

doi: 10.13241/j.cnki.pmb.2018.02.033

电针治疗轻中度腕管综合征患者的疗效及对电生理参数的影响*

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摘要 目的:探讨电针治疗轻度、中度腕管综合征(CTS)患者的临床疗效及对患者电生理参数的影响。**方法:**将2015年1月~2017年5月本院收治的86例轻度、中度CTS患者随机分为电针组(43例)和对照组(43例),给予对照组患者常规方案治疗,电针组患者在对照组常规治疗的基础上增加穴位电针进行治疗,治疗后比较两组的临床疗效,于治疗前、治疗后比较两组患者症状及功能评分、电生理参数及超声检查结果。**结果:**电针组的临床总有效率为97.67%,明显高于对照组的81.40%($P<0.05$)。治疗后电针组症状及功能评分分别为 (15.28 ± 2.35) 分和 (9.92 ± 1.42) 分,均明显低于对照组的 (20.73 ± 3.18) 分和 (14.28 ± 2.26) 分($P<0.05$);治疗后电针组正中神经末梢运动潜伏时(DML)低于对照组,拇指展肌肌肉复合动作电位(CMAP)波幅、拇指-腕正中神经感觉传导速度(SCV)、中指-腕SCV、拇指-腕正中神经感觉动作电位(SNAP)波幅、中指-腕SNAP波幅均高于对照组($P<0.05$)。治疗后电针组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的比例为27.91%,明显低于对照组的55.81%($P<0.05$)。**结论:**电针治疗轻中度CTS可进一步提高临床疗效,能够改善腕部症状和功能,同时明显改善患者的电生理参数。

关键词:腕管综合征;电针治疗;电生理参数;临床疗效

中图分类号:R245;R745 **文献标识码:**A **文章编号:**1673-6273(2018)02-343-05

Curative Effect of Electroacupuncture Treatment on Patients with Mild to Moderate Carpal Tunnel Syndrome and its Influence on Electrophysiological Parameters*

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ABSTRACT Objective: To investigate the curative effect of electroacupuncture treatment on patients with mild to moderate carpal tunnel syndrome (CTS) and its influence on electrophysiological parameters. **Methods:** 86 cases of patients with mild to moderate CTS who were treated in our hospital from January 2015 to May 2017 were randomly divided into the electroacupuncture group (43 cases) and control group (43 cases). Control group was given conventional treatment, and the electroacupuncture group was given electroacupuncture treatment on the basis of control group. After 4 weeks of treatment, the clinical efficacy of the two groups was compared. Before and after treatment, the symptoms and function scores, electrophysiological parameters and ultrasonic examination result of the two groups were compared. **Results:** The total effective rate of electroacupuncture group was 97.67%, which was obviously higher than 81.40% of control group ($P<0.05$). After treatment, the scores of symptoms and function in electroacupuncture group were (15.28 ± 2.35) score and (9.92 ± 1.42) score, which were significantly lower than (20.73 ± 3.18) score and (14.28 ± 2.26) score in the control group ($P<0.05$). After treatment, the median nerve distal motor latency (DML) of electroacupuncture group was lower than that of control group, and the abductor pollicis muscle compound muscle action potential (CMAP) amplitude, thumb-carpal sensory nerve conduction velocity (SCV), middle finger-carpal SCV, thumb-carpal sensory nerve action potential (SNAP), middle finger-carpal SNAP amplitude were higher than the control group, the differences were statistically significant ($P<0.05$). After treatment, the ratio of proximal swelling of median nerve of carpal tunnel $\geq 10\text{ mm}^2$ was 27.91% in the electroacupuncture group, significantly lower than 55.81% in control group, the difference was statistically significant ($P<0.05$). **Conclusion:** Electroacupuncture treatment on mild to moderate CTS can further improve the clinical efficacy, improve the patient's wrist symptoms and functions, and improve the electrophysiological parameters of patients.

Key words: Carpal Tunnel Syndrome; Electroacupuncture treatment; Electrophysiological parameters; Curative effect

Chinese Library Classification(CLC): R245; R745 **Document code:** A

Article ID: 1673-6273(2018)02-343-05

* 基金项目:湖南省中医药管理局科技项目(201652)

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(收稿日期:2017-09-03 接受日期:2017-09-25)

前言

腕管综合征(Carpal Tunnel Syndrome, CTS)是一种周围神经卡压性疾病,其发病基础是腕部正中神经压迫性缺血,病变程度与正中神经在腕管内卡压程度、时间长短有关^[1]。CTS的发病率呈现出职业、性别及年龄差异,一般人群中其发病率约1%~10%,在以手部重复性运动的特殊职业人群中的发病率约17%~60%,以中年人为易发群体,女性发病率略高于男性^[2,3]。CTS损害了患者的手部功能,严重者甚至能够致残,严重影响了其工作能力和生活质量。因此,选择恰当的治疗方法以提高临床疗效具有实际意义。临床上对重度CTS的首选治疗方法为手术治疗,轻度、中度CTS以保守治疗为宜^[4]。已有研究^[5,6]证实电针对周围神经的修复和再生具有直接的促进作用。本文采用临床随机对照试验探讨电针治疗轻度、中度CTS的疗效及对患者电生理参数的影响,以期为临床提供参考。

1 资料和方法

1.1 一般资料

选择2015年1月~2017年5月本院收治的轻度、中度CTS患者86例作为本次研究对象。纳入标准:(1)符合《骨科疾病诊断标准》中的CTS诊断标准^[7];(2)病情分期^[7]为轻度和中度;(3)86例患者知晓本次研究内容并签署知情同意书。排除标准:(1)入组前4周内接受过腕管内封闭治疗者;(2)不能配合治疗或因其他任何原因无法行电针治疗者。入选的86例患者均有手掌麻木、手腕僵硬症状,经超声检查证实正中神经有卡压肿胀情况,神经电生理检查显示正中神经腕部损伤,部分患者拇指短展肌萎缩无力。采用随机数字表法分为电针组(43例)和对照组(43例)。电针组患者中,男18例,女25例;年龄22~64岁,平均 (41.26 ± 6.78) 岁;病程20d~22个月,平均 (5.17 ± 3.48) 个月;病情轻度19例,中度24例;单侧病变31例,双侧病变12例;29例患者手腕部有过度活动史,14例患者手腕部无过度活动史。对照组患者中,男性19例,女性24例;年龄21~65岁,平均 (41.78 ± 6.49) 岁;病程22d~23个月,平均 (4.89 ± 3.52) 个月;病情轻度21例,中度22例;单侧病变33例,双侧病变10例;27例患者手腕部有过度活动史,16例患者手腕部无过度活动史。两组患者的基本资料经统计分析后无明显差异($P>0.05$),本研究经医院伦理委员会批准。

1.2 治疗方法

对照组给予常规治疗,具体治疗方案为:双氯芬酸钠(北京万辉双鹤药业有限责任公司,国药准字H11021339,生产批号20140812,规格25mg)25mg/次,3次/d,饭前整片吞服,连续用药2周;甲钴胺片(南京瑞尔医药有限公司,国药准字H20041642,生产批号20141108,规格0.5mg)0.5mg/次,3次/d,口服,连续用药4周;维生素B1片(北京中新制药厂,国药准字H13020594,生产批号20150104,规格:10mg)10mg/次,3次/d,口服,连续用药4周;维生素B6片(北京中新药业股份有限公司,国药准字H13020592,生产批号20141230,规格10mg)10mg/次,3次/d,口服,连续用药4周;地巴唑片(北京中新药业股份有限公司,国药准字H13022189,生产批号20141123,规格10mg)10mg/次,3次/d,口服,连续用药4周。

电针组在对照组的基础上增加穴位电针治疗,具体方案概述为:以患侧大陵/内关为主穴,根据患者的具体情况选择配穴(如拇指麻木疼痛,则配穴取经渠穴、孔最穴;食指麻木疼痛者配穴取阳溪穴、合谷穴;中指麻木疼痛者配穴取内关透外关、二白穴)。确定进针穴位后对其进行常规消毒,患者取仰卧位,采用 0.3×40 mm一次性无菌针灸针快速进针,采用轻刺激手法将针尖刺入主穴腕管内,采用提插结合捻转手法,以得气为度;配穴予以中强刺激手法,以酸麻胀感为度;主穴链接至G6805-1型电针治疗仪(购于上海华谊医用仪器厂);电针治疗仪参数设置:电压5~15V,2~20 Hz连续波,根据患者耐受情况确定输出量,每次连续电针治疗20 min,留针20 min,捻转1次/5 min。1次/d,5d为1个疗程,每个疗程结束后间隔2d开始下一个疗程,所有患者均连续治疗4个疗程,实验所用一次性无菌针灸针购于苏州针灸用品有限公司。

1.3 观察指标

(1)临床疗效:于整个疗程结束后评价两组的临床疗效,将临床疗效分为痊愈(疗程结束后患者手掌麻木及手腕僵硬无力等症状消失)、显效(疗程结束后患者手掌麻木及手腕僵硬无力等症状基本消失)、有效(疗程结束后患者手掌麻木及手腕僵硬无力等症状有所缓解)和无效(疗程结束后患者手掌麻木及手腕僵硬无力等症状无改善或加重),总有效率=痊愈率+显效率+有效率^[8]。(2)症状及功能评分:于开始治疗前1d(治疗前)和整个疗程结束后(治疗后),采用Levine CTS症状及功能问卷调查表^[9]进行调查,症状量表包括11个问题,功能量表从8种活动进行评价,每个项目5个选项,分值1~5分,各项目得分相加为总分,总分越高症状越严重,功能越差。(3)电生理参数^[10]:于开始治疗前1d(治疗前)和整个疗程结束后(治疗后),电生理检查的仪器为Dantec-Keypoint肌电诱发电位仪(所有检测材料均为Dantec品牌),比较两组正中神经末梢运动潜伏时(DML)、拇短展肌肌肉复合动作电位(CMAP)波幅、拇指-腕正中神经感觉传导速度(SCV)、中指-腕SCV、拇指-腕正中神经感觉动作电位(SNAP)波幅、中指-腕SNAP波幅。(4)超声检查:于开始治疗前1d(治疗前)和整个疗程结束后(治疗后),采用HITACHI Hivison Preirus彩色多普勒超声系统对患者腕管正中神经情况进行检查,线阵探头,频率10 MHz,测量正中神经在豌豆骨的水平与钩骨钩水平的横径、纵径,记录两组腕管正中神经近端肿胀 ≥ 10 mm²和横纵径比值 >3 的病例。

1.4 统计学方法

采用SPSS18.0软件进行统计学分析,症状及功能评分、电生理各项参数等计量资料以均数 $\pm$ 标准差($\bar{x} \pm s$)表示,组间比较采用t检验;性别比例、临床疗效等计数资料以率(%)表示,组间比较采用 χ^2 检验,检验标准为 $\alpha=0.05$ 。

2 结果

2.1 两组临床疗效比较

电针组临床总有效率为97.67%,高于对照组的81.40% ($P<0.05$),见表1。

2.2 两组CTS症状及功能评分比较

治疗前Levine CTS症状及功能评分两组比较无统计学差异($P>0.05$);治疗后两组Levine CTS症状及功能评分与治疗

前比较均显著降低($P<0.05$),且治疗后电针组较对照组降低 ($P<0.05$)。见表 2。

表 1 两组临床疗效比较[n(%)]

Table 1 Comparison of clinical outcomes of two groups [n(%)]

Groups	n	Recovery	Excellent	Effective	Invalid	Total effective
Electroacupuncture group	43	6(13.95)	19(44.19)	17(39.53)	1(2.33)	42(97.67)
Control group	43	3(6.98)	14(32.56)	18(41.86)	8(18.60)	35(81.40)
χ^2						6.227
P						0.026

表 2 两组患者的症状及功能评分比较($\bar{x}\pm s$,分)Table 2 Comparison of symptoms and function scores of two groups ($\bar{x}\pm s$, scores)

Groups	n	Symptoms scores		Function scores	
		Before treatment	After treatment	Before treatment	After treatment
Electroacupuncture group	43	31.47 $\pm$ 4.72	15.28 $\pm$ 2.35*	20.42 $\pm$ 2.75	9.92 $\pm$ 1.42*
Control group	43	31.05 $\pm$ 4.67	20.73 $\pm$ 3.18*	20.17 $\pm$ 2.68	14.28 $\pm$ 2.26*
t		0.189	-3.286	0.164	-3.178
P		0.925	0.000	0.943	0.000

Note: Compared with before treatment, * $P<0.05$.

2.3 两组正中神经电生理参数比较

治疗前两组正中神经 DML、拇指展肌 CMAP 波幅、拇指 - 腕 SCV、中指 - 腕 SCV、拇指 - 腕 SNAP 波幅、中指 - 腕 SNAP 波幅比较无统计学差异($P>0.05$);治疗后两组正中神经 DML

显著降低,其余各电生理参数均显著提高($P<0.05$),治疗后电针组正中神经 DML 低于对照组, 其余各电生理参数均高于对照组($P<0.05$)。见表 3。

表 3 两组治疗前后各电生理参数比较($\bar{x}\pm s$)Table 3 Comparison of electrophysiological parameters of two groups before and after treatment($\bar{x}\pm s$)

Groups	Time	Median nerve DML (ms)	Abductor hallucis CMAP amplitude(mV)	Thumb-carpal SCV (m/s)	Middle finger-carpal SCV (m/s)	Thumb-carpal SNAP amplitude (μ V)	Middle finger-carpal SNAP amplitude (μ V)
Electroacupuncture group(n=43)	Before treatment	5.23 $\pm$ 0.52	4.54 $\pm$ 1.13	35.12 $\pm$ 5.61	40.63 $\pm$ 6.17	8.42 $\pm$ 2.75	9.24 $\pm$ 2.77
	After treatment	3.67 $\pm$ 0.74**	8.94 $\pm$ 1.46**	44.79 $\pm$ 5.08**	48.25 $\pm$ 6.37**	13.26 $\pm$ 3.11**	13.15 $\pm$ 2.86**
Control group (n=43)	Before treatment	5.12 $\pm$ 0.56	4.63 $\pm$ 1.21	35.47 $\pm$ 5.73	40.52 $\pm$ 6.09	8.37 $\pm$ 2.58	9.16 $\pm$ 2.53
	After treatment	4.32 $\pm$ 0.93*	5.97 $\pm$ 2.03*	40.23 $\pm$ 5.87*	44.18 $\pm$ 6.33*	10.54 $\pm$ 3.07*	10.68 $\pm$ 2.94*

Note: Compared with before treatment, * $P<0.05$;Compared with control group, ** $P<0.05$.

表 4 两组治疗前后超声检查结果比较[n(%)]

Table 4 Comparison of ultrasonic examination results of two groups before and after treatment[n(%)]

Groups	n	Proximal end swelling of the median nerve of the carpal canal ≥ 10 mm ²		Ratio of transverse longitudinal diameter of carpal tunnel >3	
		Before treatment	After treatment	Before treatment	After treatment
Electroacupuncture group	43	33(76.74)	12(27.91)*	28(65.12)	26(60.47)
Control group	43	34(79.07)	24(55.81)*	27(62.79)	25(58.14)
χ^2		0.063	6.881	0.050	0.048
P		0.978	0.023	0.984	0.988

Note: Compared with before treatment, * $P<0.05$.

2.4 两组治疗前后超声检查结果比较

治疗前两组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的病例所占比例、腕管横纵径比值 >3 的病例所占比例比较差异无统计学意义($P>0.05$);治疗后两组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的病例所占比例较治疗前显著减少,与治疗前比较差异有统计学意义($P<0.05$),且治疗后电针组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的病例所占比例少于对照组,组间比较差异有统计学意义($P<0.05$);治疗后腕管横纵径比值 >3 的病例所占比例电针组与对照组比较差异无统计学意义($P>0.05$)。见表4。

3 讨论

CTS的发病机制是由于多种原因导致腕管内压力上升,压迫正中神经后引起该支配区域出现感觉、运动功能障碍的一组症候群,掌面桡侧3个半指麻木及疼痛、拇指外展、对掌功能异常或鱼际肌萎缩是CTS典型的临床表现^[1]。CTS发病与腕关节的活动度具有密切的相关性,因而多发于优势手,即便是双侧发病者其优势手的症状及功能障碍也更为严重。近年来随着互联网日益渗透到人们的生活中,越来越多的人长时间操作鼠标等原因,CTS的发病率日益增高,其诊治备受关注^[2]。对CTS治疗的关键在于解除神经的压迫性缺血及受损的神经纤维的修复与再生,目前临床上对重度CTS通常采用手术治疗,而对轻中度CTS则以保守治疗为主,治疗措施一般包括治疗原发病(例如控制糖尿病、痛风、感染性疾病及类风湿性关节炎等)、全身用药(通常给予口服神经营养药物,如维生素B1、维生素B6、甲钴胺及地巴唑等)、局部封闭治疗、腕部制动及理疗等^[3]。中医将CTS归属于“痹症”范畴,主要病机为气滞血瘀、脉络不通,可见实证和虚证,其中各种慢性或急性劳损易引发实证,由于气滞血瘀、脉络不通则表现为疼痛、指端麻木、手背指端红肿等;虚证多见于更年期女性,肝肾亏虚不荣(枯也)则痛,表现为轻度疼痛、麻木重,其表现尤以夜间更为明显^[4]。因而中医治疗的基本原则是消肿止痛、舒筋活络,治疗方法主要有中药内服、针灸、手法推拿及中药熏洗等^[5]。针刺作为中医治疗的一种中药手段,其具有调和阴阳、扶正祛邪和疏通经络等作用,与单纯的针刺相比,电针治疗还具有电场作用,使其消炎、解痉及镇痛的效果更为明显,大量的现代医学研究均证实电针对周围神经具有直接的再生和修复作用。

本研究结果显示,电针组临床总有效率较对照组上升($P<0.05$),说明在常规治疗的基础上加电针治疗可进一步提高临床疗效。治疗后两组患者的症状及功能评分均显著降低,且治疗后电针组症状及功能评分低于对照组($P<0.05$),提示常规治疗及电针治疗均能明显改善轻中度CTS患者的症状及功能,增加电针治疗可进一步提高对其症状及功能的改善效果^[6]。治疗后两组患者的各电生理参数较治疗前均明显改善,其中电针组的改善程度显著优于对照组($P<0.05$),提示在常规治疗的基础上加电针治疗可以进一步改善轻中度CTS患者的神经电生理参数。超声检查结果显示,治疗后两组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的病例所占的比例显著降低,且治疗后电针组腕管正中神经近端肿胀 $\geq 10\text{ mm}^2$ 的病例所占的比例明显少于对照组($P<0.05$),而腕管横纵径比值 >3 的病例所占比例治疗前后两组的变化均不明显($P>0.05$),提示常规药物及电

针治疗均可改善轻中度CTS患者的神经纤维缺血、水肿等情况,致使腕管正中神经压迫情况获得一定的缓解,而增加电针可使其效果更加显著,但无论是常规治疗或是加电针治疗,腕管在短期内不会有形态学上的改变^[7]。电针治疗轻中度CTS患者可获得良好的效果,其原因主要在于:首先,电针干预有助于神经营养因子家族(如神经生长因子、脑源性神经营养因子等)向有利于神经恢复的方向发展,而这些神经营养物质与神经的再生和修复有密切的相关性,对神经元的生长、发育及维护其正常功能具有重要作用^[8]。其次,电针刺激不仅具有针刺穴位本身的作用,还可以产生弱电场,神经生长因子受体在电场中总是向阴极移动^[9,20],加上针刺穴位的调和阴阳、扶正祛邪和疏通经络等作用,发挥出电针治疗的调节神经、舒筋活络、行气活血等功能,进而改善腕管的局部微循环并提高细胞氧的利用率,促进新陈代谢。再次,加上神经营养药物及消炎镇痛药物(双氯芬酸钠)的功效,从而获得较理想的效果。然而,本研究中,无论是常规药物治疗还是联合电针治疗,治疗后两组患者的腕管横纵径异常率无明显改善,说明电针治疗轻中度CTS在短期内不能使患者的腕管发生形态学改变,至于长期是否有利于腕管的形态学改善尚待进一步观察。

综上所述,电针治疗轻中度CTS可获得良好的临床疗效,可以改善患者的腕部症状以及功能,明显改善患者的电生理参数,值得临床推广应用。

参考文献(References)

- [1] Stocks SJ, McNamee R, van der Molen HF, et al. Trends in incidence of occupational asthma, contact dermatitis, noise-induced hearing loss, carpal tunnel syndrome and upper limb musculoskeletal disorders in European countries from 2000 to 2012[J]. *Occup Environ Med*, 2015, 72(4): 294-303
- [2] Harris-Adamson C, Eisen EA, Kapellusch J, et al. Biomechanical risk factors for carpal tunnel syndrome: a pooled study of 2474 workers[J]. *Occup Environ Med*, 2015, 72(1): 33-41
- [3] Violante FS, Farioli A, Graziosi F, et al. Carpal tunnel syndrome and manual work: the OCTOPUS cohort, results of a ten-year longitudinal study[J]. *Scand J Work Environ Health*, 2016, 42(4): 280-290
- [4] Prasad DA, Appachu D, Kamath V, et al. Prevalence of low back pain and carpal tunnel syndrome among dental practitioners in Dakshina Kannada and Coorg District [J]. *Indian J Dent Res*, 2017, 28(2): 126-132
- [5] Pratelli E, Pintucci M, Cultrera P, et al. Conservative treatment of carpal tunnel syndrome: comparison between laser therapy and Fascial Manipulation(?) [J]. *J Bodyw Mov Ther*, 2015, 19(1): 113-118
- [6] Chung VC, Ho RS, Liu S, et al. Electroacupuncture and splinting versus splinting alone to treat carpal tunnel syndrome: a randomized controlled trial[J]. *CMAJ*, 2016, 188(12): 867-875
- [7] 李峰,冯建书,聂喜增,等.骨科疾病诊断标准[M].北京:科学技术文献出版社,2009,466
Li Feng, Feng Jian-shu, Nie Xi-zeng, et al. Diagnostic criteria for disease in Department of orthopedics [M]. Beijing: Science and Technology Literature Press, 2009, 466
- [8] 徐士军,李智琳,杨建国,等.神经传导测定技术对腕管综合征病情评估的价值[J].现代生物医学进展,2014,14(28): 5503-5506

- Xu Shi-jun, Li Zhi-lin, Yang Jian-guo, et al. Value of Nerve Conduction Measurement for the Assessment of Carpal Tunnel Syndrome [J]. Progress in Modern Biomedicine, 2014, 14 (28): 5503-5506
- [9] Fok M, Leung HB, Lee WM. Evaluation of a Hong Kong Chinese version of a self-administered questionnaire for assessing symptom severity and functional status of carpal tunnel syndrome: cross-cultural adaptation and reliability [J]. Hong Kong Med J, 2007, 13(5): 342-347
- [10] Khan F, Shehna A, Ramesh S, et al. Subjective symptoms of carpal tunnel syndrome correlate more with psychological factors than electrophysiological severity [J]. Ann Indian Acad Neurol, 2017, 20 (1): 69-72
- [11] 何川,杨玉杰,张驰,等.正中神经掌-指III与腕-掌段感觉传导速度比值在腕管综合征中的诊断价值[J].中华医学杂志, 2016, 96(31): 2462-2465
- He Chuan, Yang Yu-jie, Zhang Chi, et al. Value of ratio of sensory nerves conductive velocity along palm-median finger/wrist-palm in diagnosing the carpal tunnel syndrome [J]. National Medical Journal of China, 2016, 96(31): 2462-2465
- [12] Gruber L, Gruber H, Djurdjevic T, et al. Gender influence on clinical presentation and high-resolution ultrasound findings in primary carpal tunnel syndrome: do women only differ in incidence? [J]. J Med Ultrason (2001), 2016, 43(3): 413-420
- [13] Oktayoglu P, Nas K, Kilinç F, et al. Assessment of the Presence of Carpal Tunnel Syndrome in Patients with Diabetes Mellitus, Hypothyroidism and Acromegaly [J]. J Clin Diagn Res, 2015, 9(6): OC14- OC18
- [14] 董贵鑫,韩克儒.针刀松解联合中医流派手法治疗腕管综合征的临床观察[J].中医药信息, 2016, 33(2): 81-84
- Dong Gui-xin, Han Ke-ru. Clinical observation on the treatment of carpal tunnel syndrome by needle knife loosening and traditional Chinese Medicine School manipulation [J]. Information of traditional Chinese Medicine, 2016, 33(2): 81-84
- [15] 张议元,杜元灏.针灸治疗腕管综合征的临床证据[J].江苏中医药, 2016, 48(4): 52-54, 55
- Zhang Yi-yuan, Du Yuan-hao. Clinical evidence of acupuncture and moxibustion in the treatment of carpal tunnel syndrome [J]. Jiangsu Journal of Traditional Chinese Medicine, 2016, 48(4): 52-54, 55
- [16] Kasundra GM, Sood I, Bhargava AN, et al. Carpal tunnel syndrome: Analyzing efficacy and utility of clinical tests and various diagnostic modalities[J]. J Neurosci Rural Pract, 2015, 6(4): 504-510
- [17] Klauser AS, Abd Ellah MM, Halpern EJ, et al. Sonographic cross-sectional area measurement in carpal tunnel syndrome patients: can delta and ratio calculations predict severity compared to nerve conduction studies? [J]. Eur Radiol, 2015, 25(8): 2419-2427
- [18] Chesterton LS, Dziedzic KS, Windt DAVD, et al. The clinical and cost effectiveness of steroid injection compared with night splints for carpal tunnel syndrome: the INSTINCTS randomised clinical trial study protocol [J]. BMC Musculoskeletal Disorders, 2016, 17(1): 415
- [19] 叶爱萍,邹燃.电针配合穴位注射治疗腕管综合征疗效观察[J].上海针灸杂志, 2014, 33(10): 941-942
- Ye Ai-ping, Zou Ran. Observations on the Efficacy of Electroacupuncture plus Acupuncture Point Injection in Treating Carpal Tunnel Syndrome [J]. Shanghai Journal of Acupuncture and Moxibustion, 2014, 33(10): 941-942
- [20] 寿依群,蒋红,陈文君,等.电针联合神经肌腱滑行训练治疗轻中度腕管综合征的疗效观察[J].中华物理医学与康复杂志, 2017, 39(1): 38-42
- Shou Yi-qun, Jiang Hong, Chen Wen-jun, et al. Electroacupuncture and nerve and tendon gliding exercises can relieve mild to moderate carpal tunnel syndrome [J]. Chinese Journal of Physical Medicine and Rehabilitation, 2017, 39(1): 38-42

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- [21] Silvester W, Goldsmith D, Uchino S, et al. Percutaneous versus surgical tracheostomy: A randomized controlled study with long-term follow-up [J]. Crit Care Med, 2006, 34(8): 2145-2152
- [22] Raimondi N, Vial M R, Calleja J, et al. Evidence-based guidelines for the use of tracheostomy in critically ill patients [J]. J Crit Care, 2017, 38: 304-318
- [23] Bekele A, Tesfaye S. Fatal tracheo-innominate artery fistula associated with a tracheostomy tube at a teaching university hospital in addis ababa: case report and review of literature [J]. Ethiop Med J, 2015, 53(3): 155-158
- [24] Mahmood K, Wahidi M M. The Changing Role for Tracheostomy in Patients Requiring Mechanical Ventilation [J]. Clinics in Chest Medicine, 2016, 37(4): 741-751
- [25] Putensen C, Theuerkauf N, Guenther U, et al. Percutaneous and surgical tracheostomy in critically ill adult patients: a meta-analysis [J]. Crit Care, 2014, 18(6): 544
- [26] Brass P, Hellmich M, Ladra A, et al. Percutaneous techniques versus surgical techniques for tracheostomy [J]. Cochrane Database Syst Rev, 2016, 7: D8045
- [27] Johnson-Obaseki S, Veljkovic A, Javidnia H. Complication rates of open surgical versus percutaneous tracheostomy in critically ill patients [J]. Laryngoscope, 2016, 126(11): 2459-2467
- [28] Long B, Koyfman A. Resuscitating the tracheostomy patient in the ED [J]. The American Journal of Emergency Medicine, 2016, 34(6): 1148-1155
- [29] Ganuza J R, Forcada A G, Gambarrutta C, et al. Effect of technique and timing of tracheostomy in patients with acute traumatic spinal cord injury undergoing mechanical ventilation [J]. The Journal of Spinal Cord Medicine, 2013, 34(1): 76-84
- [30] Wang Qin, Liu Ye-hai, Wu Kai-le, et al. The application of high tracheostomy in forced posture [J]. Journal of Clinical Otorhinolaryngology Head and Neck Surgery, 2017(01): 74-76