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足踝骨肿瘤切除后采用腓肠神经营养血管皮瓣术的修复效果及对运动功能的影响 *

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摘要 目的:探讨足踝骨肿瘤切除后采用腓肠神经营养血管皮瓣术的修复效果及对运动功能的影响。**方法:**选取我院 2013~2019 年收治的足踝骨肿瘤切除患者 83 例,应用随机分组法将其分为研究组 41 例和对照组 42 例。对照组患者应用以往清创换药的保守修复方法,研究组患者应用腓肠神经营养血管皮瓣术修复方法,对比两组患者的治疗总有效率与致残率、住院费用、住院时间以及治疗前后运动功能的变化。**结果:**治疗后,研究组的总有效率为 90.24%,显著高于对照组(64.29%, $P<0.05$);两组患者住院花费比较差异无统计学意义($P>0.05$);研究组患者的住院天数上明显短于对照组($P<0.05$);研究组患者的致残率为 2.44%,明显低于对照组(16.67%, $P<0.05$);研究组患者修复后的 Fugl-Meyer 下肢运动功能评定(Fugl-Meyer assessment, FMA)和 Berg 平衡量表(Berg Balance Scale, BBS)评分均明显高于对照组($P<0.05$)。**结论:**腓肠神经营养血管皮瓣术修复术较清创换药的保守修复方法可以更有效修复足踝骨肿瘤广泛切除术后患者足踝部的创伤面,改善患者运动功能,且手术方法相对简单,安全性更高。

关键词:足踝骨肿瘤;腓肠神经营养血管皮瓣术;修复效果;运动功能

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Effect of Sural Neurovascular Flap and Its Influence on Motor Function after Tumor Resection of Foot and Ankle*

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ABSTRACT Objective: To investigate the effect of sural neurovascular flap and its influence on the motor function after tumor resection of foot and ankle. **Methods:** 83 patients with ankle tumor resection in our hospital from 2013 to 2019 were randomly divided into the research group (41 cases) and the control group (42 cases). Patients in the control group were treated by conservative methods of debridement and dressing change. Patients in the research group were treated by sural neurovascular flap. The total effective rate, disability rate, hospitalization cost, hospitalization time and changes of motor function before and after treatment were compared between the two groups. **Results:** After treatment, the total effective rate of research group was 90.24%, which was significantly higher than that of the control group (64.29%, $P<0.05$). There was no significant difference in the hospitalization cost between the two groups ($P>0.05$). The hospitalization time in the research group was significantly shorter than that in the control group ($P<0.05$). The disability rate of research group was 2.44%, which was significantly lower than that of the control group (16.67%, $P<0.05$). The scores of Fugl-Meyer assessment (FMA) and Berg Balance Scale (BBS) in the research group were significantly higher than those in the control group ($P<0.05$). **Conclusion:** Sural neurovascular flap is more effective than the conservative methods of debridement and dressing change, which can more effectively repair the injured surface after extensive resection of foot and ankle tumor, improve the patients' motor function, and the operation method is relatively simpler and safer.

Key words: Tumor of foot and ankle; Sural neurovascular flap; Repair effect; Motor function

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前言

足踝骨和软组织肿瘤占全身的 3%。据国防病理研究所统计,3%的成骨肿瘤发生在足踝部,8%的良性软组织肿瘤和 5%

的恶性软组织肿瘤发生在足踝部^[1]。由于踝关节骨肿瘤切除后周围软组织条件差,易出现骨感染,其功能修复不仅需要彻底切除感染病灶,闭合伤口,恢复肢体正常形态,还需要局部的耐

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磨和运动功能。对于足踝骨肿瘤切除后的创伤,既往常采用清创换药的保守治疗,存在许多缺点,如无磨损、无感觉、易损伤或损伤大、致残率高等。我院经多年临床实践,发现腓肠神经营养血管皮瓣修复有手术简单、耐磨性好、致残率低、运动功能恢复好等优点,可减轻足踝骨肿瘤切除后损伤。因此,本研究选取我院 2013-2019 年收治的足踝骨肿瘤切除患者 83 例作为研究对象,主要比较了腓肠神经营养血管皮瓣术对患者足踝部修复效果及对运动功能的影响,具体报道如下。

1 资料与方法

1.1 一般资料

选取我院 2013~2019 年我院收治的足踝骨肿瘤切除患者 83 例,采用随机分组法分为研究组和对照组,研究组 41 例,对照组 42 例,两组患者的足踝骨肿瘤均为良性。对照组患者中,男性 24 例,女性 18 例;年龄(33.7 ± 2.5)岁;修复跟腱区域 18 例,外踝及足背外侧区 13 例,内踝及足内侧区 7 例,足跟及足底后半部 4 例。研究组患者中,男性 22 例,女性 19 例;年龄(34.5 ± 2.6)岁;修复跟腱区域 16 例,外踝及足背外侧区 15 例,内踝及足内侧区 8 例,足跟及足底后半部 2 例。两组一般资料对比差异无统计学意义($P > 0.05$),具有可比性。

1.2 治疗方法

对照组给予清创、换药、抗感染等基础治疗。研究组在对照组基础上给予腓肠神经营养血管皮瓣术修复治疗,方法为:①设计皮瓣:术前先采用多普勒血流检测仪检测患者的血管,标记外踝以上 5~6 cm、腓动脉最低吻合支的肌皮瓣点。以外踝中点至腓窝中点为轴,在外踝上方 5 cm 腓动脉穿支处设计皮瓣,使皮瓣的设计面积大于损伤面积 10%~20%^[4]。②手术步骤:完全清创创面坏死组织及死骨。取创面的分泌物进行细菌培养及药敏试验。对于严重感染或骨髓炎的患者,置引流管连续冲洗。在深筋膜下切开皮瓣远端及两侧皮肤,保留神经皮瓣

的营养血管、小隐静脉及腓肠内侧动脉穿支血管。分离皮瓣,切开腓肠神经近端,经结扎缝合后在切口外保留结扎线。断续缝合可固定皮肤及皮下组织,避免影响皮瓣的血液循环^[5]。皮瓣蒂宽 2.5 cm 以上,术后 2~3 d 结扎血管,术后 10~14 d 重建血管网。第二阶段采用逆行腓肠神经营养血管皮瓣修复。皮瓣旋转 180°。当皮瓣宽度 <6 cm 时,直接缝合,皮瓣厚度 >6 cm。

1.3 观察指标与疗效判定标准

观察两组的致残率、手术时间、失血及愈合情况。观察两组的 FMA 与 BBS:①运动功能采用 FMA 下肢部分进行评分,共 17 项,每项最低 0 分、最高 2 分,总分最高分为 34 分,得分越高说明运动功能越好^[6];②平衡功能采用 BBS 进行评分,共 14 个条目,每个条目按 5 个等级评分,分别为 0、1、2、3、4 分,总分最高分为 56 分,得分越高说明平衡功能越好^[9]。

疗效判定标准^[9]:患者的皮瓣基本成活,皮瓣颜色呈红色,供血顺畅,大体与周围皮肤接近,未发生感染为显效;皮瓣部分坏死,皮瓣坏死面积低于 50%;皮瓣完全坏死,皮瓣坏死面积高于 50%为有效;皮瓣坏死:血供情况糟糕,皮瓣下可见些分泌物,皮瓣颜色呈深紫色或黑色,皮瓣与周围组织连接不畅为无效。总有效率 = 显效率 + 有效率。

1.4 统计学方法

采用 SPSS 24.0 软件分析本次研究数据,以平均数 $\pm$ 标准差($\bar{x} \pm s$)表示计量资料,组间比较采取 t 检验;以 n(%)表示计数资料,组间比较采取 t 检验。以 $P < 0.05$ 为差异有统计学意义。

2 结果

2.1 两组治疗后修复效果的对比

治疗后,对照组修复总有效率为 64.29%,研究组修复的总有效率为 90.24%,较对照组显著升高,差异具有统计学意义($P < 0.05$),见表 1。

表 1 两组治疗后修复效果的对比(例,%)

Table 1 Comparison of the repair effects between two groups after treatment(n,%)

Groups	n	Marked effect	Effective	Invalid	Total efficiency
Research group	41	14(34.15)	23(56.10)	4(9.76)	37(90.24)*
Control group	42	10(29.27)	17(43.90)	15(26.83%)	30(64.29)

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

2.2 两组住院花费、住院时间和致残率情况的对比

两组住院花费比较差异无统计学意义($P > 0.05$);研究组的

住院天数上明显短于对照组($P < 0.05$),致残率明显低于对照组($P < 0.05$),见表 2。

表 2 两组手术时间、失血及愈合情况和致残率的对比

Table 2 Comparison of the operation time, blood loss, healing status and disability rate between the two groups

Groups	n	Hospitalization cost (yuan)	Hospitalization time (days)	Disability rate [n (%)]
Research group	41	4780.45 $\pm$ 400.52	16.21 $\pm$ 10.31*	1(2.44)*
Control group	42	4652.24 $\pm$ 400.20	30.47 $\pm$ 10.89	7(16.67)

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

2.3 两组修复前后 FMA 和 BBS 评分的对比

两组在修复前 FMA 和 BBS 评分对比无明显统计学差异

($P > 0.05$);修复后,研究组的 FMA 和 BBS 评分均明显高于对照组($P < 0.05$),见表 3。

表 3 两组修复前后 FMA 和 BBS 评分的比较($\bar{x} \pm s$, 分)

Table 3 Comparison of the FMA and BBS scores between two groups before and after repair ($\bar{x} \pm s$, score)

Groups	n	FMA		BBS	
		Before repair	After repair	Before repair	After repair
Research group	41	15.94 $\pm$ 2.35	24.47 $\pm$ 4.52* [#]	34.84 $\pm$ 5.49	46.09 $\pm$ 4.24* [#]
Control group	42	15.08 $\pm$ 2.25	18.33 $\pm$ 4.45*	34.02 $\pm$ 6.11	38.57 $\pm$ 4.14*

Note: compare with the same group before repair, * $P < 0.05$, compared with the control group after treatment, [#] $P < 0.05$.

3 讨论

足踝部创伤的原因复杂多样,如挤压伤、摔伤、割伤、肿瘤、糖尿病、压疮、电击伤等^[7]。无论病因如何,足、踝关节创伤中常暴露骨、关节、神经等深层组织缺损,感染发生率高,严重影响患者的运动功能^[8,9]。足踝的解剖结构复杂。一般认为只有跖骨有明显的骨间隔边界,其他区域被认为是骨间隔(中足和后足)^[10,11]。因此,即使是低级别肿瘤,也很难获得合适的切除边缘,实现肿瘤的完全切除。截肢是足踝跖骨外恶性肿瘤唯一有效可行的根治性切除方法。对于良性肿瘤,应尽量采用小切口治疗,既能缩短手术时间,又能缩短患者的康复时间^[12,13]。

近年来,皮瓣修复创面得到了广泛的应用,一般可分为三类:传统的十字腿皮瓣、带蒂皮瓣和各种游离皮瓣^[14,15]。随着治疗水平的不断提高,小腿交叉皮瓣已不是修复足踝部软组织缺损的最佳选择,腓肠神经血管皮瓣常被用于修复。足踝的深部创伤常伴有暴露骨关节、神经等深层组织^[16,17],导致出现组织感染^[18]。常规的换药、理疗等治疗可以改善创面条件,减少分泌物,但创面仍难以自愈,且会出现一系列并发症^[19]。皮瓣修复有丰富的血供和强抗感染能力,可以覆盖和保护重要的深层组织,最大限度地恢复缺损的外观和功能^[20,21]。随着显微技术和新皮瓣的发展,皮瓣移植优势显著^[22,23]。然而,皮瓣类型的选择必须基于病变的局部组织状况和患者的身体状况^[24]。满足受区重建效果最大化的同时,也要减少供区继发性损伤的程度^[25,26]。目前,临床已对组织移植手术总结出许多共同的原则,主要遵循"以二次组织修复重要组织^[27,28];先带蒂移植,再吻合血管"的原则,先分支血管再主血管,以最小的创伤达到最大的修复^[29,30]。

腓肠神经血管皮瓣术以腓动脉在小腿后外侧肌间隔的最远侧的一个穿支为血供来源,腓肠神经走行方向作为皮瓣的轴心线,血供十分可靠,且可通过吻合皮神经重建感觉,为足踝部软组织缺损创面修复提供了一个较好的选择,具有手术操作简单,手术时间短,供区损伤小,皮瓣存活率高等优点^[31]。该术式能够提供较大的血运范围,且滋养血管发出和分布也较为恒定,较长的皮瓣蒂最远可修复至跖趾关节水平处,且修复创伤面后不臃肿,即耐磨又较美观,均为患者获得良好的修复效果提供了基础^[31]。本研究结果通过对比两组的住院时间、和住院花费,发现腓肠神经血管皮瓣术对患者的失血及愈合情况效果更好,致残率低,且不会增加患者的治疗花销;修复后,研究组患者的 FMA 和 BBS 评分明显高于对照组,表明腓肠神经血管皮瓣术后均有一定程度的感觉恢复,对于非负重区恢复较好。

总之,腓肠神经血管皮瓣术修复术较清创换药的保守

修复方法可以更有效修复足踝骨肿瘤广泛切除术后患者足踝部的创伤面,改善患者运动功能,且手术方法相对简单,安全性更高。

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