

Acute Spinal Cord Injury Patients —Who Cares?

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Summary

Pertinent aspects of the remarkable advances instituted and developed for the management of patients who have sustained serious spinal injuries are discussed in this communication, and the responsibilities of medical doctors and others who care for such patients is taken up in relation to some of the recent advances in our knowledge, both experimental, and clinical. There are new challenges in investigations and therapy to be considered, some of which are being somewhat precipitously put into practice. In particular, early spinal operations, where certain closed or open reduction procedures are followed by some of the newer forms of vertebral column fixation, may cause complications. Also the apparent benefits from such techniques may not be achieved and a plea is made for careful well documented accounts to be assembled and where possible set out, using modern statistical methods, to be made by doctors treating such patients. The significance of a full understanding of the importance of modern rehabilitation techniques for spinal cord injury patients is stressed; and finally, the practical realisation of insurance claims and of possible medical litigation is mentioned.

Key words: *Acute spinal cord injury; Pre-hospital management; Hospital management; New spinal investigations; New spinal therapies.*

Introduction

We live in exciting but challenging times, and many of us as clinicians and involved in research, are fortunately in a position as educators of medical undergraduates and post-graduates, and of nursing and of allied health personnel, to influence the direction and form of the optimal care of our spinal injured patients, from every point of view.

Regarding such care, there should be no complacency, but 'vigilance, open-mindedness, innovation, flexibility, criticism and approval or disapproval' are all terms that should be considered in relation to the caring of such patients.

Are we facing up to the realities of the 1980s—and beyond? Cost-effectiveness of management and the proper allocation of resources should always be carefully considered.

The development of spinal cord injury services

The first generation of ‘paraplegists’, if one may temporarily use this not very attractive term; the distinguished doctors, Munro, Guttman (1978), and Bors who were the principal pioneers, and were creative medical scientific humanitarians; they led the way. But we should not apotheosize—they laid the foundations, but medicine is forever innovating, as well as consolidating. Their younger associates and pupils have become vigorous in developing good facilities for the treatment of patients with acute spinal cord injury, in many countries (see the reference to ‘The organization of spinal units’ (1967). But to date relatively few comprehensive ‘custom built’ new spinal units have been developed. In many countries only token facilities are available as yet, but this is a beginning. Thus, for example, in Algeria with a population of some 20 million inhabitants, Amara *et al.* (1985, see pp. 16–17), report that there is now a 30 bedded male paraplegic unit, and I note that of the 41 patients admitted ‘early’, 22 were actually admitted after 20 days following their injury, and 19 of the 41 patients had already had Harrington rod or Roy Camille plate spinal fixation procedures carried out; and three of their other patients had already had a decompressive laminectomy.

Due to the intelligence, perspicacity, determination and foresight of Ludwig Guttman, the International Medical Society of Paraplegia was founded in 1960, and the following year this distinguished doctor founded the Journal ‘*Paraplegia*’ (see reference to ‘The Organization of spinal units’, 1967); and to ‘*Paraplegia*’ (1979). That Society, and this Journal are now well established and are accepted as being authoritative entities internationally, but both at scientific meetings of the Society, and in the columns of the Journal, controversial matters are frequently discussed, and occasionally there are even quite heated arguments. This is as it should be and is to be encouraged. As would be expected, some aspects of the correct and best features of the care of people with serious spinal cord traumatic lesions give rise to some of the more vigorous discussions. But the science and art of really good medicine should always prevail. Specialist Journals, such as ‘*Paraplegia*’ (Harris, 1984; Bedbrook, 1985, see pp. 8–15; Donovan *et al.*, 1984), and specialist medical societies, such as the International Medical Society of Paraplegia, play vital roles in acting as essential forums for the publication and the discussion of relevant matters concerning the basic science and clinical aspects of vertebral column and spinal neural function and dysfunction, but therein lies a paradox and a dilemma, as there could be a situation where the presentations are mainly given by and are for ‘the converted’. All aspects, and especially controversial and new topics must be aired, and related general and specialist medical journals and societies should also be used, to publicise and to spread ‘the gospel’. One should not judge innovations too readily, but should obtain first hand knowledge about them, preferably by a personal visit to the hospital where the investigative techniques or/and new treatments are being regularly used. Then, and only then can balanced, critical and meaningful com-

ments be made. It is our bounden duty to be sentinel. We should never 'rest on our laurels'.

The attention of readers is drawn to the writings of several distinguished men and women, most of whom have offered and have had published important contributions to 'Paraplegia', and these articles form the 'backbone' of studying the historical development and the modern understanding of the caring of patients with acute spinal cord injury. (See references to 'Paraplegia', 1979; and to Donovan *et al.*, 1984; and Bedbrook, 1985).

Pre-hospital management

All senior doctors who proclaim a real interest in the management of acute spinal cord injury patients should, one feels, be actively involved either directly or indirectly with such patients from the moment of the accident causing the injury. This vital time (sometimes referred to as the 'therapeutic hiatus') for such patients should not be left entirely to others. By this I mean that doctors, especially senior doctors, concerned with the primary and 'subsequent care' of these patients should be personally involved in the pre-hospital management of patients with suspected or obvious spinal cord injuries, including their clinical assessment—and simple but essential recording and documentation of information, their handling, extrication, immediate therapy and transportation—hopefully to the nearest hospital containing 'facilities of excellence' for such patients (Harris, 1977, and 1984).

Aspects of management

The immediate management of such patients is influenced by various important factors, not the least of which is the fact that 30 per cent or more have a significant associated injury, very often a head injury with concussion, and such injuries may take priority in the management of the patient, prior to the special care of any spinal injury. Another practical problem is that in some countries, the clinical situation may also be complicated by the patient being under the influence of alcohol. Thus, obviously the optimal treatment of such patients necessitates the close-co-ordination and co-operation of appropriate hospital specialists (Guttmann and Frankel, 1966; Harris, 1977; Donovan *et al.*, 1984). There should be no conflict of medical interests. It is trite to say that expert treatment of every aspect of each individual patient, whether infant, child or adult is paramount. We require to keep the situation in proper perspective. Clinical freedom and independence must be maintained, but in a reasonable co-operative scientific way.

One important vital piece of information regarding acute spinal cord injury patients is often missing, i.e. an accurate, properly recorded account of the patient's neurological status as soon as possible (minutes) following the injury. There may be obvious difficulties in obtaining this, such as a patient with multiple injuries—especially if he or she is unconscious, and the absence of a trained experienced clinician able to carry out a full neurological examination of the patient and to properly record it. These are some reasons why it may never be known if the neurological damage resulting from a spinal injury is *initially*

complete or incomplete, and this can make all the difference in deciding on the management of the patient, and in providing a prognosis (Donovan *et al.*, 1984). For these reasons alone, some important aspects of published reports on 'series of spinal cord injury patients' may not be wholly, scientifically valid. (Harris 1977; Collins, 1983). The problem of the management of patients with acute spinal cord injuries has been compounded by the introduction of new advances in the investigation and treatment of spinal disorders, and I would refer in particular, to computerized tomography scanning (Post and Green, 1983), and to sensory evoked potential studies (Rowed *et al.*, 1978).

Newer therapies include microeurosurgery, the use of Harrington rods (Dickson *et al.*, 1973; Collins, 1983), and other forms of 'internal spinal column fixation' (Akbarnia *et al.*, 1985), following closed or open reduction of certain vertebral fractures, dislocations and fracture-dislocations. Having apparently overcome 'the bad old days' of spinal column plating, and of decompressive laminectomy (with or without the additional procedure of myelotomy), in some medical centres, what almost amounts to indiscriminate spinal surgery is still currently almost standard practice. Unfortunately, there would appear to be little if any real reliable statistical proof that many of these procedures are actually benefitting the patient. (Collins, 1983; Charlson and Horwitz, 1984; Bedbrook, 1985), and are 'cost effective'. Complications of some of these procedures are unfortunately not uncommon (Akbarnia, 1985, see pp. 27-33). Permanent operative fixation of a long segment of the vertebral column can seriously adversely affect the patient's rehabilitation. Scientifically reliable controlled therapeutic trials for the patients under discussion would appear to be impractical and indeed in many instances unethical. Carefully planned and well documented reports will hopefully appear and be published, with valid modern statistical analyses. (Young and Dexter, 1978; Collins, 1983; Charlson and Horwitz, 1984; Harris, 1984).

The optimal management of spinal cord injury patients presents unique problems in medicine, encompassing so many different specialities in medicine and in the allied health professions and therein lies the problem: 'Who treats spinal cord injury patients?'—Accident and Emergency (Trauma) Surgeons, Orthopaedic Surgeons, Neurosurgeons, or whoever; with their particular expertise, and associated with other medical specialists singly or collectively. But unfortunately, this may in practice mean fragmentation of management, and patients may be passed on from specialist to specialist and hospital to hospital, sometimes with tragic results. (Sussman, 1978; Donovan *et al.*, 1984). There is a clear case to polemicize. Patients cannot be treated 'by a committee', some suitable doctor must be in overall charge.

Much is nowadays being made of the 'vital initial period, of up to about 4 hours' immediately following the accident which caused the spinal injury, as many experimental animal studies have shown that secondary, progressive spinal neural changes, chemico-vascular, appear to occur during this time. (Collins, 1983; Harris, 1984). Obviously, it is not correct to presume that many of the animal experiments, some of which are scientifically somewhat suspect (Faden, Jacobs and Smith, 1984; Faden, Jacobs and Patrick, 1984), can be translated to the human clinical situation (Collins, 1983; Charlson and Horwitz, 1984). Even so, we should by no means ignore the intensive careful researches that

are now progressing in several academic centres by many dedicated research workers. As in every aspect of medicine, we must be open minded and interested in and receptive to new, reasonable ideas. Progress, included new work in spinal neural regeneration, is inevitable, necessary and indeed most welcome. The pioneering work of Gregg and Wilmot (1964) with their flying squad system is to be praised, regarding the earliest possible transfer of patients to a spinal centre.

There are some clear cut indications for the early, even for the immediate 'special management' of spinal cord injury patients. Obviously, reduction of dislocations and fracture-dislocations and wholly reliable maintenance of the anatomically realigned spine until spinal column healing has occurred, is essential. It is not my intention in this short communication to enter into a discussion of such therapies as 'cord cooling', 'the use of hyperbaric oxygen', or the possible place for various recommended chemical therapies. There are some definite indications for early neurosurgical operations for certain patients with acute spinal cord injuries (Harris, 1977; Harris, 1984; Bedbrook, 1985); and operative intervention by experienced orthopaedic surgeons (possibly in association with equally experienced neurosurgeons) is occasionally indicated (Harris, 1984; Bedbrook, 1985). But neither of these latter two very important matters will be further pursued in this paper.

Even although Guttman and Frankel as long ago as 1966 clearly demonstrated the serious deficiencies and indeed dangers of either (standard) Foley-type suprapubic urinary bladder drainage or per-urethram Foley-type indwelling drainage, and showed that intermittent catheterization was very much superior in the early management of the paralysed (neuropathic) bladder, this is still being frequently ignored even in 1985 and even in some spinal units. The consequences of this are often quite disastrous for the patient. This clear and very important lesson has been scientifically studied yet again recently by Wyndaele (1985, see pp. 18–26) and vividly reinforced, and it is sincerely hoped that all doctors who treat spinal cord injury patients will re-read the Guttman and Frankel paper of 1966, and will study and hopefully accept and practice the irrefutable advice given by Wyndaele (1985).

Rehabilitation

The acute care of spinal cord injury patients includes the immediate or almost immediate institution of rehabilitation measures, both psychological and physical, thus these facilities, which are developing rapidly and in some quite sophisticated ways, should be available from the time that these patients are admitted to hospital (Illis *et al.*, 1982).

Insurance and compensation

The insurance and compensation aspects of severe spinal cord injury patients are becoming increasingly important (Sussman, 1978), and questions arise, such as 'was the treatment consistent with *your* concept of normal prevailing standards of care?' and, 'is it consistent with what *you* write and teach?'

Conclusion

Strong leadership in the organization and care of the seriously spinal cord injured is vital, and I would conclude this communication by saying '*quo vadis?*'

Résumé

Dans cette communication on discute des aspects pertinents des progrès remarquables établis et développés pour le traitement des malades qui ont subi des lésions vertébrales graves, et on prend en main les responsabilités des docteurs en médecine et d'autres personnes qui soignent de tels malades par rapport aux progrès récents, tant expérimentaux que cliniques, dans nos connaissances. Il y a des idées nouvelles à considérer qui constituent une vraie gageure dans le domaine des investigations et dans celui de la thérapie et dont on est en train de mettre en pratique quelques-unes un peu précipitamment. En particulier, des opérations précoces sur la vertèbre qui ne s'avouent pas nécessaires, surtout certains procédés de réduction fermée ou ouverte, peuvent provoquer des complications. Il se peut aussi qu'on n'arrive pas à obtenir les avantages apparents de telles techniques, et on sollicite que des comptes rendus soigneux et bien documentés soient rassemblés et là où c'est possible présentés, à l'aide des méthodes statistiques modernes, et que cela soit fait par des médecins qui traitent de tels malades. On souligne la signification d'une compréhension complète de l'importance des techniques modernes de réhabilitation pour les malades qui souffrent des blessures de la moëlle épinière; et enfin, on fait mention de la réalisation pratique des indemnités d'assurance et d'un litige éventuel en matière de soins médicaux.

Zusammenfassung

In dieser Mitteilung diskutiert man gehörige Seiten der bemerkenswerten Vorsprünge, die für die Behandlung von Patienten, die schwere Wirbelverletzungen gelitten haben, angestellt und entwickelt worden sind, und man geht auf die Verantwortlichkeiten der medizinischen Doktoren und der anderen für solche Patienten sorgenden Personen mit Beziehung auf neuzeitige Vorsprünge in unseren Kenntnissen ein, und zwar im Versuch wie auch klinischem Gebiet. Es gibt neue Aufforderungen in Untersuchungen und in Therapie zu betrachten, wovon man einige schon etwas übereilt in Praktik setzt. Insbesondere unnötige frühzeitige Wirbeloperationen, vor allem gewisse Verfahren im Felde der geschlossen und offenen Reduktion, zusammen mit den neueren Arten der Wirbelsäulenfixation, können Komplikationen verursachen. Es ist auch ganz möglich, dass man die scheinbaren aus solchen Techniken entspringenden Vorteile nicht erreiche, und man äussert die Bitte, dass sorgfältige, gut dokumentierte Berichte zusammengefasst und wo möglich ausgestellt werden, und zwar mit Hilfe von modernen statistischen Methoden, und dass diese von Ärzten, die solche Patienten behandeln, verfasst werden. Man unterstreicht die Bedeutung eines völligen Verständnisses der Wichtigkeit von modernen Rehabilitierungstechniken für Patienten mit Rückengratverletzung; und endlich erwähnt man die praktische Realisation der Versicherungsansprüche und des eventuellen Rechtsstreits auf medizinischem Grund.

References

- AKBARNIA B, FOGARTY JP, SMITH KR 1985 New trends in surgical stabilization of thoraco-lumbar spinal fractures with emphasis for sublaminar wiring. *Paraplegia* 23:27-33.
- AMARA D, YAGOUBI Z, BENBAKHMA M, OULD OUALI A 1985 Traumatic paraplegia in Algeria: orientation of early management. *Paraplegia* 23:16-17.
- BEDBROOK SIR GEORGE 1985 A balanced viewpoint in the early management of patients with spinal injuries who have neurological damage. *Paraplegia* 23:8-15.
- CHARLSON ME, HORWITZ RI (1984) Applying results of randomised trials to clinical practice: impact of losses before randomisation. *British Medical Journal* 289:1281-1284.
- COLLINS WF 1983 A review and update of experimental and clinical studies of spinal cord injury. *Paraplegia* 21:204-219.
- DICKSON JH, HARRINGTON PR, ERWIN WD 1973 Harrington instrumentation in the fractured unstable thoracic and lumbar spine. *Texas Medicine* 69:91-98.
- DONOVAN WH, CARTER RE, BEDBROOK, SIR GEORGE, YOUNG JS, GRIFFITHS ER 1984 Incidence of medical complications in spinal cord injury: patients in specialised, compared with non-specialised centers. *Paraplegia* 22:282-290.
- FADEN AI, JACOBS TP, SMITH MT 1984 Evaluation of the calcium channel antagonist

- nimodipine in experimental spinal cord ischemia. *Journal of Neurosurgery* 60:796-799 (and letter from Tator CH *Ibid* 61:802; and reply by Faden *et al.*, *Ibid.* 802-804).
- FADEN AI, JACOBS TP, PATRICK DH *et al.* 1984 Megadose corticosteroid therapy following experimental traumatic spinal injury. *Journal of Neurosurgery* 60:712-717 (and letter regarding this by Hall ED and Braughler JM *Ibid.* 61:805 and reply by Faden *et al.*, *Ibid.* 806-807).
- GREGG TM, WILMOT CB 1964 The flying squad and the paraplegic unit (preliminary report). *Paraplegia* 2:15-16.
- GUTTMANN SIR LUDWIG 1978 Total responsibility of the surgeon in the management of traumatic spinal paraplegics and tetraplegics. *Paraplegia* 15:285-292.
- GUTTMANN L, FRANKEL H 1966 The value of intermittent catheterisation in the early management of traumatic paraplegia and tetraplegia. *Paraplegia* 4:63-84.
- HARRIS P 1977 The Spine. In: Dudley HAF (Ed) *Hamilton Bailey's Emergency Surgery* 10th Edn John Wright and Sons Ltd, Bristol, p 155-174.
- HARRIS P. 1984 A critique of the neurosurgical management of spinal trauma. Paper read at the Combined Meeting of the Society of the British Neurological Surgeons and the Association of British Neurologists, University of Edinburgh, September 1984.
- ILLIS LS, SEDWICK EM, GLANVILLE HJ 1982 Rehabilitation of the neurological patient. Part III: Future possibilities in neurological rehabilitation. Blackwell Scientific Publications, Oxford, p 341-410.
- 'Paraplegia' 1979 Sir Ludwig Guttman's 80th Birthday Issue. Vol. 17, p 1-138.
- POST MJD, GREEN BA 1983 The use of computed tomography in spinal trauma. *Radiologic clinics of North America* 21:327-375.
- ROWED DW, McLEAN JA, GAND TATOR CH 1978 Somatosensory evoked potentials in acute spinal cord injury: prognostic value. *Surgical Neurology* 9:203-210.
- SUSSMAN BJ 1978 Fracture dislocation of the cervical spine: a critique of current management in the United States. *Paraplegia* 16:15-38.
- The Organisation of spinal units 1967 (Guttman; Bors; Amako; Harris; Gaspar; McSweeney; Meinecke; Bedbrook; Weiss; Gregg; Rossier; Domingo; Maglio; and Pedacchia). *Paraplegia* 5: 115-187.
- YOUNG JS, DEXTER WR 1978 Neurological recovery distal to the zone of injury in 172 cases of closed traumatic spinal cord injury. *Paraplegia* 16:39-49.
- WYNDAELE JJ, DE SY WA, CLAESSENS H 1985 Evaluation of different methods of bladder drainage in the early care of spinal cord injury patients. *Paraplegia* 23:18-26.