

ABSTRACTS OF SELECTED PAPERS

Reported on by Alain B. Rossier

Plasma androgens and estrogens in paraplegic men, by S. D. Madduri, E. De Salvo and J. J. Seebode. *Urology*, 13: 179-181, 1979.

There are only a few studies on plasma androgen levels in paraplegics but no data on estrogens in these patients. Plasma testosterone, and plasma estrone (E1) and estradiol (E2) levels were measured in six paraplegic men and age-matched controls. Sephadex LH-20 columns and the celite technique were used to extract the sex steroids and a radioimmunoassay was used to measure them. Maximal Leydig cell stimulation was achieved with human chorionic gonadotropin administration in order to reduce the error produced by diurnal variation of the hormone in the peripheral circulation. There was no significant difference in plasma androgens in paraplegics as compared with normal men whereas estrogen levels were found to be within the normal range.

Somatosensory evoked potentials in acute spinal cord injury: prognostic value, by David W. Rowed, J. A. G. McLean and Charles H. Tator. *Surg. Neurol.*, 9: 203-210, March 1978.

The somatosensory evoked potentials were studied in 31 normal control subjects and 38 spinal cord injury patients 15 of whom had a complete neurological lesion. Transcutaneous stimulation of median, ulnar and tibial nerves was carried out by means of bipolar surface electrodes, with concomitant EEG recordings from leg and arm areas. The somatosensory-evoked potential was developed by averaging 128 oscilloscope sweeps, each one triggered by the stimulus.

It was found that in complete sensory and motor lesions below the level of spinal cord injury the somatosensory evoked potential was absent. In incomplete lesions with major sensory and motor deficit the early preservation or return of the somatosensory evoked potential and progressive normalisation of the wave form were found to be sensitive early indications of favourable prognosis and consistently announced major clinical recovery at a time when little clinical improvement had taken place. Those patients whose evoked responses had been present by the end of the first week are all walking. The absence of a recognisable somatosensory-evoked potential from below the level of injury at the end of the first week has been an unfavourable prognostic sign.

Comments (ABR): These preliminary data of a non-invasive technique which can be applied at bedside seem to be most valuable and deserve attention. The information obtained from this examination allows for a better neurological diagnosis and especially prognosis at a time clinical signs of recovery may hardly be visible.

Reappraisal of the sympathetic role in the sphincteric urethra. Denervation supersensitivity of the urethra of the chronic neurogenic bladder to alpha adrenergic drugs, by T. Koyanagi and I. Tsugi. *Invest. Urol.*, 15: 267-269, January 1978

Eight patients with autonomous neurogenic bladders and positive denervation hypersensitivity of the bladder to parasympathomimetic drug and ten normal control patients were investigated in regard to the response of urethral pressure profile to administration of an alpha adrenergic agent. A mean elevation of the maximum urethral pressure of 13.3 mm Hg was observed in response to alpha stimulation in patients with chronic denervated bladders. Following administration of an alpha blocking agent the supersensitive response of the urethra to alpha stimulation failed to appear.

In these eight patients parasympathomimetic drug elicited a distinct bladder response without concomitant effect on urethral pressure. These results point at pharmacologic evidence of alpha adrenergic predominance over parasympathetic in the urethra of chronic denervated autonomous neurogenic bladders.

Circulatory strain in everyday life of paraplegics, by N. Hjeltnes and Z. Vokas.
Scand. J. Rehab. Med., **11**: 67-73, 1979.

Six rehabilitated male paraplegics with a complete traumatic lesion were investigated to assess the circulatory strain in unrestricted, free-living conditions and to evaluate which of the everyday activities may be expected to maintain or enhance their circulatory fitness. Circulatory load can be expressed in a simplified way as the product of heart rate (HR), mean blood pressure and stroke volume, and it depends mainly on the intensity and type of muscular work. Since paraplegics with low levels of injury can work only with muscles of the arms and of the upper trunk, it narrows considerably the range of physical activities. Therefore the continuously recorded HR would reflect fairly well the changing levels of the circulatory strain during the day. The subjects kept a concise diary of the type, sequence and duration of activities during a two-day observation period. Their ECG was continuously recorded for up to 48 hours by portable, battery-operated tape recorders. Using the maximal heart rates assessed in arm ergometer tests, the heart rate reserve (HRR) was calculated in each subject as the difference between the lowest recorded heart rate when resting and the maximal heart rate. In order to allow a direct comparison between subjects by the heart rates alone, they were expressed in percent of the individual's HRR giving an estimate of the subject's *relative* circulatory strain. The average strain of everyday life was low, averaging 15-24 per cent of HRR. The activities which brought the HR over 50 per cent of HRR which could be expected to have a training effect on the circulatory system were connected with ambulation with crutches, driving wheelchair uphill, playing basketball or during specific training. The highest heart rates were recorded when the subjects ascended stairs. The results of this study underline the fact that the work load in the everyday life of rehabilitated paraplegics is so low that regular participation in sports or other forms of training is necessary to maintain their circulatory and physical fitness.

Effect of vasodilators and myelotomy on recovery after acute spinal cord injury in rats, by A. S. Rivlin and C. H. Tator. *J. Neurosurg.*, **50**: 349-352, 1979.

Following major spinal cord trauma, loss of function may be attributed to interruption of all the axons at the lesion site, as well as to haemorrhages and oedema, and to ischaemia of the injured segment with secondary infarction all three of which may destroy any remaining axons. The exact cause of post-traumatic ischaemia is not known, and it is postulated by the authors that if the ischaemia is due to vasospasm of the extrinsic or intrinsic spinal cord vessels, it might be counteracted by vasodilator drugs. It is also known that trauma causes cord swelling, and that ischemia could possibly result from increased tissue pressure within the cord. The purpose of this study was therefore to investigate the effects of papaverine, nitroprusside, or myelotomy on the recovery of spinal cord function in 90 female albino rats injured at T1 by acute extradural compression, the duration and the force of which were 1 minute and 180 gm, respectively. Spinal cord recovery was measured by a quantitative method of clinical assessment. Neither papaverine nor nitroprusside improved recovery of cord function which could indicate that spasm is not an important cause of post-traumatic cord ischaemia. Dorsal midline myelotomy extending as far as the central canal did not bring any significant improvement, whereas full-depth myelotomy extending completely through the cord in the anteroposterior plane produced a significant improvement in recovery. Apart from the possible beneficial effect of drainage of blood and necrotic tissue from the injury site, myelotomy could improve spinal cord blood flow by reducing vasoactive substances or tissue pressure.

Comment: This excellent experimental randomised study throws further light upon our knowledge of spinal cord injury and raises questions as to the role of vasospasm in post-traumatic cord ischaemia. It also revives interest in the effectiveness of myelotomy since Allen's initial report in 1911.

Lidase treatment of spinal cord transected rats, by T. F. Kowalski, H. L. Vahlsing and E. R. Feringa. *Ann. Neurol.*, 6: 78-79, 1979.

Following the exact protocol of Matinian and Andreasian, the authors report their results in the evaluation of spinal cord transected rats treated with Lidase prepared in the Soviet Union. The purpose of the study was to determine whether this preparation was able to enhance axonal regeneration. The animals were evaluated for clinical recovery of bladder and hind limb function, cortical evoked response after sciatic nerve stimulation, and axoplasmic flow of cortically injected tritiated proline by regenerated cortico-spinal axons. Authors' results in treated and control animals failed to confirm the beneficial effects of Lidase therapy on CNS regeneration reported by Russian investigators. None of the animals showed either signs of recovery of bladder function or any return of voluntary motor activity. The only difference between treated and control animals was that treated animals weighed significantly more than controls.