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·论 著·

银离子生物敷料封闭网状植皮创面临床观察：前瞻性病例对照研究

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[摘要] **目的** 通过与传统网眼油纱封闭网状植皮创面法进行比较,分析银离子生物敷料封闭网状植皮创面方法应用于烧伤、创伤等各种开放创面植皮手术的临床效果。**方法** 符合入选标准的 18 例患者按手术方法分为两组,试验组(6 例)为银离子生物敷料覆盖网状植皮创面,对照组(12 例)为传统网眼油纱封闭网状植皮创面。记录入选患者的人口统计学特征、创面情况、植皮后创面感染情况、术后第一次更换最内层敷料时间、术后第一次换药疼痛评分、住院时间,并计算植皮成活率、术后植皮创面感染率和住院总费用。**结果** 试验组术后植皮创面感染率低于对照组(0 vs 50.0%,$P<0.05$);试验组术后第一次更换内层敷料疼痛评分小于对照组(2.50±1.05 vs 5.42±2.02,$P<0.01$);试验组第一次更换内层敷料时间晚于对照组[(7.50±1.05) d vs (4.08±1.31) d,$P<0.01$];试验组住院时间短于对照组[(14.33±1.50) d vs (16.42±1.93) d,$P<0.05$];试验组术后植皮成活率高于对照组[(97.50±1.87)% vs (91.42±4.48)%,$P<0.01$]。**结论** 银离子生物敷料封闭网状植皮创面的方法可以提高植皮存活率、缩短创面愈合时间、减少患者痛苦,疗效满意。

[关键词] 银离子生物敷料;皮肤缺损;植皮术;创面修复
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Silver-containing biological dressing applied for transplanted meshed autografts: a prospective case-control study

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[**Abstract**] **Objective** To investigate the clinical application of silver-containing biological dressing in covering transplanted meshed autografts for treatment of open wounds (burns and trauma) by comparing with traditional petrolatum gauge on meshed autografts. **Methods** Eighteen patients fulfilling the inclusion criteria were divided into two groups according to the operation methods. The meshed autografts in the experimental group (6 patients) were covered with silver-containing biological dressing and those in the control group (12 patients) were covered with petrolatum gauge. The demographic data, wound condition, wound infection after skin grafting, time of first post-operative inner layer dressing change, pain score during the first inner layer dressing change, and length of hospital stay were all observed. The survival rate of skin graft, wound infection rate and total cost of hospitalization were also calculated. **Results** The experimental group had significantly lower wound infection rate (0 vs 50.0%, $P<0.05$) and pain score at the first inner layer dressing change (2.50±1.05 vs 5.42±2.02, $P<0.01$) after skin grafting compared with the control group. The period from skin grafting to the first post-operative change of inner layer dressing was significantly longer in the experimental group compared with that in the control group ([7.50±1.05] d vs [4.08±1.31] d, $P<0.01$). The experimental group had a significantly shorter hospital stay compared with the control group ([14.33±1.50] d vs [16.42±1.93] d, $P<0.05$). Moreover, the survival rate of skin grafting in the experimental group was significantly higher than that in the control group ([97.50±1.87]% vs [91.42±4.48]%, $P<0.01$). **Conclusion** Wound closing by meshed autografts with silver-containing biological dressing can increase the survival rate of skin graft, shorten wound healing time, reduce local pain, and obtain satisfactory outcome.

[**Key words**] silver-containing biological dressing; skin defect; skin grafting; wound repair
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烧创伤后皮肤缺损及各种开放创面的修复是临床上经常遇到的难题,自体网状皮移植手术具有节

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省皮源、操作简单、缩短手术时间等优点，目前临床工作中常常采用这种手术方式，并获得较好疗效[1]。用传统网眼油纱封闭网状植皮创面，术后创面渗出明显、换药次数多、植皮区易感染，所植网状皮坏死可能性较大。近年来银离子生物敷料在植皮前期创面的应用成为热点，已有很多报道证明其有效性[2-4]。本研究主要分析银离子生物敷料应用于烧伤、创伤等各种网状皮植皮手术的临床效果，为临床决策提供参考。

1　资料和方法

1.1　观察对象与分组　选取第二军医大学长海医院烧伤科 2010 年 1 月至 2011 年 10 月期间收治的植皮手术患者作为研究对象。本研究未采用随机方法分组。每次手术前将两种方案及可能的优缺点向患者说明，患者在全面了解手术方案及可能后果后，自行决定采取何种手术方案，实验研究者未参与或影响患者手术方式的选择。入选患者术前均签署手术知情同意书。依据手术方法将入选患者分为两组：试验组采用网状植皮＋银离子生物敷料封闭创面法治疗，对照组采用传统网状植皮＋网眼油纱封闭创面法治疗。每一试验组病例产生时，按年龄±5、诊断类似，配比 2 例对照组病例。入组标准：(1)年龄 12～65 岁，性别不限；(2)严重烧创伤创面或复杂慢性创面，植皮创面范围为 6 cm×11 cm～11 cm×16 cm；(3)排除患有糖尿病、严重肝肾功能不全、肿瘤或其他慢性消耗性疾病者。另有 1 例典型病例采用自身对照，数据未统计在内。

1.2　治疗方法　试验组患者于全麻或局部麻醉下手术。根据创面大小，用进口电动取皮刀切取相应大小的自体中厚皮片，利用国产轧皮机制成网状皮。植皮区创面反复清洗后刮除创面表层水肿肉芽组织至纤维板层或明显出血为止，再次清洗创面后将网状皮覆盖创面。根据植皮区的大小和形状将银离子生物敷料——德湿银[Atrauman Ag；上海万东生物科技有限公司，国食药监械(进)字 2010 第 3642474 号]作适当修整，覆盖于植皮创面。术后7～9 d 第一次拆除银离子生物敷料，观察网状皮成活情况。

对照组患者麻醉方法及手术创面处理同试验组，网状皮植皮后采用单层凡士林网眼油纱[绍兴振德医用敷料有限公司，国食药监械(准)字 2008 第 3640565 号]和多层植皮纱布覆盖植皮区，外用无菌绷带或腹带以适当压力包扎。术后 3～5 d 拆除外敷料及内层网眼油纱，观察网状皮成活情况。

1.3　术后评估　分别记录两组患者的植皮面积、植皮后创面感染情况、术后第一次更换内层敷料时间及 VAS 疼痛评分、住院时间，并计算植皮成活率、术后植皮创面感染率和住院总费用。术后植皮创面感染判定标准为：(1)植皮后创面细菌培养阳性；(2)植皮区渗出多且伴有明显异味，内层敷料有绿色创面分泌物；(3)创面原因引起的患者体温＞39℃或＜36℃[5]。

1.4　统计学处理　应用 SPSS 11.5 统计软件包进行分析。计数资料以例数及百分率表示，采用 χ^2 检验；计量资料以 $\bar{x}\pm s$ 表示，组间比较采用 t 检验。检验水平(α)为 0.05。

2　结　果

2.1　两组患者一般情况　共有 18 例患者入选。试验组 6 例：男 4 例、女 2 例，年龄 14～62 岁，平均(37.83±17.65)岁；其中Ⅲ度烧伤 3 例、创伤导致皮肤撕脱 2 例、压疮 1 例，伤后均行清创、负压封闭引流技术(VSD)治疗或常规换药处理，创面面积(116.33±66.25) cm^2，术前创面细菌培养阳性 1 例。对照组 12 例：男 7 例、女 5 例，年龄 18～63 岁，平均(37.42±13.64)岁；其中Ⅲ度烧伤 6 例、创伤导致皮肤撕脱 4 例、压疮 2 例，伤后均行清创、VSD 治疗或常规换药处理，创面面积(113.92±28.87) cm^2，术前创面细菌培养阳性 3 例。两组患者的年龄、性别、创面情况等一般资料差异无统计学意义($P>0.05$)，具有可比性。

2.2　两组患者植皮疗效　试验组术后植皮创面感染率低于对照组($P<0.05$)，试验组术后第一次更换内层敷料疼痛评分小于对照组($P<0.01$)，试验组第一次更换内层敷料时间晚于对照组($P<0.01$)，试验组术后植皮成活率高于对照组($P<0.01$)，试验组住院时间短于对照组($P<0.05$)，而两组患者住院总费用差异无统计学意义($P>0.05$)。具体资料见表 1。

2.3　典型病例　患者，女，15 岁，因“车祸致全身大面积皮肤撕脱、左下肢截肢术后，创面污秽伴恶臭 12 d”于 2011 年 7 月 11 日入院。入院查体：左大腿中上 1/3 截肢术后，截肢残端及右大腿、臀部、会阴部、前后躯干共约 35% 总体表面积(TBSA)皮肤坏死，回植皮肤及皮下软组织均发黑坏死，大量脂肪组织液化，创基可见大量脓性分泌物附着伴恶臭，创周红肿、压痛明显(图 1A、1B)。创面分泌物培养结果：铜绿假单胞菌、奇异变形菌、大肠埃希菌。

入院第 46 天全麻下行背部取皮＋后躯干清创拉网植皮术，背部植皮区左侧用凡士林网眼油纱覆盖，右侧用银离子生物敷料覆盖。术后患者背部植皮创面每日持续受压。术后第 4 天，去除患者背部左侧植皮创面最内层凡士林油纱，见后背部植皮创面渗出明显，原银离子生物敷料继续覆盖(图 2A)。术后第 9

天，第一次去除银离子生物敷料，覆盖银离子生物敷料处所植网状皮基本在位，创面恢复较好。凡士林网眼油纱覆盖创面网状皮局部脱落，有水肿肉芽组织增生(图 2B)；术后第 16 天，后背部右侧植皮创面第二次更换银离子生物敷料，后背左侧继续予凡士林油纱覆盖，可见覆盖银离子生物敷料处所植网状皮固定在位，创面恢复较好，凡士林油纱覆盖创面部分网状皮脱落，有水肿肉芽组织增生(图 2C)；术后第 22 天，银离子生物敷料覆盖创面愈合良好，后背左侧凡士林油纱覆盖创面见明显皮肤缺损(图 2D)。患者在我院治疗 91 d 后全身创面基本愈合(图 1C)，顺利出院。

表 1　两组患者植皮后的评估指标

Tab 1　Indices following skin grafting in the two groups

Index	Case (n=6)	Control (n=12)	P value
Area of donor sites V/cm^2	41.33±19.91	38.33±9.36	0.664
Area of skin graft V/cm^2	109.00±63.66	109.50±26.46	0.981
Time of first post-operative change of inner layer dressing t/d	7.50±1.05	4.08±1.31	<0.001
Pain score at the first inner layer dressing change[a]	2.50±1.05	5.42±2.02	0.005
Cases with wound infection after skin grafting n(%)	0(0)	6(50.0)	<0.05
Hospital stay t/d	14.33±1.50	16.42±1.93	0.035
Survival rate of skin grafting (%)	97.50±1.87	91.42±4.48	0.006
Total cost of hospitalization (yuan)	51 666.67±9 852.24	47 833.33±11 574.53	0.498

[a]: Visual analogue scale (VAS) pain score

图 1　入院时患者创面外观和出院时全身创面

Fig 1　Local wound on admission and overall wound at discharge

A: 35% of the total body surface area was necrotic; the transplanted skin graft and subcutaneous soft tissue became black and necrotic, with extensive fat liquefaction. B: After 1/3 amputation of the left thigh, there were great amount of purulent exudation on the wound surface, with foul smell. The areas around the wound had tenderness and swelling. C: Healed wounds

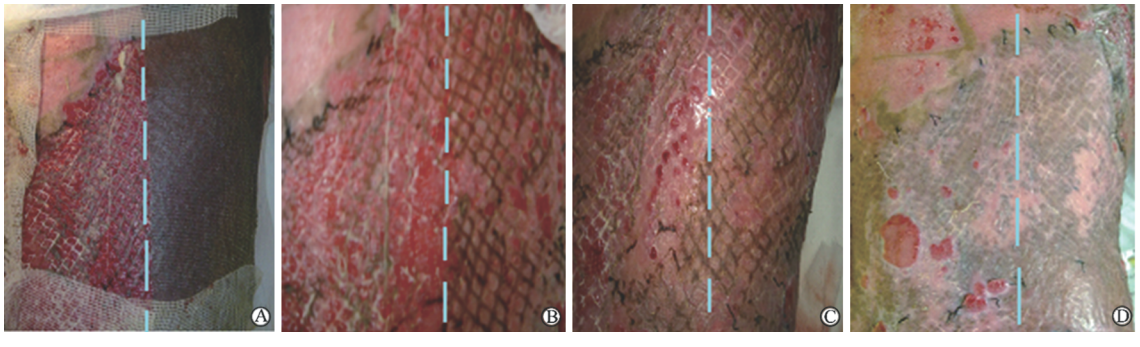

图 2　患者背部植皮创面

Fig 2　Back skin transplanted wound of the patient

Meshed autograft transplanted wound was separated by dotted line, with the left side treated by petrolatum gauge and right side by silver-containing biological dressing. A: On the 4th post-operative day, the grafted back wound with silver-containing biological dressing kept intact, while the wound with petrolatum gauge showed obvious exudation. B: On the 9th post-operative day, the grafted wound showed better recovery after removing silver-containing biological dressing while petrolatum gauge treated area exhibited partial loss of meshed autograft with edematous granulation tissue. C: On the 16th post-operative day, the grafted wound at right back received the second dressing change of silver-containing biological dressing; the transplanted meshed autograft still kept intact with a better recovery, and that treated with petrolatum gauge showed partial loss of meshed autograft with over growth of edematous granulation tissue. D: On the 22th post-operative day, better healing of grafted wound was found by silver-containing biological dressing, and the petrolatum gauge treated grafted wound showed obvious loss of skin graft

3　讨　论

烧创伤后皮肤缺损及各种复杂创面的修复是临床工作中的一个棘手的问题[6]。传统网眼油纱封闭网状植皮创面，术后渗出多、容易感染，且需要频繁进行换药操作，这既延长了住院周期，又增加了患者的痛苦，影响植皮成活率及植皮区的美观。本研究选择的银离子生物敷料封闭网状植皮创面是一种比较理想的治疗皮肤创面缺损的方法。

银离子生物敷料具有高效广谱的抗菌作用[7]，对耐甲氧西林金黄色葡萄球菌（MRSA）也具有十分有效的抗菌作用[8]，这主要基于重金属银离子对细菌蛋白质的变性作用[9]。本研究通过对两组患者术后植皮创面感染情况的比较，证实了银离子生物敷料具有显著的抗菌性能。本研究所用的银离子生物敷料（德湿银）为纳米银离子生物敷料，安全无毒[10-11]，通过控制银离子释放浓度，使释放的银离子在杀灭细菌的同时对人体的正常细胞无毒害作用[12-13]，并通过缓慢地释放银离子而持续作用于创面，使其抗菌作用更持久[4]。本研究结果表明应用银离子生物敷料覆盖网状植皮创面可以使试验组创面的换药频率尤其是最内层敷料的更换频率明显少于对照组（$P<0.01$），从而减少了所植皮片移动脱落的概率和患者换药时的痛苦。银离子生物敷料的单价较传统外敷料贵，但本研究发现试验组和对照组的住院总费用差异无统计学意义，这可能与网状皮植皮创面应用银离子生物敷料减少了换药次数、抗生素应用及住院时间有关。

综上，银离子生物敷料应用于网状植皮创面的抗菌作用显著持久，具有减少换药次数、提高植皮成活率、减轻换药痛苦、缩短住院时间等特点，值得在临床上推广应用。

4　利益冲突

所有作者声明本文不涉及任何利益冲突。

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