自血光量子疗法治疗实验性脊髓损伤的脊髓诱发电位评价

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摘要 本实验对 60 只家兔造成轻瘫，重瘫，全瘫三种实验模型，就不同程度损伤及自血光量子治疗后的脊髓诱发电位进行检测，借此对自血光量子疗法之疗效作一评价。结果表明：轻瘫、重瘫治疗组脊髓诱发电位恢复率高于各自对照组，且轻瘫组疗效高于重瘫组。提示自血光量子疗法有利于脊髓功能的恢复。

关键词 脊髓损伤 脊髓诱发电位 自血光量子疗法

1990 年起，用自血光量子（ALQ）疗法治疗脊髓损伤，取得一定疗效[1,2]。为探讨其作用机理，本实验以脊髓诱发电位（SCEP）为指标，就自血光量子疗法对不同程度实验性脊髓损伤的疗效进行评价。

材料和方法

1. 致伤方法与分组：选用家兔 60 只，体重 2.5～3.0kg，静注 30%戊巴比妥钠（30mg/kg）麻醉。动物俯卧位固定在手术台上，以 T_{13}为中心，纵行切开皮肤 2cm，向二侧推开骶棘肌后切除 T_{13}棘突和椎板，暴露脊髓 0.6×0.6cm，全部动物随机分为 6 组：

轻瘫对照组及治疗组：各 12 只家兔，改良 Allen 氏法 60gcm 打击脊髓致瘫，止血缝合伤口。治疗组于伤后第 6 天开始 ALQ 治疗。

重瘫对照组及治疗组：各 12 只家兔，改良 Allen 氏法 120gcm 打击脊髓致瘫，止血缝合伤口。治疗组于伤后第 6 天开始 ALQ 治疗。

全瘫对照组及治疗组：各 6 只家兔，锐刀片完全切断脊髓，止血缝合伤口。治疗组于伤后第 6 天开始 ALQ 治疗。

2. 治疗方法：各治疗组于伤后第 6 天按 3.5ml/kg 体重由静脉采血，与预计采血量 1/4 的 ACD 抗凝剂（血液保养液）混匀，放进血液辐射治疗仪（MD—12OB 型）石英瓶内，紫外线照射时间 4.5sec/ml，氧流量 2L/min，同步磁极化，血液处理后立即回输静脉。每 3 天 1 次，共治疗 5 次。

3. SCEP 记录方法 暴露兔一侧坐骨神经主干，将刺激电极套在坐骨神经干上，暴露 $T_{7\sim8}$棘突，将记录电极置于 T_8棘突，参考电极置于 T_7棘突，接地电极置于椎旁皮下。以单脉冲方波（波宽 0.1ms，频率 2HZ，强度 2—4v）刺激神经干，用诱发电位仪（Nihonkohden，MEB—5100 型）记录 SCEP，记录方式为单极引导，叠加 128 次。结果分析取自伤前、伤后 5 天和伤后 18 天。

4. SCEP 结果判断标准 0 级：波形全部或基本消失，近似一直线记作 0 分；Ⅰ级：波形分化不佳，N_1P_2 波幅仅及伤前值的 20～40%，潜伏期延长大于伤前值的 2 倍，记作 1 分；Ⅱ级：波形分化不佳，N_1P_2 波幅仅及伤前值的 40—60%，潜伏期延长大于伤前值的 1—2 倍，记作 2 分；Ⅲ级：波形分化较清晰，N_1P_2 波幅达伤前值的 60～80%，潜伏期延长小于伤前值的 1 倍，记作 3 分；Ⅳ级：波形分化清晰，N_1P_2 波近似伤前值，记作 4 分。

结 果

1. 伤前 SCEP：记录到一个多相复合波 $P_1-N_1-P_2-N_2\cdots\cdots$，其中 N_1P_1 最稳定，出现率达 100%，波幅高，N_1 最高幅度达 6.8uv，P_1 幅度高达 3.5uv，潜伏期平均为 12.7ms。

2. 致伤后 SCEP 致伤后 SCEP 表现为不同程度的波形显示不全或消失，波幅降低，潜伏期延长。此与临床上损伤平面以下感觉消失、肌力减退、反射消失等体征相吻合。上述现象随病程延长而日趋加重。在各对照组，第 18 天的 SCEP 恢复率明显低于第 5 天（表 1）。

表 1 对照组不同时间 SCEP 恢复率比较

组别	伤后 5 天		伤后 18 天		P
	评分	恢复率（%）	评分	恢复率（%）	
轻瘫	20（I_4II_8）	41.7	8（0_4I_8）	16.7	<0.01
重瘫	10（0_2I_{10}）	20.8	2（$0_{10}I_2$）	4.2	<0.05
全瘫	0（0_6）	0	0（0_6）	0	>0.05

经 5 次 ALQ 治疗，轻瘫和重瘫治疗组与各自对照组相比较，其 SCEP 的波形出现了部分复现，电位稍微

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升高，其恢复率也高于对照组，而全瘫治疗组无变化（表 2，图）。

表 2　对照组与治疗组伤后 18 天 SCEP 恢复率比较

组别	对照组		治疗组		P
	评分	恢复率	评分	恢复率	
轻瘫 8 (O_4I_8)	16.7	21 ($I_4II_7III_1$)	43.8		<0.01
重瘫 2 ($O_{10}I_2$)	4.2	7 (O_5I_7)	14.6		<0.05
全瘫 0 (O_6)	0	0 (O_6)	0		>0.05

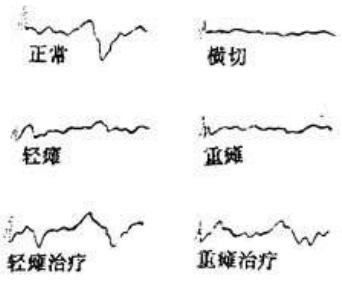

图 SCEP 记录

讨　论

对于脊髓外伤，临床上常以 SCEP 来间接判断其损伤程度、累及范围和治疗效果。因为 SCEP 是感觉神经冲动经上行传导道在脊髓内产生的传导束电位和突触后电位的总合，宜作为反映脊髓感觉传导通路功能的可定量的客观指标。Schramm 等认为，脊髓致伤重量不同，所记得的 SCEP 亦不同[3]。本实验在不同致伤力所致的轻瘫、重瘫和全瘫三组中，SCEP 恢复率各不相同，轻瘫对照组恢复率高于重瘫对照组，全瘫对照组无效。表明致伤力愈大，SCEP 自然恢复率愈差，提示脊髓损伤程度愈重，预后也愈差。

我们还观察了脊髓损伤后不同时间的 SCEP 变化，发现随损伤时间的延长，轻瘫和重瘫对照组的 SCEP 恢复率在不断下降，各对照组伤后第 18 天的 SCEP 恢复率均低于伤后第 5 天者，即在一定范围内，随脊髓损伤后的时间延长，其对 SCEP 的影响越大。这可能系脊髓组织损伤后缺血缺氧加剧而破坏了神经组织的生理完整性所致。

我们已就 ALQ 疗法治疗脊髓损伤的临床疗效做过报道[1,2]本实验系就 ALQ 疗法对轻瘫、重瘫和全瘫三种实验模型的疗效进行观察比较。发现轻瘫、重瘫治疗组 SCEP 恢复率均明显高于对照组，而全瘫治疗组无变化。这意味着 ALQ 治疗 脊髓损伤有一定效果，但其疗效与损伤程度有关，轻瘫疗效较好，重瘫次之，全瘫无效。ALQ 治疗脊髓损伤的机理比较复杂，对于不完全性脊髓损伤，ALQ 可以提高血氧饱和度，促进血肿吸收及水肿消退，改善脊髓血液循环并能直接或间接地保护神经元和传导束的细胞及血细胞结构，因此有利于脊髓功能的恢复。

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针刺阿是穴治疗肌肉拉伤

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肢体肌肉拉伤祖国医学属“扭伤”范畴，往往由于剧烈运动，过度扭转及跌扑等原因造成，其主要表现为局部肿胀疼痛、活动受限，检查局部压痛，肌肉痉挛，可触及条索状硬结。

在临床中用针刺阿是穴方法治疗肌肉扭伤 26 例，取得良好疗效，可迅速解除肌肉痉挛，缓解疼痛，具体操作方法如下：

取 3 寸 5 号针一根，常规消毒后，右手持针，在损伤肌的最痛点的近心端上方一寸处垂直刺入皮下，然后根据损伤肌肉部位深浅，以与皮肤成 15°～30°角度，与肌纤维成平行方向斜刺入肌肉中，进针 2～3 寸，同时左手触摸在肌肉压痛点部，当针刺入损伤肌肉中时，左手会感到肌肉有跳动感或抽动感，提示针刺部位正确。然后留针半小时，中间每隔 10 分钟捻针一次，并不要求有强烈的针刺得气，一般针刺一次即愈，严重者或陈旧性损伤可连续 3－5 次，每日一次，每次半小时。

体会　阿是穴属祖国医学的局部取穴中的非穴位压痛点取穴。临床上选用阿是穴治疗疾病是非常广泛的，特别是对于外科的扭伤类，常能取得立竿见影的显著疗效。可迅速缓解局部肌肉痉挛，改善局部的轿液供应，促进肌纤维的恢复。

Abstract of Original Articles

Surgical treatment of the severe thoraco—lumbar burst fracture *Chen Fen—yong, Song Jian—rong, Lin Jia—jun, et al Union Hospital of Fujian Medical College* (350001)

The authors reported 51 cases of severe thoracolumbar burst fracture treated with surgery. According to Frankel grades, there were 13 cases of grade A, 7 Cases of grade B, 14 cases of grade C, 5 cases of grade D and 2 cases of grade 3 in 11 cases, and total laminectomy decompression was done in 30 cases. The recovery rate was 73% in the incomplete paraplegia and 15. 4% in complete paraplegia. It was concluded 1. Burst fractures mainly injure the middle column of the spinal cord, and spinal canal de compression as well as internal fixation should be done, if the fragments of vetebra had compressed about 1/3 of the spinal canal and the sagital diameter of the later was less than 10 mm; 2. In ternal fixation should be selectedaccording to the condition and range of the injured vertebra, It is reasonable to choose the internal fixation procedure which can cause less injury of the spinal segment and get good results in reduction and fixxation; 3. The recovery rate of the incomplete paraplegia group was significantly higher than that of the complete paraplegia group when surgical treatment was applied.

Key words Thoracolumbar vertebrae Burst fracture Surgical treatment

(*Origiaol article on page* 3)

The following—up analysis on the patients with artificial hip—prothesis *Zhai Ming—yu, Zhao Yu—gui, Wang Chun—ping, et al. Zhengzhou Hospital of Orthopaedics, Henan Province* (450052)

108 cases (112 hips), applied with artificial prosthesis have been followed up after operation, for the average years of 6. 8. It was discovered that 37 cases of complication (about 33%) were produced due to the unproper operation; 46 cases of post—operational complication (41. 1%); and the stisfactory therapeutic effective rate being about 74. 1%.

The frequently encounted reasons and treatments of the various kinds of complications were put into stress to be analysed and discussed in this paper.

KEY WORDS Artificial prosthesis Disease of the hip region

(*Original articleon page* 5)

Study of the effect of intermittent compressive pressure to the osteoblasts in vitro. *Li Ke—xin, Shang Tian—yu, Dong Fu—hui, et al. Institute of Orthopaedics & Traumatology, Chinese Academy of TCM* (100700)

The experiment imitated the physiological changes of the cellular exte. ial circumstances, existed during skeletal functional movement, and supplied a intermittent compressive pressure (0. 098 MPa, 15 minutes pressrue, 15 minutes relax, 2 cycles/one hour, 8 hours/day) to the osteoblasts of experiment al groups in vitro. It was discovered that the numbers of osteoblasts and the reaction of alkaline phosphatase in the experimental group were markedly elevated than that of the control groups. The results indicate that the intermittent compressive prssure is able to improve the proliferation and differentiation of the osteoblasts.

KEY WORDS Intermittent compressive pressure Osteoblast in vitro

(*Original article on page* 7)

Experimental reseach on the restoration of bone defact with the complex of helorogenous deproteinized bone and the bone morphogenetic protein. *Bai Meng—hai, Ge Bao—feng, Wang Yong, et al. Institute of Orthopaedics & Traumatology, Lanzhou General Hospital of the Military Region* (730050)

The filure of the implantation of the heterogenous deproteinized bone is always due to the intensive immune rejection. A new method for treating heterogenous bone was discribed in this paper. The bone of calf was deproteinized, i. e. extracted the main antigens and combined with bovine bone morphogenetic protein (BMMP) and then produced a kind of heterogenous deproteinized bone, not only without antigenicity, but also advantageous to the bone formation. Implanting this kinds of bone comples into the artificial defact (2cm) of the radius of Newzeland rabbit, the observation on the recovery with immunological, radioactive, and histological

methods, demonstrated that there was without any immune rejection in various kinds of experimental groups and there was indistinct margin between the implant and the fracture bed at 4th week; There were a great amount of lamella of new osteocytes and neogenetic vessels invension into the implant, at the 8th week.

The experimental result indicates that the large heterogenous bone implantation, treaed beforehand, can not only without any immune rejection, but also can achieve the expected restoration.

KEY WORDS Bone morphogenetic protein　Heterogenous bone implatation

(*Original article on page* 10)

Evalution of the effect of ALQ on the experimental spinal cord injury, by means of evoked potential in the later.

pt. of Phyciology, Anhui Medical University (230032)

Three kinds of experimental model of spinal cord injury (light, severe and complete) had been imitaled in sisty rabbits and part of them were treated by autohemotherpy of light quanta (ALQ). The effect of ALQ on paralysis was observed and reported, by means of spinal cord evoded potential (SCEP), a reliable electrophysio logical index. The results demonstrated that the percentage of the recovery of SCEP in the incomplete spinal injury of the treated group, was higher than that in the control group. It indicates that ALQ can promote the control group. It indicates that ALQ can promote the functional recovery of the spinal cord from the damage.

KEY WORDS Spinal injuries　Evoded potential　Autohemotherapy

(*Original article on page* 13)

Techniques of needle manipulation for the treatment of metacarpophalangeal joint dislocation *Ren Qi—uang, Guo Min. Department of Orthopedics, The First Affiliated Hospital, Anhui Medical University (Hefei* 230022)

The closed dislocation of the metacarpophalangeal joint is not common. The open—reduction is often needed to be done, owing to the speciality of its anatomical relationship. Here an experience of close reduction in success with prying and plucking manipulation, applied with Kirschner needle on 30 cases was introduced in this paper. The mechanism and procedure of this method was demonstrated with anatomical data, diagrams and typical cases and its practical value was also discussed.

KEY WORDS Prying and plucking manipulation with Kirschner needle　Dislocation of metacarponphalangeal joint.

(*Original article on page* 15)

The Treatment of teno—skin sutureon 54 cases of mallet finger deformity *Li Liang—dong, Fang Ming—zhi, Shen Jun, et al. First Affiliated Hospital, Guiyang College of Traditional Chinese Medicine* (550001)

54 cases of fresh and old mallet finger deformity have been treated with the combination of the teno—skin suture and small splinter fixation and achieved satifactory therapeutic effect. Analysis, according to the characteristics of the anatomy and mechanics of this kind of operation, indicated that this pattern of operation is the first choice for the middle and old aged patients.

KEY WORDS Mallet finger　Small splinter fixation

(*Original article on page* 17)

The Demonstration of the functional digits of brachial plexus roots avulsion. *Pei Lian—kui, Liang Bing—sheng, Zhang Jian—zhong.*

Department of Orthopaedics, Second Affiliated Hospital of Shanxi Medical Cllege, Taiyuan (030001)

In 1993, we had reported the functional digits demonstrated at different parts of upper—limbs. Now we demonstrate the digits and percentages of function on the patients attacked with brachial plexus roots avulsion. The results indicate that the digital demonstration in the orthopaedics is an useful quantitative method to identify the injuries and curative effect on the patients and it is more standized, objective and distinctive to evaluate the clinical curative effects.

KEY WORDS Functional digits　Brachial roots avulsion　Orthopaedics

(*Original article on page* 36)