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微型游离腓动脉穿支皮瓣修复术治疗手部小创面感染的效果及对血清炎症因子的影响*

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摘要 目的:探讨微型游离腓动脉穿支皮瓣修复在手部小创面感染中的应用效果及对血清炎症因子的影响。**方法:**选择 2014 年 10 月至 2016 年 10 月我院接诊的 90 例手部小创面患者,通过随机数表法分为观察组(n=45)和对照组(n=45),对照组行游离腹壁下动脉穿支皮瓣修复,观察组行微型游离腓动脉穿支皮瓣修复。比较两组患者手术效果、血清白介素(IL)-6、IL-8、干扰素(INF)- γ 、肿瘤坏死因子(TNF)- α 、降钙素原(PCT)、超敏 C 反应蛋白(hs-CRP)水平的变化及感染发生率。**结果:**与手术前比较,两组患者手术后白介素(IL)-6、IL-8、干扰素(INF)- γ 、肿瘤坏死因子(TNF)- α 、降钙素原(PCT)、超敏 C 反应蛋白(hs-CRP)、红细胞沉降率(ESR)水平均显著升高($P<0.05$),且观察组以上指标均显著低于对照组($P<0.05$)。观察组术后优良率明显高于对照组[86.67%(39/45)vs64.44%(29/45)]($P<0.05$),术后感染率显著低于对照组[2.22%(1/45)vs17.78%(8/45)]($P<0.05$)。**结论:**微型游离腓动脉穿支皮瓣修复治疗手部小创面的临床效果显著,术后炎症反应轻,感染发生率低。

关键词:手部小创面;微型游离腓动脉穿支皮瓣修复;感染;炎症因子

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Clinical Effect of Free Peroneal Artery Perforator Flap on the Small Wound of Hand Infection and Its Effects on the Serum Inflammatory Factors*

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ABSTRACT Objective: To study the clinical effect of free peroneal artery perforator flap on the small wound of hand infection and its effects on the serum inflammatory factors. **Methods:** 90 patients with small wound of hand who were treated in our hospital from October 2014 to October 2016 were selected and divided into the observation group (n=45) and the control group (n=45). according to the random number table. The control group was treated with inferior epigastric artery perforator flap repair, while the observation group was treated with free peroneal artery perforator flap. Then the operative effect and serum interleukin (IL)-6, IL-8, interferon (INF)- γ , tumor necrosis factor (TNF)- α , procalcitonin(PCT), high sensitive C reactive protein(hs-CRP) levels before and after treatment as well as the incidence of infection were compared between two groups. **Results:** Compared with those before operation, the levels of serum IL-6, IL-8, INF- γ , TNF- α , procalcitonin(PCT), high sensitive C reactive protein(hs-CRP), erythrocyte sedimentation rate (ESR) of both groups were significantly decreased, which were obviously lower in the observation group than those of the control group($P<0.05$); the excellent and good rate after operation in the observation group was higher than that of the control group ($P<0.05$); the infection rate of the observation group was lower than that of the control group ($P<0.05$). **Conclusion:** Free peroneal artery perforator flap was effective and safe for small wound of hand, which could significantly inhibit the inflammatory response and decrease the postoperative infection.

Key words: Small wound of hand; Free peroneal artery perforator flap; Infection; Inflammatory factor

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前言

手部小创面在临床上十分常见,多数患者需进行皮瓣修复治疗,近年来多使用游离皮瓣修复软组织缺损的方式,效果尚可^[1]。随着手术技术的不断发展以及人们对术后美观等要求的

提高,对于皮瓣选取部位的研究也越来越多,选择效果优异且美观程度高的皮瓣供区已成为研究的重点^[2]。近年来,较多研究显示穿支皮瓣有着令人满意的独立穿支血管供血,可保持肌肉营养的供给,效果显著^[3,4]。在手部小创面的修复中,感染作为最重要的并发症会对治疗效果造成严重影响,也是对手术方式进

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行评估的重要依据^[5]。本研究采用游离腹壁下动脉穿支皮瓣修复以及微型游离腓动脉穿支皮瓣修复的方式治疗手部小创面患者,并比较其术后感染发生率及对相关血清炎症因子的影响,现报道如下。

1 资料与方法

1.1 一般资料

选择2014年10月至2016年10月我院接诊的90例手部小创面患者,均在受伤后12h接受治疗,所有患者均同意参与此次研究。排除标准^[6]:①伴有糖尿病、心脏病、下肢动脉闭塞症,不可参加此次研究;②伴有泌尿系统、呼吸系统等其余部位感染,不适合此次研究。通过随机数表法分为观察组 and 对照组,各45例。观察组男26例,女19例,年龄18~59岁,平均(36.59±4.41)岁;病灶部位:手背33例,手臂12例;车祸伤21例,压砸伤16例,其余8例。对照组男28例,女17例,年龄19~57岁,平均(36.71±4.25)岁;病灶部位:手背31例,手臂14例;致伤原因车祸伤23例,压砸伤15例,其余7例。本次研究已获得我院伦理委员会批准,两组患者的性别、年龄、病灶部位、致伤原因比较差异无统计学意义($P>0.05$),具有可比性。

1.2 治疗方法

对照组行游离腹壁下动脉穿支皮瓣修复:常规麻醉后,采取平卧位,标记所需皮瓣大小等内容,分开腹直肌,游离血管蒂,分离腹壁下动脉后,进行结扎等处理,将其游离分离和切取后,覆盖及修复手部创面。

观察组行微型游离腓动脉穿支皮瓣修复:根据创面部位和大小进行皮瓣面积设计,皮瓣面积略大于创面,将穿支血管作为中心,切取皮瓣,并将其覆盖在创面上,随后对神经、血管以及其余地方的缝合吻合处理。

1.3 观察指标

在手术前后采集患者空腹静脉血3mL,测定白介素(IL)-6、IL-8、干扰素(INF)- γ 、肿瘤坏死因子(TNF)- α 、降钙素原(PCT)、超敏C反应蛋白(hs-CRP)、红细胞沉降率(ESR)的变化,检测方式均使用ELISA法,试剂盒来自北京东亚免疫研究所提供。并记录术后感染率,感染判定标准根据相关文献^[7]。

1.4 疗效评定标准^[8]

优:患手部位功能得到完全恢复;良:患手部位恢复程度达到健侧的75%以上;可:患手部位恢复程度到健侧的50%~75%;差:患手部位恢复程度不足健侧的50%。

1.5 统计学分析

数据用SPSS18.0软件包处理,计量资料用均数±标准差($\bar{x} \pm s$)表示,并采用t检验,计数资料的比较采用 χ^2 检验, $P<0.05$ 表示差异具有统计学意义。

2 结果

2.1 两组患者术后优良率比较

观察组术后优良率(86.67%)显著高于对照组(64.44%)($P<0.05$),见表1。

表1 两组患者术后优良率比较(例,%)

Table 1 Comparison of the excellent and good rate between two groups after operation (n, %)

Groups	Excellent	Good	Fair	Poor	The excellent and good rate
Observation group(n=45)	23(51.11)	15(33.33)	6(13.33)	1(2.22)	39(86.67)*
Control group(n=45)	13(28.89)	16(35.56)	11(24.44)	5(11.11)	29(64.44)

Note: Compared with the control group, * $P<0.05$.

2.2 两组患者手术前后血清 IL-6、IL-8、INF- γ 、TNF- α 水平比较

手术前,两组患者血清 IL-6、IL-8、INF- γ 、TNF- α 水平比较差异无统计学意义($P>0.05$);手术后,两组患者血清 IL-6、IL-8、

INF- γ 、TNF- α 水平均较术前显著升高($P<0.05$),且观察组以上指标水平均比对照组显著降低($P<0.05$),见表2。

表2 两组患者手术前后血清 IL-6、IL-8、INF- γ 、TNF- α 水平比较($\bar{x} \pm s$)

Table 2 Comparison of the levels of serum IL-6, IL-8, INF- γ and TNF- α between two groups before and after operation($\bar{x} \pm s$)

Groups		IL-6(pg/mL)	IL-8(pg/mL)	INF- γ (pg/mL)	TNF- α (ng/mL)
Observation group (n=45)	Before operation	7.29±1.15	9.45±1.29	15.48±1.75	2.03±0.29
	After operation	8.94±1.35**	15.74±2.64**	16.79±1.94**	2.38±0.35**
Control group(n=45)	Before operation	7.34±1.13	9.52±1.25	15.41±1.77	2.08±0.25
	After operation	11.34±1.84*	19.40±2.79*	20.04±2.18*	3.19±0.57*

Note: Compared with the same group before operation, * $P<0.05$; Compared with the control group after operation, ** $P<0.05$.

2.3 两组患者手术前后血清 PCT、hs-CRP、ESR 水平比较

手术前,两组患者血清 PCT、hs-CRP、ESR 水平比较差异无统计学意义($P>0.05$);手术后,两组患者血清 PCT、hs-CRP、ESR 水平均较术前显著升高($P<0.05$),且观察组以上指标均

比对照组显著降低($P<0.05$),见表3。

2.4 两组患者术后感染率比较

观察组术后出现1例感染,对照组出现8例感染,观察组感染率显著低于对照组[2.22%(1/45)vs17.78%(8/45)]($P=0.014$)。

表3 两组患者手术前后血清 PCT、hs-CRP、ESR 水平比较($\bar{x} \pm s$)Table 3 Comparison of the levels of serum PCT, hs-CRP and ESR between two groups before and after operation($\bar{x} \pm s$)

Groups		PCT(ng/mL)	hs-CRP(mg/L)	ESR(mm/h)
Observation group(n=45)	Before operation	2.58± 0.34	5.45± 0.68	7.65± 1.14
	After operation	4.12± 0.79* [#]	7.89± 1.04* [#]	9.48± 1.39* [#]
Control group(n=45)	Before operation	2.63± 0.31	5.41± 0.72	7.79± 1.11
	After operation	7.84± 1.35*	11.43± 1.66*	13.35± 1.78*

Note: Compared with the same group before operation, *P<0.05; Compared with the control group after operation, [#]P<0.05.

3 讨论

目前,临床上对各类游离皮瓣在手足缺损治疗中的研究较多,主要倾向于腹部皮瓣、胸脐皮瓣等,但这些方式具有一些缺点,例如皮瓣厚度过大、美观程度不理想等,对术后恢复也有所影响^[9]。微型游离腓动脉穿支皮瓣修复是近年来新起的一种皮瓣修复方式,具有血管佳、皮瓣厚度低、供区隐蔽等特点,在手足部位均可适用^[10]。此外,Scaglioni MF 等^[11]学者证实微型游离腓动脉穿支皮瓣修复可避免损伤主要动脉,且可控制对供皮区的肌肉不良影响,不易出现误伤,同时由于该部位的皮下脂肪较少,在外形上不显臃肿,美观价值高。

研究表明在创面修复手术中,若患者出现术后感染,则会影响到术后恢复,甚至导致手术失败^[12,13],而血清炎症因子水平可在一定程度上反映感染程度。IL-6、IL-8、IFN- γ 、TNF- α 在创伤后炎症反应过程发挥着重要的作用,在机体出现全身感染时,其在血清中的浓度会迅速增加。TNF- α 主要由单核巨噬细胞所产生,生物学活性较广,在炎症级联反应过程中最先被激活的,和其余细胞因子之间具有十分复杂的相互作用,可诱导 IL-6、IL-8 等细胞因子的产生^[14]。IL-6 主要在纤维细胞、巨噬细胞、内皮细胞等中生产,可诱导 B 细胞的分化,并分泌免疫球蛋白,在判断机体感染中具有较高的敏感度和特异度^[15]。IL-8 又被称作中性粒细胞激活肽,主要由巨噬细胞、单核细胞、内皮细胞、T 细胞等多种细胞所产生,是重要的免疫调节因子和炎症介质,在内皮细胞的粘附过程中产生着重要的作用^[16]。IFN- γ 是由 Th1 细胞所分泌,在介导细胞免疫中也发挥着重要的作用,其主要是和 Th2 所分泌的 IL-4 之间产生相互拮抗的作用,使 Th1/Th2 维持一种平衡状态,其中 IL-4 产生抗炎效应,IFN- γ 则产生促炎效应^[17]。本次研究结果显示两种方式治疗的患者血清 IL-6、IL-8、IFN- γ 、TNF- α 水平均较术前显著升高,但应用微型游离腓动脉穿支皮瓣修复的患者上升水平较低,这与 Kneser U 等^[18]的研究具有相似性。

除了以上促炎细胞因子外,PCT、hs-CRP、ESR 等炎症应激相关指标也具有重要的作用。PCT 在临床上判断机体感染中是常用的标志物,其作为降钙素的前体在正常情况下含量较低,但在全身炎症反应状态例如细菌感染、细胞内毒素、炎症细胞因子等的影响下,PCT 会在许多组织中产生和分泌,血清中 PCT 水平会迅速升高^[19]。hs-CRP 属急性反应蛋白,在机体遭到感染或创伤后,其表达水平会急剧增加,在炎症反应中是一种高能预警因子^[20]。ESR 在临床检验感染中也十分常用,在机

体处于感染状态、炎症、组织损伤时,红细胞会发生相互重叠,随后呈"缗钱"状,使血浆带来的阻力降低,增加 ESR 的表达^[21]。ESR 主要指红细胞在一定条件下所达到的沉积速度,在正常的血沉值上,其搏动范围较小,而在病理状况下,其表达可迅速上升^[22]。本研究结果显示微型游离腓动脉穿支皮瓣修复的患者手术后 PCT、hs-CRP、ESR 水平的表达要比游离腹壁下动脉穿支皮瓣修复的患者要低,分析原因可能和该方式不损伤主要动脉,误伤率较低,因此对患者的造成的炎性刺激较轻。此外,应用微型游离腓动脉穿支皮瓣修复的患者,仅有 1 例发生感染,术后手部创面恢复优良率高达 86.67%,而应用游离腹壁下动脉穿支皮瓣修复的患者有 8 例感染,优良率为 64.44%,肯定了微型游离腓动脉穿支皮瓣修复对患者术后感染的控制效果优异,且患者术后可得到更加满意的恢复。

综上所述,微型游离腓动脉穿支皮瓣修复治疗手部小创面的临床效果显著,术后炎症反应轻,感染发生率低。

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