·经验交流·

半比目鱼肌瓣桥式移植修复小腿下端软组织缺损

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【摘要】 **目的**: 探讨半比目鱼肌瓣桥式带蒂移植修复小腿下端软组织缺损临床应用结果。**方法**: 自 2008 年 1 月至 2012 年 1 月, 应用半比目鱼肌瓣桥式移植修复小腿下端软组织缺损 12 例, 男 8 例, 女 4 例; 年龄 22~50 岁, 平均为 34 岁; 伤后时间 2~6 周, 平均 3.5 周。肌瓣表面行Ⅰ期中厚网状游离植皮, 供区直接缝合。**结果**: 肌瓣全部成活。术后随访 1.8~4 年, 平均为 2.8 年。胫、腓骨骨折全部愈合, 受区外形较好。下肢功能按 LEM 标准评定, 优 6 例, 良 5 例, 尚可 1 例。**结论**: 这种技术很适宜当伤肢仅有 1 条主要血管时伴有软组织缺损的修复, 减轻了对供区的损伤。

【关键词】 软组织损伤;　外科皮瓣;　修复外科手术;　胫骨骨折
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Repairing soft tissue defect coverage in lower leg with a bridge shaped medial hemisleus muscle flap transplantation

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ABSTRACT　**Objective**: To summarize clinical application results of repairing soft tissue defect in lower leg with a bridge shaped medial hemisleus muscle flap pedicle transplantation. **Methods**: From January 2008 to January 2012, 12 patients with soft-tissue defect in lower leg underwent reconstruction with a bridge shaped medial hemisleus muscle flap pedicle transplantation. There were 8 males and 4 females with an average age of 34 years old ranging from 22 to 50 years old. Time after injury was from 2 to 12 weeks (means, 3.5 weeks). The immediate coverage of the muscle flaps were performed by a meshed split-thickness skin graft. The donor site was closed directly. **Results**: All the muscle flaps had survived completely. Follow-up period ranged form 1.8 to 4.0 years (means, 2.8 years) postoperatively. The tibia and fibula fractures were confirmed healing. A good contour was confirmed at the recipient area. The results were evaluated with LEM questionnaire, excellent results were obtained in 6 cases, good in 5 cases and fair in 1 case. Satisfactory clinical results were obtained in 11 cases. **Conclusion**: This technique is particularly useful for repairing soft tissue defect in the injured leg when only one vessel remains, and can reduce injury to donor site.

KEYWORDS　Soft tissue injuries;　Surgical flaps;　Reconstructive surgical procedures;　Tibial fractures
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小腿下端在解剖学上的特点是腱性组织多, 肢体主要血管相对浅, 肌肉包裹骨质少, 胫骨在前并与内侧位于皮下。因而, 一旦发生高能量损伤常发生胫前软组织缺损伴骨与肌腱外露以及肢体主要血管损伤或缺损, 难以用常规局部带蒂皮瓣转移和吻合血管的组织移植修复[1], 需利用健肢血管行桥式交叉吻合技术修复。2008 年 1 月至 2012 年 1 月, 应用不吻合血管的健肢半比目鱼肌瓣桥式移植修复小腿下端软组织缺损取得满意效果。

1　临床资料

本组 12 例, 男 8 例, 女 4 例; 年龄 22~50 岁, 平均 34 岁。均为小腿下 1/3 高能量损伤, 导致胫腓骨骨折伴有软组织缺损骨与肌腱外露, 创面均有不同程度的感染和炎性肉芽与坏死组织。创面大小: 5 cm×10 cm~6 cm×14 cm。致伤原因: 交通事故伤 6 例, 重物砸伤 4 例, 机械性损伤 2 例。左侧 8 例, 右侧 4 例。均为陈旧性损伤病例, 伤后时间 2~6 周, 平均 3.5 周。临床检查: 健肢行胫后动脉阻断试验显示正常, 患足末梢循环良好。本组病例均无可供利用的局部带蒂皮瓣。均有小腿主要血管损伤, 其中胫前动脉损伤 8 例, 胫后动脉损伤 4 例。

2　手术方法

选用连续硬膜外麻醉, 取平卧位, 患侧臀部垫软枕, 使身体向健侧稍倾斜。先行受区清创, 确定应切取的肌瓣大小后, 碘伏纱布添塞包扎, 再行供区手术。在充气止血带下行胫骨后缘内侧纵行切口, 从中上部切至跟腱与内踝之间上 6 cm 处。注意保护隐神经与大隐静脉。切开筋膜后可见腓肠肌, 其下有跖肌腱通过, 该肌腱是比目鱼肌和腓肠肌的分界标志, 其上为腓肠肌, 其下为比目鱼肌, 用手指很容易将此两

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图 1　患者，男，38 岁，左小腿远端大面积软组织缺损(15 cm×10 cm)伴胫前动脉损伤，用右内侧半比目鱼肌瓣桥式带蒂移植修复，肌瓣表面行网孔状游离植皮　**1a.** 术前创面情况　**1b.** 术中植皮后外观　**1c.** 术后 26 d 断蒂后双小腿外形　**1d，1e.** 术后半年双小腿正位观、左侧观

Fig.1　A 38-year-old male patient with large area soft tissue defects in the distal end of the left leg (15 cm×10 cm) with anterior tibial artery injury underwent reconstruction with a bridge shaped right medial hemisleus muscle flap pedicle transplantation. The immediate coverage of the muscle flaps were performed by a meshed split-thickness skin graft　**1a.** Preoperative view of wound　**1b.** Intraoperative view after skin graft　**1c.** Postoperative appearance of the legs at 26 days after pedicle was severed　**1d，1e.** Postoperative appearance of the legs at 6 months of anterior and the left side view

肌分离开。将比目鱼肌与腓肠肌充分分离后，比受区创面稍大在比目鱼肌内侧半上部用电凝标出需要切取的肌瓣大小。切断比目鱼肌在胫骨的附着，向后牵开比目鱼肌就能充分显露胫后血管与胫神经，将胫神经与胫后血管分离，保留上部与比目鱼肌内侧半的连接，结扎其余分支，胫后动脉阻断试验显示正常后，在供应肌瓣的血管分支之上，将胫后血管切断结扎，同半比目鱼肌瓣向下翻转，行血管蒂表面网孔状植皮。将双小腿平行并拢后，用外固定支架临时固定，用肌瓣修复对侧小腿创面并行表面网孔状植皮。缝合供区切口，术后 2 周开始行断蒂训练，阻断血运 1 h，肌瓣血运不受影响时可断蒂。

3　结果

本组行比目鱼肌瓣移植术后经过顺利，未出现肌瓣血运障碍。肌瓣和血管蒂部植皮全部成活，肌瓣上植皮 9 例全部成活，3 例发生小块的植皮坏死，经 2 周局部换药逐渐愈合，伤口愈合良好。断蒂时间 19~27 d，平均 21 d。胫腓骨骨折术后 18~28 周均达到临床愈合。术后随访 1.8~4 年，平均 2.8 年，骨折愈合牢固，肢体功能基本恢复，受区皮瓣外形良好。供区与受区愈合满意，供区仅有一线形切口线，外形较好，无明显功能丧失。受区术后 3 个月移植的肌瓣略显臃肿，但其后逐渐消退，没有行肌瓣修薄术。下肢功能按 Jaglal 等[2]提出的 LEM(lower extremity measure，LEM)标准评定：优，行走没一点困难，跪下和做较重的家务时有一点困难；良，上下楼梯有一点困难，跪下极其困难，外出买东西没有困难，做较重的家务时有一点困难；尚可，上下楼梯和外出有中度困难，乘公共交通工具、外出买东西和跪下极其困难或不能做；差，很难体验到任何活动，洗澡、穿衣和行走有中度困难。本组优 6 例，良 5 例，尚可 1 例。典型病例见图 1。

4　讨论

4.1　本术式的优点　①当患肢骨与肌腱外露创面难以用常规局部带蒂皮瓣转移和吻合血管的组织移植修复时，充分利用了健肢以胫后血管为蒂的半比目鱼肌瓣桥式修复，其血管口径粗，血供丰富，抗感染作用好。本组创面均有不同程度的感染和炎性肉芽与坏死组织，经清创，肌瓣移植后受区愈合均较满意。②其血管蒂较长，将双腿平行位就能完成桥式带蒂肌瓣移植术，与传统交腿组织移植的术式相比，大大减轻了患者的痛苦，术后便于护理。③采用血管蒂上植皮技术，无须再从供区小腿切取皮瓣，做皮管保护血管蒂，简化了手术操作，缩短了手术时间，减轻了对供区肢体的损伤。修复后的受区与供区外形较好，无须行肌瓣修薄术。④由于血管蒂长，有利于对肌瓣血运的观察，可较早地进行断蒂训练，使断蒂操作简单化。早期行断蒂训练，促进了肌瓣与受区侧支

循环的建立,达到了早期断蒂的目的,缩短双腿固定时间,有利于患者康复。⑤肌瓣既可覆盖软组织缺损创面,还能充填局部的死腔[3-5]。而且,肌瓣移植后的在局部的抗感染作用也优于皮瓣或筋膜瓣[1,6]。⑥肌瓣为带蒂转移,没有行血管吻合,手术操作相对容易、安全、成功率高。

4.2 如何掌握手术适应证　笔者认为:该术式的适应证应限制在胫前软组织缺损伴骨与肌腱外露以及肢体主要血管损伤或缺损,难以用常规局部带蒂皮瓣转移和吻合血管的组织移植修复者[1],与以往报道利用健肢血管行桥式交叉吻合技术修复的适应证相似[7]。由于该术式无须行血管吻合,手术操作相对容易、安全、成功率高,无须用显微外科操作技术与条件,在拟行利用健肢血管行桥式交叉吻合技术修复时,笔者主张先选择该术式,因为应用小血管吻合技术耗时、费力且有一定的失败率[8-10]。

4.3 操作注意事项　①术前或术中切断胫后血管前,都要行胫后动脉阻断试验,术前显示不正常是手术禁忌证,术中显示不正常则不能切断胫后血管。②根据受区创面在患肢上的高低确定半比目鱼肌切取位置的高低。创面偏高者肌瓣切取偏高,反之,创面偏低者肌瓣切取偏低。③比目鱼肌解剖学上的特点是,上端厚而下端薄,当受区死腔需肌瓣充填的量大时,可偏上切取肌瓣,反之,当受区死腔需肌瓣充填的量小时,可偏下切取肌瓣。④血管蒂周围组织不要剥离太多,适量的筋膜组织在血管蒂上,有利于耐牵拉和保护血管蒂[11-12]。⑤应先将小腿试行并拢,确定血管蒂的最佳位置,进行下一步操作。⑥肌瓣在修复受区前应先行血管蒂部植皮,因为一旦肌瓣修复了受区创面,血管蒂在两腿之间活动的空间很小,给血管蒂部植皮带来困难。笔者认为先蒂部植皮后修复创面优于先修复后植皮的方法。⑦血管蒂部植好皮后,应用外固定将双腿固定在血管蒂张力松紧适当的位置,再用肌瓣修复受区创面。蒂部如固定不妥当时,有造成血管蒂牵拉损伤的可能。

4.4 本术式的缺点　①胫后血管是小腿的主要血管,该术式损伤了健侧胫后血管。②由于肌瓣表面植了皮,术后对其血运的观察不及皮瓣方便。

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