drainage by an indwelling catheter.

Associated lesions included 20 cases (39·2 per cent) out of which: (i) five (9·8 per cent) with severe life-threatening multiple injuries (head + thorax + abdomen); (ii) five with severe head injuries (9·8 per cent) admitted in a comatose state; (iii) four with severe chest lesions (7·8 per cent); and (iv) six with associated multiple fractures (11·7 per cent) (two of which had other vertebral injuries). Only three patients showed transitory gastro-intestinal haemorrhage (5·8 per cent), this in spite of the common knowledge that usage of steroids may induce or facilitate ulceration. In most of our cases such medication has been used for a very short time. Here we cannot say that their use gave any improvement of the clinical neurological status.

In support of fluid and electrolyte metabolism, we have always kept on the 'dry side', taking in account the production of endogenous water by protein hyper-catabolism starting practically immediately after the injury, and which is too often overlooked. One case amongst the deaths may be due to this problem since the patient died in a state of 'wet lung syndrome'.

Treatment of the paralysed bladder has been benefited by intermittent catheterisation using the 'no-touch' technique, routinely performed by the nursing staff of the Unit. The results, not using 'routine antibiotics', proved encouraging: 41 patients out of 44 (93 per cent) having been transferred with sterile urine to Mulhouse, other regions of France or other countries. Eleven patients (26·8 per cent) presented non-lasting, short intercurrent urinary infections.

Most of the patients received prophylactic subcutaneous injections of Heparin (Calciparine®), 5000–7500 U.I., 12 or, more recently, 8 hourly, starting immediately after admission (except patients with severe head injuries). One small pulmonary embolus was discovered at necropsy of one patient who died from his head injury (and for this reason did not receive preventive anticoagulation). Two patients had elsewhere an episode of phlebitis followed by pulmonary emboli, none resulting in death.

Neurological results include the following figures which are only of relative significance (Table I) knowing that in the group concerned there was a large variety of neurological syndromes (Frankel Classification System).

Diagnosis of a severe cervical spinal lesion, below C4, in an unconscious patient (coma stage I up to III) can be suspected practically by observation: the presence of diaphragmatic breathing, the posture of the paralysed upper limbs remaining in a flexed position are hallmarks of this level of injury. Priapism is also an important sign more often seen in tetraplegia than in pure head injuries with coma. As a general rule, the entire spine *must* be X-rayed in all patients with even the slightest impairment of consciousness.

In conclusion, conservative orthopaedic management of these patients is routine (taking into account all of the individual differences which determine individualisation), and diligent attention to the basic principles of the treatment emanating from your teaching.

The whole team involved in this humble paper wishes you a Happy Birthday and, naturally, Many Happy Returns.

TABLE I

Neurological results using Frankel's Classification System, most of the patients having been discharged from hospital or rehabilitation centre.

AA	AB	AC	AD	AE
12	5	0	1	0
BA	BB	BC	BD	BE
0	0	1	2	0
CA	CB	CC[a]	CD	CE
0	0	1	13	3
DA	DB	DC	DD	DE
0	0	0	0	6
EA	EB	EC	ED	EE
0	0	0	0	0

[a] In this case a temporary aggravation.

RÉSUMÉ

51 cas de lésions traumatiques de la moelle épinière cervicale sont brièvement passés en revue, confirmant l'efficacité de l'enseignement de Sir Ludwig Guttmann depuis 1944.

ZUSAMMENFASSUNG

51 Fälle traumatischer Querschnittslähmung der Halswirbelsäule wurden kurz durchgesehen und bestätigten die Wirksamkeit Sir Ludwig Guttmanns Belehrung seit 1944.

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